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INQUIRY INTO BIRTH TRAUMA

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Thesis: The link between somatic and psychological sequelae of traumatic vaginal birth (Awarded 2020)

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This doctoral thesis, that includes internationally published peer reviewed papers, was researched through the Department of Obstetrics & Gynaecology, Sydney Medical School, Nepean Campus, The University of Sydney, during 2015-2019.

The candidate, Elizabeth Skinner was awarded the Dr Albert McKern Scholarship by the University of Sydney in connection with Yale and Edinburgh Universities, that was established to support research into the causes, prevention and treatment of mental

and physical pain and distress during pregnancy, labour and the puerperium. Hence, this scholarship facilitated engagement with international researchers in United Kingdom, Switzerland, Canada and Australia regarding the disciplines of urogynecology, obstetrics, gynaecology, perinatal psychology and medical history.

The aim of the research is to facilitate better maternal outcomes antenatal, intrapartum and postpartum at local, national and international levels. It seeks to provide a 'voice' for women who have experienced traumatic vaginal deliveries and are left with unexpected and unexplained long-term effects that result in physical, psychological and sexual dysfunction and marital disharmony.

Mixed method research was utilized. This involved collecting and analyzing both quantitative and qualitative data. The former was collected from a large database created by a team of urogynecologists at Nepean Campus, The University of Sydney over an 8 year period. The team used 3D/4D ultrasound to assess whether there was birth damage to the levator ani muscle (LAM), a lesser known pelvic floor structure that if intact ensures bladder, bowel and uterus do not herniate into the vagina. This injury is poorly explained in the literature and has no guidelines in the clinical setting. It is not perineal injury, which concerns tearing/incising of the perineum during the crowning of the foetal head.

A cohort of postnatal women were chosen regarding criteria that included: delivery of a singleton, full-term baby vaginally and deemed low risk prior to birth.

40 participants were selected from the database that revealed LAM injury and consequences of vaginal prolapse re bowel, bladder and /or uterus resulting in sexual dysfunction, bowel impaction and urinary incontinence. 22 out of 40 mothers also sustained severe perineal trauma. Women were contacted for interview over a 2-year period.

Most demonstrated they wanted to talk to a clinician who would validate their experiences and assist in accessing optimal medical help.

Women rarely understood the job description of a urogynecologist and need for pelvic organ 3d /4D ultrasound assessment and often felt distressed after seeing GP's who dismissed prolapse symptoms and gave no referrals to urogynecologists .

Several asked the interviewer to explain these injuries to their male partners so they would be believed and marital disharmony decrease.

As a consequence, some male partners were interviewed in separate settings. Findings revealed men were desperate for health literacy on vaginal birth damage so they could help their partners. This is an original study as research is absent re insight into men's postnatally. Accordingly, without the remarkable honesty of this cohort this thesis would not have been possible.

The following professional women are also important due to their expert knowledge:

Professor Susan Ayers, City, University of London; Maureen Treadwell, founder of UK Birth Trauma Association 2003; Pauline Mc Donagh Hull, founder of Caesarean Birth Canada; Penny Christensen, founder of Canada Birth Trauma Association; Kim Thomas, media person for UK Trauma and journalist at The Guardian, UK.

Establishment of the Australasian Birth Trauma Association (ABTA).

After analysis of interviews with women, who had sustained physical vaginal birth trauma, findings revealed more than two thirds of women demonstrated multiple PTSD symptoms as per DSM-5¹. These findings were presented to an expert in perinatal PTSD, Professor Susan Ayers and her team of perinatal research psychologists at City, University of London. This led to contact with, and subsequent support from

¹ *American Psychiatric Association (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Washington, DC: Author*

Maureen Treadwell. During 2016, with support from urogynecologists and an affected mother, ABTA was launched.

ABTA is a not-for-profit organization that seeks to assist traumatized mothers access to accurate physical and psychological assessment during the postnatal period and optimize health outcomes.

Aims: build bridges with obstetricians, midwives and mental health clinicians to implement better outcomes for postpartum women and their families.

Birth Trauma Consultancy founded by Elizabeth Skinner in 2020, is a postnatal educational service that seeks to optimize health outcomes for women who endure vaginal birth damage and emotional trauma that are poorly recognized by clinicians, partners and friends. Programs are based on World Health Organization health literacy strategies.

Aims: assist partners' understanding of vaginal birth effects; provide perinatal clinicians with up to date evidence based research re pelvic organ prolapse, bowel, urinary, sexual impairment and perinatal posttraumatic stress disorder (PTSD).

THE LINK BETWEEN SOMATIC AND PSYCHOLOGICAL SEQUELAE OF TRAUMATIC VAGINAL BIRTH

Elizabeth Mary Skinner

Thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy (Medicine)
Faculty of Medicine and Health
The University of Sydney
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2019



DECLARATION AND STATEMENT OF ORIGINALITY

I declare this thesis, undertaken for the degree of Doctor of Philosophy, has been composed entirely by myself. Documented work was carried out by myself as part of a research team to which I contributed through planning, analysis and publication of investigations. The various studies were all approved by the Human Research and Ethics Committee of the Nepean Blue Mountains Human Research Ethics Committee.

I hereby declare that the work embodied in this thesis has not been submitted for a higher degree to any other University or educational institution. I certify that the intellectual content of this thesis is a product of my own work and all the assistance received in preparing this thesis and sources have been acknowledged.

Elizabeth Mary Skinner

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ABSTRACT

THE LINK BETWEEN SOMATIC AND PSYCHOLOGICAL SEQUELAE OF TRAUMATIC VAGINAL BIRTH

Aims and overview

This thesis investigates first time mothers' experiences of vaginal childbirth, that resulted in female pelvic organ prolapse (FPOP), fecal incontinence and sexual dysfunction, to identify links with adverse postpartum psychological health. Although vaginal delivery is widely portrayed as an empowering event with positive outcomes, modern imaging methods reveal 10-30% of women sustain irreversible pelvic floor injury that is commonly overlooked. A major factor in the causation of FPOP is detachment of the levator ani muscle (LAM) from insertion site(s) on the *os pubis*, during lengthy second stages of labour that involve forceps to deliver large babies. Such injuries are likely to be associated with psychological trauma from resultant symptoms of pelvic floor and sexual dysfunction that impair quality of lifestyle. The link between somatic and psychological trauma is poorly understood.

Methods

Mixed methods enquiry focused on qualitative methodology to explore the experiences of a cohort of primiparous women, diagnosed with LAM injury using semi-structured interviews. Participants were selected from quantitative pelvic floor imaging studies. Respective data facilitated accuracy regarding birth damage. The interviewer was a midwife with extensive professional experience. Maternal themes from this study generated additional enquiries that involved: quantitative and mixed methods analyses regarding the efficacy of a routine postnatal depression (PND) screening instrument in identifying the symptoms of postpartum posttraumatic stress disorder (PTSD) for injured women; a mixed methods approach to explore partners' understanding of birth injury sequelae related to maternal sexual dysfunction; appraisal of current research literature for insight into birth-related anatomy and physiology of the pelvic floor and

perineum; review of historical commentaries and sources on the origins of vaginal birth injury, PTSD and natural birthing methods for associations with present maternity care.

Results

More than two thirds of women in the focal study, experienced emotional trauma symptoms, similar to PTSD, as per DSM-5, usually ascribed to war veterans. Contributing factors seemed to challenge contemporary maternity practice. Mothers stated antenatal classes over-emphasized natural birthing methods and omitted risk factors of vaginal birth that "...set [them] up for failure". As a consequence, they were ill-prepared for complicated deliveries, resultant injuries and enduring morbidities that, clinicians dismissed as normal sequelae of birth. During unexpected high acuity births, women reported overt conflict between midwives and doctors regarding mode of delivery. After discharge from maternity units, they were confronted with sub-optimal diagnoses of injuries, ineffective identification of postpartum PTSD symptoms, barriers to somatic and mental health care treatment and marital disharmony.

Original study findings revealed that routine PND measures were not useful in diagnosing symptoms of PTSD for this cohort of women. Interviewed men were observed to lack understanding of links between somatic injury, sexual dysfunction and emotional trauma. Appraisal of literature on the pelvic floor and perineum demonstrated substantial imaging research on the etiology, risk factors and prevalence of diverse injuries that included LAM damage and, the more accepted obstetric anal sphincter injuries (OASI). Historical review revealed natural childbirth methods currently promoted in birth classes, and often used exclusively in birthing suites, are unproven theories from another century. Despite increasing literature on somatic vaginal birth injury and postpartum PTSD over the past decade, both of these risk factors of vaginal birth were shown to be largely overlooked.

Conclusions

This thesis is a significant contribution to the body of knowledge on sequelae of traumatic vaginal birth. Women's narratives, revealed a strong link between somatic and psychological birth trauma that was reported to be poorly understood by obstetricians, midwives and perinatal mental health clinicians. A key recommendation, is that prior to vaginal delivery, women and their partners are

informed of inherent risk factors and given unbiased education. This can only occur, if research on LAM damage and sequelae of postpartum PTSD, are integrated into clinical practice. There is an urgent need for maternity clinicians to implement evidence-based guidelines that aim to: decrease adverse birth-related sequelae; facilitate diagnostic imaging assessment; and identify emotional trauma symptoms. At present, the relationship between vaginal and psychological birth trauma is poorly recognized and has debilitating consequences for women, partners and babies.

Key words: birth trauma; female pelvic organ prolapse; levator ani muscle avulsion; postpartum posttraumatic stress disorder; primiparous women; vaginal birth

ORIGINAL STUDIES

Skinner EM, Dietz HP. Psychological and somatic sequelae of traumatic vaginal delivery: A literature review. *Aust NZ J Obstet Gynaecol.* 2015; 55 (4): 309-14.

<https://doi.org/10.1111/ajo.12286>

Skinner EM, Dietz HP. Psychological consequences of traumatic vaginal birth. *Neurourol Urodyn. Supplement: August 2015. Volume 34, Issue S3.* Pages S1–S461. Presented at 45th Annual Meeting of the International Continence Society (ICS), 6-9 October 2015, Montreal, Canada. <https://www.ics.org/Abstracts/Publish/241/000214.pdf>

Skinner EM, Barnett B, Dietz HP. Psychological consequences of pelvic floor trauma following vaginal birth: A qualitative study from two Australian tertiary maternity units. *Arch Womens Ment Health.* 2018; 21(3): 341-51. <https://doi.org/10.1007/s00737-017-0802-1>

Skinner EM, Turel F, Langer S, Dietz HP. The efficacy of the Edinburgh Postnatal Depression Scale in identifying postpartum posttraumatic stress disorder symptoms associated with somatic vaginal birth damage.[Submitted for publication]

For all these publications, I performed data collection, analysis and interpretation, wrote the drafts and was responsible for the final approval with the assistance of the research supervisor.

Elizabeth Mary Skinner

ACKNOWLEDGMENTS

This PhD thesis was researched through the Department of Obstetrics & Gynaecology, Sydney Medical School, Nepean Campus, The University of Sydney, during 2015-2019. A special thank you to The University of Sydney for granting me the Dr Albert McKern Scholarship that provided the opportunity for these studies. This award facilitated engagement with international research into the cause, prevention and treatment of mental and physical pain and distress during labour and the puerperium.

A special thanks to Professor Bryanne Barnett AM, psychiatrist, researcher and advocate for perinatal mental health, your endless support and expertise that steered me through the difficult times was greatly appreciated. Dr Judith Godden, eminent medical historian and author of *Crown St Women's Hospital A history 1893-1983*, your constant reassurance over several years have been a mainstay – I am so grateful. Dr Archondia Thanos, academic from Oxford University and University of Sydney, thank you so much for your support during the closing stages of this thesis, your input was invaluable. Associate Professor Stephen Matthey, clinical psychologist, Liverpool Hospital, thank you for your great support regarding the EPDS paper.

Most significantly, thank you to my wonderful insightful and ever loving husband Robert and our amazing sons Alex and Josh. All of you are a blessing, you always understood that this thesis was written to give women a 'voice' after sustaining injuries that had caused so much suffering. Through good and difficult moments you always believed in me – thank you. I am especially grateful to my dearest Alex for finally breathing in the delivery room after a traumatic birth. Holding you was like a dream – I am eternally thankful God protected you and, five years later miraculously blessed us with dearest Joshua. I love and treasure both of you dearly and will hold you both in my heart forever. Thank you to my dearest friends Kate Wilkinson, Sharon and John Strong, Dorothy Hood, Tracy Opera and Greta Ellerman for your enduring support and prayers that kept me focused.

A heartfelt thank you to all the women and men who told their distressing stories of traumatic deliveries and the aftermath- without your remarkable honesty this thesis would not have been possible. I was always cognizant that your personal stories would be difficult to relate but your

bravery was overwhelming and greatly appreciated. Despite your suffering, please know that your experiences will facilitate better maternal outcomes internationally.

Words cannot express my appreciation for the following professional women and their dedication, expert knowledge and enduring friendship during the difficult times of this research. Thank you, Professor Susan Ayers, City, University of London; Maureen Treadwell, founder of UK Birth Trauma Association; Pauline McDonagh Hull, founder of Caesarean Birth Canada; Penny Christensen, founder of Canada Birth Trauma Association; Kim Thomas, media person for UK Trauma and journalist at The Guardian, UK.

After analysis of interviews with women, who had sustained somatic birth trauma, findings revealed multiple PTSD symptoms. I was subsequently invited by Professor Ayers to visit London and present to her team of perinatal research psychologists. This led to contact with, and subsequent support from Maureen Treadwell who helped me to create The Australasian Birth Trauma Association (ABTA) on my return to Australia in the latter part of 2015. During 2016, with support from Maureen Treadwell and others, ABTA was launched. This not-for-profit organization is already assisting traumatized mothers to disclose their injuries and seek accurate assessment. It aspires to build bridges with obstetricians, midwives and mental health clinicians to implement better outcomes for postpartum women and their families. I look forward to future work with other clinicians, government bodies and health departments.

DEDICATIONS

This work is especially dedicated to the most wonderful individuals in my life, my husband and two sons.

To my husband Robert Skinner for your love, emotional support and amazing gift of foresight and intellectual objectivity. Thank you for being by my side on this, at times, difficult journey, I love you dearly and am grateful you helped me realize this thesis was possible.

To my fantastic and gifted sons, Alex and Josh, I love you now and forever. Thank you God for sending me these special people.

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ABBREVIATIONS

AI	Anal incontinence
APA	American Psychiatric Association
ARM	Artificial rupture of membranes
CPD	Cephalo-pelvic disproportion during labour
C/S	Caesarean Section
DSM	Diagnosis and Statistical Manual of Mental Disorders
EAS	External anal sphincter
EPDS	Edinburgh Postnatal Depression Scale
FHR	Foetal heart rate
FPOP	Female pelvic organ prolapse

IAS	Internal anal sphincter
LAM	Levator ani muscle
OASI	Obstetric anal sphincter injury
PND	Postnatal depression
PTSD	Posttraumatic Stress disorder

GLOSSARY:

American Psychiatric Association (APA) is the main professional organization of psychiatrists in the United States and comprises over 30,000 members internationally. APA publishes the Diagnostic and Statistical Manual of Mental Disorders (DSM), clinical practice guidelines, position statements and journals. Its history dates back to the mid 19th Century regarding administration of hospitals and care of patients¹.

Amniotomy is the surgical rupture of the fetal membranes to induce or expedite labour².

Anterior compartment prolapse: downward displacement of the bladder, resulting in herniation of this organ into or through the vagina. Also known as a cystocele or bladder prolapse³.

Artificial rupture of membranes (ARM) or '*breaking waters*' is a procedure that uses an amniotic hook after the complete dilation of the cervix to induce labour⁴.

Avoidance is a main symptom of posttraumatic stress disorder (PTSD) where individuals cope by avoiding reminders of the traumatic event².

Avulsion injury: pelvic floor damage sustained during vaginal delivery that results in disconnection of the levator ani muscle from one (unilateral) or both (bilateral) insertion sites on the inferior pubic ramus and the pelvic side wall^{5 6}.

Cardiotocograph (CTG): an electronic method of simultaneously recording foetal heart rate foetal movements and uterine contractions during labour. CTG is also employed to assess fetal well-being in pregnancies with increased risk of complications⁷.

Cystocele: anterior compartment prolapse that causes the bladder to herniate into the vagina².

Diagnostic Statistical Manual of Mental Disorder (DSM) is published by the APA. It offers a common language and standard criteria for the classification of mental disorders and is utilized by clinicians, researchers, psychiatric drug regulation agencies, the legal system and policy makers. Originally developed in the 19th century to collect statistical information on the insane, the focus shifted from mental institutions after World War II, due to the large-scale involvement of US psychiatrists in the selection, processing, assessment and treatment of soldiers. DSM I, II, III, IV and 5 were subsequently published in 1952, 1968, 1980, 1994 and 2013, respectively. Revisions were implemented after several manuals and these included: 1974 regarding DSM II; 1987 that was entitled DSM-III-R; 2000 that was named DSM-IV-TR. The manual is primarily concerned with the signs and symptoms of mental disorders; it has been lauded for standardizing psychiatric diagnosis grounded in empirical evidence since DSM-III, but has also generated controversy and criticism from the mental health community⁷.

Dyspareunia: recurrent or persistent genital pain before, during and after sexual intercourse².

Epi-No device: a childbirth and pelvic floor trainer that consists of an inflatable silicone balloon attached to a hand-operated pump equipped with a pressure display. Women are instructed to insert the balloon into their vagina and inflate it until they feel pressure, but not pain. They can contract and relax their pelvic floor muscles and gently expel the inflated device to simulate childbirth. Women are instructed to use the device from 36 weeks' gestation and gradually increase the size to which the balloon is inflated⁸.

Episiotomy: is a surgical enlargement of the vaginal orifice by an incision to the perineum during the last part of the second stage of labour^{9 10}.

Evidence based practice: an approach to care that integrates the best available research evidence with clinical expertise and patient values. It involves translating evidence into practice, ensuring that health practitioners, patients and family are cognizant of research evidence to inform their healthcare decision-making².

Female pelvic floor dysfunction in the context of vaginal birth this disorder encompasses several clinical conditions: urinary and faecal incontinence; obstructed defaecation; sexual dysfunction; female pelvic organ prolapse. The latter is the most common condition and may

require surgical treatment^{3 6}.

Female pelvic organ prolapse (FPOP): postpartum downward displacement of pelvic organs after traumatic vaginal births; organs can include the bladder, bowel and/or uterus. This results in herniation of these organs into or through the vagina. These are divided into anterior compartment prolapse or cystocele (bladder prolapse); uterine prolapse or 'procidentia' if complete; posterior compartment prolapse or rectocele/ enterocele (bowel prolapse)^{3 6}.

Forceps: instruments used to extract the foetal head from the maternal vagina during delivery. 700 different types of forceps have been developed over hundreds of years, with a variety of shapes, sizes and lengths aimed at particular obstetric complications. Common forceps used in Australia include: Wrigley's; Neville-Barnes'; Haig Ferguson's; Simpson's; Kielland's rotational forceps. Forceps are now known to be the main cause of LAM avulsion and postpartum somatic birth trauma. In Australia, forceps are noted to have been overused in order to decrease caesarean sections^{11 12}.

Hyperarousal is a main symptom of posttraumatic stress syndrome. It is an abnormal state of increased responsiveness to stimuli that is marked by various physiological and psychological symptoms including increased levels of alertness, anxiety, elevated heart rate and respiration².

Incontinence: involuntary leakage of urine, flatus and/or faeces².

Induced labour: medically accelerated labour that utilizes various means to soften and dilate the cervix: (i) prostaglandin gel/pessary (ii) balloon catheter or thin tube placed inside the cervix; (iii) Artificial rupture of membranes (ARM); (iv) syntocinon intravenous infusion or synthetic hormone that mimics the natural hormone, oxytocin and stimulates contractions of the uterus. A cardiotocograph is applied to monitor contractions and baby's heart rate⁴.

Instrumental delivery: vaginal delivery using forceps or vacuum extractors².

International Classification of Diseases (ICD): is the international standard diagnostic tool for epidemiology, health management and clinical purposes. It is maintained by the World Health Organization (WHO), the coordinating authority for health within the United Nations. ICD is designed as a health care classification system that provides diagnostic codes for diseases that include categorization of signs, symptoms, abnormal findings, complaints, social circumstances,

and external causes of injury or disease. It is employed internationally for morbidity and mortality statistics and, is designed to promote comparability in the collection, processing, classification, and presentation of these statistics¹³.

Intrapartum is the period during the process of birth².

Introitus is the vaginal opening in the context of childbirth².

Kielland's Forceps: forceps used for rotational, assisted vaginal deliveries and remain controversial due to major maternal and neonatal complications, that include neonatal facial nerve palsy, intracranial haemorrhage and skull fractures; high rates of maternal obstetric anal sphincter injury and LAM avulsion and postpartum haemorrhage^{11 12}.

Levator ani muscle (LAM): a broad, thin muscle, situated on the side of the pelvis and attached to the inner surface of the side of the lesser pelvis uniting with its fellow of the opposite side to form the greater part of the floor of the pelvic cavity. The levator ani is part of the abdominal envelope and encloses the urethra, vagina and anorectum⁶.

Levator hiatus: the largest potential hernial portal in the human body, bounded by the puborectalis component of the levator ani and the os pubis bilaterally. Overdistension or tearing of the puborectalis can occur during traumatic vaginal delivery and result in pelvic organ prolapse⁶.

Maternal mortality is the proportion of deaths from childbirth in a given population².

Morbidity in the context of childbirth is a complication or undesirable side effect following delivery².

Multiparous (parous): women who have experienced second or subsequent births².

Nulliparous: women who have never delivered a baby².

Obstetric anal sphincter injuries (OASI): involve 3rd degree tears of the perineum and anal sphincter complex; 4th degree tears encompass the external and internal anal sphincters and rectal mucosa^{14 15}.

Parturition is the process of giving birth².

Pelvic floor: a musculo-tendinous sheet that consists of the symmetrically paired LAM, or broad muscular sheet of variable thickness attached to the internal surface of the 'lesser or

true' pelvis¹⁶.

Pelvic floor trauma: injury to the LAM during vaginal delivery resulting in reduced pelvic floor muscle strength, enlargement of the vaginal hiatus and pelvic organ prolapse^{5 6}.

Perinatal is the period before and after childbirth².

Perineum: the female genital and anal area antero-posteriorly between the pubic symphysis and coccyx, a diamond shape area consisting of two triangles, the genital (anterior) and the anal (posterior) triangle¹⁶.

Posterior compartment prolapse: downward displacement of the bowel, resulting in herniation into or through the vagina. This may include a rectocele (a diverticulum of the rectal ampulla herniating into the vagina) and/or an enterocele (a herniation of the small bowel or sigmoid colon into the vagina)³.

Postnatal depression (PND) is a mood disorder that displays symptoms of sadness, inactivity, difficulty in concentration, increase/ decrease in appetite, feelings of hopelessness, and suicidal ideation². Clinicians typically assess symptoms with a measure called the Edinburgh Postnatal Depression Scale (EPDS).

Postpartum/puerperium: the period has been termed the 'fourth stage of labour' and has three distinct but continuous phases:¹⁷ *1st stage/acute period:* lasts 6-12 hours postpartum and involves rapid change with potential for immediate crises e.g. *postpartum haemorrhage, amniotic fluid embolism*. *2nd stage/sub-acute period:* lasts 2-6 weeks and involves major alterations in haemodynamics, genitourinary recovery, metabolism, and emotional status. Changes are less rapid than in the acute postpartum phase. *3rd stage/delayed postpartum period:* can last up to 6 months with gradual changes. Involves restoration of muscle tone and connective tissue to the pre-pregnant state¹⁷.

Posttraumatic stress disorder a diagnosis given to a person who has been exposed to an extreme stressor or traumatic event, to which he or she responded with fear, helplessness, or horror and has three distinct types of symptoms consisting of re-experiencing of the event, avoidance of reminders of the event, and hyperarousal for at least one month².

Primiparae: women who have delivered their first baby²

Procidentia: complete downward displacement of uterus through the vagina. Also known as a uterine prolapse³.

Prolapse: in the context of pelvic organ prolapse, this is defined as a hernia. The hernial portal is the levator hiatus; after traumatic vaginal deliveries, overdistension causes the bladder, uterus, bowel or rectal ampulla to transit the levator hiatus^{3 6}.

Prostaglandin gel/pessary: a synthetic hormone that mimics the naturally occurring hormone to soften and dilate cervix in labours that have not commenced spontaneously⁴.

Rectocele: a herniation of the anterior rectal ampulla into/ through the vagina³.

Sexual dysfunction is the inability for women to have sexual intercourse¹⁸.

Stress incontinence: the leaking of variable amounts of urine during activities that increase pressure inside the abdomen and push down on the bladder. Pregnancy and childbirth may stretch and weaken tissues that support the urethra causing stress incontinence¹⁹.

Stressor is a stimulus in the context of PTSD that causes symptoms of: avoidance, hyperarousal, negative cognitions, reexperiencing the event, nightmares, numbness, anxiety.

Symptoms in the context of somatic and psychological health, are any morbid phenomenon or departure from the normal in structure, function, or sensation, experienced by the woman and indicative of disease or a health problem. Symptoms are either volunteered by, or elicited from the individual².

Syntocinon Infusion: a synthetic hormone that mimics the natural hormone oxytocin; given through an intravenous infusion to stimulate contractions of the uterus. The infusion is slowly increased until regular, strong contractions occur. This continues post-delivery and assists in involution of the uterus and/or postpartum haemorrhaging⁴.

Translabial 3D/4D ultrasound: a simple, non-invasive method used by urogynaecologists to examine lower urinary tract symptoms, female organ prolapse and obstructed defaecation²⁰.

Uterine prolapse: herniation of the uterus from its normal position, through the levator hiatus³.

Vaginal prolapse: herniation of pelvic organs, that include bladder, bowel and uterus through the levator hiatus and vagina³.

Valsalva manoeuvre: assessment used for clinical diagnosis of pelvic organ prolapse that involves requesting the patient to force expiration against a closed glottis, together with contraction of the diaphragm and abdominal muscles; this increases intra-abdominal pressure markedly²¹.

Ventouse or vacuum extraction: intrapartum suction cap applied to the baby's head².

CHAPTER 1: INTRODUCTION

1.1 Overview

This chapter establishes the research problem that led to research studies in this thesis that investigated the links between somatic and psychological sequelae of major vaginal birth trauma. Content places the study within the larger context of published literature and demonstrates research deficiencies that enquiries sought to address. Discussion provides background information on the topic and shows the relevance of the proposed research to the targeted audience of perinatal clinicians. It describes the development of the research question in relation to relevant methodologies, together with aims, objectives and the scope of research. Information includes the author's reflections during her career in midwifery regarding reflexivity, that are integral to the development of credibility and trustworthiness of data acquisition and interpretation. Content presents an outline of the structure and the purpose statement for the entire thesis.

1.2 The problem

After giving birth to their first child vaginally, 10-30 percent of women suffer permanent damage to a recently rediscovered pelvic floor structure, known as levator ani muscle (LAM)^{22 23}. Current research observes these major birth injuries are poorly assessed⁶. As a consequence, debilitating symptoms of pelvic floor dysfunction appear to be undetected and typically dismissed by maternity clinicians as normal sequelae of vaginal birth. This thesis investigates the problem that a proportion of women sustain female pelvic organ prolapse (FPOP), fecal incontinence and sexual dysfunction⁶, symptoms that have the likelihood of resulting in unidentified adverse mental health outcomes. Surprisingly, reviews observe that health providers may lack understanding about the sequelae of LAM injury, that are distinct from those sustained by perineal tearing and commonly viewed in labour wards^{3 6}. Contributing factors seem to be the absence of evidence-based clinical guidelines on risk factors of vaginal birth, that include the use of forceps to deliver macrosomic babies during lengthy second stages of labour. Although this injury was recognized by the medical community as far back as the early 20th Century^{24 25 26}, the accuracy of modern imaging modalities in the 21st Century, has demonstrated that damage is attributed to the traumatic detachment of

LAM from its bony insertion site(s) on the *os pubis*, during vaginal birth^{22 23}. Despite this empirical evidence, reviews state that clinicians are largely unaware of the etiology and most advocate vaginal birth is the preferred mode of delivery due to optimal outcomes⁶.

Notwithstanding the impact of these major vaginal birth injuries, recent research from perinatal psychologists, reports that symptoms of posttraumatic stress disorder (PTSD) after events of birth that involve delivery complications and inadequate support, are poorly recognized in clinical settings²⁷. Symptoms include: re-experiencing traumatic events; avoidance; negative cognitions and mood; hyperarousal, as per DSM-5²⁸. Even so, links between postpartum PTSD and somatic effects of vaginal injury are not evident in this research.

Currently, vaginal birth in developed countries, is largely viewed as a predictable and safe event, that is broadly anticipated and positive²⁷. Although, many women experience favourable birth outcomes, it is likely that a proportion endure traumatic deliveries with resultant damage that lacks clinical validation and has dire consequences to their quality of life.

1.3 Research gap

Despite empirical evidence from imaging studies, that demonstrates a significant proportion of women sustain debilitating somatic sequelae of major vaginal birth damage^{3 6}, a substantial gap was observed in the qualitative literature regarding psychological consequences. Some authors reported that mothers suffered lifestyle alterations from consequences of major perineal damage, that were perceived as isolating and embarrassing; psychological outcomes related to emotional trauma symptoms were absent²⁹. Others discussed the enduring nature of debilitating somatic morbidities, but terminologies of perineum and pelvic floor were used synonymously³⁰. One journal observed that assessment of vaginal birth damage is largely inadequate and most postnatal women experience feelings of abandonment³¹. Studies from urogynecologists contained comprehensive details on the etiology, prevalence and risk factors of LAM damage⁵ and obstetric anal sphincter injuries (OASI)¹⁴; however, associated postpartum emotional trauma symptoms were excluded. As discussed, studies from perinatal psychologists, report that postpartum PTSD symptoms after

traumatic birth events are more common than previously realized²⁷, yet consequences of enduring pelvic floor dysfunction are not mentioned.

In order to address these discernible deficiencies and, provide a unique contribution to the knowledge on birth trauma, enquiry sought to explore birth experiences of women diagnosed with LAM injury. Even so, a broader understanding of contributing factors seemed integral, due to the fact, care of mothers typically involved several perinatal disciplines. Reasons were also unclear regarding the origins of the widespread belief that vaginal birth was an empowering event with optimal outcomes²⁷. This seemed contradictory to reviews that reported vaginal birth frequently resulted in LAM damage and sequelae of FPOP, fecal incontinence and sexual dysfunction, that were known by some physicians in the early 20th Century³⁶. In view of these disparities, perinatal mental health care guidelines from New South Wales, Australia³² were appraised to examine relevant childbirth risk factors of postpartum PTSD. Directives were observed to primarily focus on the identification of postnatal depression (PND) and anxiety symptoms; risk factors regarding postpartum emotional trauma was absent. Review of maternity guidelines in New South Wales, Australia³³ revealed that vaginal childbirth was the preferred mode of delivery for all women; complications of pelvic floor dysfunction were not evident. Hence, it was observed that exclusion of somatic and psychological risk factors of vaginal birth, had the potential of jeopardizing maternal quality of life with broad implications to women, partners and their families.

In view of these gaps in the published research, this study aimed to facilitate an accurate explanation of events and causal relationships, despite the likelihood that investigation may yield confronting explanations and, challenge widely held assumptions on childbirth and pelvic floor pathophysiology. It was evident that psychological consequences of somatic birth trauma were poorly researched in urogynaecology, obstetrics, midwifery and/or perinatal psychology publications.

1.4 Development of research questions

After establishing the research problem and gap in the literature, enquiry designed applicable research questions to reflect key intentions of the study. From the inception of this thesis, a

qualitative study was proposed as a means of exploring psychological consequences of somatic pelvic floor damage, by employing interviews with a cohort of women effected by LAM injury. Quantitative findings were scrutinized from a large population (n=800+) of low risk primiparous women with full-term singleton pregnancies, whose pelvic floor function and birth related somatic symptoms had been transcribed onto a database for the purposes of the Epi-No trial³⁴. This population had been recruited between 2006 and 2013 for a randomized controlled study trial that investigated the efficacy of a childbirth pelvic floor trainer⁶ known as the Epi-No device. Mothers were assessed for LAM trauma²² and obstetric anal sphincter injuries (OASI)¹⁴, using translabial 3D/4D ultrasound⁵. The Edinburgh Postnatal Depression Scale (EPDS)³⁵ was administered at the same time as assessments and sought to examine related scores regarding postnatal depression (PND) in association with this cohort. Related information facilitated selection of participants and accuracy regarding maternal birth injuries.

Data were instrumental in initiating an explanatory sequential mixed method approach³⁶ to provide comprehensive insight into the research problem, that concerned unidentified postpartum psychological trauma related to LAM injury and pelvic floor morbidities. Design was observed to involve the development of separate qualitative and quantitative questions³⁶. Accordingly, the following research questions were postulated:

“...What is the association between LAM birth damage and objective findings of FPOP and fecal incontinence from translabial 3D/4D ultrasound, 3-6 months after a singleton, full term vaginal birth in primiparous women?” [Quantitative question]

“... How does LAM somatic birth trauma, that results in FPOP and fecal incontinence, affect postpartum psychological health? [Qualitative question]

An overarching question proposed “...*How do somatic consequences of diagnosed LAM avulsion associated with FPOP, fecal incontinence and sexual dysfunction, affect postpartum psychological health?*” [Mixed methods question]

After interviews with women, four additional studies [see Chapters 5-8] emanated from findings. Prior to each enquiry, that included the initial scoping literature review [see Chapter 2], a specific research

question was designed. Structure was framed in accordance with the overarching question and/ or relevant thematic findings from women's interviews. These included:

Chapter 2 postulated the question: *"...What is the current literature on postpartum psychological consequences of somatic vaginal birth trauma related to the recently rediscovered LAM injury?"*

[Scoping review]

Chapter 4 postulated the question: *"...How do postpartum consequences of pelvic floor dysfunction from accurately diagnosed LAM injury, affect women's psychological health?"* [Mixed

methods question]

Chapter 5 postulated four questions, (that included a primary question) for a three phase study.

The first phase involved design of a quantitative descriptive question to examine relationships between, injuries, obstetric variables and total scores of EPDS in a large cohort of women assessed for pelvic floor function. Second and third phases mixed method questions were designed that used qualitative data from the subset of maternal interviews. These were:

"...What is the association between total scores on the EPDS instrument, somatic birth related LAM and obstetric anal sphincter injuries (OASI) and three obstetric variables that included, forceps, large baby, lengthy second stage, in a large cohort of women (n=800+) assessed for pelvic floor function?" [Quantitative descriptive question]

"...Does a subset of women (n=40) affected by somatic symptoms of LAM injury, demonstrate elevated scores on EPDS measures?" [Mixed methods question]

"...Are disclosed symptoms of postpartum PTSD from the subset of interviewed women(n=40), associated with somatic symptoms of LAM injury?" [Mixed methods question]

Primary question for this enquiry was: *"...Is the Edinburgh Postnatal Depression Scale (EPDS) effective in identifying posttraumatic stress disorder (PTSD) symptoms associated with somatic vaginal birth injuries?"*

Chapter 6 postulated the question: *"...Do men understand that somatic consequences of partner's vaginal birth damage are related to maternal sexual dysfunction?"* [Mixed methods question]

Chapter 7 postulated the question: “...*What is the current research on the pathophysiology of LAM injury, pelvic floor dysfunction and diverse birth related perineal damage?* [Scoping literature review]

Chapter 8 postulated the question: “...*How do the origins of somatic vaginal birth damage, PTSD and natural childbirth influence adverse maternal postpartum outcomes in current maternity care?* [Historical qualitative method].

1.5 Aims and objectives of thesis

This thesis sought to demonstrate that somatic sequelae of LAM injury were associated with psychological trauma that adversely affected maternal quality of life and also impacted that of their partners and families. Enquiry aimed to show that somatic and psychological assessment and identification of birth related trauma, is less than optimal and requires urgent attention by the maternity community to reduce the incidence. Research aspired to provide a clear and in-depth understanding of birth experiences by highlighting the ‘voice’ of effected women, using an interview enquiry that identified the causes and influences from emerging themes.

To achieve these aims, investigation involved specific, measurable, achievable, realistic and time constrained objectives that included: semi-structured interviews with open-ended questions for a fixed duration, with a cohort of women who had been accurately assessed by 3D/4D ultrasound and, diagnosed with LAM bilateral or unilateral injury⁶, at 3-6 months after a vaginal delivery, with a full-term singleton pregnancy. Additional enquiries [see Chapters 5 & 6] that emanated from the focal study⁴⁰ [see Chapter 4-8], aimed to utilize data from validated pelvic floor function research from the Epi-No trial³⁴, together with themes from maternal interviews and, available Edinburgh Postnatal Depression Scale (EPDS)³⁵ scores, that had been attained from questionnaires at the same time as maternal pelvic floor assessments.

1.6 Targeted audience

The research in this thesis is intended for perinatal clinicians, who work in the disciplines of obstetrics, general practice, midwifery, perinatal psychology and psychiatry. Enquiry sought to contribute to their knowledge and understanding of the relationship between somatic and psychological sequelae of traumatic vaginal birth. It was proposed that findings were highly

relevant to this group, who typically provide different aspects of maternity care and have the capacity to facilitate change. In addition, it was envisaged that results had the potential of: improving identification of diverse somatic and psychological sequelae of childbirth; expediting the development of updated evidence-based clinical processes; providing accurate and unbiased antenatal education on risk factors of vaginal delivery; and implementing informed decision making for women prior to birth. At a broader level, results from this enquiry aimed to assist health administrators provide optimal perinatal care guidelines, directives and policies, that benefited women's care regarding pregnancy and childbirth in Australia and internationally.

1.7 Author's Reflections

This section provides a 'snapshot' of the author's clinical observations during her career as a midwife. Reflections demonstrate the use of reflexivity or self-awareness³⁷ in this thesis, that is primarily underpinned by qualitative methodology, discussion is a means of disclosing experiences and biases of the researcher, that had the potential of influencing data collection, analysis and interpretation. In view of these principles, the author attempted to establish a degree of detachment and construct a study, that remained true to the data by implementing transparency to ensure the criteria of credibility and trustworthiness³⁸.

"...On the first day of her midwifery clinical placement, the author was allocated to the delivery suite of a large tertiary teaching hospital in Sydney, Australia. Despite previous expertise in trauma units as an intensive care/ registered nurse, in Australia and abroad, the kaleidoscope of alarming events, presented that day were not anticipated. Clinicians regularly managed the care of a constant array of life-threatening clinical complications, that not only affected mothers, but their 'in utero' baby as well. Midwives' scope of practice primarily involved the management of low risk deliveries using non-interventionist methods. Due to the unpredictability of vaginal birth and the threat of maternal and/or foetal impairment, these approaches were often abandoned and, the care of women transferred to obstetric doctors.

During rapidly changing high acuity situations, women and partners, were overwhelmed and, confused by changes in care, that often involved conflicting clinical opinions. Midwives advocated continuation of conservative birthing methods to yield better outcomes. Obstetricians maintained that the life of mother and baby were at stake and employed sizable obstetric forceps to birth large, mal-positioned babies or initiated transfer to theatre for caesarean sections.

After these traumatic events, women were transferred to postnatal wards, where clinical management was more confronting than expected. A typical day involved care of traumatized mothers and their hungry, crying babies. Women struggled to cope with vaginal damage, labile moods and the initiation of breast feeding. Long labours and

obstetric interventions had resulted in severe bruising, oedema, haematomas, pelvic, perineal pain and excessive vaginal bleeding that caused significant functional impairment. Sequelae closely resembled those in emergency departments after major trauma injuries. Fathers were observed to be shocked and often detached.

Three days after delivery, most mothers were discharged and, told perineal healing would occur within six weeks and sexual relations could be resumed. Perinatal clinicians rarely indicated that birth damage would result in pelvic floor and sexual dysfunction. Some proposed that child and family nurses or general practitioners, may assist these women whose plight seemed much worse than others. Nonetheless, a normal day in a community environment, consisted of multiple assessments regarding babies' developmental milestones, breastfeeding and postnatal depression. The majority of mothers were left to manage somatic morbidities by themselves.

1.8 Structure of the thesis

The structure of this thesis employed a line of argument across eleven chapters, that established associations between consequences of somatic LAM birth injury and maternal psychological outcomes. Logical relationships were demonstrated between five of the original studies [see Chapters 4-8] that evolved from findings in the focal interview enquiry [see Chapter 4] with women. Chapters 1-11 included: introduction, literature review, methodology, five original enquires, findings and interpretations, conclusions and recommendations that concerned the following:

Chapter 1: The Introduction [see Chapter 1] described the research problem that initiated enquiry in the thesis and discussed the context and background of the topic. Content provided information on research deficiencies and postulated overarching and additional research questions. It explained the aims, objectives and scope of the thesis and included the author's reflections in relation to reflexivity and, concluded with a purpose statement.

Chapter 2: A scoping review that was later published³⁹ provided a framework for establishing the importance of this enquiry, regarding the problem discussed in the introduction. Content identified the research gap and presented relevant background on the topic.

Chapter 3: The Methodology [see Chapter 3] described the broad philosophical foundations of the enquiry and discussed selected design and research methods, regarding investigations noted in Chapters 4-8. Content presented justification for methods and analyses used in the thesis.

Chapter 4: This focal enquiry, that was later published⁴⁰ explored how postpartum consequences of pelvic floor dysfunction from accurately diagnosed LAM injury, affect women's psychological health. Findings from this research generated four other studies. [see Chapters 5-8]

Chapter 5: This study investigated whether total scores from the EPDS³⁵ instrument were associated with birth damage and related obstetric variables, together with disclosed somatic and trauma symptoms experienced after birth. Enquiry was undertaken after women in the focal study, reported their symptoms of emotional distress were poorly identified by routine administration of the EPDS instrument and, they faced barriers to mental health care.

Chapter 6: This study examined male partners' understanding of women's somatic birth damage, in relation to maternal sexual dysfunction. It emanated from women's comments in the focal enquiry regarding postpartum marital disharmony.

Chapter 7: This review presented the current knowledge on the pathophysiology of somatic vaginal birth trauma. It was initiated after postpartum women reported clinicians did not seem to understand postpartum sequelae of major birth injuries and they faced barriers to care.

Chapter 8: This historical review investigated whether aspects of the history of somatic vaginal birth injury, PTSD, natural childbirth still influenced current maternity practice in the 21st Century.

Chapter 9 summarised and interpreted findings.

Chapter 10 presented conclusions.

Chapter 11 discussed recommendations for future research.

References were included at the completion of the thesis with the exception of published papers [see Chapters 2, 4 & 5]. Published and unpublished conference papers and media interviews that occurred during the period of this thesis were also included.

1.9 Purpose statement

The purpose of this enquiry was to utilize the 'voice' of women, who had been diagnosed with LAM damage, to explain the association between somatic consequences of vaginal birth damage and adverse psychological symptoms of postpartum PTSD. Historical documents were examined, with the intention of understanding whether current maternity practice had been

influenced by past events regarding the origins of somatic vaginal birth, postpartum PTSD and natural childbirth. The primary aim was to improve maternal outcomes for effected women and demonstrate that clinical identification of somatic and mental health trauma required urgent attention. Use of mixed methods optimized data collection, analysis and interpretation that employed transparency and reflexivity, to enable credibility and trustworthiness at all stages of enquiry. Research did not seek to apportion blame to the targeted audience

CHAPTER 2: LITERATURE REVIEW

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Review Article

Psychological and somatic sequelae of traumatic vaginal delivery: A literature review

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Abstract

This literature review seeks to examine current knowledge of birth trauma associated with major pelvic floor dysfunction by interpreting and critically appraising existing published material. A search of the literature for peer reviewed journal articles was conducted between September and December 2013 of the following databases: PubMed; Wiley Online; MEDLINE; OvidSP; ScienceDirect; MD Consult Australia; Biomed Central; Sage; Cochrane Database of Systematic Reviews. Unpublished interviews from mothers who attended two tertiary teaching hospitals in Sydney, Australia and international Internet blogs/websites were also utilized. Maternal birth trauma seems to be a common cause of pelvic floor dysfunction. Women who have sustained birth trauma to the levator ani muscle or the anal sphincters are often injured more seriously than generally believed. There often is a substantial latency between trauma and the manifestation of symptoms. Urinary and faecal incontinence, prolapse and sexual dysfunction are commonly seen as too embarrassing to discuss with clinicians, and frequently, new mothers have inaccurate recollections of obstetric procedures that occurred without much explanation or explicit consent. Moreover, somatic trauma may contribute to psychological trauma and post-traumatic stress disorder. The link between somatic and psychological trauma is poorly understood.

Key words: avulsion, birth trauma, levator ani, pelvic floor injury, post-traumatic stress disorder

Introduction

The aim of this paper is to review the literature on adverse maternal somatic and psychological health sequelae of traumatic vaginal delivery. Somatic maternal birth trauma has in the past been understood to comprise only perineal trauma.¹ Even vaginal tears have received little attention in clinical research.² Literature indicates that trauma to the levator ani was not unknown in the past,^{3–5} and the advent of modern imaging methods

such as MRI⁶ and 3D ultrasound^{7 8} has resulted in a more widespread appreciation of such trauma. Major levator trauma (avulsion) occurs in 13-36% of primiparae delivered vaginally⁹⁻¹² while major injuries to the external anal sphincter (OASIS) seem to be much more prevalent than generally assumed.¹³⁻¹⁵ Over 30% of women who deliver vaginally suffer trauma that is associated with future morbidity such as female pelvic organ prolapse,^{16 17} sexual dysfunction¹⁸ and anal incontinence.¹⁹ Only a small minority of 3-6% will have OASIS diagnosed in labour ward, and repair is often suboptimal.²⁰ Due to its usually occult nature behind intact vaginal skin, levator trauma is rarely identified and seems difficult to repair even if diagnosed. While trauma to perineum and anal sphincter has been the subject of clinical research for decades, there is very little data in the world literature on levator ani avulsion. The first clinical diagnosis of levator trauma in delivery suite was documented in 2007, and this case report remains the only such published instance in the literature. Overall, a large proportion of major trauma may be missed clinically. Hence, any research or clinical recommendations that are based on clinical diagnosis alone are of limited value.

Somatic trauma is likely to be associated with psychological trauma, partly because of overlapping risk factors, and partly due to resulting pain, sexual dysfunction, changes in body image and symptoms of pelvic floor dysfunction such as prolapse and urinary or faecal incontinence. The association between somatic and psychological trauma is poorly understood.

What is 'Maternal Birth Trauma'?

Due to the very recent nature of pertinent data, 'pelvic floor trauma' or 'maternal birth trauma' is often inappropriately defined in the contemporary literature. To date, the term is commonly regarded as synonymous with 'perineal trauma'. Population studies assert that significant perineal trauma occurs in 0.5-10% of vaginal births²¹⁻²⁵ and can result in significant morbidity such as pain, dyspareunia, urinary and faecal incontinence. Psychological ramifications of severe perineal trauma are under-researched. Severe perineal tears sometimes lead to secondary surgical procedures to correct rectovaginal, and vesicovaginal fistula (fortunately now rare in the developed world) and urinary/faecal incontinence procedures and may lead to a decision to avoid future pregnancies.²⁶ Primiparity, higher maternal age, instrumental births, longer second stage, larger babies and Asian ethnicity are risk factors.²⁷

However, it is now clear that maternal birth trauma comprises much more than the widespread definition of perineal trauma used by these previous authors.²⁸ One well-defined component of such trauma is damage to the levator ani muscle. This structure is part of the abdominal envelope and a muscular plate surrounding a central v-shaped 'levator hiatus', which encloses the urethra, vagina, and anorectum. During childbirth, the levator ani plays a major role²⁹ and has to distend considerably.^{30 31} Experimental data from muscle physiology suggest that skeletal muscle will not stretch to more than 150% of its initial length without suffering permanent injury.³² Modern imaging methods are now enabling diagnosis of such trauma by revealing detachment of the muscle from its insertion on the os pubis ('avulsion'). Avulsion is much more likely after forceps delivery than after vacuum extraction or normal vaginal delivery^{8 33 34} and is likely to be associated with the length of second stage.³⁵ This suggests that modification of obstetric practice in the general population may help to prevent levator and anal sphincter injury.⁹ Conversely, proposed changes to obstetric management aimed at reducing caesarean section (C/S) rates^{36 37} have the potential to increase the prevalence of such trauma.

Women's Perceptions of Somatic Trauma

To date, there is minimal qualitative research of women's own perceptions of childbirth-related own perceptions of childbirth-related somatic trauma. This is not surprising, given that most midwives and obstetricians are not aware of the high prevalence of sphincter trauma, and most are unaware of the existence of levator trauma. In addition, such injuries are often not acknowledged as the cause of chronic pelvic floor morbidity.

A study of primiparous women, observed that only 15% reported post-natal dyspareunia and discussed it with a health professional, yet 64% suffered intercourse-related problems at 6 months.³⁸ Findings suggested a lack of awareness by health professionals regarding post-natal sexual problems. The male perspective was not included, and to date, there are no reports on male perceptions of post-natal sexual health, nor has there been any attempt at correlating qualitative data with anatomical evidence of trauma.

Interviewing women on sexuality after childbirth requires skill and strategy.³⁹ Tape recording and verbatim transcription was the preferred method but was problematic when participants did not want their comments recorded. The findings noted that professionals gave insufficient attention to post-partum sexuality or pelvic floor dysfunction. Women said they looked forward to the post-partum checkup, but were ultimately disappointed with the limited time for consultation and the general attitude of the health professionals. They had hoped to discuss physical changes after childbirth along with its consequences, such as prolapse, but received casual comments like 'it will get better later on' and heard confusing or offensive comments. The authors surmised that Swedish 'medical experts' do not have adequate knowledge regarding the physical consequences of vaginal childbirth. They proposed that future studies should include the male partners' view of sexual life after a first birth.

Health consequences of pregnancy and childbirth,⁴⁰ as perceived by women and clinicians, frequently include lack of knowledge about post-partum health, emotional lability, sexual dissatisfaction, depression, poor body image, fatigue and incontinence. Paucity of data makes counselling and treating patients difficult. Physical recovery from birth was noted to greatly affect women's sexuality.⁴¹ At 12 months, mothers and fathers reported negative effects to their sexual relationship and it was concluded that new parents have questions that should be addressed by healthcare providers. Dyspareunia at 3 months after childbirth is substantially related to traumatic vaginal delivery.⁴²

Subjective experiences of Australian post-natal primiparous women 3-6 months after childbirth, reported reduced pelvic floor function, especially by those with avulsion of the puborectalis muscle.⁴³ Levator trauma was related to subjective pelvic floor muscle function and vaginal tone, but not with more conventional measures of sexual function.¹⁸

Psychological Trauma

The association between somatic and psychological birth trauma seems to be under-recognized and under-treated by health professionals. The fundamental question is whether childbirth can be recognized as a potentially traumatic event. Birth is typically realized as a benign physiological event, despite huge maternal physiological and neuro-hormonal alterations and breaches of bodily integrity not observed in normal life.

A British study of post-natal women, noted that 20-33% of women reported to be

psychologically traumatized. Mode of delivery, forceps procedures and anxiety about complications after vaginal birth were observed as causative factors. Post-natal anxiety disorders appeared more common than depression, with up to 16% of women suffering from panic, phobia, acute adjustment disorder or post-traumatic stress disorder (PTSD) related to the events of birth itself.⁴⁴⁻⁴⁶

Recently in the United Kingdom, National Institute for Clinical Excellence (NICE) Guidelines on PTSD⁴⁷ were introduced to improve diagnosis and management of this condition. The evidence for post-natal PTSD was examined in a British review⁴⁸ and found that up to 10% of women had severe traumatic stress responses to birth and 1% to 2% developed chronic PTSD. The paper notes that 1.5% may appear a low rate but is equivalent to 10,000 women developing PTSD in the United Kingdom every year. Three groups of symptoms were recorded: re-experiencing of the event; avoidance and numbing; increased startle responses, irritability and anger. Post-partum PTSD was noted to have secondary effects on the infant, existing children and the family unit as well as being highly comorbid alongside other psychological problems such as depression, anxiety and substance abuse. There is an obvious effect on the mental health of the woman and associated healthcare costs. Hence, an imperative exists to identify possible risk factors and recognize women who require help.

This is clearly an international issue. The World Health Organization^{49 50} (WHO) lists psychological illness as a significant indirect cause of maternal death in the first year after birth and has accordingly initiated an urgent international call for the integration of maternal mental health into maternal and child healthcare programs.

Research on factors relating to pregnancy, childbirth expectations and delivery noted that PTSD⁵¹ symptoms were more likely in women who had delivered vaginally and received fewer analgesics during labour with stronger reported pain. An Australian review⁵² examining the effectiveness of psychological debriefing after traumatic childbirth, noticed that women during painful births believe that a forceps delivery is more traumatic than an elective caesarean section.

Studies based on larger samples⁵³ reported that the incidence of PTSD ranges from 1% to 24%. Psychosexual problems were more prevalent after birth than during pregnancy. Post-natal sexual health morbidity after vaginal delivery, forceps/ventouse extraction and vaginal tears were very common contributing factors and suggested potentially high levels of unmet needs among new mothers and fathers.³⁸

The quality of intimate relationships regarding first-time mothers revealed marital interactions were strained and worryingly children's behaviour and development were also adversely affected.⁵⁴ WHO defines sexual health as: 'the integration of the somatic, emotional, intellectual and social aspects of sexual being, in ways that are positively enriching and enhance personality, communication and love'.⁵⁵ Mothers who are traumatized by childbirth demonstrate that for some women this state of well-being is not achievable after childbirth, at least not in the short term. While the causes of somatic and psychological trauma are by no means identical, risk factors clearly overlap, and it is likely that somatic trauma contributes to psychological trauma.

The most severe consequence is PTSD and this is far more complicated than post-natal depression because it is a direct result of a woman's trauma and she may feel compelled to be grateful to the staff that caused this trauma. It is a state of panic and can include depression, but that is not its primary state. Women have nightmares and flashbacks and

often feel unable to go near a hospital or look at pregnant women because it reminds them of their trauma.

Outcomes of misdiagnosis are serious because women are commonly prescribed antidepressants, which make them even less able to cope. Women frequently experience problems in relationships with their baby and partner. An increase in paternal PTSD has also been observed due to being present at a traumatic birth and fear of death of a partner and/or child.⁵⁶

Childbirth is unlike other traumatic events in that it is entered into willingly, broadly anticipated and experienced by the bulk of women in the population. However, it involves sizeable physiological and psychological alterations that if unchecked may result in disruptions of mental health.⁵⁷

Implications for Obstetric and Midwifery Clinical Practice

Antenatal care

Mothers perceive that health professionals do not inform them antenatally of potential pelvic floor damage and they lack education in dealing with injuries much worse than they had anticipated.⁵⁸ Informed consent is compulsory for surgical procedures but labouring women only sign consents if a caesarean section is looming.

Obstetrics faces ethical dilemmas regarding challenging deliveries where morbidity and potentially even mortality are a significant risk. Hence, it is not surprising that antenatal care rarely touches upon the possibility of maternal birth trauma, whether psychological or somatic. However, since the decision in the case *Rogers v Whitaker*,⁵⁹ it may be claimed that a medical practitioner has a duty to warn a patient of a 'material risk' inherent in the treatment proposed.⁶⁰ While C/S clearly has major disadvantages for mother and baby over an atraumatic normal delivery, women 'at risk' may prefer an elective C/S. Such choices should not be criticized or labelled 'tokophobia', and it seems imprudent to deny such choice or require psychological or psychiatric intervention.

Due to the problematic nature of the topic, the task of implementing guidelines, educating staff and changing health system processes is daunting and will require additional research in different settings nationally and internationally.

Intrapartum care

As mentioned above, there seems to be substantial scope for practice improvement. Intrapartum risk factors are increasingly well defined, with forceps being the most consistent. Length of the second stage seems to be another potentially modifiable risk factor. There is a great opportunity and need for research into the effect of changes in obstetric management, investigating the role of vacuum extraction versus forceps, episiotomy, perineal protection, obstetric analgesia and birth position. However, it is also evident that clinical outcome measures are inadequate.^{14 15 43} It is evident that much more research is required in this field before clinical recommendations can be made.

Post-natal care

Qualitative research to date reveals a limited understanding of women's post-natal somatic and psychological experiences and subsequent morbidities. Some studies propose that healthcare practitioners may be dismissive of maternal symptoms of somatic pelvic floor dysfunction, possibly due to a lack of knowledge.⁶¹ Other results suggest that most mothers do not have access to competent post-natal medical advice that recognizes pelvic floor dysfunction,^{62 63} Clearly, there is a need to learn how to better help women through the difficult first months after childbirth – not the least by

acknowledging their concerns and providing diagnostic and therapeutic services when needed. This is unlikely to occur unless health practitioners learn how to diagnose maternal birth trauma properly and realize women's perceptions and needs following traumatic childbirth.

Conclusions

The recent literature documents that sufficient quantitative research has been performed to propose that maternal birth trauma, both psychological and somatic, is a major public health issue, despite receiving scant attention to date. Somatic pelvic floor trauma is more common than previously believed. Major external anal sphincter and levator trauma affects at least 30% of primiparae delivered vaginally, with forceps being the main risk factor. Only a small proportion of anal sphincter trauma is optimally repaired, and major levator trauma is rarely diagnosed and never repaired.

The psychological and somatic effects of such trauma on the post-natal health of women are poorly researched. There is substantial latency between trauma and symptoms, but women do suffer from considerable somatic and psychological consequences of traumatic childbirth. The literature suggests that health professionals commonly lack awareness of these issues.

Modern imaging modalities have greatly simplified the identification of somatic trauma, but there is an urgent need to learn more about women's perceptions of traumatic childbirth and their problems. Qualitative research will play an important function in improving clinical services to post-natal women.

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CHAPTER 3: METHODOLOGY

3.1 Overview

This chapter discusses the methodological frames of reference, through which enquiry in this thesis was developed, designed, conducted and analysed. Content demonstrates the manner in which, the philosophies of phenomenology and critical theory, guided design of qualitative research. It provides justification for the use of a mixed methods approach, that utilized findings from validated quantitative research and provided a more comprehensive basis to explore women's experiences of diagnosed levator ani muscle (LAM) birth injury. Discussion highlights the significance of ethical issues concerning research of human subjects and demonstrates that the requirements of trustworthiness and credibility were maintained throughout enquiry. Structure sought to establish a clear relationship between the research problem, methods, analysis and interpretation. This chapter discusses: methodological approaches; ethical issues; methods of collection; literature reviews; methods of analysis; evaluation process.

3.2 Methodological Approaches

3.2.1 Justification of methods

From the onset, this thesis investigated the research question that postulated “...*how do somatic consequences of diagnosed LAM avulsion associated with FPOP, fecal incontinence and sexual dysfunction, affect postpartum psychological health?*” A scoping review [see Chapter 2: Paper 1] was subsequently initiated to investigate gaps in the published literature regarding this question. Appraisal of available research observed that maternal pelvic floor dysfunction consequences that were shown to be attributed to damage of the recently rediscovered levator ani muscle (LAM) during vaginal delivery, were poorly linked to adverse postpartum psychological outcomes. Although, quantitative research^{5 53} demonstrated LAM injury was associated with female pelvic floor organ prolapse (FPOP), fecal incontinence and sexual dysfunction, the sole use of this method was insufficient to generate meaningful findings about adverse psychological consequences. In view of this limitation inherent to quantitative methods, a focal interview enquiry⁴⁰ [see Chapter 4: Paper 1] sought to facilitate clearer insight into women's perspectives of birth trauma, using an explanatory

sequential mixed methods approach. In accordance with the principles of this research approach³⁶, quantitative results were initially analysed from retrospective pelvic floor function research from the Epi-No trial³⁴ and, progressively used to select participants, design interviews and analyse comments of women with a diagnosis of LAM birth damage. Justification for this convergent design, was attributed to the benefits of collecting comprehensive data on the effects of somatic injuries from imaging assessments and, highlighting the 'voice' of injured mothers to ensure findings were grounded in their lived-experiences. The approach was observed to have the potential of encouraging multidisciplinary team interaction, regarding the research perspectives of midwifery, obstetrics, perinatal psychology, and urogynaecology, that are disciplines relevant to the care of these mothers³⁶.

Accordingly, a mixed methods approach was undertaken to explore maternal birth experiences⁴⁰ [see Chapter 5: Paper 2]. Four additional studies [see Chapters 5-8] emanated from this enquiry and investigated reasons somatic and emotional trauma may have been overlooked. The following summary explains the background and methods that were integral to these enquiries.

Chapter 5 investigated the efficacy of the Edinburgh Postnatal Depression Scale (EPDS) instrument in identifying PTSD symptoms for a cohort of women suffering from somatic effects of vaginal birth damage [see Chapter 5: Paper 1]. Enquiry employed quantitative and mixed methods research that used: quantitative data from EPDS questionnaires; previously utilized pelvic floor function data from the Epi-No trial³⁴; qualitative data from maternal interviews regarding disclosed somatic and postpartum PTSD symptoms. This study emanated from a prevailing theme in the interview study regarding inadequate identification of disclosed symptoms of postpartum PTSD. Women reported items on the Edinburgh Postnatal Depression Scale (EPDS) were poorly related to their emotional distress and they faced barriers to mental health care.

Chapter 6 employed interviews with male partners from the focal enquiry group to explore their understanding of vaginal birth injuries related to maternal sexual dysfunction. This study used a mixed methods approach that utilized quantitative data from the maternal pelvic floor research database³⁴ together with qualitative data from women's interviews. Maternal experiences of marital

disharmony initiated this enquiry. Women reported partners' inadequate knowledge of vaginal birth damage that had resulted in maternal sexual dysfunction caused emotional distress.

Chapter 7 reviewed current research knowledge on the anatomy and physiology of the pelvic floor and perineum, in the context of childbirth. Enquiry sought to understand the etiology, pathophysiology and prevalence of somatic birth injuries from the perspective of urogynaecology and imaging research. This study emanated from women's reports that postpartum health providers appeared to have limited knowledge of FPOP, fecal incontinence and sexual dysfunction, that resulted in challenges in obtaining care and treatment.

Chapter 8 utilized qualitative methods of historical research to examine medical commentaries, as well as primary and secondary sources on the origins of somatic birth injury, PTSD and natural childbirth. Enquiry sought to explore present maternity care in the context of past events and, provide reasons adverse somatic and psychological sequelae of vaginal birth were unidentified. It aimed to understand the origins of the current orthodoxy, that purports vaginal birth is an ubiquitously positive and empowering experience with optimal outcomes, despite contradictory evidence from imaging studies. This study emanated from women's reports that birth classes overemphasized natural childbirth techniques and, lacked information on risk factors of pelvic floor dysfunction and/or emotional trauma. Women and their partners reported that antenatal education "...lacked accountability and responsibility" and they were ill prepared for complicated deliveries and resultant sequelae. Overt rivalry was also observed between doctors and midwives during high acuity labours and couples felt "overwhelmed".

3.2.2 Philosophical basis for enquiry

During the developmental stages of the focal interview enquiry⁴⁰ [see Chapter 4: Paper 1] the theory of phenomenology was identified as a suitable philosophical framework to underpin qualitative research methods. Developed during the early 20th Century by Husserl⁴¹, this approach attempts to explain how individuals give meanings to social phenomena in their everyday lives and has been subsequently employed in the disciplines of psychology and the social sciences. The original goal proposed by Husserl was to conduct objective scientific analysis of subjective topics, such as

emotion. Foundation assumptions are based on the notion that all knowledge and understanding, emanate from individuals' experiences or phenomena, that in turn, are reflected in their behaviour⁴². This philosophy challenges objective reality and seeks to understand subjective perception regarding lived-experiences. Principles emphasize that the researcher maintains openness by employing a reflective attitude to avoid pre-conceptions and thus minimize bias. Open-ended questions are shown to be beneficial in understanding participants' construction of their own identity, in relation to gender and social constructs⁴³. The theory relies on the use of semi-structured interviews to elicit understanding of complex experiences of individuals that guide the design of research questions, collection and analysis of data⁴².

Enquiry in this thesis also employed aspects of the interview method of consensual qualitative research (CQR)⁴⁴ that is supported by the theory of phenomenology. CQR is commonly used in psychological studies and was observed to be applicable to this research, that explored maternal experiences of postpartum mental health associated with somatic injury. Epistemological notions of the method are contingent on exploring the acquisition of knowledge, truth and belief and possess post-positivistic affinities that rely on examining scientific evidence by utilizing consensus among researchers in the construction of findings. Nonetheless, phenomenology does not attempt to generate wider explanations and primarily focuses on research descriptions of individuals in a specific setting³⁹.

In view of these limitations, a broader theoretical perspective was required to support additional enquiry into current maternity care processes that may be linked to historical issues. Hence, qualitative historical research methods were underpinned by the framework of critical theory and sought to explore the origins of somatic birth trauma, PTSD and natural birthing [see Chapter 8]. Critical theory was useful, in that the philosophy is contingent on the exploration of disempowered individuals, constrained by social constructs. Research application is based on the belief that the research process itself, serves as a mechanism for social change and seeks understanding into the manner in which, knowledge is obtained⁴⁵.

Origins of critical theory are attributed to Horkheimer, Adorn, and Marcuse from the Frankfurt School of critical philosophy in the 1930s and, were developed as a consequence of the First World War and related atrocities⁴⁶. The theory rejects the belief that reality is natural and objective and proposes that the construct of reality is affected by social, political, cultural, economic, ethnic and/or gender-based forces. Since its development, a number of critical theories have emerged in association with related social movements to demonstrate differences in power regarding gender, ethnicity, class, sexual orientation and disabilities. A strength of this paradigm is that it combines theory and practice and seeks understanding for positive social change⁴².

The framework of critical theory⁴⁶, was also observed to be pertinent to the broader aims of this thesis, that sought to improve maternal outcomes and subsequently inform obstetric and midwifery practice. It was useful in exploring societal implications of birth trauma, in regard to the prevailing belief that vaginal birth typically results in positive outcomes, despite substantial breaches of bodily integrity and resultant postpartum emotional trauma²⁷, that appear to be currently overlooked clinically. The perspective of this theory, provided an overall lens that shaped the types of questions, informed data collection and analyses. Research application is observed to facilitate an appeal for change, that in the context of this thesis concerned marginalized women, who suffered silently from vaginal childbirth related issues. Principles are beneficial in consigning meaning to researcher-participant interaction that rely on dialogic methods, which are combined with participant observation, in-depth interviewing and the opportunity for reflection. The approach purposely encourages a review of the status quo and examination of resultant tensions regarding pertinent research problems. It has been described as an inherently challenging paradigm that values transparency⁴².

3.2.3 Mixed methods

Mixed methods research has been described as a methodological dichotomy that facilitates understanding into contradictions between quantitative and qualitative results and, provides a 'voice' to participants, ensuring findings are grounded in their experiences. Divergent methods are progressively integrated during the stages of data collection, analysis and interpretation³⁶. The

method originated in the early 1960s and was developed by anthropologists and sociologists, to offer deeper understanding of complex research problems. In the 1970s, the concept of 'triangulation' was introduced and increasingly employed after the 1990s⁴⁷. Philosophical assumptions of both methods, guide the direction of the research. In this respect, quantitative methods are typically underpinned by a model of positivism, that is concerned with objective reality and, investigates causal variables of populations in a detached manner, using numerical and statistical analysis from an impersonal perspective. Conversely, qualitative methods are supported by constructivism models, that are primarily concerned with subjective reality and, investigate human experiences using information from interviews and case studies. Data collection occurs in a natural setting to enable the complex interactions of everyday life. The value of mixed methods research, is attributed to the combined use of methods that answers research problems more reliably than single method studies. The approach provides the opportunity for divergent views, maximises strengths and reduces limitations of single methods to increase validity⁴⁷.

The explanatory sequential mixed method approach employed in this thesis, initially analysed quantitative findings obtained from the database used to assess somatic birth injuries in the Epi-No trial³⁴ and subsequently utilized qualitative methods to explain additional psychological outcomes of somatic injury. This method is considered to be explanatory, in that the initial quantitative data results are explained further with the qualitative data. It is deemed sequential because the initial quantitative phase is followed by the qualitative phase. The design approach is prevalent in fields with a strong quantitative orientation and was applicable to this enquiry regarding its inherent urogynaecological perspective^{36 47}.

3.2.4 Qualitative methods

Qualitative research is described as exploratory enquiry that facilitates insight into underlying reasons, opinions and motivations regarding a research problem³⁶. The approach originated in the social and behavioural sciences during the early 20th Century and, is currently employed across multiple disciplines. Although many pivotal qualitative designs appeared prior to the 1960s, major socio-historical developments during the 1960s and 1970s, gave rise to rethinking and renaming

of research methods. In view of paradigm shifts, regarding the civil rights and peace movements and those of women's and gay rights, current qualitative practice reveals a social justice undercurrent⁴⁸. Approaches seek in-depth understanding of social phenomena within a natural setting. Interviews, focus groups and observational studies are typically employed to investigate the direct experiences of human beings in their everyday lives. Qualitative methods are based on three foundational assumptions that include: 'ontology,' which is defined as the study of the nature of reality⁴⁹; 'epistemology,' that is described as the study of the 'process of knowing'⁵⁰; axiology, which is concerned with how values of the researcher influence the scientific process⁵¹. Unlike the logical and statistical approaches of quantitative research, these methods are underpinned by methodological frameworks that utilize ethnography, critical theory and phenomenology to support their methods. Analysis occurs at multiple stages and involves time consuming interpretation regarding subjective perspectives of participants to provide comprehensive insight to the specified problem³⁶.

Key features of qualitative research include: the researcher is an essential part of the data and without her/his active involvement no data exists³⁶; design of the study evolves during the study, and can be altered as it develops; the researcher is cognizant that there is no single reality and data is subjective and exists only in reference to the observer; theory emerges as part of the research process. Limitations are typically related to time and money constraints, due to extensive time-consuming collection, analysis and interpretation, that require expert knowledge of specific problems. Whilst inadequate validity or reliability is a criticism due to the subjective nature of qualitative data, there are considerable strengths of this approach that include: detection of complex issues that are often overlooked by the scientific, more positivistic enquiries; discovery of relationships, causes and effects of previously unidentified problems; descriptive, narrative styles of this research are valuable to practitioners, in that investigation examines forms of knowledge that might otherwise be unavailable and thereby provide new insight³⁶.

Accordingly, proposed enquires are observed to require the same robust procedural evaluations, as those of quantitative studies that include transparency of explicit decisions, logic of data

management, justification of methodology and information on research instruments or methods. Hence qualitative approaches utilize trustworthiness and credibility to reflect accurate constructions of participants' experiences through dialogue⁴².

3.2.5 Quantitative methods

Quantitative research is defined as a systematic empirical investigation into a problem that collects quantifiable or numerical data and performs statistical, mathematical or computerized analyses³⁶. The approach focuses on verifiable observations that utilize 'variables,' that are defined as characteristics or attributes of individuals or organizations, that can be measured or observed. Psychologists use the diverse term 'constructs' that denote an abstract idea. 'Variables' are distinguished by two characteristics that include: 'temporal order' regarding the fact, one variable precedes another in time; the feature of 'measurement'. 'Independent variables' cause, influence, or affect outcomes. 'Dependent variables' depend on independent variables and, are outcomes/ results of the influence of the independent variables. Other terms for dependent variables are criterion, outcome, and effect variables. In addition, variables are used to answer a research question or to make predictions about results and these are termed hypotheses. During the process of a quantitative study, variables are controlled by research processes that typically occur in laboratories. Methods seek objectivity devoid of bias; design is pre-determined and typically involves the testing of theories³⁶. A quantitative theory is an interrelated set of variables, formed into propositions, or hypotheses, that specify the relationship among variables and is also described as an argument, discussion, or rationale, that assists explanation or prediction of a phenomena. Theories are used deductively and, situated at the beginning of a study. The objective is to test or verify a theory, unlike qualitative research that develops it. Subsequently, the researcher advances a theory, collects data to test it, and reflects on its confirmation or disconfirmation by the results. The theory becomes a framework for the entire study, an organizing model for the research questions or hypotheses and for the data collection procedure³⁶.

Limitations of quantitative research may include: the inherent features of experiments, that disallow participants from explaining choices or meaning and usually take place in manipulated settings⁵²;

suboptimal use of statistical applications that negatively impact on analysis and interpretation; the need for large sample sizes, given that smaller studies are less reliable, due to low quantity of data; phenomena are overlooked due to the focus on hypothesis testing, rather than on the theory of hypothesis generation. Strengths of quantitative research; however, include: scientific objectivity regarding beneficial properties of statistical analysis, based on the principles of mathematics and rationality; rapid analysis is also a useful aspect, in that software eliminates the need for ongoing data analysis. Numerical data can be replicated and checked and is less likely to be ambiguous^{36 52}. As discussed, validated quantitative data was used at various stages in this enquiry that relied on pelvic floor findings from 3D/4D ultrasound imaging studies to select participants and explore their experiences of accurately assessed LAM injury. This section explains the quantitative approach employed in a pelvic floor imaging study⁵³ associated with the Epi-No trial³⁴.

Hypothesis: levator ani muscle (LAM) injury is likely to be an etiological factor for female pelvic organ prolapse (FPOP). A study was performed to establish minimal sonographic criteria for the diagnosis of avulsion.

Methods: the analysis of datasets of 764 women that were seen at a urogynecological service. Offline analysis of ultrasound datasets was performed blinded to patient data. Tomo-graphic ultrasound imaging (TUI) was used to diagnose LAM damage.

Results: logistic regression modelling of TUI data revealed complete avulsion (damage to both insertion sites) that is best diagnosed by requiring the three central tomographic slices to be abnormal. This finding was obtained in 30% of patients and was associated with symptoms and signs of FPOP ($P < 0.001$).

Conclusions: complete avulsion of the LAM was best diagnosed on TUI by requiring all three central slices to be abnormal.

3.3 Ethical Issues

Research literature observes that ethical issues have a central role in social research concerning human subjects and. require stringent procedures to bridge the philosophical and practical aspects of enquiry³⁶. In view of these obligations researchers have a responsibility to ensure that harm and

exploitation of research participants are prevented. Such stipulations are particularly important regarding investigation into the plight of vulnerable populations, that were evident in this thesis. From the inception of research, the following issues should be transcribed: mandatory disclosure regarding the nature and source of the study; the manner in which research findings will be used; interviewees' voluntary participation and stipulation of privacy and confidentiality. There is also an ethical obligation to facilitate sensitivity and, carefully consider the manner in which, research participants are portrayed, in view of the fact, ethical issues are connected to ontological, epistemological and practical imperatives, that shape value systems of individual researchers. During the developmental stages of enquiry, it is also crucial to consider the public worth of the research, optimal representation of underrepresented populations and the way research findings are distributed to relevant stakeholders. Notably, reflexivity³⁷ is a core element of ethical issues for qualitative research and, requires adept acknowledgement of the researcher's power, privilege and biases throughout the research process. Attention to anonymity, confidentiality, informed consent, researchers' potential impact on the participants is integral. The social justice imperative of qualitative research and, the manner in which the researcher executes the whole project, are observed to be directly related to reflexivity^{36 48}.

Prior to conducting interviews with women and male partners [see Chapters 4 & 6] the previously discussed ethical considerations were anticipated and are reflected throughout the research. In the context of this research, that utilized research from multiple perinatal disciplines, it was deemed judicious to scrutinize relevant professional association standards and related codes of ethics for obstetrics⁵⁴, midwifery⁵⁵ and psychology⁵⁶, in order to represent these perinatal disciplines favourably. Accordingly, the author composed a research proposal that specified the time span of the study, timeframe of interviews, potential impact and outcomes of research and ethical considerations. Authorship for the proposed publications was negotiated with the supervisor. The application and relevant documents were submitted to The University of Sydney Human Research Ethics Committee (HREC) in Sydney, Australia and were approved in 2013⁵⁷. Following this process, consent forms and information on the relevance of this research were developed. Participants were subsequently contacted by phone and email and informed that interviews were

voluntary and, if they wished to proceed, instructions would be sent regarding purpose of the study, relevant clinical information on the researcher and research organization, consent forms, time, date and duration of interviews that were offered by phone, Skype or face to face. Documentation ensured clear expectations of the research, stipulated strict privacy and confidentiality for participants and the ability to withdraw at any time during the study.

During data collection all participants received the same treatment. Power imbalances were addressed regarding reflexivity³⁷, to ensure trust and confidence and optimal interaction between the researcher and participants. Confidentiality and privacy were respected at all times. Emotionally distressed women were asked if they wished to continue and given referrals for counselling if necessary. The interviewer kept to the interview guidelines of open- ended questions. At the outset, all women requested their interviews would not be taped due to the personal nature of the content. Hence, the interviewer wrote notes with the help of a transcriber and sent formatted transcripts to participants after interviews for verification of content [see Chapter 4: Paper 2 – Appendix 1b].

During data analysis the researcher/ author respected the privacy of participants and did not disclose names to anyone. Participants were delegated numbers for identification purposes and, remained anonymous. Multiple perspectives were reported together with contrary findings. Due to the fact, quantitative research from the Epi-No trial³⁴ and related pelvic floor function studies were retrospective and had been published⁵³, all ethical requirements had occurred at the time. Relevant information had been included in the HREC submission.

The process of reporting, sharing and storing data adhered to ethical procedures. These included: personal and private information from interviews was not disclosed to anyone; each participant was provided with a number for identification purposes; documentation utilized clear and appropriate language; data identified with specified numbers was shared with the supervisor; raw data was stored on two disc drives and kept for 5 years; complete proof of compliance with ethical issues and lack of conflict of interest were provided to HREC; the author's name was on the data from interviews and indicated ownership.

3.4 Data collection for maternal interviews [see chapter 4: Paper 2]

3.4.1 Methods & selection of participants

This section discusses the qualitative process of gathering responses and subjective viewpoints of postpartum women who had been diagnosed with LAM injury. An explanatory sequential mixed methods approach scrutinized quantitative data from pelvic floor imaging results obtained from the Epi-No trial³⁴ database, for the purposes of selecting participants and documenting relevant somatic birth damage and consequences. This process occurred prior to initiating interviews that sought to explore maternal experiences of birth trauma in association with psychological outcomes. Ensuing qualitative data collection employed quantitative results at different stages to facilitate comprehensive data. Participants were identified from a large population (n=800+) of women who had been assessed 3-6 months after the vaginal delivery of a full-term, low risk, singleton pregnancy regarding the Epi-No³⁴ trial. Primiparous women (n=70) with documented full unilateral and bilateral LAM avulsion were selected. Pelvic floor injuries had been retrospectively diagnosed by 3D/4D translabial ultrasound; multislice imaging was employed according to a previously published methodology^{5 53}. Women (n=40) agreed to be interviewed. Data was recorded on Excel and Word documents regarding somatic damage and pelvic floor dysfunction, together with information from respective hospital records at two tertiary maternity hospitals in Sydney, Australia. The cohort had delivered 1-4 years prior to contact with interviewer. Selected women were requested to sign consent forms regarding interviews for a duration of 35-40 minutes via phone, Skype or face to face, during May 2013 to October 2014 [see Chapter 4 – Appendix 2]. The interviewer/author is a midwife with extensive professional experience.

Quantitative data included: postpartum somatic birth injuries of LAM avulsion, obstetric anal sphincter injuries (OASI) and related consequences of FPOP, sexual dysfunction, fecal and urinary incontinence, bowel impaction, severe constipation. Obstetric details from birth records included: BMI before and after delivery; maternal age at delivery; gestation of pregnancy; length of 1st and 2nd stages of labour; method of delivery regarding forceps use, ventouse suction; epidural,

induction of labour, episiotomies, perineal tearing, weight and head circumference of baby at birth; estimated date of delivery; date of delivery [see Chapter 4 – Table 2].

3.4.2 Main outcome measures

This enquiry utilised explanatory sequential mixed methods that employed quantitative data from pelvic floor function research³⁴ to comprehensively examine maternal experiences of accurately assessed birth damage, and provide deeper insight into clinical processes that may have influenced adverse outcomes. The quantitative terminology of ‘main outcome measures’ was utilized to define the scope of outcomes that research anticipated were achievable and subsequently assist the structure of interview guidelines.

Content included: efficacy of hospital antenatal education regarding comprehension of birth process; existence of informed consent to explain potential intrapartum interventions; memory of intrapartum intervention, syntocinon induction, length of second stage, mode of delivery, forceps use, ventouse use, epidural, episiotomy, and perineal tears; and birth weight of baby. Other aspects included women’s perspectives regarding: clinicians’ advice during birth; incidence and/or efficacy of postnatal assessment of injuries and follow-up; referrals to address symptoms of pelvic floor dysfunction; occurrence of sexual health education after delivery; reactions and coping behaviour of mother and partner regarding pelvic floor dysfunction and bladder and bowel changes (if any); clinician response to maternal symptoms; maternal emotional state during and after delivery; short/long-term coping mechanisms; and long-term medical follow-up [see Chapter 4 – Appendix 1a].

3.4.3 Interview guidelines

Interview guidelines were developed from several sources that included: quantitative data on pelvic floor damage and somatic consequences, obstetric data, main outcome measures; the authors’ clinical expertise and knowledge, as a midwife and, relevant research literature on the topic³⁶. Guidelines presented a clear set of instructions, that aspired to provide reliable, comparable qualitative data regarding clinical aspects of pregnancy and birth, that may have contributed to suboptimal maternal outcomes. A template was established regarding the format of questions to assist in consistency. Each participant had an individual document with different obstetric and

personal details, that included participants' educational background, which was viewed as a prerequisite for knowledge regarding level of literacy prior to interviews. The following six domains were developed: 1) pre/antenatal knowledge; 2) antenatal care; 3) labour and deliver; 4) postnatal period in hospital; 5) postnatal period adjustment at home; 6) long term after the birth/ before restorative surgery [see Chapter 4 – Appendix 1a:]. These sought to explore all aspects of maternity care to understand associations with resultant birth trauma.

3.4.4 Semi-structured interviews & open ended questions

The use of semi-structured interviews is a qualitative strategy that involves a series of predetermined open-ended questions from a pre-prepared interview guideline. The design gives the participants ample time and scope to express their diverse views and personal experiences and, requires a relational focus regarding adept skills of facilitation from the interviewer³⁶. In the context of this study, it enabled: active listening techniques; knowledge-producing dialogues that enabled flexibility; empathetic responses from the interviewer, who had a clinical midwifery background and, understood issues mothers may have faced during hospital care; guided the interviews and enabled the emergence of themes regarding women's birth experiences⁵⁸. *Open-ended questions* provided structure to the interviews and, allowed respondents to discuss feelings, attitudes and understanding of the subject, as opposed to close-ended questions that require a short or single-word answer.

3.4.5 Interview process

Development of the interview process involved substantial preparation regarding: convenient dates, times and places of interviews; preparation of the interview guide for each participant; perusing the quantitative data concerning the degree of somatic trauma for each participant prior to interview; establishing optimal rapport with participants; conducting the interview; demonstrating trustworthiness of interview methods and utilizing reflexivity³⁷ regarding the authors' clinical experience as a midwife; and transcribing and reflection.

Invitation to participate in interviews was proposed as via the telephone, face-to-face or on Skype, to enable open discourse in familiar surroundings and enable flexibility and freedom to discuss

personal issues^{36 48}. In accordance with ethical requirements, interviews were not commenced until consent forms were legally signed and, at times there were delays in this process. Data collection was observed to be optimized by adept relationships between the participant and researcher/interviewer. As a clinical midwife at the time of research, the interviewer possessed optimal knowledge about clinical issues related to women's experiences. This background situated her as a reference point regarding obstetric knowledge and enabled optimal interactions. However, she was mindful that as the key instrument for collecting data, her biases and ideological preferences influenced the enquiry. As noted by the principles of reflexivity³⁷ a degree of detachment is integral during discourse, to minimize bias. Hence, the interviewer utilized open and emotionally neutral body language that involved nodding, smiling and encouraging sounds, where possible. The use of silence was effective at times, especially regarding distressing memories. Other methods included: allowing the participant to contemplate their responses; asking the participant to elaborate or clarify issues; leading questions were avoided to facilitate objective data.

At the outset of interviews, many participants appeared to be reserved, due to the personal nature of the research. This required adept skill and empathy on the part of the interviewer to facilitate trust, rapport and confidence. Others were perceived as angry or desperate to talk about their injuries. The interviewer was mindful that interviews had the potential of distressing participants, and so endeavoured to assist women with amenable options to protect their mental health. One interviewee displayed substantial symptoms of emotional trauma and stated that participation in an interview would be too overwhelming. Nonetheless, she still wanted to engage in the process and requested that the interviewer email her the respective questions at intervals. In view of this woman's observed emotional trauma that seemed pertinent to robust data, this method of correspondence was allowed. After perusing the content of her emails, the author believed the data was credible. Her replies were articulate and demonstrated an authentic voice. Nonetheless, after lengthy interviews with women, that were at times emotionally distressing and seemed like debriefing sessions, the author organized debriefing at various stages of research from a hospital counsellor.

3.4.6 Strengths and limitations

A major challenge during interviews, was that women refused to have their comments taped due to the personal nature of the content. Whilst it was possible to transcribe notes to capture participants' answers, this approach had the potential of inadequate note-taking and detracted from the rapport between interviewer and participant. Hence a note-taker was present during the phone interviews and, transcripts were later sent to the women on email for verification. This process was useful in that mothers often added information to transcripts that they later remembered and contributed to credibility of data. Skype and face-to-face were easier to implement (n=9), but at times, were more distressing for the interviewer and transcribing notes lacked the support of a transcriber. It was not apparent that these interviews adversely affected the quality of data, as noted by all participants in the cohort, who gave positive affirmations and verified the veracity of the content. Although, interview duration was stipulated as occurring between 35 to 40 minutes, several women spoke much longer. Two of the face-to-face interviews, lasted up to 3 hours and women were difficult to disengage, due to their overt emotional distress. The interviewer suggested counselling follow-up and ensured they were in contact with a partner, friend or relative after the interview. Due to the fact, interviews were largely by phone (n= 30), the interviewer was constrained by limited facial signals, depicting emotion and, had to rely on women's inflections in their voice. Punctuality and reliability were integral to contact with participants at all times. Friendly non-judgemental attitudes on the part of the researcher/ interviewer facilitated women to answer honestly. Participant information was documented and included: number of women interviewed (n=40); number invited (n=70) number declined (n= 29); number removed from database (n=1); number of years interviewed after delivery; ethnicity of women; number in private care of obstetrician; number of interviews that involved phone, Skype or face to face interviews; length of interviews [see Chapter 4 – Table 3].

3.4.7 Ethics

Ethical approval was obtained prior to interviews, from the local Human Research Ethics Committees (NBMLHD 07-021 and SLHD RPAH zone X05-0241)⁵⁷. Consideration was given to the

personal nature of questions and responses; anonymity, confidentiality, valid consent, and the right to withdraw from the study were emphasized. All participants were offered clinical and psychological consultation if required.

3.5 Data collection for enquiry into efficacy of EPDS in identifying postpartum PTSD

3.5.1 Methods & selection of participants

This section discusses the methods of data collection for the enquiry in Chapter 5 that emanated from themes in the maternal interview study. Women reported their postpartum symptoms of PTSD were poorly identified by the routine administration of the EPDS instrument. It was unclear whether this measure was useful in assessing emotional trauma for this cohort. During interviews, more than two-thirds of mothers (n=27) had disclosed 3-4 symptoms of PTSD as per DSM-5²⁸ that were associated with enduring symptoms of somatic LAM damage. Enquiry used quantitative and mixed methods approaches that collected data from pelvic floor studies, together with EPDS scores, obtained at the same time as somatic assessments. Qualitative data from published maternal interviews⁴⁰ were also employed.

Research questions were developed for three phases of this study, that included: design of a quantitative descriptive question to examine relationships between, injuries, obstetric variables and total scores of EPDS in the entire cohort of women assessed for pelvic floor function as per Epi-No trial³⁴; two mixed method questions that used qualitative data from the subset of maternal interviews; a primary question for publication purposes. These postulated the following:

“...What is the association between total scores on the EPDS instrument, somatic birth related LAM and obstetric anal sphincter injuries (OASI) and three obstetric variables that included, forceps, large baby, lengthy second stage, in a large cohort of women (n=800+) assessed for pelvic floor function?” [Quantitative descriptive question]

“...Does a subset of women (n=40) affected by somatic symptoms of LAM injury, demonstrate elevated scores on EPDS measures?” [Mixed methods question]

“...Are disclosed symptoms of postpartum PTSD from the subset of interviewed women (n=40), associated with somatic symptoms of LAM injury?” [Mixed methods question]

The primary question for this enquiry was: “...*Is the Edinburgh Postnatal Depression Scale (EPDS) effective in identifying posttraumatic stress disorder (PTSD) symptoms associated with somatic vaginal birth injuries?*”

3.5.2 Data collection

Data were collected from total scores of the EPDS regarding the total population (n=800+) of the Epi-No³⁴ and POND trials; questionnaires had been administered at the same time as pelvic floor assessment. This study utilized the basic format of the EPDS and interpretation of scores as described by its authors³⁵. Current stressor criteria regarding PTSD were taken from DSM-5²⁸ [see Chapter 5 – Tables 1 & 2]. Enquiry utilized quantitative data from EPDS scores and pelvic floor function assessments; qualitative data from women’s interviews; research methods employed a three phased enquiry.

Phase 1 employed quantitative data from the large cohort of women from the entire study (n=800+) and collected data on obstetric variables regarding forceps, size of baby and length of 2nd stage of labour; somatic LAM and OASI birth damage; data from total scores of EPDS.

Phase 2 collected quantitative data on women’s EPDS scores from the subset of 40 interviewed women, together with qualitative data on disclosed symptoms of pelvic floor dysfunction, that were also available from quantitative sources [see Chapter 5: Paper 3 – Tables 1 & 2].

Phase 3 collected qualitative data from interviews on disclosed somatic and PTSD symptoms [see Chapter 5: Paper 3 – Tables 1 & 2].

3.5.3 Ethics

Studies received ethical approval from Human Research Ethics Committees³⁶ at two health areas in Sydney, Australia. Consideration was given to the personal nature of this study; anonymity, confidentiality, valid consent, and the right to withdraw were emphasized. All participants were offered clinical and psychological consultation.

3.6 Data collection for interviews with men

3.6.1 Methods & selection of participants

This interview enquiry employed an explanatory sequential mixed methods approach to investigate male partners' understanding of women's somatic vaginal birth injuries [see Chapter 4: Paper 2]. Contact details of respective men were obtained from the previously interviewed women³¹, who had requested the interviewer speak to partners due to perceived marital disharmony. 20 men were approached for interview; 12 were uncontactable despite their partners stating they had been agreeable to interviews. 1 man did not send back the consent form after interview and had to be removed from the study. The remaining men (n= 7) responded and consented to interviews. [See Chapter 6 – Table 1] Invitations to participate in this study were via telephone discussion together with, email correspondence. Options to engage in an interview for 35 to 40 minutes were proposed as being via telephone, a face-to-face environment, or Skype internet application. The interviewer was a midwife with extensive professional experience. All participants received a written invitation with information about questions and consent forms.

In order to appreciate the individual circumstances of each male participant, quantitative data was obtained from pelvic floor imaging research regarding assessed maternal birth damage. LAM avulsion had been retrospectively diagnosed in women by 3D/4D translabial ultrasound, 3-6 months postpartum. Some women sustained OASI as well. Corresponding birth records from two major tertiary obstetric hospitals in Sydney, Australia were examined between May 2014 and October 2018. Due to the fact men were difficult to contact, this study took 4 years. Qualitative data were also collected from women's interviews and sought to investigate individual experiences of male partners (n=7) of women, who suffered from somatic postpartum birth related morbidities that included FPOP, urinary and faecal incontinence and sexual dysfunction, 1-4 years after vaginal birth. Participants were identified as partners of primiparous mothers, who had been deemed low risk prior to delivery and delivered vaginally after a full-term, singleton pregnancy.

3.6.2 Main outcomes measures

During the inception of this interview study with men, it was observed that a primary aim of this thesis, was to improve postpartum outcomes for women, partners and families. The quantitative terminology of ‘main outcome measures’ was utilized in respect to the use of quantitative data that defined the scope of outcomes that research anticipated were achievable in a mixed methods study. These measures also provided structure for the interview guidelines that included: antenatal information given in classes regarding the birth process and related risk factors and/or prior knowledge of birth; intrapartum procedures regarding length of second stage, forceps use, ventouse use, epidural, episiotomy, and perineal tears; birth weight of baby; assistance and support from clinicians of women during birth; postnatal observations regarding women’s somatic and psychological changes immediately after birth; incidence and/or efficacy of postnatal assessment of maternal injuries and follow-up consultations for somatic vaginal damage. Partners’ observations at home regarding: women’s somatic and psychological changes; maternal reactions and coping behaviour regarding birth injury including, bladder and bowel changes (if any); ‘sex after baby’; health providers’ response to maternal symptoms of birth injury; women’s long-term coping mechanisms, psychological state and reactions regarding sexual relations; medical follow-up [see Chapter 6].

3.6.3 Interviews guidelines

Interview guidelines were developed using similar domains to those employed in maternal interviews and used open-ended questions on antenatal, intrapartum and postpartum care, that were altered according for this cohort of men, who had observed their partners’ deliveries [see Chapter 6 – Appendix 1a]. Content and structure were developed from multiple sources that included: women’s quantitative data on pelvic floor damage and somatic consequences, obstetric data, main outcome measures; the authors’ clinical expertise and knowledge, as a midwife and research literature on the topic³⁶. Guidelines provided a distinct set of instructions, that sought reliable qualitative data regarding clinical aspects of partners’ pregnancy and birth. A template was established regarding the format of questions to assist in consistency. Each partner had an

individual document with different obstetric and personal details, that included participants' educational background, which was viewed as a prerequisite for knowledge regarding level of literacy prior to interviews. The following six domains were developed: 1) partners' pre/ antenatal knowledge; 2) partners' observations of antenatal care; 3) partners' observations of labour and deliver; 4) partners' reflections of the postnatal period in hospital; 5) partner's observations of the postnatal period/ adjustment at home; 6) partners' reflections of women's long term recovery after the birth/ before restorative surgery [see Chapter 6 – Appendix 1a]. No participants agreed to interviews being audiotaped so the interviewer took written notes, which were then emailed back to the participants for verification as an unbiased record; men were given the opportunity to add or change information on these scripts. [see Chapter 6 – Appendix 1b]. A transcriber was present for the phone interviews. Data from all interviews were verified by all participants as an accurate account of interviews.

3.6.4 Semi-structured interviews & open ended questions

The use of semi-structured interviews involved open-ended questions from a pre-prepared interview guideline that, as noted, had been adjusted from those used in women's interviews. The design provided male participants with ample scope to express diverse opinions and personal experiences that required a relational focus from the interviewer³⁶. Format facilitated: active listening techniques; flexible knowledge-producing dialogues; empathetic responses from the interviewer, who had previously discussed birth issues with women and understood the degree of somatic and psychological trauma; directed interviews regarding the emergence of themes⁵⁸. Open-ended questions provided structure to the interviews and allowed men to discuss feelings, attitudes from their observed perspective regarding birth trauma. Most men experienced problems describing their partners' psychological and somatic states, at various stages after birth, hence the interviewer used a grading system of 1-10 to assist regarding 'best' and 'worst' case scenarios, that was later added to the template. Although men did not wish interviews to be taped, written interpretation of responses was emailed to participants for editing and facilitated additional comments at a later date. Taped interviews may have yielded poorer information on sensitive topics. Participants were offered

psychological follow-up; one man remained in contact with the interviewer in an attempt to have his wife reassessed. Partners were given details of available urogynecologists for women and/or psychologists for their purposes, if required.

3.6.5 Interview process

Substantial preparation was required prior to interviews with men. The interviewer organized the following processes: verification of convenient dates and times of interviews on email; preparation of the interview guide for each participant; documentation of maternal quantitative data onto Word documents, that stipulated somatic damage and consequences for each participant's partner; implementation of optimal rapport with male participants; trustworthiness of interview methods; data transcription and related reflections.

Invitation to participate in interviews was proposed as via the telephone, face-to-face or on Skype, to enable open discourse in familiar surroundings that provided flexibility and freedom to discuss personal issues⁴⁸. Six men spoke to the interviewer on the phone; one man decided to use Skype. In accordance with ethical requirements, interviews were not commenced until consent forms were legally signed and, at times there were delays in this process. Data collection was observed to be optimized by adept relationships between the participant and researcher/ interviewer. As a clinical midwife at the time of research, the interviewer possessed optimal knowledge about clinical issues; she had also spent time speaking to men's partners about their birth experiences. This background situated her as a reference point regarding women's personal birth related problems. She was also aware that as the key instrument for collecting data, her biases influenced the enquiry. In accordance with the principles of reflexivity³⁷ a degree of detachment was integral during discourse, to minimize any preconceptions, especially in the case of maternal sexual dysfunction and psychological trauma. Hence, the interviewer utilized open and emotionally neutral body language that involved nodding, smiling and encouraging sounds, where possible. Other methods included: allowing the participant to contemplate their responses; asking the participant to elaborate or clarify issues; leading questions were avoided to facilitate objective data.

3.6.6 Strengths and limitations

From the onset of this study in 2014, men were difficult to contact, despite the fact women had suggested they would be agreeable to interviews. It was unclear whether marital disharmony influenced this problem. The interviewer continued to attempt contact over a period of four years, having envisaged that more participants would have agreed to interviews. Even so, the cohort of male participants (n=7) that consented to discussion were very keen to speak from the outset and demonstrated overt concern for their partners. Men were all well-educated (completed secondary school) and older than 30 years of age with demonstrated empathy skills. The interviewer was mindful that men wanted advice about partners' birth injuries and were cognizant that she was a maternity clinician. Hence, she endeavoured to refrain from providing clinical opinions and remained neutral, except in cases where medical or psychological referrals were deemed necessary. One interview was on Skype and the man's partner was in the background. It was apparent that this participant was uncomfortable and his responses may have been adversely influenced.

3.6.7 Ethics

This study received ethical approval from the local Human Research Ethics Committees (NBMLHD 07-021 and SLHD RPAH zone X05-0241)⁵⁷. Women partners were asked to sign consent forms regarding partners participation in study [see Chapter 6 – Appendix 2]. Men were given relevant information about the study and asked to sign consent forms [see Chapter 6 – Appendix 3]. Original Epi-No trial³⁴ consent forms regarding women's interviews were also given to men for perusal. Consideration was given to the personal nature of questions and responses; anonymity, confidentiality, valid consent, and the right to withdraw from interviews at any time.

3.7 Literature reviews

Three reviews were employed at various stages in this thesis and sought explanation regarding an overarching question that postulated: *"...How do somatic consequences of diagnosed LAM avulsion associated with FPOP, fecal incontinence and sexual dysfunction, affect postpartum psychological health?"*

From the onset of research, a scoping review [see Chapter 2] examined published journals, databases and reference lists, to appraise current knowledge on the links between adverse sequelae of LAM damage and impaired psychological health from the perspectives of urogynaecology, midwifery and perinatal psychology. Findings observed an absence of qualitative literature on these associations, despite current research on postpartum PTSD, that demonstrated traumatic birth events were associated with complicated deliveries, fear of childbirth, lack of support and the demise of infants²⁷. Inspection of quantitative imaging studies^{22 23} revealed insight into the etiology, prevalence and risk factors of the recently rediscovered LAM damage, however psychological outcomes were omitted. Other studies^{30 31} used the terms pelvic floor and perineal injuries synonymously, that was observed to be contradictory to the evidence from imaging studies that revealed these birth injuries were dissimilar⁶. Notably, interviewed women⁴⁰ in this thesis reported postnatal health providers, frequently dismissed debilitating morbidities as normal sequelae of vaginal delivery and appeared to have limited knowledge to assist with treatment options.

In view of these findings, the review in Chapter 7 was initiated to provide a clearer understanding of diverse forms of somatic vaginal birth damage that included, LAM damage and OASI. Published journals were scrutinized for information on related etiology, pathophysiology, risk factors and prevalence and, examined the anatomy and physiology of the pelvic floor and perineum in non-pregnant women, compared with that of, pregnancy and vaginal childbirth. The purpose was to describe the functional and dysfunctional pelvic floor and perineum and elucidate whether childbirth injuries were diverse and more serious than previously realized.

The review in Chapter 8 inspected medical archives and commentaries regarding: historical origins of birth related LAM injury; the development of the concepts of somatic vaginal damage; diagnostic imaging and urogynaecology over past centuries; history of PTSD and relation to childbirth; and origins of natural childbirth methods. Enquiry emanated from couples' reports that birth classes overemphasized natural birthing techniques and, lacked information on risk factors of pelvic floor dysfunction and/or emotional trauma. Interviewed women and partners, stated that, on reflection, antenatal education "...lacked accountability and responsibility" and they were ill-

prepared for complicated deliveries and resultant sequelae. Overt rivalry was also observed between doctors and midwives, during high acuity labours and couples felt overwhelmed. Investigation sought to understand the origins of the current orthodoxy, that purports vaginal birth is a positive and empowering experience with optimal outcomes²⁷, despite contradictory evidence from imaging studies⁶. Discussion aimed to provide an appreciation of watershed moments, that may have guided obstetrics, midwifery and perinatal mental health care practice and thus, reveal insight into related issues that contribute to adverse consequences for this current population of postnatally injured women.

3.8 Data analysis of interviews with women and men [see Chapter 4: Paper 2 and Chapter 6]

3.8.1 Overview

This section explains the method of analysis employed to identify themes from interviews with women (n=40) effected by birth trauma, together with, analogous methods used in the separate interview study with some of the male partners (n=7). As discussed, data were obtained from quantitative and qualitative sources. Both studies utilized an explanatory sequential mixed methods approach and formulated research questions prior to enquiries. These included:

“...how do postpartum consequences of pelvic floor dysfunction from accurately diagnosed LAM injury, affect women’s psychological health?” [see Chapter 4: Paper 2].

“...Do men understand that partner’s somatic vaginal birth damage are related to maternal sexual dysfunction?” [see Chapter 6].

3.8.2 Thematic analysis and framework method

Thematic analysis is a qualitative method, that has been broadly used across a range of studies to facilitate knowledge acquisition regarding research questions. The approach assists in identifying, analysing, organizing, describing, and reporting themes within a selected data set⁵⁸ and provides a flexible approach that facilitates a detailed account of data. The process also enables trustworthiness and credibility of data by inherent approaches that promote transparent, precise and consistent data analysis³⁶.

Enquiries in this thesis utilized the step-by-step approach of the *Framework Method* that facilitated a detailed description of thematic analysis [see Chapter 4 – Table 1; Chapter 6 – Table 2]. The approach originated in the late 1980s and was developed for social policy research. Since that time, it has been increasingly employed in medical and health studies, to assist interdisciplinary projects and, is typically employed for thematic analysis of semi-structured interview transcripts, where themes are generated by making comparisons within and between cases. A seven-step process is employed, in conjunction with a glossary of terms that explain relevant language used in the method. The defining feature concerns the matrix output regarding rows (cases), columns (codes) and ‘cells’ of summarised data that provide a structure to reduce and analyse data⁵⁹. In-depth analyses of key themes occur across the whole data set. Perspectives of each participant remains connected to other aspects of their account within the matrix, so that the context of the individual’s opinions is not lost. This approach facilitates: comparisons across and within individual cases; is not aligned with a particular theoretical approach; is a flexible tool regarding the use of any qualitative approach that aims to generate themes; and is not committed to inductive or deductive thematic analysis. It relies on a skilled researcher during the data collection and analytical stages, that in turn, is influenced by the characteristics of their relevant disciplines. Critical reflection throughout the whole research process is mandatory. To optimize the analytical process, the researcher records reflexive notes on their impressions of the data and, remains flexible and adaptive to findings that explain the research question.

In accordance with these principles, data from both interview enquiries [see Chapters 4 & 6] were analysed inductively and employed all stages of the Framework Method⁵⁹ that included: transcription of data; familiarization with the participant responses and immersion in the raw data; generating of initial coding; codes were developed into subthemes and themes; recognition of the way in which themes were patterned to relate an accurate story of the data; themes were summarized and subsequently renamed “category statements” that were condensed to overarching themes, for the purposes of addressing the broader aims of the enquiry regarding unidentified clinical issues in maternity care; data was subsequently interpreted. Deduction

assisted in interpreting data, at all stages of the process and enabled clearer insight into adverse experiences. The researcher/author was the key instrument for collecting, analysing and interpreting data. During analysis quantitative information was merged with that obtained from qualitative interviews, by way of triangulation to obtain different and complementary data to explain the research problem⁴⁷ and thus examine the relationship between somatic damage and any psychological sequelae.

This approach assisted an inductive process that identified patterns, categories and themes. Deduction was subsequently utilized to determine if more evidence was required to support each theme. During the entire process, focus was retained on the meaning participants attributed to the research problem. The researcher/interviewer utilized reflexivity³⁷ that, as discussed, acknowledged her interpretations may impact upon the context of the investigation. In order to construct a study that remained true to the data and ensure credibility and trustworthiness³⁶, detachment was a challenge and, the interviewer had regular debriefing sessions with a hospital counsellor from her work environment. For the purposes of this thesis, as discussed in the 'Introduction' [see Chapter 1], the author included reflections of her clinical background in midwifery, as a way of revealing her values and biases, regarding her interest in vaginal birth trauma.

Qualitative aspects of all enquiries abided by the consensus principles of CQR⁴⁴, that involved the collection of consistent data from semi-structured interviews and subsequent analysis by more than one researcher, who arrived at an agreement regarding the meaning of the data. Findings were checked by a designated 'auditor,' who also assisted in cross-case analysis regarding developing categories and common themes reflected in core ideas. Consensus was maintained with the assumption that multiple perspectives provided an approximation of the truth and, reduced the influence of researcher bias, as noted in research literature^{42 44}.

3.9 Method of analysis in additional enquiry [see Chapter 5: Paper 3]

This section discusses the methods of analysis employed in the enquiry that examined the efficacy of EPDS for women exhibiting postpartum PTSD symptoms related to vaginal birth damage. Data were obtained from quantitative and qualitative sources; 3 phases of analysis involved quantitative

and mixed methods approaches. Prior to enquiry, the following research questions were formulated:

“...What is the association between total continuous scores on the EPDS instrument and somatic birth related LAM and obstetric anal sphincter injuries (OASI) including three obstetric variables of forceps, large baby, lengthy second stage, in a large cohort of women assessed for pelvic floor function?” [Quantitative question for large cohort from Epi-No trial³⁴]

“...Does a subset of 40 women affected by somatic symptoms of LAM injury, demonstrate elevated scores on EPDS measures?” [Mixed methods question using qualitative data from interviews and quantitative data]

“...Are disclosed symptoms of postpartum PTSD from the subset of 40 interviewed women, associated with somatic symptoms of pelvic floor dysfunction?” [Mixed methods question using qualitative data from interviews and quantitative data]

A primary question for the purposes of publication for this enquiry was: *“...Is the Edinburgh Postnatal Depression Scale (EPDS) effective in identifying posttraumatic stress disorder (PTSD) symptoms associated with somatic vaginal birth injuries?”* [Mixed methods question]

Three phases of analysis were employed in this study. The first phase analysed quantitative data of the entire population (n=800+) from published pelvic floor function research³⁴ that concerned: birth related LAM damage and OASI; obstetric variables of mode of delivery, length of 2nd stage of labour and, size of baby; total scores of the EPDS questionnaires, obtained at the same time as pelvic floor assessment.

Second and third phases utilized published qualitative data from a subset of women (n=40), who had been diagnosed with LAM injury and were interviewed regarding birth experiences⁴⁰. Data included: disclosed somatic pelvic floor symptoms and trauma related symptoms of PTSD. Mixed methods enquiry analysed quantitative data from respective EPDS scores together with, that of pelvic floor dysfunction. These phases were a secondary census of birth damage that merged quantitative data with that obtained from qualitative interviews, by way of triangulation to obtain different and complementary data to explain research questions^{36 47}.

The first phase of analysis employed quantitative research methods to examine whether total continuous scores of the EPDS, obtained from primiparous mothers (n=800+), were associated with LAM damage, OASI and obstetric variables regarding mode of delivery, size of baby and lengthy 2nd stage of labour. Descriptive univariate analysis assessed the distribution of individual variables concerning: overall mean and standard variation, median and inter-quartile range for numeric data regarding the EPDS outcome, score, size of baby, length of 2nd stage of labour, together with counts and percentage for categorical data of LAM damage and OASI, mode of delivery. Bivariate descriptive analysis assessed the relationships between the EPDS score outcome with the explanatory variables. Univariable inferential linear regression analysed the associations of explanatory variables with the outcome [see Table 5].

The second phase analysed data from the subset of interviewed women (n=40) who had all been diagnosed with LAM injury. Explanatory sequential mixed methods analysed the associations between FPOP, urinary and fecal incontinence and sexual dysfunction and respective EPDS scores from this cohort (n=40) [See Tables 1 & 2].

The third phase also employed mixed methods analysis to assess whether pelvic floor dysfunction from LAM injury was linked to disclosed PTSD symptoms [see Tables 1 & 2].

3.10 Evaluation

Enquiries in this thesis adhered to the principles of research integrity regarding evaluation criteria. This process involved demonstrating trustworthiness of data collection, analysis and interpretation by procedures that: maintained ethical and rigorous technical methods; described transparent data generation and management; and justified the relevant methodology and methods [see Chapters 4 and 6 – Tables and Appendices]. Credibility was also considered as integral to internal validity of qualitative research approaches. Hence, published results⁴⁰ of interviews contained descriptions of contextual significance that were likely to be recognizable to women who shared birth trauma experiences, together with perinatal clinicians, who cared for the selected population³⁸. The credibility of interview enquiries in this thesis, are defended by research practices that included: 'reflexivity' or attending to the context of knowledge construction regarding researcher bias³⁷ [see

Chapter 1: Author's reflections] triangulation that involved, answering the research question through interviews, observation, documentary analysis and description of the interpretation process; verbatim quotations from the data are supplied to illustrate and support their interpretations; prolonged engagement with participants or multiple points of contact; optimal storage of raw data; member checks with participants to ensure veracity of interviews; researcher debriefing. [see Chapter 4 – Appendix 3; Chapter 6 – Appendix 5]

The criterion of *applicability or transferability*, that is the means of evaluating external validity³⁸, was demonstrated by results from women's interviews, that sought to contribute to the body of knowledge regarding the poorly understood relationship between somatic and psychological sequelae of traumatic vaginal birth. Results aimed to facilitate meaningful knowledge for clinicians and researchers, regarding identification of adverse clinical implications for a population of postpartum women, who had sustained the lesser known LAM injury. [see Chapters 4 & 6: Results]

Research methods additionally adhered to the principles of *consistency or dependability* of results, as a means of assessing reliability that was achieved by logical, traceable, and distinctly documented processes [see Chapters 4 & 6 – Tables and Appendices].

Approaches abided by *confirmability*, a criterion of research integrity that stipulates interpretations and findings are shown to be derived from the data. This was evident by the Framework Method of analysis, in conjunction with women and men's quotes, that are transcribed in each chapter. Notably, confirmability is shown to be established when credibility, transferability, and dependability are all achieved regarding reasons for theoretical, methodological, and analytical choices throughout the entire study⁵⁰. Quantitative research in this thesis was retrospective and had been previously validated as per Epi-No trial³⁴ and pelvic floor function imaging studies^{5 53}

CHAPTER 4: INTERVIEWS WITH WOMEN WHO SUSTAINED LEVATOR AVULSION

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ORIGINAL ARTICLE



Psychological consequences of pelvic floor trauma following vaginal birth: a qualitative study from two Australian tertiary maternity units

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Abstract

Vaginal birth may result in damage to the levator ani muscle (LAM) with subsequent pelvic floor dysfunction and there may be accompanying psychological problems. This study examines associations between these somatic injuries and psychological symptoms. A qualitative study using semi-structured interviews to examine the experiences of primiparous women ($n = 40$) with known LAM trauma was undertaken. Participants were identified from a population of 504 women retrospectively assessed by a perinatal imaging study at two obstetric units in Sydney, Australia. LAM avulsion was diagnosed by 3D/4D translabial ultrasound 3–6 months postpartum. The template consisted of open-ended questions. Main outcome measures were quality of information provided antenatally; intrapartum events; postpartum symptoms; and coping mechanisms. Thematic analysis of maternal experiences was employed to evaluate prevalence of themes. Ten statement categories were identified: (1) limited antenatal education (29/40); (2) no information provided on potential morbidities (36/40); (3) conflicting advice (35/40); (4) traumatized partners (21/40); (5) long-term sexual dysfunction/relationship issues (27/40); (6) no postnatal assessment of injuries (36/40); (7) multiple symptoms of pelvic floor dysfunction (35/40); (8) “putting up” with injuries (36/40); (9) symptoms of posttraumatic stress disorder (PTSD) (27/40); (10) dismissive staff responses (26/40). Women who sustain LAM damage after vaginal birth have reduced quality of life due to psychological and somatic morbidities. PTSD symptoms are common. Clinicians may be unaware of the severity of this damage. Women report they feel traumatized and abandoned because such morbidities were not discussed prior to birth or postpartum.

Keywords: Birth trauma · Pelvic floor · Avulsion · Morbidities · PTSD

Brief summary: Symptoms of postpartum post-traumatic stress disorder were commonly reported by women who delivered vaginally and sustained unexpected and unexplained major pelvic floor trauma

Introduction

Maternal birth complications in the form of levator ani muscle (LAM) damage are more common than generally assumed (Dietz 2013). Anecdotal evidence suggests these injuries may be a marker for psychological trauma (Skinner and Dietz 2015). This study of maternal birth experiences examines the association between traumatic vaginal delivery and psychological symptoms. Unexpected and unexplained birth events may be particularly distressing; childbirth is commonly viewed as a predictable and positive life experience (Ayers and Ford 2009). Surprisingly, maternal reports of pelvic organ prolapse, sexual dysfunction, and fecal and/or urinary incontinence are rarely investigated formally as compromising psychological health after birth; often they are regarded as negligible and likely to improve over time.

Contemporary literature usually defines somatic damage as “perineal trauma” in the sense of episiotomy and perineal tears. While there is ample literature on women’s experience of perineal birth trauma (Priddis et al. 2013; Williams et al. 2005), the interviews reported here specifically examine the consequences of LAM avulsion, although some participants also sustained severe perineal trauma. Since the advent of translabial 3D/4D ultrasound, clinicians now classify “pelvic floor trauma” differently. Major damage of this type encompasses of the levator ani muscle “avulsion” (Dietz 2004) or detachment of the puborectalis component of this LAM from the pelvic sidewall. Perineal injuries are significant but noted as separate traumas with different origins. Clinicians rarely identify LAM injury in labor wards or during the puerperium since it is commonly occult: overlying vaginal muscularis is more elastic, stretching without tearing even after the underlying muscle has exceeded its elastic limit (Dietz et al. 2007).

There is now substantial evidence from large epidemiological studies (Gyhagen et al. 2013; Glazener et al. 2013) demonstrating that vaginal childbirth, especially forceps delivery, may be associated with pelvic organ prolapse (POP), anal and urinary incontinence, and sexual dysfunction. A difficult delivery with resulting somatic LAM trauma may have psychological consequences. Postpartum trauma symptoms have been shown to hinder mother and baby bonding and maternal adjustment; negatively affect children’s behavior and development (Garthus-Niegel et al. 2017); adversely affect relationships, and diminish the quality of sexual and marital interactions (Iles et al. 2011; Fenech and Thomson 2014; Coates et al. 2014). Recognition of birth-related post-traumatic stress due to life-threatening complications with long-term mental health issues has occurred only recently (Furuta et al. 2014; McKenzie-McHarg et al. 2015); the literature does not include pelvic floor dysfunction as a risk factor. Hence, we attempted, in a qualitative study, to explore and describe women’s experiences of major LAM pelvic floor trauma.

Methods

Mothers with documented full unilateral or bilateral LAM avulsions, were approached for interviews. Informed consent was obtained and semi-structured interviews undertaken with a focus on individual experiences. The template comprised open-ended questions on antenatal, intrapartum, and postpartum care (see Appendix 1). The interviewer was a midwife with extensive professional experience. Data used in this analysis was obtained retrospectively from participants of the Epi-No trial (Kamisan Atan et al. 2016) and corresponding birth records at two major hospitals in Sydney from May 2013 to October 2014. Primiparous women with major LAM avulsion were identified from a population of 504 women who had returned for a postnatal appointment in the context of this trial. Pelvic floor injuries were diagnosed by 3D/4D translabial ultrasound 3–6 months after the birth of a first child at term, following an uncomplicated singleton pregnancy. Multislice imaging was employed according to a previously published methodology (Dietz 2007; Dietz et al. 2011).

Main outcome measures

The main outcome measures comprised efficacy of hospital antenatal education regarding comprehension of birth process; existence of informed consent to explain potential intrapartum interventions; memory of intrapartum intervention, for example: syntocinon induction, length of second stage, mode of delivery, forceps/vacuum, epidural, episiotomy, and perineal tears; and birth weight of baby. Other aspects were clinicians' attitudes and advice during birth; incidence and/or efficacy of postnatal assessment of injuries and follow-up; referrals to address symptoms of pelvic floor dysfunction; occurrence of sexual health education after delivery; reactions and coping behavior of mother and partner regarding pelvic floor dysfunction and bladder and bowel changes (if any); clinician response to maternal symptoms; maternal emotional state during and after delivery; short/long-term coping mechanisms; and long-term medical follow-up.

Interviews

Women were invited to participate in this study by telephone and email. Options to engage in an interview for 35–40 min were proposed as being via telephone, in a clinical environment face-to-face, or by Skype software application. All participants received a written invitation with information about questions and consent forms. No participants agreed to interviews being audiotaped so the interviewer took written notes which were then emailed to the participants for formal authorization as an unbiased record. Women were given the opportunity to add or change information on these scripts.

Ethical considerations

This study received ethical approval from the local Human Research Ethics Committees (NBMLHD 07-021 and SLHD RPAH zone X05-0241). Consideration was given to the personal nature of questions and responses; anonymity, confidentiality, valid consent, and the right to withdraw from the study were emphasized. All participants were offered clinical and psychological consultation if required.

Analysis

Thematic analysis of purposeful sampling (Braun and Clarke 2006; Gale et al. 2013) was undertaken by two researchers with an inductive approach. A framework method analyzed data and consistent coding matched identified themes in the template (see Table 1). Saturation of answers was noted at 14 when no new themes were introduced. In-depth analyses of key themes took place across the data set and were observed to be 10. These were renamed "statement categories" and reduced to four main overarching themes. Experiences of each participant remained connected to their account within the matrix so the context was not lost. Themes were observed to complement and clarify retrospective quantitative findings on the Epi-No database. Examples where thematic data converged with quantitative findings were women with sexual dysfunction and multiple somatic pelvic floor symptoms displayed psychological trauma and reported marital disharmony (Themes 2 and 3) after sustaining forceps deliveries, long second stages, and/or macrosomic babies (see Table 2).

Table 1: Framework Method for Thematic Analysis

Framework method for analysis	Details
1. Transcription of data	40 Word documents were developed and women's self-edited responses transcribed to interview templates. 40 hard copies were also prepared with large margins for coding.
2. Familiarization with 40 participant responses and immersion in the raw data. After each interview the researcher (also the interviewer) pinpointed particular phrases, incidents, or types of behaviour in each script.	Interviews were separated into 3 sections: 1-14; 15-29; 30-40. These were read in sections several times to locate emerging index themes and categories specific to 40 participants and then transcribed onto 3 Excel files. Both researchers scrutinized these regarding agreement.
3. Generation of initial coding occurred with 1-14 interviews as a base line. Other sections were then scrutinized. Codes were developed into an analytical framework that identified key words, concepts, images, reflections as a foundation for themes. These were rechecked by each researcher to ensure validity and consistency	Each document was read line by line to capture the participant's own words and maintain women's experience at the centre of the account with a constant comparison to the rest of the data. Data reduction was utilized to create categories re codes. Researchers agreed on the initial codes. At this stage saturation seemed to be at 14 interviews
4. Codes were indexed into sub-themes and themes from participant responses	These were developed in order to accurately depict the common data within the context of the research e.g. were psychological consequences linked to somatic injuries?
5. Recognition of how themes were patterned to tell an accurate story about the data.	This process involved understanding themes and how they fitted together with the given codes. Qualitative themes were also observed to complement and clarify retrospective quantitative obstetric findings on the Epi-No database. Examples of this convergence are included in Table 2a of results regarding 'obstetric details of participants'.
6. Ten themes were summarized and re-named as ' category statements ' and later reduced to 4 overarching themes. All data was recorded on an Excel document/ matrix spreadsheet.	The researchers defined/ described each 'category statement' and which aspects of data were being captured.
7. Data was interpreted.	Four main themes emerged as ' over- arching ' interpretive propositions that explained aspects of the data and were articulated by interrogating data categories through comparison between and within cases.

Adapted from: Gale NK Heath G Cameron E Rashid S and Redwood S (2013) Using the framework method for the analysis of qualitative data in multi disciplinary health research *BMC Medical Research Methodology*; 13(117): 1-8. Doi: 10.1186/1471-2288-13-1

Glossary of key terms used in Framework Method

Analytical framework: The set of codes organised into categories and jointly developed by 2 researchers to manage and organise the data.

Categories: During the analysis process, codes were grouped into clusters around similar and interrelated ideas or concepts.

Code: The descriptive or conceptual label that was assigned to excerpts of raw data

Data: The written texts of the women's interviews

Indexing: Systematic application of codes from the agreed analytical framework to the whole dataset

Matrix: The Excel spreadsheet containing cells that summarized women's data using columns and rows

Themes: Interpretive concepts or propositions that described aspects of women's data and were the final output of the analysis of the whole dataset.

Table 2: Obstetric details of participants

Obstetric Details	Quantitative data extracted from Epi-No database
Gestation at birth:	38-41 weeks
Normal vaginal delivery:	n = 14
Vacuum extraction:	n = 8
Forceps instrumentation: These women exhibited 3-4 trauma symptoms [per DSM-5]	n = 18 (participants who experienced forceps delivery and exhibited 3-4 emotional trauma symptoms)
Length 1 st stage labour:	Duration: 90- 1440 minutes Mean: 620 minutes
Length 2 nd stage labour: Participants displaying 3- 4 trauma symptoms (as per DSM-5) experienced lengthy 2 nd stages > 120 minutes (2 hours) One participant endured 2 nd stage for 314 minutes and was so traumatized she refused verbal interview but still wished to be part of the study and offered her responses via email on the template. This was accepted 16 of these 18 participants with long 2 nd stages of labour disclosed sexual dysfunction	Duration: 22-317 minutes Mean: 60 minutes n =18 (participants who endured 2 nd stages of labour > 120 minutes) as per list: 125, 126, 127, 145, 148, 159, 164, 177, 178, 180, 187, 189, 193, 219, 220, 283, 314, 317 minutes n = 1 (participant who endured labour for 314 minutes) n = 16 (participants who disclosed sexual dysfunction)

Birth weight of baby: Participants who delivered babies > 4000 grams displayed 3-4 trauma symptoms (as per DSM-5)	Range of weights: 2400-4680 grams Mean: 3600 grams n = 4 (delivered babies > 4000grams)
Identification of LAM avulsion (levator ani muscle) in delivery suite	n= 0
Identification of OASIS (obstetric anal sphincter injuries) at delivery	n= 5
3D/4D ultrasound diagnosis of LAM	n= 40 Mean: 114 days after delivery
D/4D ultrasound diagnosis of OASIS	n= 22 Mean: 114 days after delivery

Results

Statement Categories

The following statement categories and clinical attributes were identified within the context of the interview and quantitative findings (see Table 2, Table 3, and Table 4). After analysis, we identified four overarching themes:

Table 3: Characteristics of participants

Characteristics of interviewed participants	Details
No. of women invited:	n= 70
No. of women invited:	n=40
No. of women declined:	n= 29
No. of women removed from dataset:	n=1 (participant was interviewed but did not return consent)
No. of years interviewed after delivery:	Range: 1-4
Mothers' age in years at delivery	Range: 21- 40.5 years Mean age: 32.9 years
Ethnicity of participants:	Caucasian: n=37 Asian descent: n =3
<i>Participants in public hospital care with public clinicians</i>	<i>Public clinicians and care: n=37</i> <i>*subsidized by Australian Government</i>
Participants in public hospital care with private clinicians	<i>Private clinicians: n=3</i> <i>*private health insurance</i>
No. of Face- to- face interviews	n= 5 participants (clinical office at university)
No. of Skype interviews	n= 4 participants
No. of telephone interviews	n= 30 participants
No. of interviews via email only	n =1
Length of interviews	Range: 30- 218 minutes Mean: 64 minutes (often entailed debriefing)

Table 4: Identified statement categories from 40 interviews of primiparous women after birth trauma

Identified statement categories & women's comments	n= 40
<p>1. Subjectively inadequate antenatal education resulting in poor preparedness for birth.</p> <p>"...I thought we were not given accurate information at all."</p> <p>"...Poor standard of education – a waste of time."</p> <p>"...I felt brainwashed -classes are biased towards natural birth"</p>	29
<p>2. No information provided by clinicians on potential postnatal pelvic floor morbidities.</p> <p>"...No one informed us about damage down there. I had never heard of pelvic organ prolapse or rectocele until I had them?"</p> <p>"... Now I have to live with this debilitating injury and life afterwards."</p> <p>"...Too much idealistic talk about relaxing and breathing before"</p>	36
<p>3. Conflicting advice from clinicians before, during and after birth.</p> <p>"...Conflicting opinions from clinicians in front of us seemed very disconcerting– who is right?"</p>	35
<p>4. Partners traumatized by unexpected events.</p> <p>"...My partner was of no use ... he was in shock I am sure."</p> <p>"...He never speaks about the birth – if it is brought up he closes down."</p> <p>"...He explained the birth to friends ... and they thought baby and I had died."</p>	21
<p>5. Long term sexual dysfunction/ relationship issues</p> <p>"...I did not have sex for 2 years –and now it is not at all good- it's just too difficult to navigate."</p> <p>"...My partner thinks I am avoiding sex – can you explain the damage to him – I can't."</p>	27
<p>6. Nil postnatal assessment of pelvic floor or perineal injuries.</p> <p>"...GP's are of no help – they never assess you down there and community nurses only check baby."</p>	36
<p>7. Multiple symptoms of pelvic floor dysfunction including urinary and/or fecal incontinence, female pelvic organ prolapse, chronic pain, sexual dysfunction</p> <p>"...I feel like my insides are falling out – how can I manage lifting and work?"</p> <p>"...I can't stand for long periods?"</p> <p>"...Unable to do exercise - everything hangs out or I wet myself. I need to be near toilets"</p> <p>"...How do I explain a vaginal prolapse to my boss?"</p>	35

<p>8. 'Putting up' with injuries that clinicians did not assess</p> <p>"...No one else in the mother's group has this problem." "...If I had a broken arm I could tell people – no one can see this injury..."</p>	36
<p>9. Symptoms of postpartum post-traumatic stress disorder (PTSD): poor baby bonding, flashbacks during sex, detachment, avoidance & anxiety.</p> <p>"...I never doubted that I had PTSD after that delivery." "...I could not attach to my baby for 6 months and they thought I had PND." "... I booked in for a termination next pregnancy but managed to change my mind when CS was offered because I really wanted to have a 2nd baby." NB: All symptoms met formal criteria for DSM-5 [APA, 2013]</p>	27
<p>10. Dismissive reactions from poorly informed clinicians to maternal injuries/symptoms.</p> <p>"...The midwife said that this was OK... but I knew it was not normal and I felt abandoned." "...The doctors and midwives really did not understand the situation and left me with this terrible injury."</p>	26

Overarching themes

Theme 1: Lack of accurate information about potential birth complications. resulting in pelvic floor morbidities (statement categories: 1-3, 6)

A core finding was women reported they would have preferred accurate information on potential complications of vaginal birth, along with options about given clinical situations. Predominant issues that obscured understanding of somatic trauma and its effects were reported to be inadequate preparation in scheduled classes. Mothers had not understood what was happening to them and felt educators idealized birth. "...I felt brainwashed – classes are biased towards natural birth and seem to romanticize delivery." Many noted they knew motherhood would be difficult but became overwhelmed when physical and emotional health or relationships were compromised to such an extent. Some participants felt the need to warn other pregnant women. "...I had to bite my hand to stop myself telling other women how bad birth and delivery will be." Conflicting advice exacerbated the impact of traumatic intrapartum events. "...The doctor wanted to take me to theatre ...but the midwife wanted to wait." Women stated they were traumatized by unexpected and unexplained procedures and distress extended into the postnatal period. "...No one checks you after birth in the hospital or later – it stays hidden. I feel isolated and abandoned." Most complained that clinicians dismissed injuries that were obvious to women and did not offer assessment. "...No one informed me about damage down there. I had never heard of pelvic organ prolapse or rectocele until I had them? ... Now I have to live with debilitating injuries and life afterwards." Most mothers undertook pelvic floor muscle exercises but resigned themselves to damage when there was no positive effect. Lack of therapeutic efficacy seemed to exacerbate psychological issues. Interview findings noted altered body image. "...I hate my body it has never returned to normal." Women wondered why they had not been informed of risks and warned ...Overall, it has been a nightmare of no medical accountability, no support, lack of continuity ...My life has been severely affected by a terrible labour and delivery that left me with a blown out pelvic floor."

Theme 2: Impact on partner and sexual relationships (statement categories: 4, 5)

Interviewees' reported communication between partners regarding "sex" was strained and both parties felt "...let down" by both antenatal and postnatal clinicians who had told them sex would return to normal after birth. When this did not eventuate, women became anxious and blamed themselves; many stated these inaccurate facts had adversely affected their sexual lives and marital harmony. Most participants said they were unsure whether partners really understood their sexual dysfunction post birth. Resumption of sexual activity was delayed for up to a year postpartum, and it was experienced as emotional and invasive, sometimes initiating flashbacks of delivery. Some women stated they wanted vaginal plastic surgery or asked the interviewer to talk to their partners. Many believed men thought their complaints or silence was an excuse to avoid sex; most participants said they had no sensation and just wanted sex over; one woman said she felt like a "...sausage is between my legs and sex is impossible"; varying degrees of pain, dryness, and scarring were all noted up to a year or more later "...Every aspect of my life has been affected including my relationship with the baby's father who has left me. How can I ever navigate sex with another partner?"

Theme 3: Somatic and psychological symptoms (statement categories: 6-9)

Open-ended questions regarding bladder, bowel, and sexual function yielded a number of explicit responses: many reported symptoms of prolapse such as a vaginal bulge or dragging sensation; vaginas were perceived as altered and "not belonging" to the woman, "...my whole vulva was hanging out – I could see it in the mirror from behind and it did not seem part of me – everything is unrecognizable down there."

Urinary incontinence varied from a total lack of control in the first months postpartum to stress incontinence when exercising "...after I change my baby's nappy I need to change mine." Multiple symptoms of bowel dysfunction were reported, but anal incontinence was rarely mentioned in interviews, although evident in quantitative data of assessments by doctors. In about 2/3 of women, somatic symptoms were paired with psychological symptoms suggestive of PTSD, such as flashbacks, dissociation, avoidance reactions, and anxiety. Women reported that they were "...shell shocked," "...in a bad / terrible place," "...did not tell anyone," "...detached," denying symptoms; needing to flee from the hospital to the security of home; "...numb;" experiencing poor bonding with baby. Many were still numb at the time of their ultrasound appointment (performed as part of the parent study) 3-6 months after birth and did not retain information or under- stand injuries "...I was in shock...why am I unable to get any health professional to understand? I feel abandoned." "...I am weak and do not measure up as a mother." "...This is a hidden injury; I cannot tell anyone."

Theme 4: Dismissive reactions from postnatal clinicians (statement categories: 5-10)

Women reported health care providers dismissed their at- tempts to enquire about postpartum birth damage symptoms and they became anxious, numb, and isolated, especially when clinicians did not offer assessment or treatment options. At interview, they exhibited shame and stigma about vaginal injuries that had been clinically viewed as normal outcomes of birth and often said "...I just put up with the consequences – it is part of having a baby." Another said: "I was in shock – devastated and unable to get any health professional to under- stand. I was overwhelmed by their incompetence and unconcerned manner." Interviewees reported clinicians rarely allowed them to discuss personal/sexual problems and dismissed their concerns with comments like "...it will get better." Women had hoped for more information and noted: "...GP's are not of any use when you mention intimate stuff – they are too busy."

Discussion

Main findings

This study increases our knowledge regarding postpartum psychological experiences of women known to have suffered major somatic pelvic floor damage. It offers insight into mothers' coping behavior concerning lack of antenatal information on risk factors of vaginal births; postpartum impact on marital relationships; discovery of unexpected somatic vaginal symptoms; and feeling dismissed by clinicians. During interviews, women were given an opportunity to reflect on antepartum, intrapartum, and postpartum issues that had previously been unidentified. Many exhibited adverse coping behaviors that included the following: anxiety, avoidance, detachment from babies/ partners, and numbing; distress that sexual relations were almost impossible and involved unwelcome flashbacks of the birth; feelings of stigma that their bodies had not met the required standards of a natural birth; a belief had failed as mothers and could not tell anyone. Women stated that contact with researchers in this study had been a welcome chance to debrief because no one else believed them. Most said they had never heard of rectoceles, cystoceles, or vaginal prolapses and wondered why clinicians had not informed them prior to delivery.

A significant finding is that participants displayed psychological trauma symptoms as maladaptive "coping behaviors" to unexpected and unexplained somatic injuries and were unable to move forward.

Ayers' team in the UK (Ayers et al. 2015) have extensive research regarding the causes and effects of PTSD after birth and propose that substantial empirical studies now demonstrate a proportion of women develop postpartum PTSD due to events of birth. Related symptoms of anxiety, numbness, avoidance, dissociation, and flashbacks of traumatic deliveries, as specified in the Diagnostic Statistical Manual of Mental Disorders-V (U.S. Department of Veteran Affairs 2017), are observed to have potentially wide-ranging consequences. Minimal research exists on prevention, assessment, and intervention of this often-undisclosed perinatal mental illness, and many women do not typically receive the treatment they need to recover because they feel stigmatized and conceal distress. These UK studies purport contributing factors of stigma may be both external and internal, the former involving stigmatizing attitudes of the general public and the latter where mothers believe this negative appraisal applies to them (Moore et al. 2016).

Participants in our study exhibited comparable symptoms, along with negative perceptions of shame and failure from unforeseen somatic vaginal injuries. Women reported they did not really understand their physical damage and mental health consequences due to insufficient antenatal discussion of birth risk factors. This correlates with research that notes a plausible reason women do not seek help is their lack of information (Jorm et al. 2006). Studies linking PTSD-related symptoms as psychological sequelae of somatic pelvic floor damage are absent in the worldwide literature and not included in Ayers' research; this cohort appears to be unidentified and unrecognized.

Refusal of audiotaped interviews by women in this study also seemed to reveal substantial symptoms of anxiety and stigma regarding disclosure of birth damage because they did not want to upset maternity clinicians. One author proposed that affected mothers' inherent distress is a direct result of trauma sustained in the labor ward and yet women feel bound to be grateful to the very people who caused that damage (Hilpern 2003).

Usually, qualitative research relies on mothers' own reflections of morbidities (Herron-Marx et al. 2007) and does not employ accurate assessment as observed in this study. There is evidence in the literature of analogous poor data regarding postnatal care that notes lack of insight into what comprises normal postnatal pelvic floor recovery and severe morbidities; women are typically

uniformed about pelvic floor dysfunction and discuss options with friends who falsely tell them injuries will resolve (Buurman and Lagro-Janssen 2013). One review observes there is a profound silence in the research that surrounds this pivotal postpartum period (Borders 2006).

Most agree that an imperative exists to explore ways of enabling women to discuss physical, psychological, sexual, and social demands related to childbearing and decide whose responsibility this is, when leading strategic development of postnatal services. Our participants reported they were “in the dark” and encountered significant challenges finding physical assessment so they remained silent. Undisclosed perinatal mental health issues are known to result in adverse outcomes for women and their families. This research observed a direct association between somatic injury and psychological trauma after birth that was frequently undisclosed.

Strengths and limitations

This interview study built on quantitative data that had retrospectively been diagnosed in women with LAM avulsion (Dietz 2013) to clarify qualitative findings. An objective diagnosis of major somatic trauma was implemented, thus avoiding the detection bias inherent in intrapartum clinical diagnosis. Contrary to the original study plan, we were unable to audiotape interviews. Women were fearful their negative perceptions of maternity care might be quoted back to clinicians despite the caveat of privacy and confidentiality. Disclosure of these traumas was difficult and appeared to reflect stigmatized belief processes that women’s bodies had failed them.

One interview was conducted by email because a distressed woman requested this alternative mode during a 30-min discussion inviting her to be part of the study. She explained that even after 2 years, she was still experiencing trauma symptoms and wanted to be included; it seemed urogynecologists from this research had assisted her debriefing at her 3-month postnatal ultrasound appointment, but she noted: “...I have unfinished business about this labour.” It was decided this data should be allowed because the authors believed her input was credible and added to the data set by highlighting the intense psychological trauma she experienced after events of birth and discovering injuries. Her replies were articulate and demonstrated an authentic voice.

Comments: “...There is a big push towards natural delivery... they all say that you were made for it and this is how it’s going to be... even if the baby is sideways and won’t turn, we will try everything to get him out naturally ...because that’s what everyone wants ...I still think about my delivery all the time- it is always on my mind. I experience anxiety, panic attacks and flashback ...I would like that delivery to be erased from my brain if possible.”

We were mindful that these interviews had the potential of distressing participants, so endeavored to assist women with amenable options to protect their mental health. Recent research has shown writing about traumatic events can decrease postpartum symptoms of anxiety or PTSD (Thompson et al. 2015). Although transcribing responses during interviews was not the intention, the process elicited optimal data because women could add/change information later on the template. Generally, the choices of phone, face to face, or Skype gave flexibility and facilitated rapport and respect that enabled women to speak freely.

Mothers gave birth in public hospitals and represented the majority from a publicly funded Australian health care system that entitles all residents to subsidized treatment from accredited clinicians. A few had private obstetricians but all practitioners are regulated by a national agency. Recruitment of participants was problematic because women hesitated to trust the study or interviewer and skill was required to reassure them. All aspects of the interview required reassurance as regards

privacy and confidentiality. Sensitive questions on sexual dysfunction entailed diplomacy; many women were not prepared to go into detail; participants addressed these issues later in writing or not at all. Findings of anxiety and “avoidance of disturbing memories” emerged during interviews.

Taped interviews may have yielded poorer information on sensitive topics. Participants collaborated regarding consent forms and self-editing of the template, but at times took weeks to return their version as a record. Women were often emotional during interviews, necessitating empathy, as well as extensive knowledge of maternity and mental health issues. All participants were offered clinical and psychological follow-up and often remained in contact with the interviewer. Fifteen women were given details of available urogynecologists and/or psychologists. In NSW, midwives do not have the scope of practice to assess major pelvic floor trauma such as levator avulsion and 3rd/ 4th degree tears; urogynecologists’ expertise is essential for this degree of somatic trauma; all clinicians are mandated to adhere to *Maternity – Towards Normal Birth* (Anonymous 2010), and this policy does not include risk factors of pelvic floor complications; perineal injuries are frequently confused with the more recently classified LAM damage; maternity units do not formally assess antenatal fetal weight regarding macrosomia to forewarn women of risks to pelvic floor function. The interviewer corresponded with relevant clinicians regarding participant compliance. This was deemed judicious despite time restraints, given the risk of serious psychological morbidity after severe somatic damage. During each interview, vigilance concerning mental distress was essential and the option of abandoning the interview was canvassed repeatedly. None of the 40 women exited the study during data acquisition. The interviewer received debriefing sessions with a hospital counselor.

Interpretation

Major somatic trauma after vaginal birth in the form of levator avulsion is one of the main causes of pelvic floor dysfunction with potential for lifelong morbidity. Correspondingly, undisclosed perinatal mental health issues are a major public health concern. Women in this study sustained LAM avulsion with resultant morbidities and exhibited significant psychological morbidities in the form of anxiety, PTSD symptoms, and stigma. Participants were often relieved to be interviewed and expressed comments like: “...your study is a lifeline, no one else seems to believe me and I do not know where to turn for help.” Themes demonstrated they experienced multiple barriers to help-seeking behavior and felt abandoned by a medical system that did not recognize or identify either trauma. How can clinicians address some of the issues raised by our interviewees? The solution, like the problems described, is complex. Providing potentially alarming details about physical and psychological complications needs to be done in such a way as to enhance the contract of care and mutual respect rather than increasing anxiety; this may require additional training for midwives, obstetricians, GPs, and other involved clinicians. This is particularly urgent in view of a recent UK Supreme Court decision, which explicitly affirms the autonomy of the obstetric patient (Montgomery v Lanarkshire Health Board 2015).

Conclusions

Women in this study suffered considerable somatic and psychological morbidities, including pelvic organ prolapse, urinary and/or fecal incontinence, sexual dysfunction, and PTSD symptoms. It seems their reports were dismissed by clinicians as foreseen issues after birth. Participants’ undisclosed post-partum mental health issues could be seen as a serious by-product of a health care system that has not recognized or identified women’s assertions of somatic birth injury. Poor knowledge and stigma noted in this study also appear to have been barriers to help-seeking behavior that adversely affected lifestyle. Psychological symptoms uncovered in our interviews suggest a possible formal diagnosis of PTSD in some women: a disorder that occurs secondary to exposure to stressors that are outside the usual range of human experience.

It seems that women who have sustained these somatic vaginal injuries and resultant emotional distress could be greatly assisted by perinatal clinicians who acknowledge their concerns and provide relevant diagnostic and therapeutic services. This may include (1) routinely discussing potential complications of vaginal delivery during antenatal consultations; how information and responsibility for decision-making will be shared; transcribing this information into a Birth Document that both patient and provider sign; (2) comprehensively identifying and enquiring about physical and psychological problems during postpartum consultations; (3) validating maternal concerns as they arise; and (4) implementing evidence-based assessment services with both partners being included as appropriate.

Authors' contributions:

Eizabeth Mary Skinner: project development, template construction, data collection, data analysis, manuscript writing

Bryanne Barnett: manuscript writing

Hans Peter Detz: project development, approval of protocols, data analysis, manuscript writing

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

Addendum: Subsequent to the publication of this paper, further interrogation of the data revealed that participants (n=5) reported that postpartum emotional distress did not match PND questions on the EPDS instrument at 6 week routine screening. Respective women sought consultation with psychologists and were diagnosed with PTSD.

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Appendices

Appendix 1a: Template of open-ended questions for interviewees

Introduction

1. Confirm that the participant has signed the consent form.
2. Explain the interview can be discontinued if the participant wishes.
3. Indicate that the participant can withdraw their responses later if required
4. Clarify there are no right or wrong answers.
5. Emphasize responses are strictly private and confidential.
6. Explain that some of the questions may be sensitive and personal.
7. Affirm that the researchers appreciate the assistance of participants.

Relevant participant information extracted from Epi-No database

Participant name:

BMI (Pre-& during pregnancy):

Height:

Date/ mode/ duration of interview:

Maternal age at delivery:

Email/ Mob e/Land ne no:

Mode of Delivery (induction, epidural, Forceps, Ventouse, episiotomy, perineal and vaginal tears):

Ist Stage Labour duration:
2nd Stage Labour duration:
Baby weight/ head circumference/ position:
Estimated Date of Delivery:
Date of Delivery:
Gestation at delivery:
Postnatal symptoms of pelvic floor/ perineal dysfunction:

Domain 1: Pre/ Antenatal Care

What did you know about childbirth at this stage?
What did you understand about your body regarding childbirth at this stage?
What or who was the source of your information?

Domain 2: Antenatal Care

Where did you go for antenatal care and education - if anywhere?
What can you remember about this experience?
Can you tell me any information on childbirth/ delivery you received during the antenatal period?
What impact did this education have on you and your partner at that time?
Now you have delivered would you change anything about your antenatal care and education?
What were your expectations regarding childbirth, your health and living with baby at home afterwards?

Domain 3: Labour and Delivery

How did you deliver your baby?
Can you describe the course of events?
Did you understand what was happening?
How did you feel when baby was born?
What was your partner's reaction during labour and delivery?

Domain 4: Postnatal Period – in hospital

Tell me about your experience in the postnatal ward?
What physical changes to your body did you notice?
When you passed urine or opened your bowels was there any difference from before birth?
Tell me about any psychological changes at this stage after birth?
Did these changes affect you while you were in hospital (if relevant)?
Did you notice that your perineal area (around vagina and anus) felt any different?
What was your experience of breast-feeding and time with your baby?
Did you notice that your vagina felt different after birth?
Who did you tell about any alterations to your perineal area (if any)?
What was your partner's reaction to the postnatal stay?

Domain 5: Postnatal Period – adjustment at home

Can you tell me about your physical health at this stage? For example: passing urine, opening bowels, vaginal sensation?
How was your psychological health at this stage after the birth?
Did you tell anyone about any changes to your physical and/ or psychological health?
How was your relationship with your baby at this stage?
How did you feel about your body image at this stage?
Were your expectations prior to the birth similar to that which occurred?
How were you feeling about sex?

What was happening with your partner at this time?
Did you want to debrief about your delivery at this point?

Domain 6: Long term – after the birth of the baby /before restorative surgery

Can you tell me about your general physical health?
Can you tell me about your emotional or psychological health?
Is passing urine the same as before you were pregnant?
Is your vaginal area the same as before pregnancy?
Are you able to use tampons?
Have you noticed anything different about your bowel habits?
Can you tell me about your overall body image at this stage?
Do you think childbirth has affected your activities of daily living?
Are you able to discuss any changes to your urinary, bowel, vaginal or emotional health with anyone?
Have you resumed sex with your partner? If so, does it feel any different to before your pregnancy?
Do you know how your partner is feeling about sex with you at this stage?
Do you still want to debrief or talk about your delivery?
What are your memories of your labour ward and postnatal experiences now

Extra comments:

Appendix 1b: Confirmation of Accuracy of Interview Notes

This is an accurate account of my responses discussed with the researcher from Sydney Medical School, Nepean Campus, The University of Sydney. This research explores women's experiences of physical vaginal birth trauma.

I have signed and witnessed the relevant consent form and read the participant information sheet.

Name:

Date:

Appendix 2: Consent Form: women's interviews

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INFORMATION FOR PARTICIPANTS

Introduction

You are invited to take part in a research study into the protective effects of the EPI-NO on the pelvic floor. The objective is to investigate whether the EPI-NO system protects the pelvic floor muscles during childbirth. The EPI-NO device is a vaginal dilator which is designed for use in the last 3 weeks before your date of delivery. It can be used up to once a day, for 15 minutes each session. The EPI-NO is a balloon device which is inserted into the vagina, and dilated to a maximum diameter of 10 cm (the expected diameter of the baby's head). The size is increased gradually over a number of sessions, with you only dilating to the level which is comfortable for you. At the end of the session the device is pulled out of the vagina whilst dilated to mimic the delivery of the baby's head. Small studies have shown that the device may reduce the likelihood of vaginal tears, and episiotomy. It is our aim to assess the effect of its use on the pelvic floor muscles, and to establish if it is protective to these pelvic floor muscles. The study is being conducted by Professor Peter Dietz of the University of Sydney.

Study Procedures

If you agree to participate in this study, you will be asked to sign the Participant Consent Form. You will then be interviewed and asked to have an ultrasound. The interview will take approximately 5 minutes, and involve questions relating to your urinary and bowel function, and any prolapse that is present. The ultrasound involves placement of a scanner on the perineum, i.e., between the legs. It does not involve anything internal as the scanner stays on the outside, and you are covered with a sheet to minimize embarrassment. The reason for this approach is that the muscles of the pelvic floor can be seen much better from below than from above. The scanner is covered with a glove, and the examiner is also gloved. The test takes approx. 10 minutes.

After this interview and ultrasound, the computer allocates you to one of two groups. One group is given the EPI-NO device (for you to keep after the end of the study) which is used to stretch the pelvic floor before you have your baby. The device is to be used as per manufacturer's instructions. The other group will continue normal antenatal care, and will not be given the EPI-NO device. In both cases your general care at the hospital continues as before. We'll ask you not to tell staff in clinic and labour ward about the study.

Three months and two years after your delivery we'd like to see you back for a short interview and an ultrasound similar to the one you had at the beginning of the study, regardless of how you've delivered. We'll give you several questionnaire to fill in which requires about 10 minutes of your time. The questionnaires contains some questions of a very personal nature, and you don't need to answer them if you feel uncomfortable doing so. We'd also like your permission to collect information from your medical records about your pregnancy, labour and the birth of your baby for use in this study.

At the time of a follow-up visit we will offer you participation in an optional in-depth interview of 30-60 minutes with a research midwife. This interview will explore your birth experience and pelvic floor health

and also discuss matters related to intercourse. If you were to agree you'd be welcome to bring your partner if you wanted to do so.

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Risks

All medical procedures – whether for diagnosis or treatment, routine or experimental – involve some risk of injury. In addition, there may be risks associated with this study that are presently unknown and unforeseeable. In spite of all precautions, you might develop medical complications from participating in this study. As far as we are aware, there are no known risks associated with the use of pelvic floor ultrasound or use of the Epi-No device.

Benefits

While we intend that this research study furthers medical knowledge and may improve the care of pregnant women in the future, it may not be of direct benefit to you. If you are in the intervention group, you will be able to keep the Epi-NO device for future use.

Costs: Participation in this study will not cost you anything, nor will you be paid.

Voluntary Participation

Participation in this study is entirely voluntary. You do not have to take part in it. If you do take part, you can withdraw at any time without having to give a reason. Whatever your decision, please be assured that it will not affect your medical treatment or your relationship with the staff who are caring for you.

Confidentiality

All the information collected from you for the study will be treated confidentially, and only the researchers named above will have access to it. The study results may be presented at a conference or in a scientific publication, but individual participants will not be identifiable in such a presentation.

Further Information

When you have read this information, Susanne Langer or Professor Dietz will discuss it with you further and answer any questions you may have. If you would like to know more at any stage, please feel free to contact them at Nepean Hospital on 02 4734 1474 or 47342000.

This information sheet is for you to keep.

Ethics Approval

This study has been approved by the Ethics Review Committee of the Nepean Blue Mountains Local Health District. Any person with concerns or complaints about the conduct of this study should contact the Secretary on 02 4734 3441 and quote protocol number 07-022.

EPI-NO Study

PARTICIPANT CONSENT FORM

I, [name]

of [address]

have read and understood the Information for Participants on the abovenamed research study and have discussed the study with the Researchers

I have been made aware of the procedures involved in the study, including any known or expected inconvenience, risk, discomfort or potential side effect and of their implications as far as they are currently known by the researchers.

I understand that my participation in this study will allow the researchers to have access to my medical record, and I agree to this.

I freely choose to participate in this study and understand that I can withdraw at any time.
I also understand that the research study is strictly confidential.
I hereby agree to participate in this research study.

NAME:

SIGNATURE:.....

DATE:

NAME OF WITNESS:.....

SIGNATURE OF WITNESS:.....

Version No. : 8

Date: 15.5.2012

Appendix 3: Women's quotes from interviews

Antenatal experiences

"...They showed us forceps and vacuum extractors. The natural birth film led me astray as I started thinking how many mothers are going to achieve this ideal- what were the statistics? Could I personally do this natural birth thing? I concluded that not many women could do this. My partner and I wondered if it was helpful – such general information. I suppose I thought vaginal delivery would not hurt that much. Mothers need to know it is not a bad thing to have interventions – natural birth is not for everyone."

"...The classes were too long and could have been done in a third of the time. Most of the information on the pelvis they discussed was on the fact sheets for us to read."

'...Educators discussed the cycle of intervention implemented by medical doctors e.g. syntocinon induction, epidurals, forceps. In retrospect this was a sort of propaganda and promotion of natural birth. At that stage, I was keen not to have forceps and definitely wished to seek out a natural birth. After hearing this I emphasized this in my 'birth plan.' These classes talked a lot about protecting the pelvic floor and doing exercises but in retrospect I don't think I really understood the impact pelvic floor damage could have overall."

"...I wish I had been informed of the repercussions of damage to the pelvic floor. My sister had said that I should opt for a C- section like her, because it would protect my 'bits and pieces.' She had no problems and I wish I had not romanticized the whole natural birth thing and followed her advice. I was into the 'too posh to push' thought process. Now I have such awful damage... I wish they had told me about the risks of pelvic floor damage."

"...They did not teach antenatal parents about possible bad outcomes so we were able to make an better decisions. I did not have a mother to explain this to me at the time. I did not understand the significance of the episiotomy – would this have prevented the damage? I was not prepared for this!"

"...No mention of a forceps possibility and no mention of consent form to be signed regarding these instruments. Why did we sign for a C/S in the middle of delivery and not forceps. The classes were too textbook and of no use. During labour when my contractions stopped I thought baby had died. It was useless information that did not prepare me for any problems during delivery."

"...I thought we were not given accurate information at all. Poor standard of education – a waste of time."

"...I felt brainwashed -classes are biased towards natural birth"

"... Some information was given but nothing near what happened during delivery.

"...I am sure my really long labour that ended with forceps caused these problems. The antenatal classes did not give me proper information about the impact of pushing on the pelvic floor."

"...Classes did discuss forceps and vacuum I think... but the educators spent too long talking about relaxing and breathing."

"...Educators gave no information on pelvic floor damage that I now have to live with...why wasn't I told?"

"... No one informed us about damage 'down there'. I had never heard of pelvic organ prolapse or rectocele until I had them?"

"... Why wasn't I told more... I have to live with these debilitating problems and life afterwards."

"...Classes had too much idealistic talk about relaxing and breathing before the birth"

"...In hindsight I think I agree with my husband... he said that we were badly informed by the hospital. I have been reading over my notes made in early labour...so idealistic...I thought we could still have a natural birth, perhaps even a water birth. Given what actually happened, and how quickly it all escalated to forceps intervention, my optimistic hope for a natural (even water) birth is quite ironic."

"...Hospital or private classes did not prepare me for what happened in my labour. I attended both. The private hypnobirthing classes were disappointing for a first time mother. We really should have had more information on those bad complications of delivery... I did not and be understand so much- needed explanation and options."

"...Overall, I would have preferred the educators in the classes to explain more about procedures that the delivery suite staff would be performing... at the time we were confused."

Vaginal delivery experiences

"...Hard to know where to start about my birth.... my experience of delivery was really bad – I was trashed so badly."

"...Felt I had been in a boxing ring and punched severely in my genital region. Later I wondered if all the labour procedures were evidence based.... there was substantial tension between doctors and midwives during my delivery."

Author comment: Mother was a health professional

"...when labour started, I rang the 'birth centre' and they said to stay at home. The next day I went to the high-risk antenatal clinic as my membranes had ruptured and I needed a CTG. That was OK... but then they sent me home and... I started contracting again... and went back to the birth centre... I had not dilated and was given morphine and slept and then delivered in labour ward... I was so 'messed up' from going back and forward."

"...The delivery was nothing like what happened – I was not prepared. There are no prizes or certificates for pushing out a baby vaginally and having a natural birth. 'Yummy mummy' propaganda is all around and the more women repress this stuff it is not addressed. The paradigm is quite pervasive. Doula and natural birth information are 'rubbish'- they say you recover better without surgery and somehow don't believe pain exists. Why are Birth Centre and Labour Ward any different? You just get wheeled from one place to the other – it is the wheel of shame (as a playwright aunt of mine suggested.) YOU HAVE FAILED if you are in Labour Ward!! Every birth should have every option – why is having epidural relief a failure ? Postnatal experiences like I sustained are REAL problems!"

"...I was given an epidural and I vomited a lot and had serious shakes. But... I was still not dilated and I wanted to have a C/S but the theatres were not free. Then I was fully dilated and the theatres were free. I was not talking to anyone I was so tired. Maternal exhaustion was diagnosed and I was given IV saline. The staff seemed to conveniently forget me. Duration was about 26 -27 hours? Then I pushed for 3 hours and this can't have been good for my pelvic floor. Neville Barnes forceps were used and I had a 2nd degree tear and an episiotomy. I think baby was in an occipital anterior position (OA). I was on my back with a lot of pain and needed to turn to the side to get relief. I have blocked a lot of it out though."

".....I started in the Birth Centre... but the labour became so long so... I needed to go to delivery suite - I am unsure when that happened. My partner and Mum were always with me. I think the baby was in an OP position (initially thought it was OA). I remember spending 10 hours with a midwife helping me and that was good. I was offered a Caesarean Section but due to a bad experience from an appendicectomy in Central America and large scar I did not want a C/S. I delivered vaginally in the delivery suite and my baby was delivered by forceps. I don't remember a lot because I was trashed badly. I thought labour would be hard, but didn't realize that I would be so physically injured down there..."

"... I did not understand what was happening during the birth a lot of the time. I was given multiple vaginal pessaries with gel but they did nothing... that experience was horrible... I walked around all day and nothing happened. The staff decided to put up a drip and give me a syntocinon induction and artificially rupture my membranes (ARM). This lasted for 4-5 hours and the medication did not respond – still nothing happened – they had been trying to get me to go into labour for 1.5 days at this stage. Then... they decided to give me a maximum dose of syntocinon and suddenly I was in full-blown labour but still pushing for a long time. Baby was in a posterior position and 'stuck'. When I was transferred to theatres for a possible C/S delivery they decided to give me a spinal anaesthetic, forceps and an episiotomy to deliver baby vaginally. I was not told anything and very traumatized and felt let down."

"...The staff put up an intravenous infusion of syntocinon and tried to do an ARM but this initially failed. I was in the delivery ward for a day and a half and finally they ruptured my waters, gave me an epidural after nitrous oxide did not work and baby was born after 40 minutes of pushing. Despite a few tears I did not need stitching –however I bled a lot in the delivery. I understood what was happening - mostly everything was explained except there was a difficult midwife who sat at the desk knitting and would not come and help me despite my husband's requests for help."

"....I can remember most of the birth...but felt abandoned by the staff... they did not explain stuff.... I know I had a drip but was not sure why this was used – maybe the situation was worsening. ...the staff set up for forceps and the doctor had a foot stool at the end of the bed without wheels and I was worried about flying off the bed with the baby's head. At least I was given Panadol tablets and a lot of internal needles and an episiotomy but no epidural.. it all hurt so much ... but I was not a noisy patient and told herself to cope with it... it was all so horrible How much force were they going to use... my legs were up in stirrups... I felt so unbelievably alone – stage one fright... I was also very anxious about baby and the fact that the room had filled up with more people. No one helped me... they were all telling me that the baby was in distress – but that did not help me. The paediatrician was there and once the head was out the forceps were no longer pulling - at least that was good... but baby was not crying - there was silence... baby was still inside me – what if I never have another contraction...I could not focus on what was happening – then baby was on my stomach and the cord was cut and they took her to the resuscitation table – there was deafening silence... our baby was not crying. I was abruptly asked 'don't you want to know the sex of the baby?' It was a very surreal feeling and felt like it was not really happening and lasted for several weeks... I never felt that I got a positive baby moment...."

"... My delivery was horrific –I commenced my labour in delivery suite with a series of different doctors and midwives, all with differing opinions... over 3 days. I clearly had a large baby on board... she was not engaged and my cervix was only 1-2cm dilated. They gave me so many epidural top ups.. it seemed like nothing was happening but someone said the labour had failed to progress and baby's oxygen levels were

decreasing. To make matters worse... I was vomiting so much... and my partner was asleep in the corner. Finally a decision was made to go to C/S. I was transferred to theatre but the doctor wanted to do a vaginal delivery...but he didn't explain and in hindsight, gave me minimal advocacy. So I pushed really hard... I had no sensation from the epidurals... then they used a vacuum extractor and baby was born with a 1st degree tear. All appeared to be normal but it was not the case. I have terrible injuries down there, that are not going away"

Postpartum experiences in hospital

"...I felt abandoned and traumatized but relieved it was all over... pretty well freaked out by whole process for ages..."

"...My vagina felt like it was broken, bruised, swollen and drooping. I felt like my guts were falling out and I had to sit very delicately."

"...It is very sad that women can't share their experiences as it is a hidden injury and there is no proof because no one can see it."

"...I did not expect to go through so much stuff during this delivery... my vagina was so swollen and foreign...I wish I had surrendered to birth more as discussed with my doula. No good saying anything – the postnatal staff were so intimidating."

"...My genital area was so bruised and swollen – but I suppose pain connects with suffering in the world and gives people a deep and positive experience! It would have been much worse if I had delivered overseas. Pain is a badge of honour..."

"...I told the postnatal staff about my damage and saw a doctor in the pelvic floor clinic at the hospital. The physiotherapist was not any good – she did not help my incontinence... midwives were not that helpful. Everything was totally different down there– I had not experienced this before – swollen and sore."

"...I had the catheter out after 24 hours and was able to pass urine but urinating was not better for at least a month. When I sneezed I wet myself. Bowels were OK. I was very exhausted and 'out of it' and traumatized. Everything felt a lot looser than usual... plus I had a tear with stitches in it, that definitely felt a bit odd. I didn't really talk to anyone about these changes down there. But I was concerned. I remember checking with a mirror because it all seemed so foreign and different."

"...I was given Panadol for pain and 'ice condoms' for swelling – my husband said I was in shock and got really distressed about the condoms- creepy and overwhelming.... I couldn't get off the bed for 2 days – the perineal area was so swollen – I was scared to touch it and I needed a pillow to sit on for a few days.– I asked questions but in the end began to have minimal expectations from staff. It appeared postnatal staff did not consider giving reasonable answers to my questions- not at all. Terrible postnatal ward – incorrect information... bullying behaviour from staff on formula feeding and ridiculous consent forms.... I had cracked nipples and baby was hungry and crying.... I spoke to the midwifery staff but I got no answers... had to manage this with all my injuries"

"...I was very sore and swollen and needed a lot of ice packs... it was really bad... Could not sit.... felt like everything was falling out. I had to sit on the side of toilet to go properly for 2 weeks. Was also very hunched over for ages – unsure why... still have stress incontinence."

"....This ward offered atrocious care! As soon as I could go home I went – the staff did not seem to ask about anything. The stitches near my vagina were very sore and I was really traumatized and exhausted – the staff were too busy to ask me anything!"

"...Baby stayed with me but I was exhausted and shell-shocked. The catheter stayed for 24 hours... the

epidurals had numbed me so much that the pelvic floor damage was not evident initially. When the catheter was removed, I was totally incontinent of urine and I looked in the mirror and could see that my vulval area was swollen and hanging out. The midwife said that this was OK and just swollen... but I knew that it was not normal to see a prolapsed pelvic floor in the mirror. It had completely changed and altered in every way. 4 days later, I began to pass this fluid, which no one seemed to know anything about its origin. Another urinary catheter was inserted... but I was still passing this fluid so I was sent to operating theatres for a cystoscopy because the doctors thought it was a fistula from the bladder into the vagina. Nothing seemed to show up. I was in shock – devastated and unable to get any health professional to understand. I was also overwhelmed by the incompetence of the medical staff and their invasive manner...

I went home with a catheter and this remained for 1 week. After that I needed to wear nappies/ pads as I was leaking urine all the time. I saw a physiotherapist at the hospital who helped me to a point but I still have no sensation when I pass urine and a terrible dragging sensation at period time and I need to sit down often.

My life has been severely affected by a terrible labour and delivery that left me with a 'blown out pelvic floor' (avulsion) and even now I have to sit on the toilet every 1-2 hours to avoid severe incontinence. Every aspect of my life has been affected including my relationship with the baby's father- we have separated. I had a failed Manchester repair surgery 9 months after the birth.... then an insertion of a 'pessary type apparatus with horns' which made me feel sub human and was totally unsatisfactory. Apparently my urethral pressure as noted by urodynamics was nil...my relationships has broken up for good- he is another relationship. This has been a nightmare of no medical accountability, no support, lack of continuity...."

Author comments: Mother is a registered nurse and was considering legal proceedings. She was given contact details of a urogynaecologist and had surgery.

"...My vaginal area felt very different and weird. In fact it felt horrible – falling apart and heavy. Walking was quite an effort and I felt very proud of myself achieving that skill.

At home... thoughts, somatic symptoms, emotional distress, partners' reactions, help seeking behaviour

"...My partner was pretty layback and sat in the corner and slept for a bit – although I couldn't understand how he could do that. I didn't want him in my space. We decided that he would stay up the 'good end' of the bed and not see all the difficult bits because I was worried it may detract from my 'attractiveness. In retrospect we felt that he might have missed out on something – so we will maybe change this next time..."

"...It was a difficult time – never the same perineum. It took 1 month to feel that my perineum was any better to sit down. Little things accumulated into big things. A woman GP – she told me nothing could be done – I was very distressed and disheartened. It is disgusting – my perineum that is...I hate my body – tried going back to the gym 6 weeks later – OK – can't tell if I am doing pelvic floor exercises. Months later and then it occurs in the dark – I lie there and hope it is over – can't be bothered. Yes – it is good to talk and it is cathartic- finally someone is listening!"

"...Doctor told us we could have a C-section... but it was disconcerting that the midwife was so opposed to it. There were too many people in the delivery...jeans, clothes, shoes so uncomfortable... life is so different now... sex makes me leak."

"...This was the most horrific experience of my life...my pelvic floor is not like a 'fractured arm injury' where you could discuss the pain and effects with all and sundry. It is a hidden injury and women cannot share this with anyone – there was no validation or proof. This is not talked about in mothers' groups – if you do you only get intimidated – what's the point!"

Author comment: Mother spoke to interviewer, face- to- face, for 3 hrs 38 minutes- referral to counsellor suggested but declined.

"...I am just getting on with being a mother. My general physical health is not that good because I have a really bad prolapse of my bowel, uterus and bladder....I am just getting on with everything.... I saw a doctor who put in a pessary to stop the prolapse but that was not that good..."

"...In retrospect, my thoughts about birth and afterwards were nothing like what occurred. I felt everyone had an opinion and were not uniform in their approach."

"...I knew it would be busy but did not think my physical and emotional health would be so compromised."

"...I wish it was easier to cope at home – nothing prepared me for what happened. What used to be my vagina is now all out of shape – I wish this were not the case!"

"...It was difficult because I had previous constipation issues prior to pregnancy. Very sore and then I was bleeding from the bowel."

Author comment: Mother was very distressed at interview.

"...Mothers need to know it is not a bad thing to have interventions – natural birth is not for everyone. I felt brainwashed -classes are biased against pain relief – they said drugs were not a good idea...."

"...I am still very anxious -I hate my body – I want plastic surgery – cannot live with this!!

It may have been preferable if I had been given information about some of those procedures before birth- it is worrying that they did not tell us- we trusted them... I can't imagine why I thought a homebirth would be OK...birth is unpredictable..."

"...I didn't enjoy it one bit. It didn't bring me closer to my baby, it gave me no benefits and I don't believe there would be any benefits to baby from a natural birth either. My overall body image at this stage so many years later is not great, sometimes feel jealous of those who have not had children.... but wouldn't have it any other way, I suppose."

"...To be honest having a natural birth was not something that I would have chosen to do; I was quite afraid of what the impact may be on my body. Coming from South Africa where the vast majority of births are done via C-Section, I never really thought that I would not be given this choice. I wish I had been given a C-section. This is not due to the pain experienced during childbirth but rather the pain and discomfort afterwards, which lasted more than 2 years after my first born."

Author comment: Mother was too distressed to speak and wished to write her responses on the template

"...I have a dragging feeling in my pelvis around the time of my periods. I had an ultrasound from a gynaecologist who said I had a displaced bladder... but I have severe wind issues and can't control my bowels. I would like to see the urogynaecologist linked to this study. I saw a physiotherapist– the anal probe was a bit confronting but effective...I had to go for 20 minutes to 1 hour every day for week I think.. then fortnightly. So much to do and look after baby... I think this was diagnosed as OASI."

"...the more I think about it the more angry I get and.... I still wish I was given the choice of C-section. It's not necessary to go through all the pain and discomfort. It makes you no more or less of a mother."

"...I had really bad flatulence for a long time... and at that stage I worried how I was going to ever lecture again!! It was a nightmare – straining bowels, flatulence, faecal incontinence, nervous bladder and prolapsed vagina starting to emerge!

I had a terrible first 10 weeks after a really bad delivery/ birth. Panic attacks at night and hyperventilating – struggling to mother my baby. I did not want any more children! Saw the hospital counsellor. Saw a physiotherapist and was given some device to stimulate muscle tone inserted vaginally – really horrible. "

"...The urogynaecologist from your team was helpful and thoughtful. He told me that I had a grade 2 prolapse and he believed me when I said it was falling out of my vagina into my pants... no one else did. Before seeing him... I tried to talk to the physiotherapist and learn how to sit on the toilet to open bowels... so awful. I also spoke to the midwife from antenatal classes because I was so desperate – she tried to help and suggested a pessary.... I also told the GP- who did nothing. No one seemed to know anything..."

"I am annoyed and angry that this has happened to me. I was in the dark for 6 months – no name for this 'thing' before I spoke to the urogynaecologist on your team.

I have to say it out loud. I feel ripped off! I have no power over what has happened. Also I really didn't like it when the urogynaecologist examined me and pushed my bladder up...made me have flashbacks about my delivery on the floor. I was... am... overwhelmed

I don't feel good in my skin..."

"...What used to be my vagina - is now out of shape - I wish this was not so... the prolapse falls out into pants and the pessary is awful. To make matters worse I have had to have a cone biopsy for a positive herpes virus. Sex is a job and like there is something blocking my vagina. The GP did nothing..."

"...My husband was overwhelmed by the whole experience and thought the care was atrocious, as he could not help me feel better other than changing nappies and attending to our baby. He wanted me to go home also."

"....I was coping the best way I could without medical help."

"....This is a hidden problem that women do not discuss and it is very unfair. What is the point of this being so 'hush hush'! I don't think I knew much about my body before pregnancy – I do not know what is normal or abnormal now."

"...I am only 23 years old and my husband is only 25. I think we will have these 2 kids and have some rehabilitation. I go to mother's groups to try and make sense of all this by gleaning snippets of information from other's experiences. I hear some mothers say... their birth was not quite as they expected; some say enjoyable and positive; others like me.. have pressure to maintain face and just put up with damage ...I need validation somehow. Facebook groups say the same...all women would benefit from a debriefing!...I have unfinished business regarding this delivery and its impact on my life and health...I still remember the feeling that the baby can't get out..."

"...It took me some weeks to feel close to baby – I didn't fall in love with her straight away - maybe from the shock of this delivery. It wasn't her fault – she had bombarded her way out with no help from the staff. I felt very disempowered by staff - they were not nice. I felt that I should not have been treated like this nor should anyone else! I had definitely not had a normal vaginal delivery as they later suggested. What was normal about that horrible birth – it was yuk!

"...I had to see a women's health physiotherapist because I had incontinence. She said my pelvic floor muscles were weak and did some bladder re- training and it got better - not too bad after that –I suppose. The stress incontinence happened again with the second baby but I did pelvic floor exercises and got over it well – I was pleased with myself."

"...I now have massive pelvic floor issues –uterine prolapse and cystocele. I was not aware that this birth caused these until now – I thought it was due to being a woman. At the time I was in so much pain it felt like something was snapping or like an axe slicing my pelvis or bone. I was so swollen down there for an inordinate amount of time. We only had sex 3 times between kids e.g. 2.5 years. Why me - am I bad? I was pumped with syntocinon and the pain was so intense that I thought I was going to die – I looked at the clock on the wall and knew I was not going to survive. My mother may have had these injuries – she never talks about it but my grandmother does. I was not believed and told I was over- reacting."

"...I visited one of the urogynaecologists on your team and after external ultrasound testing, he told me that I had sustained a right 'tearing away' (avulsion) of the muscle from the pelvic bone and had a rectocele or damage to the rear wall of the vagina. He suggested I might have surgery when I had finished having babies.

There is apparently a new surgery where there is re- attaching of muscle to pelvic wall. Otherwise I would need grafting of netting."

Author comment: This mother did not exhibit PTSD symptoms at interview... but contacted me after surgery 3 years later and spoke for 2 hours – she described 3-4 symptoms of PTSD and sought counselling.

Sex and marital issues after birth injuries

"...We almost never have sex."

Author comment: Marital disharmony noted and mother stated her husband was angry.

"...Not really prepared in retrospect – I probably was not aware of how anxious, tired and exhausted I would be. I also am finding it really difficult to navigate our relationship status quo along with coping with a new baby... it is all very stressful."

Author comment: Mother requested that interviewer speak to partner about the extent of her birth injuries that effected sex.

"...My libido is decreased and I feel it would be OK never to have sex again. I think my partner may feel rejected regarding sex and this may a cause of our relationship issues. I am a bit anxious about our relationship issues."

Author comment: Mother was very anxious about her relationship issues and requested the interviewer speak to her husband

"...I am so emotional having sex."

"...My sex life is ruined !!"

"...Parameters of my relationship changed once I was home. My husband was looking after the baby but it seemed later that he had not been coping that well either and needed cuddles that I could not give."

"...My husband is supportive about sex and decreased libido and sore vagina- sex feels like a Chinese burn."

'Sex is totally different – never imagined this – my sister warned me – she wanted me to have a C/S. My partner and I tried sex at 8-10 weeks – total disaster then tried at 3 months with KY gel – scar tissue still a problem a year later... am I weak?'

"...To be honest, my baby was 3 years old before I felt OK enough to have intercourse again. I was always aware that this was an unusual situation that very few women wind up in (especially when many women around me have kids spaced 1 or 2 years apart...) I never knew how they were able to bring themselves to have kids again so soon. I was petrified of even the more prospect of this occurring again, hence the reluctance to have intercourse."

"...Sex is awkward and my libido is gone – no sensation it is like a sausage down the hallway. I need to get it over with – at least we do it. Effort to go through throws of sex – breasts and foreplay all useless."

*"...I am unsure whether my husband understands- he is very reserved and does not cry"
Can you talk to him?"*

"I talked about my sex life and perineal symptoms with my woman GP – but it went nowhere – a small chat! I was really angry with her – she was running late and just rushed the consultation! I also had thrush and it was really awful – itchy and hot and I rubbed the skin around the area and it was like paper. The woman doing my Brazilian wax noticed it so I went to the dermatologist and they gave me dermatological cream – it was not oestrogen cream- it soothed it. Yes we have sort of resumed but I dread sex –it is in the dark and I just wait till it is over – it hurts and throbs."

"...Very painful sex up until recently – even then it hurts and need to relax – [mother crying] My husband is very patient and worried about me! I am seeing a psychologist. Better health wise but still have stress incontinence and need to relax when having sex. Passing urine is not the same as before I was pregnant—I have stress incontinence if my bladder is too full. Saw a chiropractor re squats etc. My vaginal area is too tight... but getting better I suppose. Can wear tampons. Had sex at 13 months but very painful – like something stinging, hitting and hurting on penetration."

"...My sex life is difficult and a chore – can't broach the subject with my husband. Wish someone could talk to my husband – maybe a male doctor on your team.... my husband does not speak much about this delivery or our sex life."

"...I was really distressed when we first tried at 6 months– vaginal intercourse was traumatizing and brought back all the memories of the delivery. My partner is really supportive."

Postpartum trauma symptoms of PTSD

"...I was diagnosed with PTSD a year after delivery....I thought of terminating 2nd baby but changed my mind because my partner was so supportive."

"...I did not bond with baby for quite a while and needed to seek counselling but my baby was crying so much in the first few weeks and I had undersupply of breast milk so I put this on the 'back burner'."

"Often had to use a wheel chair with towels on it to get off my perineum. Blurry – horrible experience but beautiful birth. I do have flashbacks during sex and when I am falling asleep."

"...My partner was quite traumatized by the birth"

"....I am still blurry about all of this– trying to confront reality of this horrible delivery but beautiful baby... I have flashbacks during sex and when I am falling asleep.... but the baby empowers me. I told my GP at 6-8 weeks about the physical problems and she did a minor procedure re stitches being too tight in her rooms. I did not mention my emotional state as I thought this would mean I was weak...I think I am weak – never realized it was such an issue – maybe I am just making it up."

Author comment: Mother was in tears... interview was on Skype

CHAPTER 5: EFFICACY OF EPDS IDENTIFYING POSTPARTUM PTSD SYMPTOMS

Paper 3 [Submitted for publication]

The efficacy of the EPDS in identifying postpartum PTSD symptoms associated with somatic vaginal birth injuries.

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Abstract

Background: The Edinburgh Postnatal Depression Scale (EPDS) has been routinely administered to identify postnatal depression (PND) symptoms over the past decades and has achieved considerable success. Even so, diverse symptoms of posttraumatic stress disorder (PTSD) after traumatic vaginal deliveries that result in pelvic floor dysfunction appear to be poorly identified in perinatal settings.

Aims: To examine whether the EPDS instrument is efficacious in identifying emotional trauma symptoms related to postpartum PTSD in a cohort of women with vaginal birth damage.

Materials and Methods: A retrospective analysis of total scores of the EPDS examined links with somatic birth damage. Questionnaires were obtained from primiparae (n=800+) after vaginal deliveries at two maternity hospitals in Sydney, in New South Wales, Australia. Participants were recruited for two perinatal trials and assessed for injuries by 3D/4D translabial ultrasound. The EPDS was distributed at this visit. Enquiry utilized qualitative data from the Epi-No trials³⁴ and qualitative data from the subset of injured women, who had been interviewed in the study on birth trauma⁴⁰.

Quantitative descriptive analysis assessed whether total continuous scores of EPDS were associated with LAM damage and OASI; obstetric variables regarding: mode of delivery, length of 2nd stage of labour and weight of baby.

A secondary census of a subset of participants (n=40) with LAM injury from the interview study², employed a mixed methods approach to assess associations between total EPDS scores and postpartum somatic symptoms of pelvic floor dysfunction. Subsequent mixed methods analysis examined associations between pelvic floor dysfunction and disclosed symptoms of PTSD from the subset of women (n=40).

Results: Total scores of EPDS were not associated with maternal LAM damage and/or OASI, and/or obstetric variables for the entire cohort (n=800+). The secondary census of women, revealed that total EPDS scores were below 13 and probable depression was not detected. Instead mothers disclosed 3-4 emotional trauma symptoms of postpartum PTSD associated with somatic pelvic floor dysfunction symptoms.

Conclusion: EPDS is not an effective instrument in identifying postpartum PTSD symptoms associated with somatic vaginal birth damage in this cohort.

Key words: postpartum; depression; birth injuries, post-traumatic stress disorder

Short title: Is EPDS effective identifying PTSD symptoms?

Introduction

This study examines the efficacy of the EPDS postnatal screening instrument¹ in identifying emotional trauma symptoms of postpartum PTSD related to somatic vaginal birth injury. A published study of mothers, diagnosed with LAM damage² observed that postpartum sequelae of

female pelvic floor prolapse (FPOP), urinary and fecal incontinence and sexual dysfunction were strongly linked to postpartum PTSD symptoms as per DSM-5³, that included: detachment, avoidance of memories of birth events, panic, nightmares and re-experiencing of traumatic births. At present, the EPDS is often the only measure, maternity clinicians employ to assess postpartum mental health in New South Wales, Australia.

Recent research into the incidence of postpartum PTSD, reveals that 3-4 percent of mothers suffer from this disorder⁴ with risk factors that include: complicated deliveries, fear of childbirth, demise of an infant and limited intrapartum support from maternity clinicians and partners^{5 6}. Even so, symptoms are noted to be largely unrecognized in maternity settings and, unlike PND, routine screening is not utilized. In addition, diagnostic criteria for PTSD following childbirth are noted to be poorly defined and validated questionnaires are scarce or often adapted from non-obstetric PTSD measures⁴. A fundamental question is whether childbirth can be described as a traumatic event due to the fact, it is typically viewed by society as a positive event, despite physiological and neuro-hormonal alterations, that breach bodily integrity⁵. Perinatal research currently reports that the incidence of postpartum PTSD, is more widespread than previously realized and, clinicians should broaden their understanding of diverse mental health disorders^{5 7}. Symptoms indicative of this disorder comprise: numbness, detachment, intrusive thoughts of birth events, avoidance of memories linked to childbirth, blame, panic, nightmares or flashbacks^{4 5}. Women in a recent study, described a lack of identification with PND on screening measures and faced barriers to treatment if they suffered from diverse forms of postnatal emotional distress that included trauma⁸.

Over the past several decades, population screening for PND has been beneficial in gaining access to women during pregnancy or after childbirth⁹. Despite this initiative, a United Kingdom review advised that routine use of PND instruments such as the EPDS¹, can be counterproductive due to: unsatisfactory psychometric properties that lack clarity for the population to be identified; outcomes of false results have potential of stigmatizing women and/or overlooking diverse symptoms¹⁰. Although, the EPDS is worthwhile in initiating discussion, research has recently observed that it can be dangerously misleading if used incorrectly, and recommended that the measure: should only be employed as an adjunct to a clinical interview; requires supervision by trained clinicians with access to mental health services and treatment options; should be checked for validity regarding the population of mothers completing it¹¹.

Notwithstanding these concerns, vaginal childbirth is reported by mothers to be presented as a positive and empowering experience with minimal complications². However, since the advent of modern imaging technology this century, urogynaecological studies have revealed that vaginal delivery can result in somatic injury that is more serious than previously recognized¹². Findings from 3D/4D ultrasound¹³ and magnetic resonance imaging (MRI)¹⁴ studies demonstrate that traumatic vaginal births can damage the integrity of pelvic floor structures, especially the levator ani muscle (LAM). Injury is distinct from the well accepted perineal trauma and obstetric anal sphincter injuries (OASI)^{12 15} and, is observed to involve the puborectalis component of the LAM, a pelvic floor structure that becomes severely compromised, either by over-stretching or avulsion damage during birth^{12 13}. Detachment or avulsion of this muscle, from one or both insertion sites on the inferior pubic ramus subsequently affects pelvic organ support and is strongly associated with prolapse, especially of the bladder, bowel and uterus^{12 16}. Excessive distension of the levator hiatus can also lead to sexual dysfunction in the sense of vaginal laxity¹⁷.

Another severe form of birth trauma noted by research, concerns that of major perineal tearing¹⁸ or disruption of external and internal anal sphincters, that is the primary etiological factor for anal incontinence^{19 20}. Current studies reveal LAM damage and OASI, are both associated with obstetric variables that include: forceps deliveries, particularly Kjelland's rotation forceps²¹;

prolonged second stages of labour; macrosomic babies with weights greater than four kilograms^{15 22}. Research also demonstrates that vaginal sidewall tears during delivery are clinical indicators of an increased risk of LAM trauma²³.

Materials and Methods

This study investigated whether EPDS was efficacious in identifying postpartum PTSD symptoms related to somatic birth injury and sequelae. Participants were deemed low risk prior to birth and had delivered at term with singleton pregnancies. Birth injuries were diagnosed, on multislice U/S imaging by post-processing of stored volume data sets at a later date, blinded against all other data^{12 18}.

Women (n=800+) had delivered at two maternity hospitals in Sydney, Australia during 2007-2013. Data was acquired from recruited participants of the Epi-No trial²⁴ and the POND study²⁵, together with birth records at the same hospitals. Participants were asked to return for assessment by 3D/4D translabial ultrasound between 3 and 6 months post-delivery; the EPDS was administered at the same visit, in accordance with relevant guidelines¹; all participants returned.

A subset of women (n=40) from the entire cohort (n=800+) who had been diagnosed with LAM injury, were interviewed about birth related experiences, 1 to 4 years after vaginal birth, during 2013-4 and findings were later published². Participants disclosed somatic birth injury symptoms during interviews that were analogous to those noted on the quantitative pelvic floor function database. These included: pelvic organ prolapse, urinary and faecal incontinence and/or sexual dysfunction. Multiple emotional trauma symptoms, related to PTSD were also disclosed by more than two thirds of the cohort. Although women had answered the EPDS questionnaire, many stated their symptoms did not match the items on this instrument.

Research methods utilized 3 phases of analysis.

The first phase used quantitative methods to examine whether total continuous scores of EPDS¹, obtained from the entire cohort of primiparous mothers (n=800+) from the trials^{24 25}, were associated with LAM damage, OASI and obstetric variables regarding mode of delivery, size of baby and length of 2nd stage of labour.

Descriptive univariate analysis assessed the distribution of individual variables concerning overall mean and standard variation; median and inter-quartile range for numeric data regarding the EPDS outcome score, size of baby, length of 2nd stage of labour, together with counts and percentage for categorical data of LAM damage and OASI, mode of delivery. Bivariate descriptive analysis assessed the relationships between the EPDS score outcome with the explanatory variables [See side-by-side boxplots re delivery mode; correlation coefficient 'r' regarding each numeric variable with the outcome score in Table 5]. Univariable inferential linear regression analysed the associations of explanatory variables with the outcome [See Table 5].

The second phase analysed data from the interviewed women (n=40) who had all been diagnosed with LAM injury as a secondary census of damage. Participants were a subset of the entire cohort that were used as a secondary census of women, diagnosed with LAM damage. Explanatory sequential mixed methods analysis assessed whether individual scores of EPDS were associated with maternal symptoms of FPOP, urinary and fecal incontinence and sexual dysfunction disclosed in interviews. [See Table 1 & 2].

The third phase employed explanatory sequential mixed methods of analysis, with the same subset of damaged women (n=40), to examine whether quantitative data regarding pelvic floor

symptoms of LAM injury were associated with disclosed symptoms of postpartum PTSD in interviews [See Table 1 & 2]. This phase was also a secondary census of damage.

Studies received ethical approval from Human Research Ethics Committees at two health areas in Sydney, Australia²⁶. Consideration had been given to the personal nature of this study; anonymity, confidentiality, valid consent, and the right to withdraw were emphasized. All participants were offered clinical and psychological consultation. This research utilized the basic format of the EPDS¹ and interpretation of scores as described by its authors. [See Table 2: EPDS & interpretation of scores]. Current stressor criteria regarding PTSD were taken from the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)³ [See Table 3: postpartum PTSD criteria].

Results

First phase analysis revealed that total scores of the EPDS were not associated with LAM avulsion, OASI and obstetric variables regarding mode of delivery, size of baby and length of 2nd stage of labour.

Second phase *analysis that* concerned the subset of participants (n=40), revealed individual EPDS scores, were below 13 and, probable depression was not detected. Participants (n=2) disclosed a previous history of depression and were not taking medication. Women (n=5) reported they had been given diagnoses of postpartum PTSD by counsellors and did not identify with symptoms of PND. Mothers (n=2) exhibited elevated scores of 6 out of a total of 9 for the EPDS-3A anxiety items 3, 4, 5²⁷.

Third phase analysis of the subset also revealed that somatic symptoms of LAM injury were strongly associated with 3-4 emotional trauma symptoms, related to PTSD as per DSM-5³, that included: avoidance of memories regarding the birth, detachment, nightmares of the delivery and panic [see Table 4: Associations between total scores of the EPDS, disclosed somatic and PTSD symptoms].

Discussion

Maternal experiences of emotional trauma from birth trauma

Women in a published interview study on birth experiences², reported that somatic vaginal birth damage was far worse than anticipated, and was largely dismissed by maternity clinicians as normal sequelae of birth. Pelvic floor dysfunction symptoms also reduced intimacy with partners due to their inability to have sexual relations. Many stated that negligible validation of birth damage from health providers triggered emotional trauma symptoms of PTSD. Most described significant barriers when seeking assessment for psychological trauma and reported that mental health clinicians did not seem to understand the pathophysiology of birth damage or emotional effects of debilitating morbidities. Mothers stated they were too embarrassed to disclose the extent of these personal injuries to clinicians. Typical comments were: "...[I was] shocked at the amount of enduring vaginal damage after birth"; "...my genital area is totally foreign and has never returned to normal"; "...sex is untenable; my husband does not understand the reason sex is impossible"; "...I was totally unprepared for a traumatic delivery and these debilitating injuries"; "...clinicians 'romanticized' vaginal birth and never informed me of consequences that I now have to live with"; "...I am distraught...a counsellor said my distress is due to underlying marital and social issues...I have no way forward"; "...I am angry they misdiagnosed me with PND...I know this is wrong"; "...the EPDS questions were not relevant to my distress." This cohort described unforeseen somatic and psychological morbidities, one to four years after complicated traumatic vaginal deliveries. Most stated that adverse consequences of vaginal delivery had not been explained prior to birth, due to a reported 'natural birthing' ethos in antenatal classes².

A perinatal review from the United Kingdom⁵, proposed that postpartum PTSD is shown to be the consequence of an interplay between antenatal vulnerability, intrapartum risk factors and postnatal outcomes. This approach has been observed as a useful framework in understanding how the severity of these events may have interacted with individual factors to determine the outcome of PTSD symptoms and appears relevant to this group of women. Lack of preparedness for birth and "...shock at the extent of damage," were reported to be 'triggers' that contributed to maternal distress. Similar risk factors of postpartum PTSD were observed in other research that noted contributing factors of: a first baby, loss of control, psychological detachment during labour, inadequate pain management, poor support from delivery staff, obstetric emergencies, instrumental deliveries and serious vaginal damage that was not validated by clinicians^{4 7}.

Unidentified postpartum PTSD

Current research proposes that unidentified postnatal psychological distress is a consequence of: inadequate training for perinatal clinicians regarding diverse mental health symptoms⁸; time and funding restraints; suboptimal guidelines on assessment processes; and limited integration of care between mental health and maternity clinicians^{28 29 30}. Disorders that are often overlooked include: panic, generalised anxiety, adjustment or stress-related disorders, such as PTSD⁸. Although PTSD is a less recognized postpartum disorder, studies observe that childbirth can cause intense fear, feelings of helplessness and/or threat of death or injury^{4 6}. If untreated, psychological impairment may involve: mood and behaviour changes; intrusive thoughts about the trauma, detachment, anger, panic, avoidance of birth-related triggers, numbness, social isolation, marital disharmony, sexual dysfunction issues, partner blame for events of birth; decreased infant bonding and fear of future births or tokophobia^{5 6 29}. A review of perinatal service provision from the United Kingdom, proposed clinicians should be cognizant of traumatic responses to delivery; complications of prolapse, urinary and anal incontinence and psychosexual problems²⁸.

The impact of major somatic birth injuries

Since the introduction of modern imaging modalities, studies reveal that intrapartum damage to LAM and resultant pelvic floor dysfunction is estimated to affect 10-30 percent of primiparae who have a vaginal delivery¹². The incidence of OASI are shown to be 4-6.6 percent and, like LAM, vary according to the mode of delivery and obstetric practice³¹. Women in the published study² who sustained these injuries, described feelings of isolation and anxiety at managing pelvic floor morbidities by themselves with, a quality of life that was negatively impacted. Another enquiry stated that perineal damage resulted in a continuing need for toileting amenities, showers and change of undergarments, that adversely affected social and sexual relationships, and diminished employment opportunities³². Research that examined adverse effects of major perineal damage reported: constant anxiety about control of bodily functions and faecal leakage; sexual dysfunction that affects partner relationships; poor self-image; a limited life with injuries that did not heal; the need to develop a "...new kind of normal" for daily routines³³. A recent study showed that women felt abandoned and marginalized after clinicians proposed their emotional trauma was attributed to PND, sleep deprivation, adjustment to motherhood and/or psychosocial factors⁸. Research on enduring pelvic floor and perineal morbidities observed that women "...just put up [with]" pelvic floor and perineal morbidities and, although they sought medical assistance, mothers reported that health providers "...had no idea of how to help" during this critical period^{34 35 36 37}.

The emergence of postpartum PTSD

Enquiry into postpartum PTSD has developed considerably over the past three decades. During 2001, prospective studies estimated that 1.5 percent of women in the United Kingdom developed chronic PTSD attributed to traumatic birth events³⁸. Prior to that, the first documented evidence of this disorder was observed in 1978³⁹ by a group of French obstetricians, who examined the responses of ten postpartum women over a two-year period. Recent studies from Britain, note that 3-4 percent of mothers suffer from postpartum PTSD, together with 15-19 percent, who have endured high risk pregnancies and preterm complications and up to 39 percent of women, whose babies have died⁴. PTSD is currently categorized in DSM-5³ as a 'trauma and stressor-related disorder' following direct or indirect exposure to, or witnessing of, actual or threatened death, serious injury or sexual violence. However, perinatal trauma experts propose the classification of intense fear and anxiety from previous DSM-IV-TR⁴⁰ criteria is more applicable for postpartum populations.

PND and Postpartum PTSD

Recent case studies observe traumatized mothers largely judge their postpartum mental health against descriptions of depression, and subsequently discover their emotional state is different⁸. Once the EPDS reveals they are not depressed, women feel confused, in terms of the symptoms they are experiencing. An investigation into postnatal emotions found depression was not the most common distress encountered, and that anxiety and emotional trauma symptoms related to PTSD, were observed to be prevalent⁸. The symptom profile of postpartum PTSD is observed to be substantially different to PND, although comorbidity is evident in some women with overlap of symptoms⁴¹. PND is a major depressive disorder with risk factors that include extreme hormonal alterations, genetic disposition, personality types, unresolved grief, family history, lack of social and emotional support^{41 42}. A diagnosis of postpartum PTSD requires a gateway criterion of a traumatic event such as, birth-related trauma, that causes women to exhibit symptoms of: avoidance, anxiety, negative cognitions, hypervigilance, detachment, nightmares, numbness and reexperiencing of traumatic events⁴³. These symptoms are criteria for a diagnosis of postpartum PTSD as noted in DSM-IV-TR⁴⁰. The 'gold standard' for assessment is a structured clinical interview^{4 44}.

Strengths and Limitations

The strength of this study was demonstrated by the use of published data on somatic pelvic floor dysfunction and obstetric variables, obtained from women, who had been retrospectively evaluated by urogynaecologists using 3D/4D ultrasound in the Epi-No²⁴ and POND²⁵ trials; data allowed for an objective assessment of major birth damage. Selection of the subset of women (n=40), from the interview study² gave depth to the study and highlighted the use of qualitative data regarding disclosed pelvic floor dysfunction and PTSD-related symptoms. A limitation was that the follow-up interval for somatic assessments varied from three to six months and this time lapse may have affected resultant EPDS scores, due to the fact the instrument is typically administered during the initial three months after delivery. Mothers reported that appointments were difficult to orchestrate due to the more pressing needs of babies. However, this may have been an advantage since results are more than a snapshot in time. Limited extrapolation to other populations was also apparent; 36 women in the interview group were of Caucasian ethnicity; 4 were Asian.

Conclusions

This study demonstrates that the EPDS instrument was not efficacious in detecting emotional trauma symptoms related to postpartum PTSD for a cohort of women suffering from pelvic floor dysfunction after vaginal birth. Findings substantiate current research that proposes mental health

clinicians should facilitate a more in-depth assessment beyond PND, with a broader awareness of disorders that include postpartum PTSD⁸. Although administration of the EPDS instrument has achieved successful outcomes over the past decades, research notes that results can be misleading without clinical consultations from perinatal health providers¹¹. EPDS was designed to identify women at risk of PND and the symptom profile is very different to that of postpartum PTSD⁴⁴. Currently, mothers report considerable challenges in accessing informed services and treatment options for non-PND related symptoms after childbirth⁸. Interviews with women effected by vaginal birth trauma, observe that pelvic floor dysfunction symptoms are strongly linked to those of postpartum PTSD². Unidentified and untreated mental health problems have wide-ranging repercussions for mothers, partners and families. Findings in this enquiry reveal an urgent need for better identification of somatic and psychological outcomes of vaginal birth to ensure women are offered accurate assessment, follow-up and treatment.

Authors' contributions:

E zabeth Mary Skinner: project development, template construction, data collection, data analysis, manuscript writing

Fryan Fure: statistical analysis

Susanne Langer: data collection

Hans Peter Dietz: project development, approval of protocols.

Compliance with ethical standards

Conflict of interest: The authors declare that they have no conflicts of interest.

Tables:

Table 1: Details of participants

Table 2: Association between total scores of the EPDS; somatic and PTSD symptoms

Table 3: The EPDS and interpretation of the scores

Table 4: Postpartum PTSD criteria as per DSM-5

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Table 1: Details of participants

Obstetric variables, psychosocial and economic issues	Details [n = 40]
Age of participants	Range: 21- 43 years Mean: 32.5 years
English speaking	40 participants
Caucasian/ Non Caucasian	36 Caucasian 4 Asian
Social support and socio economic status	<ul style="list-style-type: none"> • 38 participants had good support and a partner • 1 woman had a same sex partner who had also sustained somatic birth injury and PTSD • 1 woman's partner was not supportive after birth damage with sexual dysfunction and left her and baby • 40 women had a stable socio economic status
Mental health history	<ul style="list-style-type: none"> • 38 participants disclosed no previous mental health problems • 2 woman disclosed previous depression and CBT therapy – nil medications • 5 women stated they were diagnosed with PTSD by mental health clinicians postpartum
Time span EPDS was answered by participants	Range:3-11months Mean: 4.5

Gestation of pregnancy	Range: 38-41 Mean: 40 weeks
Birth weight of baby	Range: 2400 – 4680grams Mean: 3600 grams
Babies requiring intensive care	Nil
2nd stage of labour	Range: 22 -317 minutes Mean duration: 60 minutes
Non-assisted vaginal births	n = 14
Vacuum extractions	n = 8
Forceps instrumentation	n = 18
Caesarean Sections	Nil

Table 2: Association between total scores of the EPDS, somatic and PTSD symptoms (n=40) women

EPDS total scores	Interpretation of EPDS results	Somatic birth symptoms	Postpartum PTSD symptoms
<p>Women (n=40) scored: 0-11 on EPDS</p> <p>Women (n=2) scored: a cumulative sum of 6 out of 9 for EPDS-3A anxiety items 3,4,5</p> <p>Women (n=2) scored: 1 for question 10 re <i>suicidal ideation</i></p>	<p>Total EPDS scores were all below 13 in this cohort</p> <p>Scores of 13 or greater are indicative of PND.</p> <p>Findings demonstrate somatic birth symptoms in this cohort were not linked to probable depression</p> <p>Elevated anxiety may be related to somatic symptoms for 2/40 women.</p> <p>Background to suicidal ideation for 2 women was unclear. 1 mother disclosed sexual dysfunction the other was distressed by amount of somatic damage. Both exhibited avoidance, numbing and blame symptoms of PTSD</p> <p>EPDS was not a useful measure for this cohort</p>	<p>Women (n=35) disclosed: unexpected pelvic organ prolapse symptoms, urinary and faecal incontinence 1 to 4 years postpartum</p> <p>Women (n=27) disclosed: Persistent sexual dysfunction 1 to 4 years postpartum</p> <p>Women (n=36) stated major somatic damage was unexpected due to lack of antenatal information about risk factors of vaginal birth. Women (n=27) reported their sexual dysfunction resulted in emotional trauma and relationship problems Woman (n=1) disclosed her partner had left the relationship.</p>	<p>Women (n = 27) disclosed 3-4 symptoms of PTSD After birth trauma that included: detachment, avoidance of birth triggers, numbness, flashbacks, blame, panic attacks, nightmares, intrusive thoughts of delivery during sex, 1-4 years later.</p> <p>Women (n=5) experienced decreased infant bonding after birth trauma</p> <p>Woman (n=1) wanted to terminate her 2nd pregnancy and revealed 4 symptoms of PTSD</p> <p>Women (n=5) stated that the items on the EPDS did not match their emotional symptoms they subsequently sought counselling and were diagnosed with PTSD.</p>

Table 3: EPDS¹ and interpretation of scores**Instructions to mother:**

As you have recently had a baby, we would like to know how you are feeling. Please **UNDERLINE** the answer which comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Questions	Possible responses
1) I have been able to laugh and see the funny side of things	As much as I always could (score of 0) Not quite so much now (score of 1) Definitely not so much now (score of 2) Not at all (score of 3)
2) I have looked forward with enjoyment to things	As much as I ever did (score of 0) Rather less than I used to (score of 1) Definitely less than I used to (score of 2) Hardly at all (score of 3)
3) *I have blamed myself unnecessarily when things went wrong	Yes, most of the time (score of 3) Yes, some of the time (score of 2) Not very often (score of 1) No, never (score of 0)
4) I have been anxious or worried for no good reason	No, not at all (score of 0) Hardly ever (score of 1) Yes, sometimes (score of 2) Yes, very often (score of 3)
5) *I have felt scared or panicky for no very good reason	Yes, quite a lot (score of 3) Yes, sometimes (score of 2) No, not much (score of 1) No, not at all (score of 0)
6) *Things have been getting on top of me	Yes, most of the time I haven't been able to cope at all (score of 3) Yes, sometimes I haven't been coping as well as usual (score of 2) No, most of the time I have coped quite well (score of 1) No, have been coping as well as ever (score of 0)
7) *I have been so unhappy that I have had difficulty sleeping	Yes, most of the time (score of 3) Yes, sometimes (score of 2) Not very often (score of 1) No, not at all (score of 0)
8) *I have felt sad or miserable	Yes, most of the time (score of 3) Yes, quite often (score of 2) Not very often (score of 1) No, not at all (score of 0)
9) I have been so unhappy that I have been crying	Yes, most of the time (score of 3) Yes, quite often (score of 2) Only occasionally (score of 1) No, never (score of 0)
10) *The thought of harming myself has occurred to me	Yes, quite often (score of 3) Sometimes (score of 2) Hardly ever (score of 1) Never (score of 0)

Table 4: Postpartum PTSD criteria as per DSM -5³

Category: Traumatic and Stressor-Related Disorder-4 symptom clusters

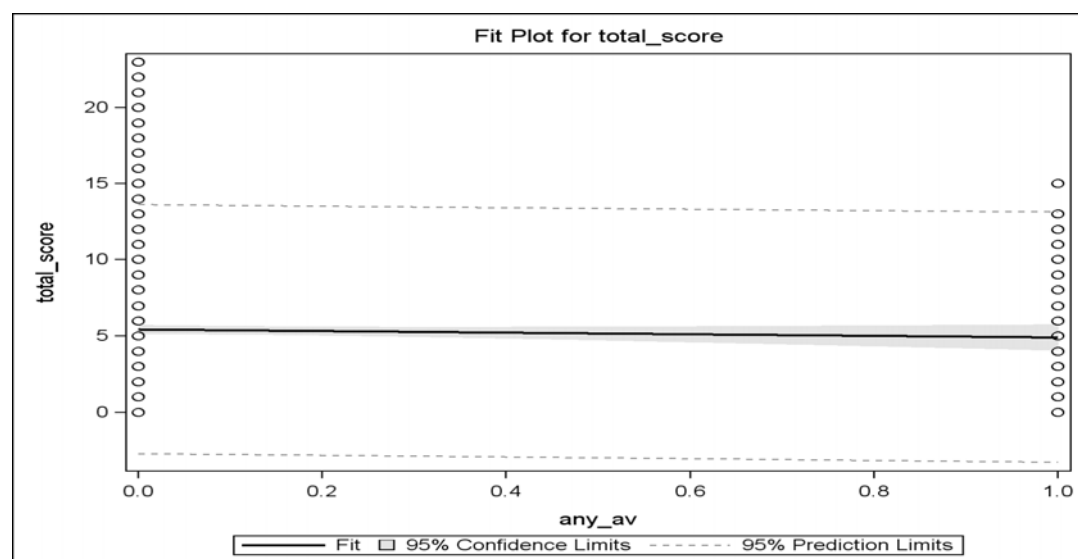
Event Criterion A	Direct exposure to actual or threatened death; serious injury; sexual violence; witnessing event in person or indirectly by learning friend or family was exposed; repeated or extreme indirect exposure e.g. health professionals, police
Criterion B INTRUSION re-experiencing trauma	The event is INTRUSIVE in 1 of 5 symptoms that include: (1) Recurrent involuntary & intrusive memories of event (2) Repeated traumatic nightmares about event (3) Flashbacks of event (dissociative reactions) from brief episodes, a continuum to loss of consciousness (4) Intense and prolonged distress after exposure to traumatic reminders (5) Marked physiological reactions after exposure to trauma related stimuli
Criterion C Persistent effortful AVOIDANCE of trauma-related stimuli after event	At least 1 of 2 symptoms of AVOIDANCE that include: (1) Avoidance of trauma related thoughts or feelings (2) Purposeful avoidance of trauma related external stimuli (e.g. places, people, conversations, smells)
Criterion D NEGATIVE ALTERATIONS IN COGNITIONS & MOOD that began or worsened after traumatic event	At least 2 of 7 symptoms of NEGATIVE ALTERATIONS IN COGNITIONS & MOOD that include: (1) Inability to remember key features of event (numbing) (2) Persistent and distorted negative beliefs and expectations about oneself or the world (e.g. I am bad/ the world is dangerous) (3) persistent distorted blame of self or others for causing event (4) persistent negative trauma related emotions (e.g. fear, horror, anger, guilt, shame) (5) markedly diminished interest in pre-trauma activities (6) feeling alienated from others (detachment or estrangement) (7) constricted affect: persistent inability to experience positive emotions
Criterion E HYPERAROUSAL reactivity	At least 2 of 6 symptoms of HYPERAROUSAL that include: (1) Irritable or aggressive behaviour (2) Self destructive or reckless behaviour (3) hypervigilance

that began or worsened after traumatic event	(4) exaggerated startle response (5) problems in concentration (6) sleep disturbance
Criterion F	Persistence of symptoms [in Criteria B, C, D, E] for more than a month
Criterion G	Significant symptom-related distress or functional impairment
Criterion H	Not due to medication, substance or illness

Adapted from: Friedman MJ. Trauma and Stress related disorders in DSM-5. National Centre for PTSD. School of Medicine at Dartmouth. United States Department of Veteran Affairs & Defence. [Accessed 12 Feb 2019] Available at URL: https://www.istss.org/ISTSS_Main/media/Webinar_Recordings/RECFREE01/slides.pdf

Table 5: Analysis tables for entire cohort of women (n=800+) from Epi-No/POND trials

Levator ani muscle (LAM) avulsion and total scores of EPDS



Number of observations Read 821

Number of Observations Used 810

Dependent variable: total score

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	22.16682	22.16682	1.28	0.2585
Error	808	14006.47639	17.33475		
Corrected Total	809	14028.64321			

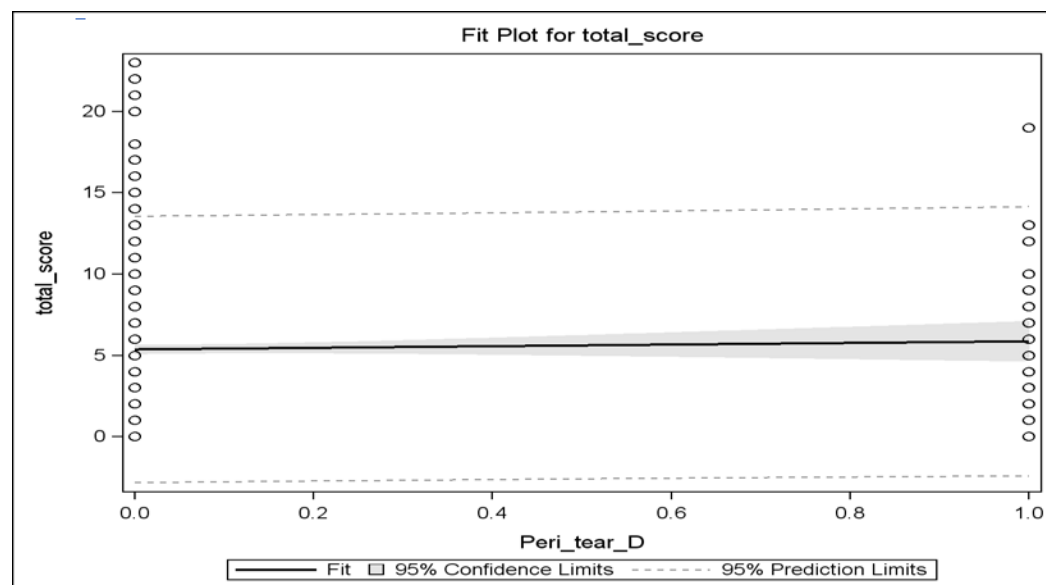
R-Square	Coeff Var	Root MSE	total_score Mean
0.001580	77.40272	4.163502	5.379012

Source	DF	Type I SS	Mean Square	F Value	Pr > F
any_av	1	22.16682099	22.16682099	1.28	0.2585

Source	DF	Type III SS	Mean Square	F Value	Pr > F
any_av	1	22.16682099	22.16682099	1.28	0.2585

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	5.437500000	0.15516455	35.04	<.0001
any_av	-0.526388889	0.46549366	-1.13	0.2585

Perineal tearing (OASI) and EPDS scores



Number of Observations Read	821
Number of Observations Used	821

Dependent variable: total score

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	10.15776	10.15776	0.58	0.4447
Error	819	14228.67050	17.37322		
Corrected Total	820	14238.82826			

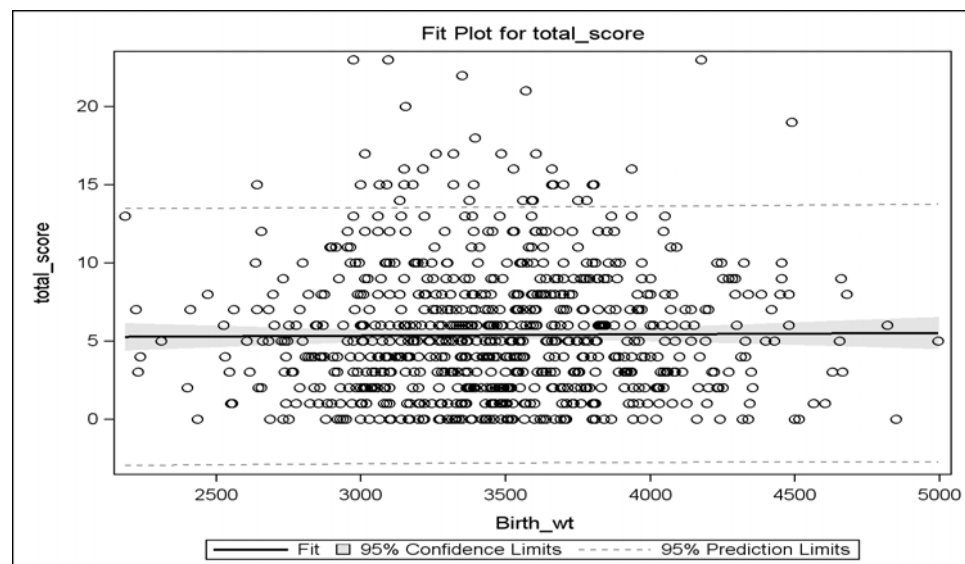
R-Square	Coeff Var	Root MSE	total_score Mean
0.000713	77.36890	4.168120	5.387333

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Peri_tear_D	1	10.15775544	10.15775544	0.58	0.4447

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Peri_tear_D	1	10.15775544	10.15775544	0.58	0.4447

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	5.361182519	0.14943434	35.88	<.0001
Peri_tear_D	0.499282597	0.65296178	0.76	0.4447

Birth weight of baby [obstetric variable of somatic birth injury] and EPDS scores



Number of Observations Read			821		
Number of Observations Used			816		
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.24300	1.24300	0.07	0.7892
Error	814	14153.22637	17.38726		
Corrected Total	815	14154.46936			

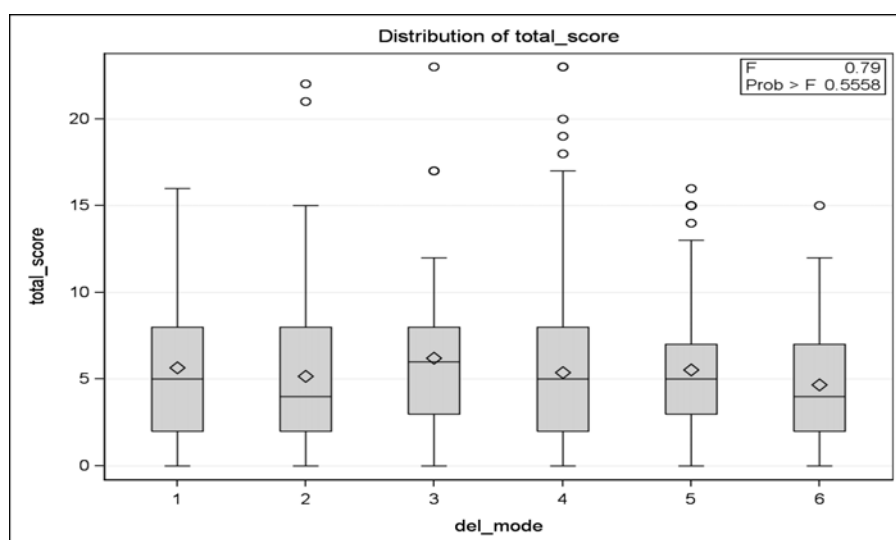
R-Square	Coeff Var	Root MSE	total_score Mean
0.000088	77.48939	4.169803	5.381127

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Birth_wt	1	1.24299563	1.24299563	0.07	0.7892

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Birth_wt	1	1.24299563	1.24299563	0.07	0.7892

<i>Parameter</i>	<i>Estimate</i>	<i>Standard Error</i>	<i>t Value</i>	<i>Pr > t </i>
<i>Intercept</i>	5.073906857	1.15826418	4.38	<.0001
<i>Birth_wt</i>	0.000088501	0.00033100	0.27	0.7892

Mode of delivery [obstetric variable of somatic birth injury] and EPDS scores
[1,2,3 n/a; 4= normal delivery; 5= vacuum extraction; 6= forceps]



<i>Class Level Information</i>		
<i>Class</i>	<i>Levels</i>	<i>Values</i>
<i>Delivery_mode</i>	6	1 2 3 4 5 6

<i>Number of Observations Read</i>	821
<i>Number of Observations Used</i>	816

Dependent variable: total score

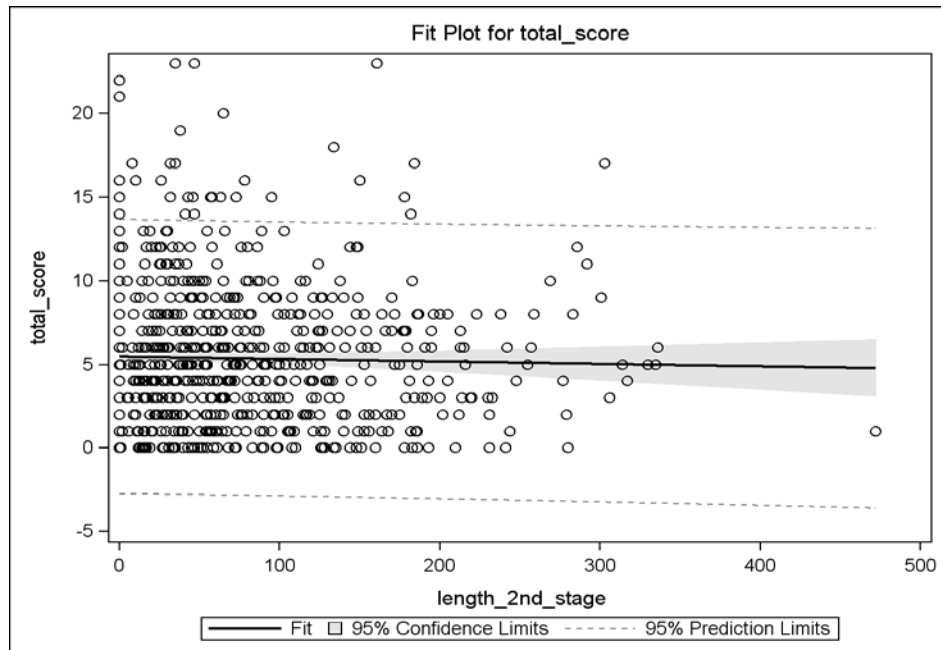
<i>Source</i>	<i>DF</i>	<i>Sum of Squares</i>	<i>Mean Square</i>	<i>F Value</i>	<i>Pr > F</i>
<i>Model</i>	5	68.83515	13.76703	0.79	0.5558
<i>Error</i>	810	14085.63421	17.38967		
<i>Corrected Total</i>	815	14154.46936			

<i>R-Square</i>	<i>Coeff Var</i>	<i>Root MSE</i>	<i>total_score Mean</i>
0.004863	77.49477	4.170093	5.381127

Source	DF	Type I SS	Mean Square	F Value	Pr > F
del_mode	5	68.83515125	13.76703025	0.79	0.5558

Source	DF	Type III SS	Mean Square	F Value	Pr > F
del_mode	5	68.83515125	13.76703025	0.79	0.5558

Length of 2nd stage of labour [obstetric variable of somatic birth injury] and EPDS



Number of Observations Read	821
Number of Observations Used	785

Dependent variable: total score

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	8.39541	8.39541	0.48	0.4877
Error	783	13634.47847	17.41313		
Corrected Total	784	13642.87389			

R-Square	Coeff Var	Root MSE	total_score Mean
0.000615	77.56878	4.172904	5.379618

<i>Source</i>	<i>DF</i>	<i>Type I SS</i>	<i>Mean Square</i>	<i>F Value</i>	<i>Pr > F</i>
<i>length_2nd_stage</i>	1	8.39541395	8.39541395	0.48	0.4877

<i>Source</i>	<i>DF</i>	<i>Type III SS</i>	<i>Mean Square</i>	<i>F Value</i>	<i>Pr > F</i>
<i>length_2nd_stage</i>	1	8.39541395	8.39541395	0.48	0.4877

<i>Parameter</i>	<i>Estimate</i>	<i>Standard Error</i>	<i>t Value</i>	<i>Pr > t </i>
<i>Intercept</i>	5.477177242	0.20475229	26.75	<.0001
<i>length_2nd_stage</i>	-0.001472008	0.00211996	-0.69	0.4877

CHAPTER 6: INTERVIEWS WITH MEN WHOSE PARTNERS SUSTAINED LEVATOR ANI MUSCLE AVULSION

Enquiry: Do men understand that somatic consequences of partners' vaginal birth injuries are related to maternal sexual dysfunction?

6.1 Purpose of study

This enquiry interviewed seven male partners of women from the published study⁴⁰ [see Chapter 4: Paper 2], who had been diagnosed with LAM injury after vaginal birth. The primary purpose was to investigate men's understanding of somatic vaginal birth injuries, in relation to maternal sexual dysfunction. Enquiry was precipitated after lengthy interviews with mothers, that often involved in-depth discussion about their inability to have sexual relations. It was observed most women were relieved to discuss intimate consequences of birth damage with the interviewer, who was also a well-informed maternity clinician. Many reported substantial barriers in obtaining medical assessment for sequelae of birth injuries. Accordingly, this apparent lack of clinical validation, exacerbated feelings of isolation from partners, who were perceived to have limited understanding of sexual dysfunction associated with FPOP, urinary and fecal incontinence and, instead stated that women no longer desired sexual intimacy. Most women were desperate to find "...a way forward in their relationships" and requested the interviewer explain the severity of damage to men. More than two thirds of the cohort disclosed emotional trauma symptoms of: persistent avoidance regarding memories of birth events, nightmares, detachment, panic and numbness, as described by DSM-5²⁸ criteria for PTSD. A commentary on postpartum PTSD, observes that childbirth is typically viewed by society as a positive event, despite huge physiological and neuro-hormonal alterations that breach bodily integrity²⁷. It was unclear whether men adhered to this belief and did not understand somatic consequences of vaginal birth that resulted in sexual dysfunction.

6.2 Introduction

Currently there is a dearth of research on men's experiences before, during and/or after childbirth. This may be attributed to their poor response regarding recruitment for postpartum interviews.

Even so, exploratory studies observe that men suffer from fear of childbirth⁶⁰ and anxiety due to limited antenatal preparation regarding birth procedures⁶¹. Typical reactions include: fear for the life of their partner and baby during childbirth; anxiety from societal expectations that men should avoid fear reactions in front of women; feelings of powerlessness and inability to discuss their emotions⁶²; constraining emotions and being thoughtful towards their partner; difficulties related to 'gender constructions'⁶³; traumatized emotions from witnessing birth events⁶⁴. These findings support criteria for PTSD as per DSM-5²⁸, that states exposure to traumatic birth stressors, involves actual or threatened death or, severe injury of the mother and baby.

Nonetheless, prevalence of PTSD in men is noted to be difficult to quantify due to inadequate assessment of criteria from a population who avoid interviews⁶⁵. Enquiry into women's experiences of birth events, observes clinicians frequently view maternal traumatic responses as subjective and, disregard their significance. This situation appears to be similar regarding partners' perspectives, that are frequently dismissed as reactions to maternal distress⁶⁶; some authors propose men's post-traumatic responses may be influenced by those of their partners^{65 67}. Enquiry into couples' experiences of childbirth-related PTSD, reported significant adverse outcomes that included: marital disharmony⁶⁷, disordered parent-infant bonding, anger, disagreements, blame and lack of sexual intimacy^{68 69}. Some studies observed that men usually exhibited feelings of helplessness more than women⁶⁰. However, both parties were perceived to experience lack of control during the birth and, felt they had been ill-informed during the antenatal period about possible complications regarding deliveries⁶². Couples also reported conflict between midwives and doctors during deliveries and were overwhelmed by clinicians' disdainful, disparaging and impersonal behaviour regarding women's and men's visible distress^{70 71}. Studies from the United Kingdom reported that 'continuity of care', was described by couples, as poorly integrated with environments that often lacked privacy⁶⁸ and contributed to emotional trauma. During the postpartum period, authors note that PTSD consequences of birth events were connected to women's avoidance of sexual relations⁶⁷; contributing factors of somatic vaginal birth damage were not included in this research. One man reported, he had avoided sex, through fear his wife may get pregnant and he was unable to cope with another delivery⁶⁵. Other partners

said women did not respond to normal touching or caressing and barriers to intimacy were noticeable. Most men found discussion with women about birth events was strained. Conflict and negative emotions within relationships was observed by men to be frequent⁶⁷⁻⁷¹.

Ten first-time fathers interviewed in a Swedish study⁷² reported they were uncertain about their role during delivery and, felt helpless witnessing a partner in pain. Findings support other research, that reports men were unable to practically assist, due to the lack of information from clinicians who "...did not explain what was happening"⁶⁵. Other men stated that the fear of the unknown, together with, gendered beliefs of masculine hegemony⁷³ resulted in distress and confusion. They wanted to share the birthing experience with their partners and provide support in collaboration with maternity staff, but subsequently felt anxious and excluded from a "...female domain"⁷⁴. Overall, most men reported they felt alienated, depersonalized and excluded from decision making. Their partners' birth was experienced "...like a spectator witnessing a traumatic event." Most attempted to keep their feelings "hidden" but the confronting nature of birth emerged later and had negative effects on sexual relationships and resulted in fear of intimacy^{65 75}.

Recent research into men's experiences of birth from the United Kingdom⁶⁵, employed internet websites to collect data, due to insufficient information on partners' lived experiences of birth events. Participants reported births were like a "...rollercoaster of emotion" during rapidly changing and unexpected events. Many feared their partner and baby may die but attempted to "...keep it together". Others described their involvement in partners' births as "...helplessly watching a catastrophe unfold" with lack of guidance and support from maternity staff. Men reported their responses to women's deliveries were "...unjustified as nothing had happened to them" and exhibited avoidance symptoms of emotional trauma. On reflection, most wanted to debrief to clinicians, but were reluctant to discuss their emotions. An overriding theme was that men attempted to hide their emotions at all stages of birth, due to societal expectations regarding masculinity and coping strategies, resulted in distress and avoidance symptoms^{76 77 78 79 80}. In view of these findings regarding men's adverse experiences of birth events, it is not surprising the literature is profoundly silent about men's perspectives on partners' somatic consequences of somatic vaginal birth injuries.

6.3 Methods

Explanatory sequential mixed methods were employed in this enquiry that used semi-structured interviews to explore the experiences of male partners (n=7) of women, who suffered from birth related consequences that included: FPOP, urinary and faecal incontinence and sexual dysfunction, 1-4 years after vaginal birth. Participants were identified as male partners of twenty primiparous mothers, who had been previously interviewed in the published study⁴⁰ [see Chapter 4: Paper 2]. Quantitative data used in this enquiry with men, concerned information about partners that had been obtained from the Epi-No trial³⁴ and corresponding birth records at two major tertiary obstetric hospitals in Sydney, Australia. Obstetric details of the seven respective women from the previous study⁴⁰ included [see Table 3] use of induction, epidural, length of 1st and 2nd stage of labour, use of forceps or ventouse instrumentation, episiotomy, weight of baby, LAM avulsion and OASI, symptoms of pelvic floor and perineal dysfunction, symptoms of PTSD. LAM avulsion had been diagnosed in these women by 3D/4D translabial ultrasound, 3-6 months after a vaginal delivery. Some women sustained OASI as well. Quantitative data of women were merged with that obtained from qualitative interviews with men, by way of triangulation to obtain different and complementary data to explain the research question, that postulated: “...*Do men understand that somatic consequences of partner’s vaginal birth damage are related to maternal sexual dysfunction?*” Qualitative data from maternal interviews were also used to develop interview guidelines for men. Contact details of men, were obtained from the previously interviewed women, who had requested the interviewer speak to respective partners. Of the twenty men approached for interview; twelve were uncontactable despite their partners stating they had been agreeable to interviews. Another, did not send back the consent form after interview and had to be removed from the study. The remaining seven men responded and consented to interviews. [see Table 1].

6.3.1 Main outcome measures

In view of the fact, enquiry utilised explanatory sequential mixed methods to comprehensively explore men’s understanding regarding the impact of somatic vaginal injuries on partners, the quantitative terminology of ‘main outcome measures’ was utilized. They defined the scope of out-

Table 1: Characteristics of male partners

Characteristics of interviewed men	Details
No. of men invited	n=20
No. of men consented	n=7
No. of men who were uncontactable despite women stating they would agree to interview	n=12
No. of men removed from dataset	n=1 This man was interviewed but did not sign consent form and was uncontactable
No. of years interviewed after delivery	7 men were interviewed 4 years after their partners delivery
Fathers' age at partners delivery	Range: 32-39 Mean: 35
Mothers' age at first delivery	Range: 29- 37 year of age Mean: 32 years of age
Ethnicity of men and women:	Caucasian: n =7 male Caucasian: n =7 mothers
<i>Participants in public hospital care with public clinicians</i>	<i>Public clinicians and care: n=7</i> <i>*subsidized by Australian Government</i>
Level of education for men	Tertiary: n=4 High school leavers: n=3
No. of telephone interviews No. of Skype interviews	n=6 n=1
No. of men whose partner was present at interview	n=2
Length of interview	Range: 35- 90 minutes Mean: 54 minutes [often entailed debriefing]

comes that research anticipated were achievable and subsequently assisted the structure of interview guidelines regarding men's understanding and memory of: antenatal information given in classes regarding the birth process, related risk factors and/or prior knowledge of birth; intrapartum procedures regarding length of second stage, forceps or vacuum extraction, epidural, episiotomy, and perineal tears; birth weight of baby; assistance and support from clinicians of women during birth; postnatal observations regarding women's somatic and psychological changes immediately after birth; incidence and/or efficacy of postnatal assessment of maternal injuries and follow-up

consultations for somatic vaginal damage. Their observations at home regarding: women's somatic and psychological changes; maternal reactions and coping behaviour regarding birth injuries including, bladder and bowel changes (if any); 'sex after baby'; health providers' response to maternal symptoms of birth injury; women's long-term coping mechanisms, psychological state and reactions regarding sexual relations; medical follow-up.

6.3.2 Interviews and guidelines

Men were invited to participate in the study by telephone or email, with an emphasis on individual experiences. Options to engage in an interview for 35-40 minutes were proposed as being via telephone, in a clinical face-to-face environment, or by Skype software application. The interviewer was a midwife with extensive professional experience and was cognizant of reflexivity³⁷ principles regarding the researcher's influence in the qualitative research. All participants received a written invitation with information about questions and consent forms. The interview guideline [see Appendix 1a] consisted of analogous domains to those used in maternal interviews and involved: open-ended questions on antenatal, intrapartum and postpartum care, that were altered accordingly for this cohort.

Content and structure were developed from multiple sources that included: women's quantitative data on pelvic floor damage and somatic consequences, obstetric data, main outcome measures; the authors' clinical expertise and knowledge, as a midwife and research literature on the topic³⁶. Guidelines provided a distinct set of instructions, that sought reliable qualitative data regarding clinical aspects of partners' pregnancy and birth. A template was established regarding the format of questions to assist in consistency. Each partner had an individual document with different obstetric and personal details, that included participants' educational background, which was viewed as a prerequisite for knowledge regarding level of literacy prior to interviews. The following six domains were developed: 1) partners' pre/antenatal knowledge; 2) partners' observations of antenatal care; 3) partners' observations of labour and deliver; 4) partners' reflections of the postnatal period in hospital; 5) partner's observations of the postnatal period/ adjustment at home; 6) partners' reflections of women's long term recovery after the birth/ before restorative surgery

[see Appendix 1a]. No participants agreed to interviews being audiotaped so the interviewer took written notes with the assistance of a transcriber. These were emailed back to the participants for formal authorization as an accurate unbiased record [see Appendix 1b]. Men were given the opportunity to add or change information on the transcripts. Data from all interviews was verified by all participants as an accurate account of interviews.

6.3.3 Ethical considerations

This study received ethical approval from the local Human Research Ethics Committees [NBMLHD 07-021 and SLHD RPAH zone X05-0241]³⁶. Women partners were asked to sign consent forms regarding their partners' participation in this study [see Appendix 2]. Men were given relevant information about the study and asked to sign consent forms [see Appendix 3]. Men were also given the original Epi-No trial³⁴ consent form regarding women's interviews for perusal [see Appendix 4]. Consideration was given to the personal nature of questions and responses; anonymity, confidentiality, valid consent, and the right to withdraw from the study were emphasized. All participants were offered psychological consultation.

6.3.4 Analysis

Thematic analysis of purposeful sampling⁵⁸ was initially undertaken with an inductive approach regarding men's experiences during the antenatal, intrapartum and postpartum stages. Enquiry employed the Framework Method to facilitate in-depth analyses of key themes across the whole data set. Perspectives of each participant were linked to other aspects of their account within the matrix to ensure the context of men's opinions was not lost. The approach enabled: comparisons across and within individual cases; flexibility to generate themes; and was not committed to inductive or deductive thematic analysis. In view of the fact, the researcher/ interviewer worked clinically as a midwife, data collection and analytical stages were optimally influenced by her understanding of maternity processes that enabled critical reflection throughout the whole research process. the interviewer/researcher recorded applicable reflexive notes on her impressions of the data and, remained flexible and adaptive to findings that explained the research question⁵⁹ [see Table 2].

Table 2: Men's framework for thematic analysis

Framework method	Details of analyses
1) Transcription of data	7 Word documents were developed and men's self-edited responses transcribed to interview templates. 7 hard copies were also prepared with large margins for coding.
2) Familiarization with 7 participant responses and immersion in the raw data. After each interview, particular phrases were pinpointed regarding incidents or types of behaviour in each script	Interviews were read several times to locate emerging index themes and categories specific to 7 participants and then transcribed onto an Excel file. Researchers scrutinized these for agreement
3) Generation of initial coding occurred as a base line. Codes were developed into an analytical framework that identified key words, concepts, images, and reflections as a foundation for themes. These were rechecked by researchers to ensure validity and consistency	Each document was read line by line to capture the participant's own words and maintain men's experience at the centre of the account with a constant comparison to the rest of the data. Data reduction was utilized to create categories re codes. Researchers agreed on the initial codes.
4) Codes were indexed into sub-themes and themes from participant responses	These were developed in order to accurately depict the common data within the context of the research, e.g., do men understand somatic and psychological sequelae of birth injury to respective partners
5) Recognition of how themes were patterned to tell an accurate story about the data	This process involved understanding themes and how they fitted together with the given codes. Qualitative themes were examined for links regarding retrospective findings from women's interviews. Obstetric details of women [Table 1] were observed for common associations with men's themes.
6) Nine themes were summarized and renamed as " category statements " and later reduced to 3 overarching themes. All data was recorded on an Excel document/matrix spreadsheet.	Each "category statement" was defined and described regarding aspects of data captured
7) Data was interpreted	3 main themes emerged as overarching interpretative propositions that explained aspects of the data. These were articulated by interrogating data categories through comparison between and within cases

Adapted from: Gae NK, Heath G, Cameron E, Rash d S and Redwood S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*; 13(117): 1-8. doi: 10.1186/1471-2288-13-117

Table 3: Obstetric details of women partners [as per Epi-No³⁴ database] Postpartum somatic and psychological sequelae reported by women [see Chapter 4: Paper 2]

Obstetric information & psychological sequelae	Details
Gestation at birth	38 - 41.5 weeks
Normal vaginal delivery	n=1 with a shoulder dystocia
Syntocinon induction with epidural	N= 6
Vacuum extraction	n=2
Forceps instrumentation	n=4
Episiotomy	7 including indwelling catheters
Length 1st Stage of labour	Duration = 210- 955 minutes Mean = 557 minutes
Length 2nd stage of delivery	Duration = 56- 219 minutes Mean = 135 minutes
Birth weight of baby	Range of weights =3380 -4680 grams Mean= 3831 grams
Diagnosis of LAM from 3D/4D translabial ultrasound	7 women Including x 3 women with vaginal tears
Diagnosis of OASI from 3D/4D exoanal ultrasound	2 women Including 1 woman with 3rd degree observed in labour ward
Symptoms of pelvic floor dysfunction reported by women at assessment and interview	*7 women reported vaginal prolapse symptoms of lump, dragging feeling *7 women reported sexual dysfunction *5 women reported severe constipation and impartial emptying of bowels *3 women reported poor control of urine *4 women reported flatulence *1 woman later had reconstructive surgery
Symptoms of perineal dysfunction reported by women at assessment and interview	*2 women reported faecal incontinence and also sustained LAM damage
Symptoms of PTSD disclosed by women at interview	7 women disclosed/ exhibited 3-4 trauma stressor symptoms of postpartum PTSD including detachment, avoidance, nightmares, panic as per DSM -5 ² related to events of birth and enduring somatic morbidities 1 woman was diagnosed with PTSD and was in counselling. 6 remaining women put up with symptoms 1 woman wanted to terminate her 2nd pregnancy but changed her mind after discussion with partner

In-depth analyses of key themes took place across the data set and were observed to be 9 and reduced to three overarching themes. Themes were observed to complement and clarify women's themes in the previous study.

6.4 Results

Nine themes were identified within the context of men's interviews. These included:

Table 4: Themes and comments

Themes and comments [n =7]	Number
<p>1. Antenatal classes presented an unrealistic expectation of childbirth.</p> <p>Comment: "...The classes were thin on detail...they romanticized birth... I was anxious about the actual birth and expected more information. No facts were given about what actually happened at the birth... not enough to quell the anxiety I had about my wife's delivery. We were under- informed and needed more realistic and honest education</p> <p>Comment: "...I thought the staff must know, as they are the health professionals with expertise – I thought I would just leave it to them. I did not know what to expect and was OK with that...but this did not occur and we were not given realistic expectations."</p> <p>Comment: "...We were told that delivering baby was like passing a stool – I had not really thought that was the case...classes were unrealistic and lacked information on what eventuated."</p> <p>Comment: "...We attended private birth classes. They focused mainly on natural birth and were run by people who did not like hospitals or their staff. They tried to sell the idea of natural birth and lacked balance. They seemed to say that intervention was bad and to be wary of overbearing midwives and doctors. They were too alternative for my liking."</p>	7 men
<p>2. Couples were not warned about risk factors of vaginal damage.</p> <p>Comment: "...No information was given on episiotomies or tears and I really wish in retrospect that this had occurred. There was a huge gap in the information. The staff and educators never mentioned the fact that my wife's body would change after the baby. This would have helped us regarding my wife's mental state. There was no information regarding the urinary incontinence.</p> <p>Comment: "...I would have liked more information on vaginal damage so I could have helped my wife afterwards. Maybe we could have even been given options to prevent it. I never imagined this amount of damage and long term distress to my wife."</p> <p>Comment: "...Before birth no one explained the impact of forceps on my partners' anatomy or even consider complications regarding cutting ... it is concerning that hospitals do not require consent regarding forceps... this is certainly less comfortable with me."</p>	7 men

<p>3. Men were ill-prepared for complicated deliveries.</p> <p>Comment: "...The doctors were unable to deliver the baby vaginally without the use of forceps in theatre. It all developed into a 'pressure cooker' after unsuccessful long and drawn out contractions, dilatation and failure of epidural. At one stage I thought the epidural would be the answer – I went out to the car and realized how much pressure was in that room."</p> <p>Comment: "...I was a helpless bystander."</p> <p>Comment: "...It was like watching a nightmare unfolding."</p> <p>Comment: "...I tried to make up a scheme to keep my wife focused re-counting contractions in 'bits and pieces' – it worked for a while. When the anaesthetist arrived to give the epidural after my wife had relented to having pain relief, I felt like shaking him to hurry him up! Then I realized how serious this procedure was – very close to the spine. I never looked at the actual site or even the vaginal area when my wife was delivering – I stayed with her to reassure her always."</p> <p>Comment: "...I was very stressed...just trying to cope."</p> <p>Comment: "Everything was constantly changing without guidance."</p> <p>Comment: "...I was aware that things could be going wrong and my thoughts were a stream of consciousness..."</p>	<p>7 men</p>
<p>4. Men were traumatized by the violent nature of birth.</p> <p>Comment: "...I remember seeing the forceps – they were very unpleasant."</p> <p>Comment: it was a much more violent experience than I had expected- it was a big shock."</p> <p>Comment: "...I was relieved baby was fine but still worried and helpless about my wife - she had lost so much blood. The birth was like a car crash. My wife was very unwell especially after the huge blood loss and long labour and she seemed traumatized.</p> <p>Comment: "...She was very emotional and could not take in information about what was happening to her body. She wanted to flee to the safety of home after birth. She said she felt traumatized not depressed and was unable to really come to terms with these injuries."</p> <p>Comment: "...My wife is still very traumatized... this will not be resolved until surgery is performed."</p> <p>Comment: "...I did not expect my wife to be so different and unable to do things. She could not get out of bed in the postnatal ward for 2 days. During the last part of the long labour, I overheard a midwife say that she had a low threshold of pain. I was confused because my partner is a black belt in karate."</p>	<p>6 men</p>
<p>5. Men were angry with clinicians' dismissal of birth injuries.</p> <p>Comment: "...We expected everything to be different. No one examined her and we were given no information about healing or treatment. We did not expect the short and long-term problems regarding my wife's sore and swollen vagina, constipated bowels and urine incontinence. When the doctor sutured her tear after birth, she was given no information at the time or later – he just sewed her up and left – she felt disempowered and confused. The postnatal ward was a terrible experience – there was no information and emotional support."</p>	<p>7 men</p>

<p>Comment: "...We could not trust the postnatal staff. No information was given that explained the reason my partner's perineum was so sore and swollen!"</p> <p>Comment: "...Distressed, discouraged and dissatisfied at the lack of postnatal help."</p> <p>Comment: "...My wife saw a woman GP and was very distressed, disheartened and disappointed about this doctor's attitude. She was told that there was nothing to be done! I was shocked that a professional would say this..."</p>	
<p>6. Men were distraught by the loss of sexual intimacy after birth.</p> <p>Comment: "...She has no libido and no sensation and does not discuss it –but we still try.</p> <p>It has been 4 years since this delivery and I now realize it was a badly managed birth and has caused a great deal of damage to my wife's vaginal area and sex life...during the second delivery the back part of the vagina fell out."</p> <p>Comment: "...We discuss things [sex and intimacy] eventually... but it is difficult because these issues about birth injuries are so private and demoralizing."</p> <p>Comment: "...Sex is totally different – infrequent and it hurts my partner...a throbbing and uncomfortable feeling! I wish we could be uninhibited again like before baby."</p> <p>Comment: "...Sex for my partner is like a chore! She does not let me see ...but it appears to hurt inside her body. I definitely want to talk to your team about her delivery as this may help recovery – it is 4 years after this distressing delivery."</p> <p>Comment: " ...We expected sex to return to normal ...that's what they told us in classes"</p> <p>Comment: "...We will work this out privately."</p>	7 men
<p>7. Men lacked medical understanding of birth injuries.</p> <p>Comment: "...I cannot see the serious damage – I understood it to a degree – my partner said it was muscular damage that impeded the pelvic floor – a urogynecologist told her – I do not know totally what a prolapse was – a bulge coming out of a hole maybe."</p> <p>Comment: "...I never expected this amount of vaginal damage to my wife...unsure how to understand something I cannot see...just trying to believe it will get better."</p> <p>Comment: "...My wife's vaginal area is still different 4 years later... but she doesn't tell me... I just assume this... I am still at a loss of what to do – helpless and anxious!!"</p> <p>Comment: "...No I did not see the damage... later she tried to discuss the tears and pelvic floor issues but at times I think she felt it was very private so I just left it until she felt a bit better. It was complex but we always discuss things eventually."</p> <p>Comment: "...My partner showed me her perineum – I couldn't see it properly but I believed her."</p> <p>Comment: "...She said she had a protrusion in her vagina which she noticed some weeks later and was told a year later that it was a cystocele or bladder prolapse... I believed her but could not see it.</p>	7 men
<p>8. Information on vaginal birth damage was unavailable to men.</p> <p>Comment: "...I tried to talk to other men... I wanted some perspective on my wife and delivery. The men I talked to 'before' the birth demonstrated the bravado of 'everything was fine' but that was small consolation to me. Other men I talked to after</p>	5 men

<p>their wives' birth- felt helplessness – they seemed like me... unable to get behind their wives' self-made walls. I had hoped for a better discussion to assist me to help my wife's state of mind and marital situation. I just want my wife back..."</p> <p>Comment: " My wife and I are keen to see your team for recovery and a better life. This is really important research and I will assist any way possible. Up to now-other than speaking to you regarding this research, there has been minimal information out there towards my wife's recovery regarding her physical and psychological health – I am angry I suppose. You have given both of us hope!"</p> <p>Comment: Up to now-other than speaking to you, there has been minimal information out there towards my wife's recovery regarding her physical and psychological health- I am angry I suppose. We are keen to see your team for recovery and a better life. This is really important research and I will assist any way possible. You have given both of us hope!"</p>	
<p>9. Men observed partners were emotionally detached postpartum.</p> <p>Comment: "My wife was disconnected with baby for 6 months after birth. She was still detached and traumatized at 12 months....8/10 on this scale...but we saw the urogynaecologist from this research... he believed her and gave her time to talk unlike other clinicians she saw. She was back to normal after that..."</p> <p>Comment: " ...Her distress after birth was 8/10 and still the same level of trauma and in a very dark place for 18 months and still is... only decreased to about 5/10 – going back to work helped ."</p> <p>Comment: "...Initially 7-9 out of 10 after birth but decreased a bit over 6 months later work helped and it is 5/10."</p> <p>Comment: "...Immediately after the delivery she was 7/10 and remained the same for about 15 months I think..."</p> <p>Comment: "...My wife was disconnected from baby for 6 months and was very traumatized."</p> <p>Comment: "...Everything after the birth was different – she was a different person to the one I knew before and still is not back to normal. I am very concerned- on a scale 7/10."</p> <p>Comment: " ...I just want my wife back"</p>	7 men

6.4.1 Overarching themes

After analysis, three following overarching themes were identified:

Overarching theme 1: *Men were critical of antenatal education that failed to warn them of women's potential injuries that were later dismissed by clinicians.* [see Themes: 1, 2, 5]

A main finding was that men relied on expert antenatal education for guidance during the birth process to support partners. Prior knowledge of childbirth was described as minimal and they expected health professionals to have expertise that would prepare them for any potential

complications. All participants stated they were under-informed and given idealistic information that, romanticised birth and did not prepare them for unforeseen and rapidly changing situations. On reflection, men were critical of classes that: omitted facts about what actually happened; lacked balance; presented subjective opinions about natural birthing, obstetric interventions, doctors and midwives; were insufficient to quell the anxiety they felt about partners' deliveries. Men reported clinicians never mentioned the possibility of long term vaginal damage related to forceps, tearing or episiotomies. One man stated that lack of consent to these procedures was concerning. During the postnatal hospital period men stated clinicians were "...untrustworthy because they never assessed vaginal injuries". They were angry maternity clinicians rarely assessed injuries or gave follow-up consultations for women and observed that six week check-ups were distressing, disheartening and disappointing for women. One man reported that his wife was told "...nothing could be done" about damage, and was "...aghast a health professional would verbalize this statement to a patient." Overall, men felt disempowered, angry and helpless at the lack of education and postnatal assessment of vaginal injuries.

Overarching theme 2: Men were traumatized by the violent nature of vaginal birth, felt helpless during deliveries and troubled by women's resultant emotional detachment. [see Themes: 3, 4, 9]

Opened-ended interview questions regarding men's experiences of partners' delivery, revealed a clinical situation of extreme trauma that: evolved as a rapidly changing situation without guidance; resembled a "...pressure cooker" or a "...car crash" that made men feel helpless and confused; was unrelenting and demonstrated threat of death regarding their partner and baby. On reflection, men attempted to distract themselves, but realized birth was a "...violent process" they had not expected. Participants described distress at seeing the loss of large amounts of blood that was exacerbated by the use of "...unpleasant" forceps, episiotomies and perineal tearing. Overall they felt "...helpless bystanders" to partners' birth ordeals.

Postpartum maternity staff were observed to be emotionally unsupportive to women and offered unwelcome subjective comments about mothers' "...low threshold of pain." Men were distressed partners appeared traumatized after "...horrific births" that caused mothers to "...flee to their

homes because no one cared". All men said women were "...totally different after birth." One man displayed symptoms of PTSD as per DSM-5²⁸ at interview 4 years later. Men stated partners exhibited emotional detachment with minimal communication of their feelings that lasted years. One man noticed his wife could not bond with their baby for 6 months after birth. Another man said he just wanted his wife "...back to normal" and would do anything to help her, even though it was years later. Data from the previous interview study⁴⁰ with seven women partners, substantiated men's concern about women's traumatic experiences. All women exhibited 3-4 symptoms of PTSD as per DSM-5²⁸ that were observed by the interviewer; multiple symptoms of pelvic floor and perineal damage; were diagnosed with major LAM avulsion after complicated vaginal deliveries. Two women had also sustained OASI. [see Table 2]

Overarching theme 3: Men lacked medical knowledge to understand the loss of sexual intimacy. They attempted to find information but were unsuccessful and tried to work out relationship issues themselves. [see Themes : 6, 7, 8]

Although men believed their partners had sustained birth injuries, men said they had difficulty understanding the nature of injuries and resultant effects. Some women showed their partners injured perineal areas, but men could not see any changes. Others tried to talk to men whose wives had recently delivered babies, but were confronted with "...masculine bravado that everything was just fine in the bedroom." One man said "...I did not see the damage but understood it to a degree." His wife had tried to explain it after seeing a urogynecologist: "...she said it was muscular damage that impeded the pelvic floor." He reported that he "...did not totally understand what a prolapse was – a bulge coming out of a hole maybe?" Another said "...I never expected this vaginal damage to my wife... I am still trying to believe it will get better." One man said "...sex is so infrequent and it hurts my partner... she says it is a 'throbbing and uncomfortable feeling.' I wish we could be uninhibited again like before baby." Another reported that "...sex for my partner is like a chore! She does not let me see but it appears to hurt inside her body." Overall, men reported they had never expected their wives to sustain severe physical damage with such drastic effects but they still wanted to "work it out." During interviews, they were observed to be very respectful towards their partners and loyal regarding their privacy [see Appendix 5].

6.5 Main Findings

This interview study presents unique knowledge on the lived experience of men, whose partners sustained major birth injuries after traumatic vaginal deliveries. Findings revealed this cohort believed women had suffered considerable vaginal damage and emotional detachment. Despite their lack of medical understanding and inability to visualize 'hidden' damage, men were respectful of their partners' privacy regarding resultant morbidities. Men largely discussed their feelings and did not mention their concerns about suppressing male emotions, as noted in other studies^{62 75}. However, most of these participants were interviewed 1-4 years after delivery and reported partners' somatic and psychological symptoms were still evident and were desperately seeking answers. Participants were overwhelmed by the "violent" nature of childbirth and angry with antenatal clinicians who had not warned couples about potential vaginal injuries. During deliveries men described themselves as "...helpless bystanders, watching a nightmare unfold."

At the outset of this study, there was an apparent 'impasse' between previously interviewed women⁴⁰ and this cohort of men, regarding lack of sexual relations. Women reported partners did not understand the severity of birth-related injuries that prevented sexual relations. Men stated they had attempted to obtain anecdotal information from other fathers and, although unsuccessful, they would continue to look for answers. Men revealed that the loss of sexual intimacy had caused significant distress to both parties up to four years later. One couple attended a consultation regarding birth injury assessment with urogynaecologists and, later stated their communication had improved, trauma and anxiety symptoms were decreased and, their sex life recovered despite injuries. Men did not mention to the interviewer they thought women no longer wanted sexual intimacy. This seems to have been an emotive statement, during a heated discourse between couples, due to the lack of knowledge and understanding regarding the nature of birth injury and consequences. Responses indicated men were well aware of the 'sexual impasse' and wanted more medical information. One man exhibited postpartum PTSD symptoms of memory loss and panic years later, but still wanted to help his partner to get better emotionally and physically. Interviews assisted men to debrief due to the fact, most had spent years without any direction or

treatment options for their partners.

Findings substantiate research that observes men are: distressed by birth events and need optimal guidance during antenatal instruction^{60 74}; display PTSD-related symptoms after witnessing traumatic birth events that include perceived threat of life to mother and baby^{64 65 68}; demonstrated self-blame and anxiety about maternal and/or infant trauma they were unable to prevent⁶⁸; men feel they are relegated to the role of "...bystander" and staff view them as an encumbrance^{65 75}.

Fathers were observed to be in a vulnerable position and experienced inner turmoil during and after deliveries. Some stated that at the time, they tried to maintain an outward appearance of strength and support but, their only source of guidance had been antenatal classes that portrayed birth as a positive experience. Most agreed they had insufficient knowledge about female anatomy and physiology. Women's resultant physical damage from forceps, long labours or macrosomic babies were concerning factors and many observed women "...appeared totally different" after deliveries and were emotionally detached.

6.5.1 Men's understanding

All participants were aware of their partners' postpartum vaginal damage but reported they were "...in the dark" due to lack of available medical information. Some remembered being shown forceps in antenatal classes but reported that they were ill-informed about adverse effects. One man stated he thought forceps only "...changed the shape of babies' heads." During hospital stays men were distressed that staff had dismissed women's injuries that were reported as "...extreme soreness or throbbing inside their vagina." After discharge from hospital, men observed women had suffered substantial vaginal problems; some were shown perineal and vaginal areas, but they could not see prolapses or severe tearing and hoped injuries would resolve. Others were concerned about partners' ability to cope with damage, but did not understand that women may require frequent toileting or showering due to leaking urine and faeces, impacted bowels or need to push up a prolapse in their vaginas. Men wanted partners to seek medical expertise and were angry clinicians gave disparaging comments and rarely assessed injuries; one man hoped surgery was an answer. Most had problems juggling work, demands of babies and lack of sleep. Within the

first postnatal week, men noticed their partners' emotional detachment and said women "...appeared very different" and they were unable to reach them emotionally. One woman began seeing a psychologist after 8 months and was diagnosed with PTSD; her partner reported therapy assisted their relationship. Two women were told they had PND after responding to the EPDS³⁵ at 6-week postnatal visits. Respective men reported women were distressed by a misdiagnosis of PND and wanted assistance for emotional trauma. It was apparent clinicians had not canvassed the possibility women may suffer from diverse symptoms of distress like PTSD and women remained undiagnosed.

6.5.2 Sexual intimacy

All of the seven women from published interviews⁴⁰ reported that sexual relations had not commenced for at least a year, due to the fact sex was "...unpleasant or unachievable" and triggered memories of birth. Men did not comment, other than to say they "...hoped relationship issues could be worked out eventually". Some men were distressed they hurt their partners and sex was seen by women as "...a chore." Notably, this cohort of mothers, were unique, in that injuries had been accurately assessed by imaging modalities and, participants were given information on the current knowledge of birth injuries, during consultations. Even so, during interviews it was apparent most women had been unable to relay this accurate information to partners afterwards. Hence limited knowledge was observed to contribute to the previously discussed, "impasse" between couples regarding sexual intimacy, that was exacerbated by suboptimal antenatal education on the risk factors of vaginal birth damage. Findings correlate with research that observed couples' experience of traumatic birth events, resulted in blame, anger and marital disharmony and decreased sexual intimacy⁶⁸. Men in this study stated they just wanted their wives back. Respective women; however, reported the presence of a "...sausage-like presence in their vagina" that made sex untenable for the women, and that the men did not seem to notice, so they felt isolated by the lack of validation⁴⁰. Findings are supported by other studies^{30 31} that observe women were "...too embarrassed" to discuss physical consequences of birth with men. Although some research observed that relationships deteriorate from sexual consequences

of enduring pelvic floor and perineal injuries³⁰, this was not evident during interviews with men. Even so, there was a likelihood that marital disharmony may have occurred, due to the fact some interviewed women displayed extreme emotional distress about their relationships and, despite asking partners to contact the interviewer, men were largely unavailable. Research into sexual function after childbirth^{81 82 83} reveals an increased prevalence of postnatal sexual morbidity, with low rates of consultation for problems concerning sexual intercourse and lack of medical support for postpartum morbidities, that included sexual dysfunction, vaginal prolapse, urinary incontinence, pelvic floor pain, haemorrhoids and severe constipation⁸⁴. Mothers were left to cope with birth-related morbidities and told by clinicians, "...sex will improve everything down there".⁸⁵ Findings substantiate comments by women and men in this thesis, that reported a high level of marital distress for couples regarding sexual dysfunction that postnatal care services do not currently address.

Studies on maternal experiences of enduring OASI, observe women feel anxious and lonely and 'sex' was experienced as embarrassing due to fecal leakage and flatus. Findings did not mention men's perspectives although women often said they had sex for their partners' sake and not for themselves^{29 86}.

6.5.3 Unrealistic antenatal education

A central theme observed in men's interviews, was the lack of antenatal education. Men were critical that birth classes concentrated on *natural birthing* methods and adversely influenced maternal decision-making about birth options. Some reported self-blame for women's damage, after realizing instruction had been "...unrealistic and light on detail". One father said "...I was naive prior to the delivery and blame myself for both of us attending private *calm birth classes*." One man stated that: "...women are presented with a *cultural mindset* regarding the method of giving birth. When a woman meets another woman they always discuss whether they delivered naturally and breast-fed their baby." Another said: "...We needed more realistic and honest education about what actually happened and options prior to birth. After all – many people have

caesarean sections by choice in Australia don't they? This experience of ours seemed to involve the "great unknown!"

Overall, interviewed men reported they felt unprepared for complicated vaginal births that were "...terrifying". Some stated they would have preferred their partner had undergone a caesarean section. All seven partners attended antenatal birth classes with women after work, for three hours over a 6-week period or, two eight hour days over a weekend, and stated they were a "...waste of time". Content was reported to consist of "...endless discussion about idealized birth scenarios" that never eventuated. Intrapartum and postpartum risk factors were omitted and only mentioned during labour, when a caesarean section was imminent and couples were ill prepared. Comments validate research findings that observe men need adept antenatal guidance to allow them to support labouring women. Without this process, most non-medicalized men are bewildered by the birthing process and utilize maladaptive coping mechanisms of avoidance^{71 87 88}. From the author's clinical perspective, informed consent is not mandatory in this discipline and it seems that midwives and doctors avoid discussion of intrapartum complication because they "...do not wish to frighten the mothers." Nonetheless, as noted by one review, it has been a legal requirement in general medicine for several decades and provides patients with an adept understanding of risk factors regarding all procedures prior to surgery⁸⁹.

6.6 Strengths and limitations

The strength of this study is that, currently, it appears to be the only enquiry in the literature, that has examined men's lived experience associated with partners' somatic vaginal birth trauma. Due to the fact enquiry emanated from women's experiences of accurately diagnosed birth injuries, obstetric data was an objective medical evaluation of pelvic floor and perineal injury. Other research typically relies on maternal subjective assessments^{62 63}. Findings from overarching themes, correlated with women's experiences and demonstrated that birth events had caused substantial somatic, sexual and psychological distress for both men and women at all stages of the birth process. Hence, it was beneficial to have interviewed both partners to compare findings from respective studies and observe consequences of birth injury to couples. This gave depth to the

study and enabled both perspectives. Interviews had the potential to facilitate informed debriefing between couples after men reported they were relieved to finally speak with a health professional who had knowledge about birth injuries. Although the cohort only consisted of seven men, this is comparable to the number recruited in current studies on partners' perspectives of childbirth trauma. Prior to men's interviews, women gave written consent and thus allowed men to speak freely about their understanding of related consequences of birth damage. Recruitment of participants was problematic because men were difficult to contact, despite partners suggesting they were accessible. Twenty men were accessed over a three year period and only eight responded. One man had not signed his consent form and was uncontactable after the interview. During interviews with women, privacy and confidentiality required reassurance but this was not the case with these participants, who were all keen to speak and trusted the interviewer. Many stated they experienced substantial barriers in attaining any information in the past. One couple was interviewed together and responses to open ended questions were observed to be optimal; both parties wanted to stay in contact with the researcher. This couple had previously attended a consultation with a urogynecologist together and, said medical information alleviated maternal trauma symptoms, and assisted the couple's communication. Sensitive questions on sexual dysfunction entailed diplomacy; men were not prepared to go into detail and often said they "...would work it out" with partners.

Negative cognitions of anxiety, anger and self-blame emerged during interviews that revealed symptoms of men's emotional trauma that requires further research with a different template of questions. Men initially found it difficult to describe their partners' psychological state at various stages after birth, hence the interviewer used a grading system of 1-10 to assist regarding 'best' and 'worst' case scenario, that was later added to the interview guidelines. This measure was adapted from the pain scale communication tool⁹⁰ commonly employed to understand patients' pain levels in medical settings. Although men did not wish interviews to be taped, written interpretation of responses was emailed to participants for editing and facilitated additional comments at a later date. Taped interviews may have yielded poorer information on sensitive topics. Participants were offered psychological follow-up; one man remained in contact with the interviewer in an attempt to have his wife reassessed. Partners were given details of available urogynecologists for women and/or psychologists for their purposes, if required. A

limitation of this study was that interviewed men were all Caucasian, exhibited high levels of empathy, were well-educated and aged between 35-40 years. Thus, the cohort was not representative of other sections of society. Interviews occurred 4 years after vaginal deliveries that were observed on the Epi-No trial³⁴ database to have substantial complications. Respective women suffered from 3-4 somatic morbidities that included FPOP, sexual dysfunction, urinary and fecal incontinence, bowel impaction and severe constipation; all exhibited 3-4 symptoms of PTSD that consisted of detachment, nightmares, avoidance, panic, and numbing, as noted by DSM-5²⁸. One woman was under the care of a psychologist and had been diagnosed with PTSD.

6.7 Conclusions

This original enquiry demonstrated men did not understand anatomical factors of somatic vaginal birth injury that caused sexual dysfunction but, believed women had sustained severe vaginal damage, after witnessing complicated deliveries, that they perceived as traumatic and "...violent", Men observed women were shocked and emotionally detached for long periods that lasted, in some cases, up to four years. Sexual dysfunction after somatic vaginal birth trauma was observed to be poorly communicated between both men and women. Contributing factors were noted to be: couples' insufficient knowledge of anatomical alterations of resultant LAM damage; expectations from birth classes that birth is a positive event; inadequate antenatal education on complicated events of birth and risk factors; postpartum PTSD symptoms that included, avoidance and re-experiencing of birth events during sexual relations. Despite unavailable medical knowledge, men believed their partners had suffered from birth trauma, and they desperately wanted to help "...any way possible". Men were observed to exhibit anxiety, self-blame and emotional avoidance. On reflection, participants stated their partners' birth was not a positive and empowering event and they felt "...hoodwinked" by clinicians who advocated *natural birthing* methods and "...unrealistic information about events of birth that did not eventuate". Most were distressed that maternal treatment options were minimal and clinicians rarely offered "...a way forward." Men felt ill-prepared to witness 'violent' births that subsequently caused women to suffer long term trauma, lack of sexual intimacy with an inability to communicate their attendant feelings.

Findings demonstrate that unexplained and unexpected maternal somatic and emotional trauma have negative effects on couples' relationships and mental health. This research increases current knowledge about men's traumatized emotional state before, during and after complicated birth events. It reveals that men are overwhelmed and distressed when they return home with partners, who have sustained undiagnosed somatic trauma and symptoms of PTSD. Medical knowledge about LAM damage, is difficult for men to attain, unless they attend urogynaecological consultations with their partners. In the current environment, health providers are reported to rarely refer women to specialists for imaging assessment, hence men are prevented from gaining adequate understanding of birth injuries and sexual dysfunction. They experience substantial barriers when attempting to communicate with partners about problematic sexual relations. There is an urgent need to inform couples of potential risk factors of pelvic floor, perineal and sexual dysfunction prior to birth and adequately prepare men so they can support women. These findings significantly contribute to the body of knowledge regarding a taboo topic that is rarely discussed by clinicians and the general public .

Appendices

[Appendix 1a](#): Interview guidelines for men.



[Interview guidelines for partners](#)

Research topic: Psychological and lifestyle consequences of traumatic vaginal birth on women and their partners.

Chief Investigator: Professor Hans Peter Dietz

Co-investigator: Elizabeth Skinner - PhD Candidate

Institution: The University of Sydney, Nepean Clinical School, Penrith. NSW.

Department: Obstetrics, Gynaecology & Neonatology

Participants: partners of women interviewed in 2013 & 2014 from EpiNo Database

Method: written templates or 35-40 minute telephone interviews to *partners of first time mothers* from previous interviews.

Participant Information Sheet: explaining that some interview questions may be sensitive and confronting.

Consent Form: to be signed and 'ownership of interview' confirmed after interview.

Introduction & instructions:

1. Read the participant information prior to commencing.
2. Sign the consent form, prior to interview
3. There is an option to stop interview.
4. There is an option to withdraw your data later.
5. There are no right or wrong answers
6. Responses are strictly private and confidential.
7. The researchers greatly appreciate your assistance.

Domain 1: Pre-Antenatal Care

What did you know about childbirth at this stage?

What did you know about your partner's body as regards childbirth at this stage?

What or who was the source of your information?

Domain 2: Antenatal Care

Where did your partner go for antenatal education – if anywhere?

Did you accompany her?

What can you tell me about this experience?

Can you tell me any information on childbirth you received during antenatal classes?

What impact did this care/ education have on you and your partner?

Now your partner has delivered would you change anything about your antenatal care/education?

What were your expectations regarding your partner's health after childbirth at home?

Domain 3: Labour and Delivery

How and where did your partner deliver the baby?

Can you describe the course of events?

Did you understand what was happening?

Did health professionals explain all the procedures?

How did you feel during the labour and birth?

Where in the room did you position yourself most of the time?

How did you perceive your partner's reaction during labour and delivery?

How did you feel during and after the birth?

Were you given an opportunity to talk to health professionals about the birth?

Domain 4: Postnatal Period – in hospital

Can you tell me about your partner's experience in the postnatal ward?

What effect did that experience have on you?

Did you stay overnight in the ward with your partner and baby?

Can you remember any physical changes in your partner at this time?

Did your partner talk about any changes to the way she passed urine or opened her bowels compared to before the birth?

Did you notice any psychological changes in your partner after birth? If yes, please explain what you noticed.

Are you able to assess your partner's psychological changes immediately after birth compared to the antenatal period on a scale of 1-10?

- '1' would denote that there was no change
- '10' would mean there was a total change.

Are you able to say whether these changes decreased during the stay in the postnatal ward?

Did any physical and psychological changes affect the way your partner cared for the baby?

Can you tell me about your partner's experience of breast-feeding at that time?

How did you feel during your partner's stay in the postnatal ward?

Were you able to assist your partner and/ or baby in any way?

Did you ever see your partner's perineal area during this stay? (*Check that participant understands where the perineal area is located.*) If the answer is yes, was it as you expected?

Was your partner examined by a health professional regarding perineal health in the postnatal ward before she went home? If so who examined her?

Was your partner given any explanation and assistance regarding vaginal/ perineal healing and future impacts on you as a couple?

Domain 5: Postnatal Period – at home

Can you tell me whether you partner told you about any problems regarding the healing of any vaginal / perineal wound at home?

Did your partner show you her perineal area? If so, was it as you expected?

Did you partner explain to you any issues she may have experienced regarding urination or bowel movement *during the adjustment at home* period?

Can you explain any psychological changes you noted in your partner at this stage?

Are you able to assess your partner's psychological changes at this stage after the birth compared to the initial postnatal time on a scale of 1-10?

- '1' would denote there was no change
- '10' would denote there was a total change.

Did your partner tell a health professional, relative or family friend about any changes to her physical and psychological health? If so, what was the outcome?

How would you assess your partner's relationship with baby at this stage?

What was your impression of your partner's body image at this stage?

Can you tell me whether your expectations prior to the birth were similar to what actually occurred?

Did you feel prepared for the birth and outcome?

At this stage did you have positive or negative thoughts about future sexual relations with your partner?

Are you able to tell me how your partner is feeling regarding sex? Is she able to discuss this with you or a friend/ relative/ health professional?
How were you feeling at this stage after the birth?
Would you benefit from talking to a well-informed health professional e.g. doctor and/or midwife regarding your partner's physical and psychological changes after birth if any?
Do you believe that your partner would benefit from the same discussion?
Would it be preferable that you both attended together or separately?
Did your partner attend an appointment with a health professional about her postnatal health? If so, when did that occur?
Did your partner feel the issues had been addressed and was she given adequate medical advice?

Domain 6: Long term – after the birth of the baby

How long ago was baby born?
What do you remember about your partner's labour ward and postnatal experiences now you have had time to adjust?
Do you have any reoccurring memories regarding your partner's delivery?
Do these memories affect your lifestyle and relationship with your partner?
What do you know about your partner's physical and perineal health at this stage?
Do you know whether your partner's bladder function is the same as before the birth or has it changed? Is it better than the initial months after birth?
Do you know whether your partner's bowel function is the same as before birth or has it changed? Is it better than the initial months after birth?
Is your partner's vaginal area the same as before the pregnancy? Has she discussed this with you or shown the area to you?
Do you know whether your partner able to use tampons?
If there were earlier postnatal physical perineal health issues have they improved?
Are you able to assess any changes on a scale of 1-10 when comparing your partner's physical perineal health in the initial postnatal period to now?

- '1' would denote that there is *no change*
- '10' would denote there is a *total change*

Did your partner seek medical assistance? Who did she see?
Is she did seek help, how long after the birth did this occur?
Can you tell me about your partner's psychological health?
Can you tell me about your impression of your partner's overall body image at this stage?
If your partner experienced any earlier postnatal psychological health issues have they improved?
Are you able to assess the changes on a scale of 1-10 when comparing your partner's psychological health during the early postnatal period and now?

- '1' would denote there is no change
- '10' would denote there is a total change

Are you able to tell me whether you have resumed sexual relations?
At what stage after the birth did this occur?
If so, is the experience different to before your partner was pregnant?
How does your partner feel about sex now? Does she discuss it with you?

If she does not discuss sex with you, does she talk to friends, relatives or health professionals?

Do you think you and your partner disregard or avoid thinking or talking about sexual problems?

Would you both benefit from an appointment with a well-informed health professional regarding your partner's sexual and perineal health?

Additional Comments:

Appendix 1b : Confirmation of Accuracy of Interview Notes

This is an accurate account of the responses that I discussed on the telephone with Elizabeth Skinner, researcher for Sydney Medical School, Nepean Campus, The University of Sydney. It concerns research on: *Lifestyle consequences of traumatic vaginal birth on women and their partners*. I have signed and witnessed the relevant consent form and read the participant information sheet.

Name:

Date:

Appendix 2: Consent to approach



Study Title:

Psychological and lifestyle consequences of traumatic vaginal birth on women and their partners

Researchers:

Chief Investigator & Supervisor: Professor Hans Peter Dietz

Co-investigator: Elizabeth Skinner - PhD Candidate

CONSENT TO APPROACH

I give permission for my name and contact details to be given to the researchers and for them to contact me. I understand that I am not obliged to participate in this study.

My name is: _____ (please print)

Signature: _____ (this can be added if you convert this document to a PDF)

Date: _____

Email: _____

My telephone contact numbers are:

(Home) _____

(Mobile) _____

[Appendix 3: Male partner consent form & research information](#)

Introduction

You are invited to participate in this research study regarding: **psychological and lifestyle consequences of traumatic vaginal birth to women and their partners.**

When your partner was pregnant she agreed to be involved in the Epi-No Trial at Sydney University Medical School Nepean. Elizabeth (Liz) Skinner, one of our researchers has been interviewing women and partners since 2013 and now wishes to speak to you at your convenience.

Aims

This research is being undertaken to understand and identify actual experiences of women and their partners' during the antenatal period, birth process and the ensuing postnatal time. It seeks to facilitate optimal obstetric care for childbearing women concerning medical and obstetric treatment and outcomes.

Study procedure

The interview will be informal and about 20 minutes in duration over the telephone. It may contain some sensitive and confronting questions. Any information supplied is strictly **private and confidential** and will only be used for research purposes. If you wish to withdraw at any time you can do so.

If you are agreeable to this interview, Elizabeth (Liz) Skinner would like to talk to you via telephone at your convenience. She presently has contact details from the EpiNo Trial database and discussion with your partner. She has emailed a consent form to the given address as an attachment. This requires signature and witnessing.

On completion of the interview, a copy of the responses you gave will be emailed to you as a document. This will require your response via email to confirm that it is an accurate account of your answers.

Risks

There are no risks associated with this interview, but some of the questions may be very personal and/ or confronting. If you don't want to answer any question you are very welcome to say so.

Benefits

While we intend that this research study furthers medical knowledge and improves the care of pregnant women in the future, it may not be of direct benefit to you.

Costs

Participation in this study will not cost you anything, nor will you be paid.

Voluntary Participation

Participation in this study is entirely voluntary. If you do participate you can withdraw at any time without having to give a reason. Whatever your decision, please be assured that it will not affect current or future relationships with the Public Health Service or the University of Sydney.

Confidentiality

All the information collected from you for this study will be treated **confidentially** – only the researchers named above will have access to it. The study results may be presented at a conference or in a scientific publication, but individual participants will not be identifiable in such a presentation.

Further Information

When you have read this information, Elizabeth Skinner or Professor Dietz can discuss it with you further and answer any questions you may have. If you would like to know more at any stage, please feel free to contact them at Nepean Hospital on 02 4734 1474 or 47342000. This information sheet is for you to keep.

Ethics Approval

The Ethics Review Committee of the Nepean Blue Mountains Local Health District has approved this study. It also concurs with the guidelines of The Sydney University, Human Research Ethics Committee. Any person with concerns or complaints about the conduct of this study should contact the Secretary on 02 4734 3441 and quote protocol number 07-022.

PARTICIPANT CONSENT FORM

I, [Name]

of

..... [Address]

have read and understood the Information for Participants on the above named research study and have discussed the study with the researchers

I have been made aware of the procedures involved in the study, including any known or expected inconvenience, risk, discomfort or potential side effect and of their implications as far as they are currently known by the researchers.

I understand that my participation in this study will allow the researchers to have had access to my partner's medical record, and I agree to this.

I freely choose to participate in this study and understand that I can withdraw at any time.

I also understand that the research study is strictly private and confidential.

I have read and understood the Information for Participants on the above named research study and have discussed the study with the researchers

I have been made aware of the procedures involved in the study, including any known or expected inconvenience, risk, discomfort or potential side effect and of their implications as far as they are currently known by the researchers.

I understand that my participation in this study will allow the researchers to have had access to my partner's medical record, and I agree to this.

I freely choose to participate in this study and understand that I can withdraw at any time.

I also understand that the research study is strictly private and confidential.
I hereby agree to participate in this research study.

NAME:

SIGNATURE:.....

DATE:

NAME OF WITNESS:.....

SIGNATURE OF WITNESS:

Version No. : 1 Date: 7.5.2015

Appendix 4: Women's Consent Form [from women's interviews: see Chapter 4]

Page 1 of 2



The EPI-NO Study

INFORMATION FOR PARTICIPANTS

Introduction

You are invited to take part in a research study into the protective effects of the EPI-NO on the pelvic floor. The objective is to investigate whether the EPI-NO system protects the pelvic floor muscles during childbirth. The EPI-NO device is a vaginal dilator which is designed for use in the last 3 weeks before your date of delivery. It can be used up to once a day, for 15 minutes each session. The EPI-NO is a balloon device which is inserted into the vagina, and dilated to a maximum diameter of 10 cm (the expected diameter of the baby's head). The size is increased gradually over a number of sessions, with you only dilating to the level which is comfortable for you. At the end of the session the device is pulled out of the vagina whilst dilated to mimic the delivery of the baby's head. Small studies have shown that the device may reduce the likelihood of vaginal tears, and episiotomy. It is our aim to assess the effect of its use on the pelvic floor muscles, and to establish if it is protective to these pelvic floor muscles. The study is being conducted by Prof. Peter Dietz of the University of Sydney.

Study Procedures

If you agree to participate in this study, you will be asked to sign the Participant Consent Form. You will then be interviewed and asked to have an ultrasound. The interview will take approximately 5 minutes, and involve questions relating to your urinary and bowel function, and any prolapse that is present. The ultrasound involves placement of a scanner on the perineum, i.e., between the legs. It does not involve anything internal as the scanner stays on the outside, and you are covered with a sheet to minimize embarrassment. The reason for this approach is that the muscles of the pelvic floor can be seen much better from below than from above. The scanner is covered with a glove, and the examiner is also gloved. The test takes approx. 10 minutes.

After this interview and ultrasound, the computer allocates you to one of two groups. One group is given the EPI-NO device (for you to keep after the end of the study) which is used to stretch the pelvic floor before you have your baby. The device is to be used as per manufacturer's instructions. The other group will continue normal antenatal care, and will not be given the EPI-NO device. In both cases your general care at the hospital continues as before. We'll ask you not to tell staff in clinic and labour ward about the study.

Three months and two years after your delivery we'd like to see you back for a short interview and an ultrasound similar to the one you had at the beginning of the study, regardless of how you've delivered. We'll give you several questionnaire to fill in which requires about 10 minutes of your time. The questionnaires contains some questions of a very personal nature, and you don't need to answer them if you feel uncomfortable doing so. We'd also like your permission to collect

information from your medical records about your pregnancy, labour and the birth of your baby for use in this study.

At the time of a follow-up visit we will offer you participation in an optional in-depth interview of 30-60 minutes with a research midwife. This interview will explore your birth experience and pelvic floor health and also discuss matters related to intercourse. If you were to agree you'd be welcome to bring your partner if you wanted to do so.

Page 2 of 2

Risks

All medical procedures - whether for diagnosis or treatment, routine or experimental – involve some risk of injury. In addition, there may be risks associated with this study that are presently unknown and unforeseeable. In spite of all precautions, you might develop medical complications from participating in this study. As far as we are aware, there are no known risks associated with the use of pelvic floor ultrasound or use of the Epi-No device.

Benefits

While we intend that this research study furthers medical knowledge and may improve the care of pregnant women in the future, it may not be of direct benefit to you. If you are in the intervention group, you will be able to keep the Epi-NO device for future use.

Costs: Participation in this study will not cost you anything, nor will you be paid.

Voluntary Participation

Participation in this study is entirely voluntary. You do not have to take part in it. If you do take part, you can withdraw at any time without having to give a reason. Whatever your decision, please be assured that it will not affect your medical treatment or your relationship with the staff who are caring for you.

Confidentiality

All the information collected from you for the study will be treated confidentially, and only the researchers named above will have access to it. The study results may be presented at a conference or in a scientific publication, but individual participants will not be identifiable in such a presentation.

Further Information

When you have read this information, Susanne Langer or Prof. Dietz will discuss it with you further and answer any questions you may have. If you would like to know more at any stage, please feel free to contact them at Nepean Hospital on 02 4734 1474 or 47342000.

This information sheet is for you to keep.

Ethics Approval

This study has been approved by the Ethics Review Committee of the Nepean Blue Mountains Local Health District. Any person with concerns or complaints about the conduct of this study should contact the Secretary on 02 4734 3441 and quote protocol number 07-022

EPI-NO Study**PARTICIPANT CONSENT FORM**

I, [name]

of

..... [address]

have read and understood the Information for Participants on the abovenamed research study and have discussed the study with the Researchers

I have been made aware of the procedures involved in the study, including any known or expected inconvenience, risk, discomfort or potential side effect and of their implications as far as they are currently known by the researchers.

I understand that my participation in this study will allow the researchers to have access to my medical record, and I agree to this.

I freely choose to participate in this study and understand that I can withdraw at any time.

I also understand that the research study is strictly confidential.

I hereby agree to participate in this research study.

NAME:

SIGNATURE:.....

DATE:

NAME OF WITNESS:.....

SIGNATURE OF WITNESS:.....

Version No. : 8

Date: 15.5.2012

[Appendix 5: Comments from men & some women](#)

Antenatal classes:

“...The classes were thin on detail...they romanticized birth ...I was anxious about the actual birth and expected more information. No facts were disseminated about what actually happened at the birth. Not enough to quell the anxiety I had about my wife’s delivery. We were under- informed. We needed more realistic and honest education about what actually happened and options prior to birth. After all – many people have caesareans sections by choice in Australia don’t they? This experience of ours involved the “great unknown!”

“...I thought the staff must know, as they are the health professionals with appropriate expertise – I thought I would just leave it to them. I did not know what to expect and was OK with that...but this did not occur and we were not given realistic expectations.”

“...We were informed of postnatal problems with a maternal weak bladder after birth and told that this could be expected. We were shown forceps and I was OK with this at the time but not enough information.”

“...We were told that delivering baby was like passing a stool – I had not really thought that was the case...classes were unrealistic and lacked information on what eventuated”

“...The staff and educators never mentioned the fact that my wife’s body would change after the baby. This would have helped us regarding mental preparedness.”

“...We attended private birth classes. They focused mainly on natural birth and were run by people who did not like hospitals or their staff. They tried to sell the idea of natural birth and lacked balance. They seemed to say that intervention was bad and to be wary of overbearing midwives and doctors. They were too alternative for my liking.”

“...No information was given on episiotomies or tears and I really wish in retrospect that this had occurred. There was a huge gap in the information. The staff and educators never mentioned the fact that my wife’s body would change after the baby. This would have helped us regarding my wife’s mental state. There was no information regarding the urinary incontinence.”

“...I believe women are presented with a *cultural mindset* regarding the method of giving birth. When a woman meets another woman they always discuss whether they delivered naturally and breast-fed their baby. The first question is always what *type of birth did you have?* There seems to be a competitive cultural issue amongst them and this seems to be the root cause.”

“...I was naive prior to the delivery and blamed himself for attending Doula classes instead of regulated hospital classes... but that is what my wife wanted...”

During the delivery

“...I still felt very apprehensive but kept telling myself that “we would get through it and all would be OK – I tried to trust in the natural process and if that failed I thought there was always expert professional in the birth suite. I think my wife had a similar sense maybe not as intense.”

“...The doctors were unable to deliver the baby vaginally without the use of forceps in theatre. The labour ward developed into a ‘pressure cooker’ after unsuccessful long and drawn out contractions, dilatation and failure of epidural assistance. At one stage I thought the epidural would be the answer – I went out to the car and realized how much pressure was in that room.

“...I tried to make up a scheme to keep my wife focused re-counting contractions in ‘bits and pieces’ – it worked for a while. When the anaesthetist arrived to give the epidural after my wife had relented to the administration of this pain relief, I felt like shaking him to hurry him up! Then I realized how serious this procedure was – very close to the spine. I never looked at the actual site or even the vaginal area when my wife was delivering – I stayed with her to reassure her always.”

“...Most of the time the staff were good but absent often. I tried to just cope and remembered my mother’s dictum of ‘tough love’

“...Just before the delivery (in theatres) I was very angry at the lump in my wife’s stomach that caused this dreadful pain. However, as baby was delivered I could see this *anonymous intestinal lump* turning into a living breathing human and then a beautiful daughter. She was taken to the table to check oxygen and signs of stress and I got to her but could not get back to my wife.”

“...helpless bystander.”

“...Very stressed – trying to cope.”

“ ...the experience was constantly changing without guidance.”

“ ...I want my wife to have a CS next time.”

“...Relieved baby was fine but still worried and helpless about my wife that she had lost so much blood. I felt like we had sustained a car crash – we both said this afterwards. She was very unwell especially after the huge blood loss and long labour and she seemed traumatized. I was concerned but glad she was in hospital and did not have a home birth. I wish I had been better informed and had attended better antenatal classes with my wife.”

“...I don’t remember it well but I was inherently relying on medical judgment – in retrospect this may not have been a good thing as the outcome was not good. Their judgment seemed like it was not always correct – the circumstances were changing rapidly.”

“...The staff did not leave me out but I did not feel in control. I suppose control is not really a variable. In retrospect, you simply don’t have prior experience during the first delivery. As the time dragged on during the birth, I was coping less and less as I was concerned about my partner not really wanting a CS. I remember seeing the forceps – they were very unpleasant – I possibly saw them at classes – but don’t remember. I was holding her leg as she delivered.”

“...I was aware that things could be going wrong and my thoughts were a stream of consciousness e.g. a lot can go wrong and this was a much more violent experience than I had expected. Intellectually I can now see that – but to experience it – it is a big shock.”

“...The physical experience of the birth was very overwhelming – I am a bit back there as I speak to you and I can feel the stress. I experienced it in a matter of fact way and then tried to focus on what I could do –at some stage I realized that I couldn’t do much at all – my role was not clear – but I was happy with that – OK to be there and be helpful as this was part of the delivery - physically holding my partner’s leg – felt more constructive.”

“ ...that birth was like having a car crash...”

After the birth

The damage down there...

“...We expected everything to be different. No one examined her and we were given no information re healing or treatment. We did not expect the short and long-term problems regarding my wife’s sore and swollen vagina, constipated bowels and urine incontinence. When the doctor sutured her

tear after birth, she was given no information at the time or later – he just sewed her up and left - she felt disempowered and confused. The postnatal ward was a terrible experience – there was no information and emotional support.”

“...No I did not see the damage- later she tried to discuss the tears and pelvic floor issues but at times I think she felt it was very private so I just left it until she felt a bit better. It was complex but we always discuss things eventually.”

“...Yes my partner showed me her perineum – I couldn't see it properly but believed her.”

“...Her vagina felt foreign – she said it was like it did not belong to her.”

“...She said she had a protrusion in her vagina which she noticed some weeks later and was told a year later after the birth by a urogynaecologist that it was a cystocele or bladder prolapse. I am unsure of the time lapse but she went to a physiotherapist at 3 months and this assisted a bit with exercises, etc. – not much improvement was noted. GP useless. Physio OK. Bonding OK but not totally good.”

“...No one explained the impact of forceps on the mother and her anatomy or complications regarding cutting her down there. I thought forceps just affected the baby as I had seen a person who had a *square head* and it was thought forceps had caused this problem. I did not consider the fact that hospitals do not require consent to this procedure of forceps but all other medical/ surgical procedures require consent by law and this new knowledge is certainly less comfortable with me.”

“...She kept saying she was sore and throbbing *between her legs* and needed pain relief and ice. They kept on giving her those awful iced ‘condoms’ and this distressed her more.”

“...I know she stayed in bed for 2 days but I knew nothing much about her perineum. She had a catheter removed and I think her urine was OK.”

“...We could not trust the postnatal staff. No information about her perineum was noted as explanatory – it was just sore and swollen!”

“...During my partner's stay in the postnatal ward I was very concerned about my wife's condition and helpless. She did not see her perineal area – she did not show me”

“...She told the midwives but no satisfactory information seemed to be given regarding her discomfort – we were in the dark.”

“...I did not expect it would be so difficult for my wife to breast-feed and then juggle personal recovery and tiredness. Delivering our baby for so long and then needing to care for baby along with complications of urinary incontinence, constipation and sore vagina/ perineum were great challenges.”

“...No I did not see the serious damage –I understood it to a degree – my partner said it was muscular damage that impeded the pelvic floor – a urogynaecologist told her – I do not know totally what a prolapse was – a bulge coming out of a hole maybe.”

“...I never expected this vaginal damage to my wife. Trying to believe it will get better.”

“...She has no libido and no sensation and does not discuss it – we try. Four years later It probably was a badly managed birth and it has caused a great deal of damage to my wife’s vaginal area and sex life. She is unable to use tampons and is very distressed about it – especially re swimming etc. Nothing is resolved - during the second delivery the back part of the vagina fell out.”

“...Distressed, disheartened and disappointed at the lack of help.”

“...We discuss things eventually but it is difficult because these issues about birth injuries are so private and demoralizing.”

Women’s comments in relation to men’s trauma

Mother: “...My partner was so traumatized – he spoke to friends after and they thought I had died the way he spoke.”

Mother: “...My husband was looking after the baby but it seemed later that he had not been coping that well either and needed cuddles that I could not give.

Mother: “...Husband traumatized by forceps delivery”

Long term

“...Vaginal area is different but she doesn’t tell me – I just assume this and I am still at a loss of what to do – helpless and anxious!!”

“...Immediately after her mental state was 7/10 and this remained the same for about 15 months I think until my wife went back to work- but it was still noticeable.”

“...My partner saw a woman GP and was very distressed, disheartened and disappointed at the lack of help. She was told that there was nothing to be done! I was shocked that a professional would say this...”

“...My wife is still not the same, she doesn’t talk much to me about it, I mainly try to observe.”

“ My wife and I are keen to see your team for recovery and a better life. This is really important research and I will assist any way possible. Up to now-other than speaking to you regarding this research, there has been minimal information out there towards my wife’s recovery regarding her physical and psychological health- I am angry I suppose. You have given both of us hope!”

“...My wife was in a very dark place- traumatized +++ until she saw urogynecologist and he explained the injuries. She started to come out of the haze after that 12 months later.

“...We did benefit greatly from talking to the urogynecologist –we finally understood. My wife was psychologically back to normal after that. Sex life completely different but we are working it out.”

PTSD

“...She was very emotional and could not take in information about what was happening to her

body. She wanted to flee to the safety of home after birth. She said she felt traumatized not depressed and was unable to really come to terms with these injuries until a urogynaecologist really listened and then explained them to us 12 months after the birth. He gave my wife the time and did not put her on a schedule like another doctor she saw. She was able to cry about the injuries and consequential damage at 12 months before that she was numb. She said that when she cried and was not dealing with it serenely anymore, she was taken seriously – before then no one believed her.”

“...My wife is still very traumatized and still is... this will not be resolved until surgery is performed.”

“...I tried to talk to other men with pregnant and postnatal wives respectively ‘before’ and ‘after’ the birth. I wanted some perspective on my wife and delivery. The men I talked to ‘before’ the birth demonstrated the bravado of ‘everything was fine’ but that was small consolation to me. The men with whom I connected with- after their wives’ birth- felt helplessness –(they seemed like me unable to get behind their wives’ self-made walls). I had hoped for a better discussion to assist me to help my wife’s state of mind and marital situation. I just want my wife back...”

“...I did not expect my wife to be so different and unable to do things. She could not get out of bed in the postnatal ward for 2 days. During the last part of the long labour, I overheard a midwife say that she had a low threshold of pain. I was confused because my partner is a black belt in karate. Everything after the birth was different – she was a different person to the one I knew before and still is not back to normal. I was very concerned.”

Men observed women’s mental state was changed. A rating scale assisted re level of distress immediately after birth and long term.”

Scale of 0-10 regarding distress:

0 = pre-pregnant normal emotional state

10 = extreme distress regarding PTSD symptoms of detachment, avoidance, numbness, panic, flashbacks

“...8 out of 10 immediately after birth. My wife was disconnected with baby for 6 months after birth. She is still detached and traumatized at 12 months but the urogynaecologist helped because he believed her and gave her time to talk unlike other clinicians she saw. She was back to normal after that...”

“...8/10 after birth. My partner was traumatized and in a very dark place for months and still is... only decreased to about 5/10 – going back to work helped.”

“...7-9 out of 10. Decreased a bit over time 6 months later 5/10- paid work helped.”

“...Yes I noticed my wife was euphoric initially and then seemed traumatized. [Partner traumatized also and unable to give accurate figures on scale- his wife had wanted to terminate their second child – but changed her mind when she realized her husband was so wonderful...]”

“...Immediately after she was 7/10 for about 15 months I think.

Sexual dysfunction

“... we are working it out.”

“...Sex is totally different – infrequent and it hurts my partner – throbbing and uncomfortable feeling! I wish we could be uninhibited again like before baby.”

“...Sex for my partner is like a chore! She does not let me see but it appears to hurt inside her body. I definitely want to talk to your team about her delivery as this may help recovery – it is 4 years after this distressing delivery.”

“We expected sex to return to normal.”

“...My wife is much better 3 years later but still struggling with urinary issues at times. We are working it out sex but it is difficult.”

NB Partner not aware of flatus or other prolapse issues [according to woman partner].

Comments from women whose partner did not respond to interviewer contact:

Mother: “...We resumed at 5 months but I was very anxious and stressed. Seems like a chore – cannot talk to my husband about it there is pain on intercourse. Wish someone could talk to my husband. This has changed our relationship – I do not feel like having sex.”

Mother: “ ...Will you speak to my partner he does not believe me and thinks I am withholding sex – he feels angry and left out”

Mother: “ ...My husband does not understand about these hidden injuries... no one talks about them... maybe you can get him to understand.”

Mother: “ ...I never imagined this birth would cause such difficult relationships issues.. at times that seems worse than the injuries... can you speak to my husband please.”

Mother: “ ...We can't even have sex... there is a sausage between my legs...he feels terrible and so do I... who could speak to him?”

Mother: “...He was wandering back and forth between the top and foot of the bed. He was probably scared but we did not talk. I know he was frightened but did not see me tear or being stitched”

Mother: “...my partner said the delivery was out of control and he could not do anything to help mother or baby.

Mother: “.... We resumed sex at 5 months but I was very anxious and stressed. Seems like a chore – cannot talk to my husband about it there is pain on intercourse. Wish someone could talk to my husband. This has changed our relationship – I do not feel like having sex.”

CHAPTER 7: ANATOMY & PHYSIOLOGY OF THE PELVIC FLOOR AND PERINEUM

7.1 Background

This chapter is a review of the anatomy and physiology associated with the pre-pregnant, intrapartum and postpartum pelvic floor and perineum. Enquiry was initiated after interviewed women⁴⁰ reported postnatal health providers, frequently dismissed debilitating morbidities as normal sequelae of vaginal delivery and appeared to have limited knowledge to assist them with treatment options. It examines the mechanism of labour to provide an understanding of the unpredictable nature of parturition and postpartum outcomes, that couples stated [see Chapters 4 & 6] were absent in birth classes, that typically promoted vaginal birth as a positive and empowering experience. Imaging studies and commentaries have been employed to give a clearer appreciation of damage to the recently re-discovered levator ani muscle (LAM) that appears to have been largely overlooked prior to the advent of imaging technology, more than a decade ago⁶. Enquiry includes explanation of relevant obstetric variables that contribute to LAM damage, together with those of the more recognized birth injury, known as obstetric anal sphincter injuries (OASIs) or 3rd and 4th degree tearing. Although, a proportion of these injuries involve latencies⁹¹ between insult and presentation, this chapter focuses on more immediate consequences. In view of the fact, intrapartum LAM damage is not predicted antenatally⁹², discussion explains the pathophysiology of morbidities that include, female pelvic organ prolapse (FPOP)^{93 94}, sexual dysfunction⁹⁵ anal incontinence⁹⁶ that were unforeseen by injured women in this thesis⁴⁰. It includes statistical estimates from population studies regarding substantial utilization of healthcare resources^{97 98} and explains the significance of sexual dysfunction⁹⁹ in relation to LAM damage that has impact on marital harmony and was often described by women as "...too personal to mention"⁴⁰. Quantitative findings from current imaging and urogynaecology studies, seek to demonstrate that intrapartum somatic birth trauma is more serious than previously realized.

7.1.1 Literature search

Published journals, textbooks and reference lists from the disciplines of urogynaecology, gynaecology, colorectal medicine and obstetrics were scrutinized for information on related etiology, pathophysiology, risk factors and prevalence of somatic birth injury. Enquiry initially examined the anatomy and physiology of the pelvic floor and perineum in non-pregnant women, compared with that of, pregnancy and vaginal childbirth to provide a clearer understanding of diverse forms of somatic vaginal birth damage regarding LAM damage and OASI. The purpose was to describe the functional and dysfunctional pelvic floor and perineum and elucidate whether childbirth injuries were diverse and more serious than previously realized. Enquiry was guided by women's postpartum experiences of LAM injury and OASI from published interviews⁴⁰.

7.2 The pelvic floor in pre-pregnant women

The pelvic floor is not defined consistently in the literature and some texts describe the pelvic floor and the perineum as synonymous. This appears to be attributed to poor uptake of advances in imaging that have developed exponentially since early magnetic resonance imaging (MRI) in the 1980s and 1990s¹⁰⁰⁻². Discussion on these implications to clinical practice is explained further in the historical overview [see Chapter 8]. Current methods of assessment for birth related pelvic floor and perineal injury, utilize translabial 3D/4D ultrasound¹⁰³. This modality is observed to be reliable and inexpensive with less discomfort for women. Findings largely demonstrate that the pelvic floor is a highly integrated structure of pelvic organs, muscles and nerves that facilitate organ support, controlled evacuation of solid and liquid wastes and, sexual intercourse and childbirth^{6 104}.

From a clinical perspective, the author observes that literature employed to instruct the discipline of midwifery, primarily focuses on the anatomy and physiology of the perineum. Current knowledge about the pelvic floor specifically related to the LAM, levator hiatus and plate is absent and differentiation between the pelvic floor and perineum is unclear¹⁰⁵. Conversely, some texts for the disciplines of gynaecology and obstetrics only discuss the pelvic floor muscles^{106 107}.

and provide information on the bladder, urethra, vagina, rectum and anal canal, together with that of connective tissue structures in the pelvis^{108 109}. Overall, the pelvic floor is observed to have several functions that include: support against pelvic organ prolapse during increased intra-abdominal pressure; the facilitation of micturition, defaecation, sexual intercourse and childbirth⁶. Another source states efficient pelvic organ support is reliant upon the coordination between pelvic floor muscles, supportive ligaments and endopelvic fasciae¹⁶.

7.2.1 Bony pelvis

Although, the pelvic floor muscles are vital to the structure of the pelvic floor, the bony pelvis is observed to be equally relevant. In females, it has a broader diameter with a more rounded shape to facilitate head engagement and parturition. It can be classified into four parts: gynecoid or a rounded inlet with its long axis transverse; multiple projections and contours provide attachment sites for ligaments, muscles, and fascial layers¹⁶. The bony pelvis consists of the two innominate or hip bones, which are attached to the sacrum posteriorly, as well as anteriorly to each other, at the pubic symphysis. Each innominate bone is composed of the ilium, ischium, and pubis, and the pelvis has two basins: the 'greater' pelvis and the 'lesser' pelvis¹⁰⁹. The abdominal viscera are situated in the major pelvis; the minor pelvis is the narrower continuation of the major pelvis inferiorly. The inferior pelvic outlet is closed by the pelvic floor. Components are attached by three joints: the symphysis pubis and two sacroiliac joints¹¹⁰. These are stabilized by the sacroiliac, sacrospinous, sacrotuberous and sacrococcygeal ligaments. Bony scaffolding support is essential during vaginal delivery¹⁰⁹.

7.2.2 Supportive connective tissue

Supportive connective tissue of the pelvic floor, contains the endopelvic fascia¹⁶ which are made up of a mesh-like cluster of collagen fibres, intertwined with neurovascular, fibrovascular bundles and smooth muscle cells^{16 110}. These fascia are located immediately below the peritoneum and surround the vagina and part of the cervix, connecting them to the pelvic side walls^{109 111}. Endopelvic fascia thicken in specific areas that include: (i) *arcus tendineus fasciae pelvis*^{6 110 112}; (ii) *arcus tendineus levatoris ani*¹¹²; (iii) uterosacral ligament¹¹⁰; (iv) cardinal ligament^{110 113}; (v)

rectovaginal septum¹⁶. The existence of fascia between the bladder and anterior vaginal wall is disputed¹⁴.

7.2.3 Pelvic floor muscles

Pelvic floor muscles are situated in the 'lesser or true' pelvis that is shaped by a gutter-shaped pelvic diaphragm, which is the inferior limit of the abdomino-pelvic cavity. Muscles provide pelvic organ support and enclosure¹¹⁵. The pelvic floor mainly consists of striated muscles that are arranged into superficial and deep layers that include: LAM, coccygeus, external anal sphincter (EAS), urethral rhabdosphincter, deep and superficial perineal muscles; and the fascial structures that overlay the superior and inferior parts of these muscles. The deep pelvic floor muscle layer includes four muscles known as the puborectalis, pubococcygeus, ileococcygeus and coccygeus¹¹⁶. LAM is connected to the pubic bone anteriorly, ischial spines posteriorly; the arcus tendineus of the LAM, is attached between two bony sites on each side¹⁰⁹. The pelvic floor stretches between the anterior, lateral and posterior walls of the lesser pelvis and affords closure to the ring of the pelvic girdle. In addition, it divides the pelvic cavity from the perineum, for which it forms the roof¹¹⁶ [see Figure 1].

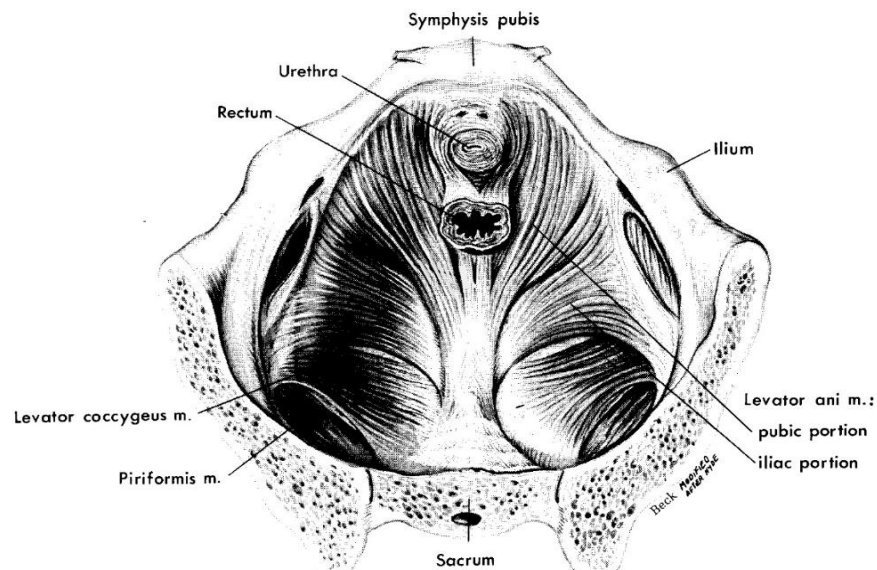


Figure 1: Drawing of the pelvic floor, viewed from cranio-caudal direction (.e., from above) demonstrating the organs and attachments of the muscles that compose the pelvic floor. [Used with permission, courtesy of Ixora Kam san Atan, Sydney Medical School Nepean, The University of Sydney].

One review notes that the literature often uses overlapping definitions synonymously in respect of LAM nomenclature regarding: *pubococcygeus*, *pubovaginalis*, *puboperinealis*, *puboanal*, *pubovisceralis*, *puborectalis* and *iliococcygeus*¹⁰⁹. It is disputed whether the latter structures are part of the LAM or part of one functional unit. Even so, they are not easily distinguished on imaging or clinically and, accordingly, there is ambiguity in clinical use of these nomenclatures⁶. The pelvic floor muscles have various subdivisions that are described by both MRI and ultrasound¹¹⁷ and include: the deep muscle layer formed by the levator ani and coccygeus muscles that, along with relevant fascia, is known as the pelvic diaphragm^{16 117}. Studies from cadavers demonstrate the pelvic floor is basin-shaped⁶. MRI research reveals; however, it is dome-shaped in living individuals¹¹⁸ and acts as an ‘anti-gravity’ muscle that is constantly in a tonic condition¹¹⁹. The baseline tonic condition is vital in ensuring closure of the ‘levator hiatus’ compressing the vagina, urethra and rectum against the pubis¹¹⁷.

7.2.4 Levator ani muscle (LAM)

Accepted clinical terms for LAM include: (i) the *puborectalis* muscle, a V-shaped muscle originating on the *os pubis* or the inferior pubic ramus, and surrounding the anorectal angle posteriorly; (ii) the *iliococcygeus* muscle or thin sheet of muscle acting as a continuation of the *puborectalis* cranially and laterally⁶. LAM is described by MRI²² and 3D/4D ultrasound²³ studies as the largest soft tissue structure of the pelvic floor musculature. One review based on sonography findings, notes it is part of the abdominal envelope that comprises a muscular plate surrounding a central V-shaped levator hiatus, which enfolds the urethra, vagina and anorectum¹⁰⁹. Its shape, size and function are a ‘compromise between conflicting priorities’ that include: the abdominal organs need to be secured against the pressure differential between, inside and outside and, against gravity; requirements for provision of controlled evacuation of solid and liquid wastes; sexual intercourse and childbirth. Parturition is observed to be a challenge, in view of the unpredictability of vaginal delivery and the size of the baby’s head⁶. MRI and sonography both demonstrate that the integrity and function of the LAM, is central to the etiology of female pelvic organ prolapse^{6 120}. Functionally, the most important component of

LAM is the medial portion, or the part that defines a structure known as the levator hiatus⁶. Some sources state this is the 'pubococcygeus muscle'¹¹⁹ but another states no muscle exists to connect the pubis to the coccyx and reports that 'puborectalis muscle'⁶ is more appropriate. This chapter has used this latter term throughout for consistency.

The puborectalis component arises from the pubic bone bilaterally, and forms a sling behind the rectum at the ano-rectal junction¹²¹ and is situated at the proximal edge of the anal canal posteriorly¹¹¹. The 'iliococcygeus muscle' is the lateral part of the LAM and originates from the *arcus tendineus* and inserts into the coccyx and anococcygeal raphe. This spans the posterior pelvic opening from one pelvic sidewall to the other^{108 113}. The primary function of the LAM is to ensure the levator hiatus is narrow enough to maintain pelvic organ support^{108 111}. To facilitate this, it is in a constant state of contraction or high resting tone^{111 22}. When the LAM loses its tone, the levator hiatus enlarges and causes sagging of the levator plate¹⁶ with increased strain on connective tissue, and resultant deterioration of pelvic organ support^{111 119} [see Figure 2].

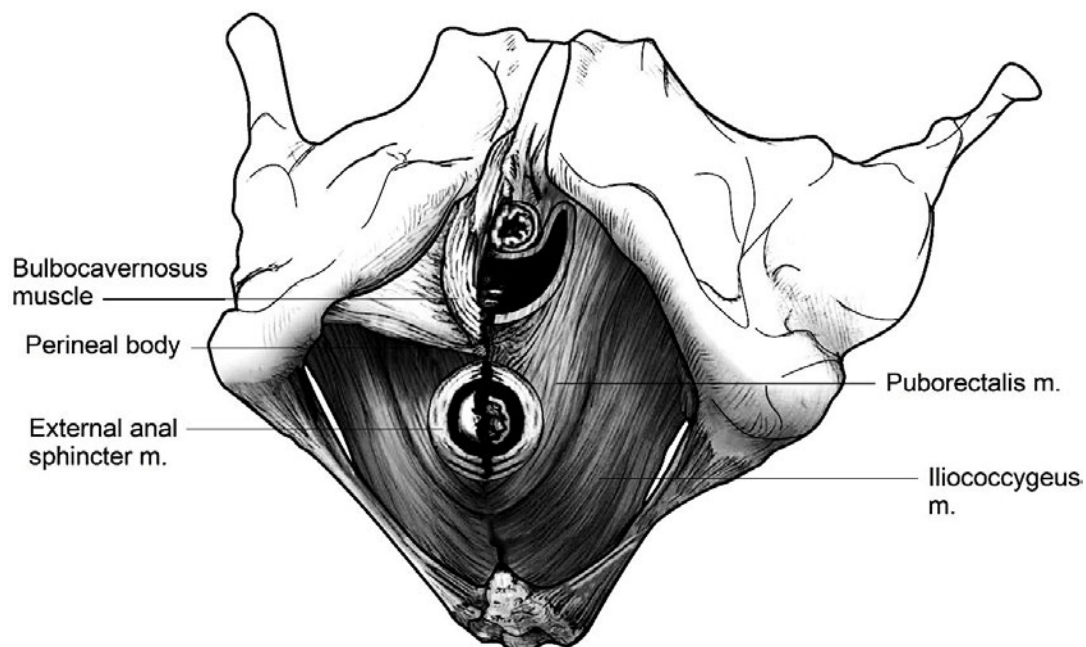


Figure 2: Schematic view of the pelvic floor from below, after the vulvar structures and perineal membrane have been removed. [Adapted from: Corton MM. Anatomy of the perineal structures: how the perineal structures support. *Clinical Obstetrics and Gynecology*. 2005 Sep 1;48(3): 611-626.]

7.2.5 Levator hiatus and plate

The levator hiatus is described as the largest potential hernia portal in the human body⁶. It is formed by the symphysis pubis and the inferior rami, of the *os pubis*, ventrally and, the puborectalis muscle laterally and dorsally¹¹¹; the urethra, vagina and rectum pass through it^{6 111}. Its dimensions vary substantially amongst nulliparous women¹²² and thus demonstrate great variability in the biomechanical properties of the puborectalis muscle. Within the context of the functional anatomy of the LAM, the impact of vaginal birth trauma, is observed to be mediated through its effect on the dimensions of the hernial portal of the levator hiatus¹¹³. Studies show there is irreversible overdilation of the levator hiatus in more than a quarter of all women after vaginal childbirth⁶.

The levator plate is the shelf on which the pelvic organs rest; it is horizontal when the body is in a standing position and supports the rectum and upper two thirds of the vagina above it. Weakness of the LAM may loosen the sling behind the anorectum and cause the levator plate to sag, opening the urogenital hiatus and allowing pelvic organ prolapse¹⁶.

7.2.6 Innervation

The LAM and the coccygeus muscle obtain their nerve supply from the sacral foramina 3, 4 and/or 5^{123 124}. Originating from S2-S4, the pudendal nerve is both somatic and autonomic, and innervates the external urethral and anal sphincter and the superficial perineal muscles. It is unclear whether part of the pudendal nerve also supplies the LAM¹²⁴. Passing through *Alcock's canal* where it is fixed and subject to compression, the nerve may be subject to injury when the foetal head descends into the true pelvis^{125 126}.

7.3 The perineum in the pre-pregnant woman

The perineum is a diamond shaped, surface region between the symphysis pubis and coccyx. It is the most inferior aspect of the pelvic outlet and lies below the pelvic floor¹²⁷. An imaginary line connects the ischial tuberosities and, divides the perineum, into the anterior urogenital triangle and the posterior anal triangle^{127 128}.

7.3.1 Perineal body

The perineal body is located between the vagina and the external anal sphincter of the anal canal and performs a significant role in supporting pelvic floor integrity¹²⁸. It is a fibromuscular structure with nerve endings in the shape of an inverted pyramid; the tip is wedge-shaped and condenses to become the rectovaginal septum¹²⁷. The latter is vital to the integrity of the posterior vaginal compartment. Lateral aspects of the transverse perineal muscles decussate into the perineal body; ventral aspects intersect into the *bulbospongiosus/ bulbocavernosus* muscles^{127 128}. During childbirth, the perineal body distends and then recoils. Caudal components are commonly injured intrapartum, and many primiparae sustain first or second degree perineal tears^{129 130}. The perineal body is significant to pelvic floor support and resultant weakness causes elongation and predisposes to rectocele and enterocele¹⁶. [see Figure 3]

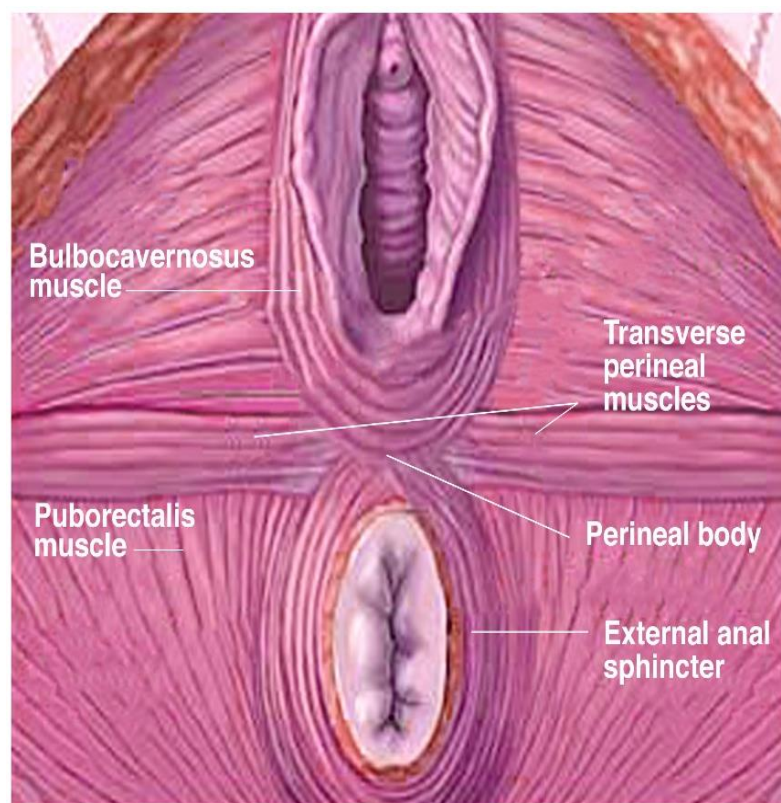


Figure 3: Schematic view of the female perineum and perineal body from below, after the vulvar structures have been removed. [Image used with permission from the C ne-Med, Inc Image Library ©2017, www.cne-med.com]

7.3.2 Anal sphincter complex

Advances in anal endosonography, translabial ultrasound and MRI have enabled better visualization and comprehension of the anal canal and related sphincter complex. Even so, a degree of variability, and contradictory literature, exists. The anal canal is situated dorsal to the perineal body, in the anal triangle of the perineum. In females, it is 30-50mm in length¹³¹ and begins at the anorectal junction or the levator plate posteriorly¹³². It is formed by: the anal mucosa, the internal anal sphincter (IAS), and the external anal sphincter (EAS). The anal mucosa consists of two parts that are separated by the 'dentate' line and covered by cylindrical epithelium above it, together with squamous epithelium beneath it¹³². Mucosa is also folded into rectal columns or anal cushions; proximal ends are attached together by anal valves that are densely innervated¹³³. The rectal columns are also termed anal cushions and fill with blood after relaxation of the IAS, and hence seal the anal canal¹³⁴. The IAS is the involuntary smooth muscle sphincter component of the anal sphincter complex; it is an extension of the rectal circular muscle layer¹³⁵ and consists of muscle fibres that are in a state of constant contraction¹³⁶. Distally, the IAS reveals a smaller diameter¹³⁶. The IAS is innervated by both sympathetic spinal nerves from the lower thoracic ganglia together with parasympathetic pelvic nerves from sacral nerves. The EAS is a large voluntary sphincter, composed of striated muscles, surrounding the inferior two-thirds of the anal canal, that is in a constant state of tonic contraction to facilitate closure of the anal canal; it is responsible for voluntary contraction¹²⁴. The primary function of the anal canal is maintenance of anal continence. Intra-anal pressure is reliant on the coordination, contraction and tone of the EAS, IAS and anal cushions^{137 138}. [see Figure 4]

7.4 Pregnancy

7.4.1 Alterations to the pelvic floor

During pregnancy mothers experience substantial changes to the pelvic floor^{139 140 141 142 143} in preparation for vaginal delivery of the foetus¹⁴⁴. Factors that contribute to these alterations include: altered hormone levels vis-à-vis estrogen, progesterone, relaxin and collagen; increasing body weight; pressure of the growing uterus and fetus^{145 146}. Subsequently, there is

an increase in pelvic organ mobility^{141 142 143} and widening of the levator hiatus¹⁴⁴. Some research proposes these changes continue after birth and result in long term damage¹⁴⁰

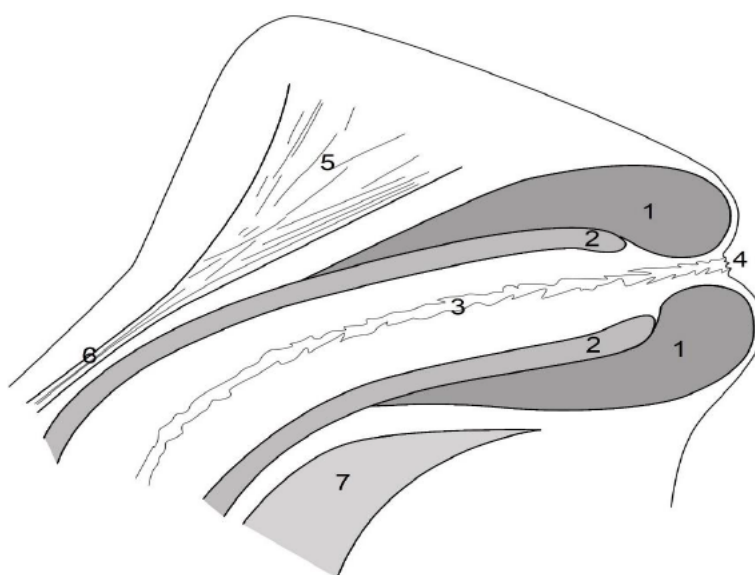


Figure 4: Schematic image of mid-sagittal view of the female anal canal, positioned as on trans-labial ultrasound. 1= external anal sphincter (EAS); 2= internal anal sphincter (IAS); 3= anal mucosa, 4= anus; 5= perineal body; 6= rectovaginal septum; 7= puborectalis muscle or levator plate. [Diagram used with permission, courtesy of Fryanture, Sydney Medical School Nepean, The University of Sydney]

7.5 Vaginal childbirth

7.5.1 Labour & delivery

Vaginal childbirth involves three stages of labour to deliver the foetus and subsequently expel the placenta and membranes through the vagina^{148 149}. The 1st stage of labour commences with inconsistent contractions and, progresses to regular rhythmic contractions, accompanied by increasing dilatation of cervix to 10 centimetres^{149 150}. The 2nd stage involves 'crowning' of the presenting part and delivery of the foetus through the pelvis.¹⁵⁰ The 3rd stage is the complete expulsion of the placenta and membranes^{149 150}.

7.5.2 Mechanisms of labour

During the 2nd stage of labour (*intrapartum* period), parturition is reliant on unpredictable, complex interactions between three mechanical factors. Such variables have been described as the three P's: the passageway, the passenger and the powers^{149 151 152}. The *passageway* is the birth canal that is formed by the bony pelvis and soft tissues. The latter include the cervix,

vagina and pelvic floor muscles. These cause varying degrees of resistance to fetal expulsion^{150 153}. The *passenger* is the foetus and during the intrapartum period its position, head flexion, size and presentation can have an impact on the course of labour^{152 153}. The *power* is the force produced by the contracting uterus that is accompanied by cervical dilatation and distension of the soft tissues of the birth canal. Intrapartum voluntary pushing also facilitates a degree of force expel the foetus¹⁵². The birth process is observed to demonstrate confounding factors that adversely affect the pelvic floor structures, these include: the foetal head size, that is large in comparison to the maternal pelvis^{148 151 154 155 156}; the bony pelvis, that also has a complex shape^{148 155 156}; rotation and flexion-extension of the foetal head to navigate the corkscrew-shaped passage¹⁵⁵. Typically, the foetal head has to change shape or 'mold', to accommodate the birth canal. These actions are termed *cardinal* movements of the foetus^{148 149 156} and involve: engagement, descent, flexion, internal rotation, extension, external rotation and expulsion. Hence, the most feasible diameter of the foetal head adapts to the most beneficial pelvic diameters^{148 153} to enable the delivery process with a path of least resistance¹⁴⁸. [see Figure 5]

Common reasons for caesarean sections are cephalo-pelvic disproportion (CPD) or a disparity between the size of the pelvis and the size of the foetal head. In a proportion of deliveries the head does not engage in the pelvis, and despite molding of foetal bones, that are not fused to facilitate this process, vaginal delivery is untenable¹⁵¹.

7.5.3 Intrapartum pelvic floor

During delivery, the cardinal movements of the foetal head involve complex interactions that substantially affect the pelvic floor muscles. Over the past decade, computational models of this process have demonstrated complexity between these variables^{148 153 157 158 159}. LAM is observed to be the primary soft tissue structure defining the dimensions and biochemical properties of the birth canal and thus creates resistance to the foetal head^{153 157}. During foetal descent, the LAM has to stretch and endure considerable distension^{158 159}; this process causes the levator hiatus to widen and lengthen¹⁵⁹.

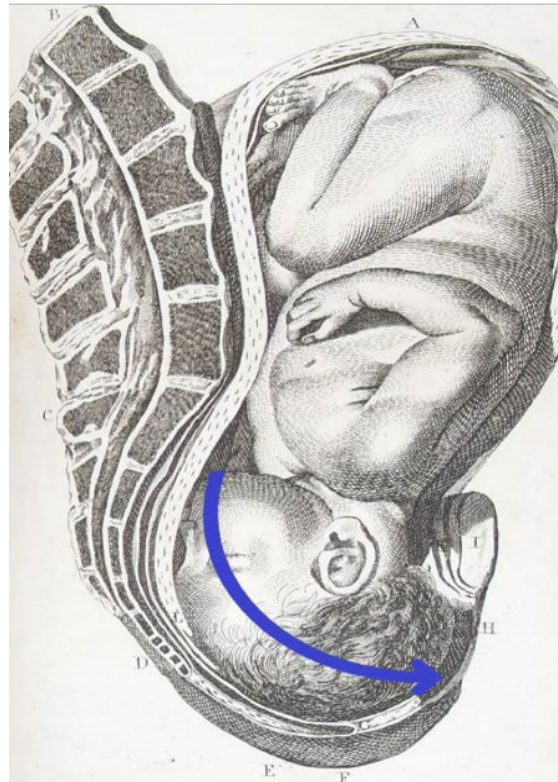


Figure 5: Vertex presentation of the foetus .e., head first. Arrow describes the curve of the birth canal. [From: Smellie W. Vertex presentation, occiput anterior. Plate 14, *A set of Anatomical Tables with Explanations*, 1792]

As the foetal descent progresses, the head pushes against the pelvic floor and increases the resistance produced by the pelvic floor muscles. In turn, resistance from these pelvic floor muscles exert a substantial effect on the foetal cardinal movements^{150 153 156}. During crowning of the head and resultant extension and rotation, the foetus is expelled through the levator hiatus and vulvar opening¹⁵⁶. As a consequence, the most medial aspects of the levator plate, including the puborectalis muscle, are required to stretch considerably^{158 159}. Since levator hiatal dimensions fluctuate significantly among women, required tissue distention for vaginal delivery also differs appreciably. Late pregnancy studies of transperineal ultrasound assessment demonstrate, that stretching of the most medial part of the LAM needed for vaginal delivery, varied between 67% and 276%; this was calculated from resting length¹²². [see Figure 6]

In addition vaginal sidewall and 3rd/4th-degree perineal tears have been shown to be independent clinical indicators of an increased risk of LAM trauma¹⁶⁰. [see Figure 7]

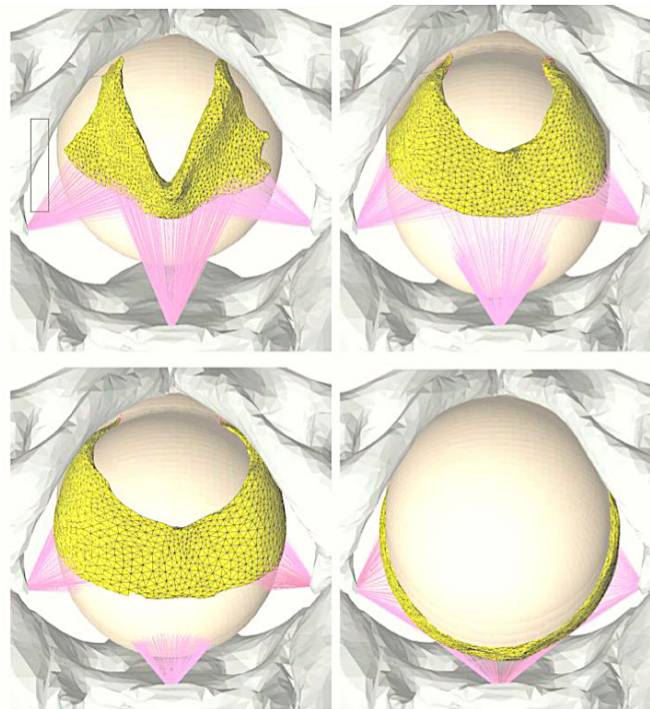
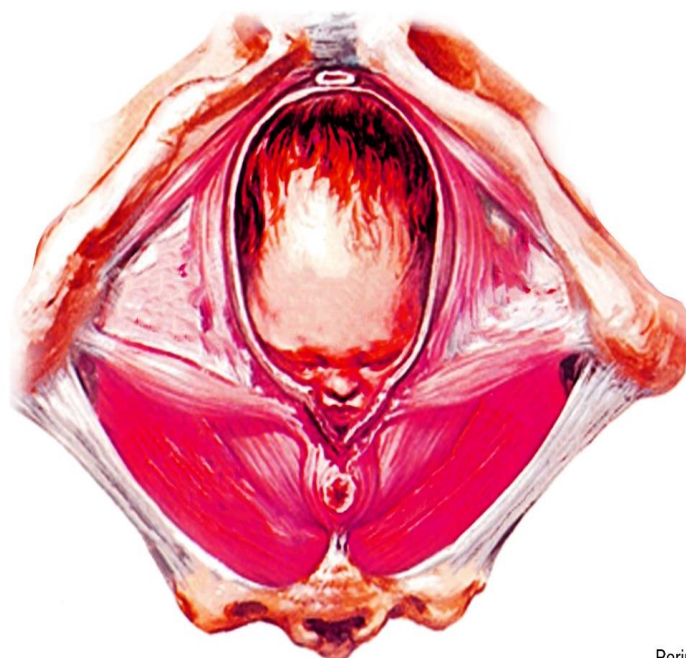


Figure 6: Finite element modelling demonstrating distension of the levator plate during vaginal delivery. With permission from: Hoyte L, Damaser MS, Warfield SK, et al. Quantification and distribution of levator ani stretch during simulated vaginal childbirth. [*Am J Obstet Gynecol* 2008;199: 198.e1-198.e5.]



Perineal tear extending to the external anal sphincter

Figure 7: Schematic diagram of mechanism of perineal trauma caused during vaginal childbirth. [Adapted from: Netter's Atlas of Human Anatomy]

7.6 LAM damage

7.6.1 Avulsion

During the 2nd stage of a traumatic vaginal delivery, the levator ani muscle (LAM) is shown to disconnect or avulse, from one or both insertion sites on the inferior pubic rami and pelvic side wall; injury is a consequences of overstretching and distension of the muscle^{122 158 159}. LAM avulsion is usually occult but may occasionally be observed directly in women after major vaginal tears. At present, no techniques exist for the surgical repair of this injury. A typical finding, in cases of 'overt' tears, is a complete detachment of the vagina from the pelvic sidewall. One source notes that the muscle lateral to the anal canal retracts, with the inferior pubic ramus more or less denuded of muscle, and the obturator fascia visible as the lateral limit of the defect⁶. This tearing is associated with anterior and central compartment prolapse and represents the missing link between childbirth and prolapse^{3 23}.

LAM avulsion was described by Gainey in 1943, following a sizeable observational clinical study of postpartum women. His findings demonstrated a 20% occurrence of palpable defects in the puborectalis or medial component of the LAM²⁶. Nonetheless, it remained unrecognised for 60 years, until MRI²² and 3D/4D ultrasound²³ imaging research, identified the damage as the 'missing link' between vaginal delivery and pelvic organ prolapse. One investigator notes this oversight resulted in delayed clinical diagnosis, prevention and treatment of birth-related trauma for two generations, despite the fact LAM avulsion is palpable vaginally⁶. This is discussed further in Chapter 8.

7.6.2 Terminology of LAM

Several terms describe major trauma to the LAM; some are used synonymously, these include: complete avulsion, full avulsion, major levator defects, levator trauma or tear^{23 161 162}. Damage can occur as: partial avulsion¹⁶³ or thinning of muscle; partial tear with some muscle still attached to its insertion on the pubic bone; a complete avulsion^{164 165} that is, the muscle has entirely detached from its insertion on the pubic bone on either side. Complete LAM avulsion and hiatal

area ballooning¹⁶⁹ are strongly associated with FPOP, particularly cystocele and uterine prolapse^{167 168}. [see Figures 8 & 9]

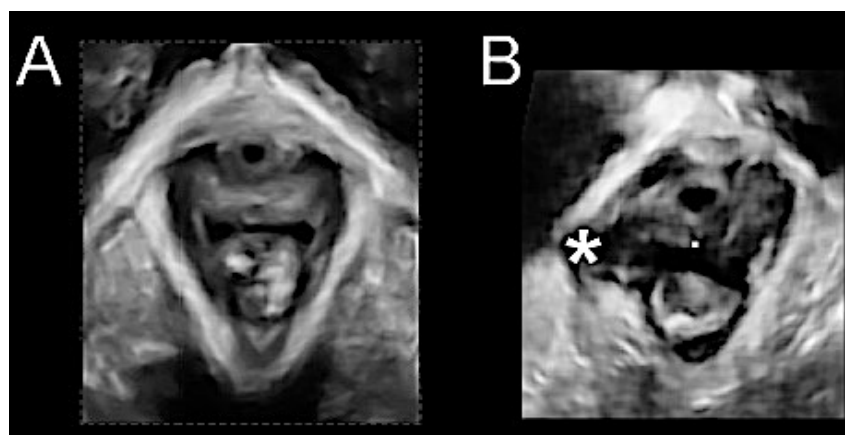
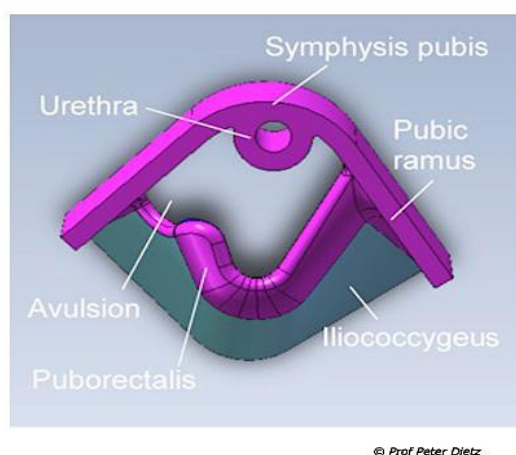


Figure 8: A comparison of ultrasound findings in a normal patient (A) and in a patient with a typical right-sided avulsion (B); rendered volume, axial plane, indicated by a *. It is evident that the morphological abnormality documented here is an avulsion of the puborectalis muscle insertion, i.e., the muscle has separated from its bony insertion. [Permission from Prof HP Dietz, 2014 Pelvic Floor Trauma in *Childbirth O & G Magazine* 2014. Volume 16; No 1 Autumn]



© Prof Peter Dietz

Figure 9: Avulsion model depicting right-sided levator ani muscle avulsion. [Permission from Dietz HP. Nepean Medical School The University of Sydney]

7.7 Consequences of LAM trauma

7.7.1 Incidence

Large population-based studies demonstrate that at least one-third of adult women endure one or more pelvic floor disorders^{172 173 174}. Although, imaging research reveals 10-30% of primiparous women sustain macroscopic LAM trauma after vaginal birth that result in pelvic floor dysfunction^{22 23 166-168}, there may be a greater number of mothers with microtrauma or

irreversible overdistension of the levator hiatus⁶. The incidence of injury is contingent on the study population and definitions employed; lifetime risk of surgery for postpartum women with FPOP or urinary incontinence, in developed countries, is estimated to be 11-19%^{175 176}. Pelvic floor dysfunction is reported to have dire consequences on maternal quality of life and mental health that in turn, has a considerable impact on the healthcare system¹⁷⁷. The current annual cost associated with surgical repairs and patients suffering from pelvic floor dysfunction is not known, but one study in the United States, during 2006, estimated then, it to be US\$412 million per annum¹⁷⁸.

7.7.2 Etiology

Pelvic floor trauma has been shown to constitute substantial alteration of the functional anatomy regarding the integrity of the puborectalis component of the LAM during vaginal delivery⁶. Damage to this structure is currently the best defined etiological factor in the pathogenesis of FPOP¹⁶¹ and subsequent pelvic floor dysfunction, that adversely affects evacuation and sexual function^{6 93}. As discussed, traumatic disconnection of LAM from pubic rami, has been shown to also cause over-distension of pelvic floor structures that include: enlargement of the levator hiatus¹⁴⁷, stretching of levator plate^{158 159}, perineal and vaginal tearing⁶. However, 4D ultrasound imaging studies have shown that perineal and vaginal tearing are independent clinical indicators of an increased risk of LAM trauma¹⁶⁰. In both instances, perineal injury can range from minor tears affecting the vaginal epithelium and skin or 1st and 2nd degree tearing, commonly seen in labour ward, to those that affect the entire perineum and the full thickness of the anal canal including the mucosa or OASI^{179 180}. Other potential etiological factors include: genetic predisposition, neuropathic changes, connective tissue abnormalities or myogenic factors; most are inadequately defined and poorly understood¹⁸¹. Research has also demonstrated that the effect of hormonal alterations from pregnancy, may persist for up to 14 months after delivery and exacerbate avulsion damage, pelvic organ support and/or pelvic muscle strength¹⁸².

7.7.3 Clinical implications

Risk factors of intrapartum LAM damage include: larger foetal birth weights and head size, lengthy 2nd stages of labour and use of forceps instrumentation^{166 167 168}. There is also evidence that the first vaginal delivery causes the most morphological and functional alteration, regarding actual tears, levator distensibility and/or pelvic organ support. The strong association between forceps and avulsion suggest their decreased use would benefit maternal outcomes. Alternate instruments such as vacuum extractors (ventouse) are associated with less incidence of LAM trauma⁶. Other studies observe the maternal age at first delivery is significant. The probability of major LAM trauma during vaginal delivery, more than triples during the reproductive year and is reported to be less than 15% at age 20 to over 50% at 40 years of age⁶.

Nonetheless, the potential for negative consequences of vaginal childbirth are reported to be poorly understood in clinical settings and effected postpartum women often remain undiagnosed⁴⁰. Despite improvements in pelvic imaging research these developments do not appear to have been translated into clinical practice. The following section focuses on postpartum pelvic floor dysfunction, morbidities, incidence and etiology, specifically related to LAM avulsion.

7.8 Pelvic floor morbidities

During 2010, a consensus based terminology report from the International Urogynecological Association (IUGA) / International Continence Society (ICS) published information on 250 pelvic floor dysfunction symptoms¹⁸³. This positive contribution to the research literature was observed to validate maternal reports of postpartum somatic injury. Even so, many of these symptoms may also be termed 'lifelong morbidities' as noted by World Health Organization (WHO) in 2013, that defined 'obstetric morbidity' as: *"any health condition attributed to and/or aggravated by pregnancy and childbirth that has a negative impact on the woman's wellbeing"*¹⁸⁴. Surprisingly, uniform criteria for identification and classification of maternal morbidities do not currently exist¹⁸⁴. Women in this thesis, who were interviewed one to four years after traumatic deliveries, stated symptoms of rectocele, cystocele and vaginal prolapse had not resolved and, continued

to cause severe life-altering disabilities⁴⁰. Over the past several decades, the United Kingdom and Australia, have developed substantial national surveillance systems regarding the identification of pregnancy morbidities^{185 186} to improve the safety and quality of maternity care, that also inform policy development and clinical guidelines. Although these initiatives are laudable, similar systems do not exist regarding birth-related pelvic floor morbidities, that are shown to have debilitating, long-term effects on a substantial cohort of postpartum women and adversely impact their families' lives.

7.8.1 Etiology of FPOP

FPOP is described as the downward displacement of pelvic organs that herniate into: the vagina, and known as a 'uterovaginal prolapse'; the anal canal, also called 'rectal prolapse'. These are divided into: (i) anterior compartment prolapse that are termed 'cystocele' or bladder prolapse – the two main forms of cystocele are differentiated as: cystourethrocele; cystocele with intact retrovesical angle; (ii) central compartment or 'uterine prolapse' is also known as 'procidentia,' if complete; (iii) posterior compartment prolapse, including a rectocele or a diverticulum of the rectal ampulla, herniating into the vagina and/or, an enterocele, a herniation of the small bowel or sigmoid colon into the vagina. A birth related prolapse is a *hernia*; the hernial portal is the '*levator hiatus* or an opening in the pelvic floor muscle or LAM, which allows the urethra, vagina and anorectum to transit the abdominal envelope³.

Multiple studies demonstrate that intrapartum LAM avulsion is the primary etiological factor in FPOP of the bladder and/ or uterus^{161 165 169}. A recent meta-analysis found it was also the strongest risk factor for prolapse recurrence after reconstructive surgery¹⁷¹. FPOP is more prevalent in women with LAM avulsion with anterior and central compartments exhibiting the strongest link^{161 169 187}. LAM trauma has less influence on the posterior compartment descent and research has shown a link between LAM avulsion and rectal intussusception¹⁸⁸. Bilateral avulsion is more strongly associated with FPOP than unilateral avulsion¹⁸⁷. Studies also reveal that the size of the hiatus is associated with resultant symptoms of FPOP^{170 189}. Although congenital and lifestyle factors can affect the size of the hiatus to some degree¹⁹⁰, hormonal

influences of pregnancy and mechanical consequences of childbirth^{143 144} also cause enlargement of the hiatus.

7.8.2 Symptoms

Common symptoms associated with prolapse are experienced as a vaginal lump or bulge, or 'dragging' sensation in the lower pelvic area¹⁹¹. Women also report vaginal 'laxity' that results in sexual dysfunction and is exacerbated by excessive movement of prolapsing tissues that may include: secondary symptoms of impaired voiding, recurrent urinary tract infections, nocturia regarding FPOP, urethral kinking, urethral compression¹⁹². Notably, posterior compartment prolapse may result in secondary symptoms of obstructed defecation, with rectocele the most common cause¹⁹³ and may require surgical treatment. Interviewed women⁴⁰, reported a persistent protrusion in the vagina, lower pelvic pain during menstruation, severe constipation, inability to lift toddlers, problems walking distances or engaging in normal exercise and sexual dysfunction.

7.8.3 Clinical diagnosis

In cases where women are referred to urogynaecologists, clinical diagnosis typically employs a Valsalva manoeuvre to assess the extent of a prolapse, visualization of the anterior and posterior vaginal wall²¹. This process involves requesting patients to force expiration against a closed glottis, together with contraction of the diaphragm and abdominal muscles that subsequently increases intra-abdominal pressure markedly, while relaxing the LAM. Since 1996, prolapses are also quantified by clinical examination, using the International Continence Society Pelvic Organ Prolapse Quantification (ICS POP-Q) system¹⁹⁴ [see Figure 10]. A significant prolapse is defined as ICS POP-Q stage 2 or above¹⁹⁵.

Some reviews of this quantification of prolapse, however, assert that it is based on expert opinion rather than data and it provides information on surface anatomy rather than giving data on underlying organs or functional anatomy¹⁹⁶.

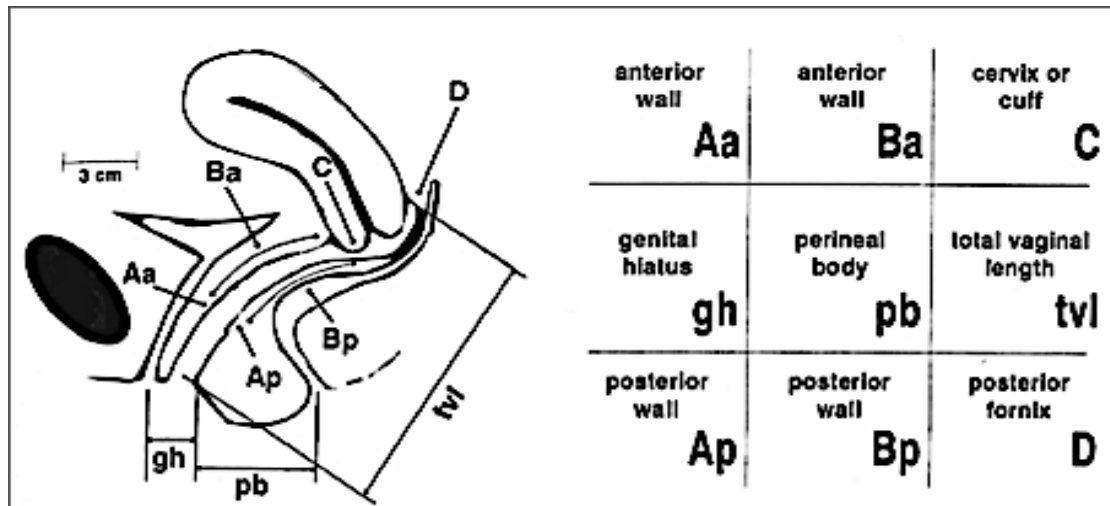


Figure 10: ICS Pelvic Organ Prolapse Quantification (POP-Q) System [Reproduced with permission from Elsevier from Bump RC, Mattasson A, Bø K, et al. *Am J Obstet Gynecol* 1996; 175:10–17]

7.8.4 Imaging

3D/4D ultrasound imaging^{197 198} has been shown to be an accurate method in the diagnosis of LAM avulsion, hiatal ballooning together with, the degree and type of FPOP. The procedure involves a non-invasive, translabial technique that takes ten minutes to perform and, requires no preparation⁶. Abdominal curved array transducers are positioned in a mid-sagittal orientation on the perineum¹⁹⁹ [see Figure 11].

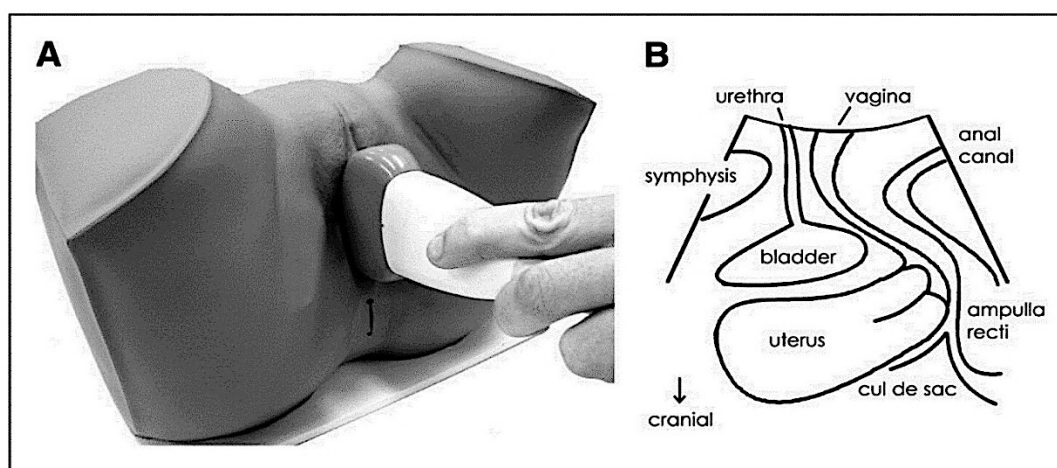


Figure 11: Transducer placement for a translabial ultrasound imaging (A) and a schematic diagram of the resulting image in the mid-sagittal plane. [Reproduced from Detz HP. *Pelvic Floor Ultrasound: a review. Am J Obstet Gynecol*. 2010;202:321-34 with permission]

After an imaging consultation, findings can reveal: organ descent, levator integrity and distensibility. Severity of FPOP is quantified against the symphyseal margin²⁰⁰. Another form of imaging for childbirth related defaecatory symptoms is called defaecation proctography²⁰¹, but women are observed to cope with ultrasonography more easily.

7.8.5 Prevention

Research has shown that limited employment of intrapartum forceps is the primary modifiable risk factor for LAM avulsion and consequences of FPOP⁶. One review states that forceps application can facilitate an intrapartum mechanical advantage, with pull forces that are double²⁰² those of the safer vacuum extractors²⁰³. Forceps are associated with a much higher probability of major maternal trauma, chiefly to the anal sphincter and LAM, with potential for considerable future morbidities that include FPOP^{11 162}. Injured women in this thesis⁴⁰, who experienced forceps deliveries, reported that maternity clinicians attempted to birth their babies vaginally to avoid a caesarean section and instead they sustained lifelong birth damage that caused sexual dysfunction and major lifestyle alterations. Most stated they would have preferred a caesarean section. Notwithstanding these severe consequences of vaginal childbirth, current health policies and opinions from New South Wales, Australia³³, the United States²⁰⁴, the United Kingdom²⁰⁵ and Canada²⁰⁶ generally advocate a preference for vaginal delivery, to reduce increasing rates of caesarean section. It is proposed that these policies may inadvertently contribute to complex labours and consequent maternal perineal and pelvic floor injuries^{207 208}, especially if forceps¹¹ are employed, with up to 60 percent increase in LAM avulsion rates when rotational forceps are utilized¹⁶⁶. One review notes that forceps rates appear to be rising in developed countries¹¹. Figures from the United Kingdom, between 2004-2013, demonstrated an increase from 3.3-6.8%²⁰⁹. In New South Wales, Australia, there is a similar trend in forceps use, with public hospitals' data revealing an increase from 3.1% in 2008 to 4.3% in 2012²¹⁰. Studies propose vacuum extractors are preferable²⁰³ and have been shown to decrease the rates of FPOP and anal incontinence from OASI; the odds ratios for occurrence of LAM avulsion in forceps, relative to vacuum are 3.4-11.4¹¹.

7.9 Postpartum sexual dysfunction

7.9.1 Consequences, prevalence and assessment

A proportion of women in this thesis⁴⁰ reported that consequences of vaginal birth damage, resulted in unachievable sexual intercourse that occurred up to 4 years after delivery. Common symptoms included: protrusion of pelvic organs into the vagina, vaginal laxity, urinary incontinence or flatus during sex, that were accompanied by flashbacks of traumatic deliveries during sex, avoidance of sexual relations, isolation and marital disharmony. Although qualitative research on women's experiences of sexual dysfunction is scarce, a review of published data observed significant sexual dysfunction after complicated deliveries²¹¹. Another joint report from the IUGA and ICS²¹² recently published extensive terminology to assist in the assessment of sexual health regarding pelvic floor dysfunction. The authors stated that more than 40% of women experience a sexual problem over a lifetime, with epidemiologic surveys demonstrating the prevalence of diagnosable sexual disorders was approximately 8-12%. Correlations with sequelae of somatic birth damage were omitted, but are likely to be commensurate.

A study from the United States, noted that childbirth morbidities are more serious than previously realized²¹³. Investigators observed that identification of sexual dysfunction, primarily relied on self-reporting to maximize diagnosis and treatment; the use of valid and reliable questionnaires was recommended, to avoid direct interviews that caused maternal embarrassment. They observed that optimal assessment of dysfunction involved inspection of vascular, neurological and musculoskeletal systems for any abnormalities. Other authors examined the influence of hormone levels to understand reasons for decreased libido, lack of arousal, vaginal dryness and dyspareunia²¹⁴.

Currently available self-report measures are limited; however, the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12) devised by IUGA, was observed to be beneficial evaluation tool for this population²¹². Even so, clinicians are reported to mainly address short term problems and overlook long term associations with morbidities such as enduring pelvic floor or perineal dysfunction.

Some research proposes that pelvic floor muscle (PFM) strength is associated with the sexual mechanisms of orgasm and arousal²¹⁵. In view of this finding, PFM tone has been linked to vaginal sensation tone, strength, endurance, coordination, reflex activation, during rises in intra-abdominal pressure and relaxation of muscles²¹⁶. Hence assessment of pelvic floor muscle (PFM) function has been shown to be useful. However, at present clinical assessment of female sexual dysfunction is rare and, most enquiries are undertaken in research settings²¹¹.

7.9.2 Symptoms

Table 1: IUGA and ICS terminology of symptoms for sexual health assessment in women with pelvic floor dysfunction

TABLE 1: Symptoms of pelvic floor dysfunction for sexual health assessment	
Vaginal symptoms that complicate sexual intercourse	<ul style="list-style-type: none"> • intercourse is not possible due to obstruction by female pelvic organ prolapse (FPOP) • vaginal laxity - feeling of vaginal looseness • anorgasmia- lack of orgasm causing personal distress • vaginal dryness or reduced lubrication
Lower urinary tract sexual dysfunction	<ul style="list-style-type: none"> • coital urinary incontinence • orgasmic urinary incontinence • penetration urinary incontinence • coital urinary urgency during vaginal intercourse • post coital urinary tract symptoms of urinary frequency, dysuria, suprapubic tenderness
Anorectal sexual dysfunction	<ul style="list-style-type: none"> • Coital faecal or flatal incontinence during vaginal intercourse • Coital faecal urgency of impending bowel action during vaginal intercourse, and/or anal laxity • Reduction of anal tone
FPOP specific symptoms	<ul style="list-style-type: none"> • Abstinence from sexual activity due to FPOP. • vaginal wind (flatus) – passage of air from vagina accompanied by sound • vaginal laxity • obstructed vaginal intercourse due to FPOP
Pain symptoms	<ul style="list-style-type: none"> • Dyspareunia or persistent pain associated with attempted or complete vaginal penetration

Table 1 adapted from: Rogers RG, Paus RN, Thakar R, Morin M, Kuhn AK, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for the assessment of sexual health of women with pelvic floor dysfunction. *Neurourology and Urodynamics*. 2018; 37(4): 1220-40. <https://doi.org/10.1002/nau.23508>²¹²

7.9.3 Etiology

Research on links between sexual dysfunction and PFM strength, appear to be limited in the literature. Even so, intrapartum avulsion of LAM and/or related components, have been shown to have a marked effect on reduced pelvic floor muscle strength^{217 218 219 220}. One study reported associations between decreased PFM strength, LAM injury and anterior compartment prolapse that involved postnatal urinary incontinence, symptoms of reduced vaginal sensation and a ‘...too loose vagina’²²¹. Mothers in this thesis, who had sustained LAM avulsion⁴⁰, described minimal improvement after pelvic floor exercises and stated that “...[the] vaginal area was numb.” Other research observed that 5 years after vaginal birth, the stages of prolapse worsened and, women were more likely to experience a deterioration in the general sex score²²². Adverse effects of sexual function after vaginal delivery, have also been shown to be associated with operative vaginal delivery and perineal trauma²¹³. One commentary postulated that the puborectalis muscle, also described as the ‘love muscle’ by the popular press, may have some effect on sexual function, but stated that research was difficult to attain, due to the personal nature of sequelae and women’s embarrassment²²¹. A study of primiparous women, assessed associations between questionnaire responses on sexual function, levator avulsion and hiatal over-distension²²². Findings revealed increased vaginal and pelvic floor muscle laxity together with reduced pelvic floor muscle efficiency. Nonetheless, most studies examine the more recognized, sequelae of perineal damage or OASI regarding painful and difficult sexual relations or dyspareunia^{85 223}.

7.9.4 Vaginal laxity

Recent research observes that pelvic floor dysfunction after vaginal delivery, can also result in a less understood symptom, known as *vaginal laxity* that is, reported to cause loss of physical sensation and diminished sexual dissatisfaction. Currently, a standardized definition of vaginal laxity or ‘looseness’ does not exist²²⁴, but in the past it was generally attributed to pregnancy and childbirth. An Internet-based survey was circulated targeting physician members of IUGA that consisted of 27 questions and was designed to query attitudes and practices with respect

to vaginal laxity. The authors concluded that vaginal laxity is common and may impact sexual function and quality of life. They recommended that expanding knowledge regarding pathophysiology and treatment would be beneficial. A retrospective observational study from 337 women²²⁵, investigated associations between *vaginal laxity*, reported 'troublesome' nature of this symptom, demographic data and other related symptoms; standardized interviews, clinical examinations (ICS POP-Q) and 4D translabial ultrasonography were employed. Findings observed vaginal laxity was common at a prevalence of 24%. The 'troublesome nature' of laxity was noted to be almost as high as that of FPOP symptoms and, associated with younger age, vaginal parity, symptoms of prolapse, prolapse distress and objective prolapse on POP-Q examination and imaging. The authors proposed that vaginal laxity may be considered a symptom of prolapse and not psychogenic in origin. They concluded that results validated maternal symptoms and a complaint of vaginal laxity should not be dismissed.

7.10 Other symptoms of pelvic floor dysfunction

7.10.1 Urinary dysfunction

Health providers largely assume that urinary incontinence is attributed to postpartum pelvic floor dysfunction, but current research demonstrates that intrapartum LAM avulsion, is negatively associated with stress incontinence (SUI) and urodynamic incontinence^{226 227 229}. Conversely, another review noted that alternate mechanisms of parturition are more likely to adversely affect urinary continence²²¹. These are observed to include: denervation regarding the pudendal nerve and respective branches²²⁹; damage to the urethral rhabdosphincter or the longitudinal smooth muscle of the urethra that may occur as a result of devascularization; pressure transmission mediated through the pubo-urethral ligaments and/or suburethral tissues²²¹. Other research notes that LAM avulsion was observed to be more common in women with Green Type III cystocele, where the retrovesical angle was intact and they were more likely to suffer from voiding dysfunction and less stress incontinence²³⁰.

In the context of the interview study from this thesis⁴⁰, it was evident participants experienced substantial urinary incontinence and urgency that was long term, particularly after deliveries that

involved lengthy 2nd stages of labour, macrosomic babies and forceps instrumentation. One woman, who was interviewed two years after her delivery, gave a distressing account of postpartum urinary problems:

“...my life has been severely affected by a terrible delivery that left me with a ‘blown out pelvic floor,’ that I now know is an avulsion. Even now, 2 years later, I have to sit on the toilet every 1-2 hours to avoid severe incontinence. I cannot feel the sensation of having a full bladder as my bladder never gets to that stage without urine starting to leak.I had been trying to vaginally deliver a 2-week overdue baby weighing 4344gms, with a head circumference of 35.5 centimetres for 164 minutes, almost 3 hours on my pelvic floor. ...When the catheter was removed after 24 hours in the postnatal ward, I was totally incontinent of urine. When I stood up after the catheter came out, it was like someone dumped a bucket of water out between my legs. ...I went home still not being told anything or what would happen next with a catheter and this remained for 1 week. After that I needed to wear nappies/ pads as I was leaking large amounts of urine all the time. I saw a physiotherapist at the hospital and she helped me to a point, but I had and still have no sensation when I pass urine with a terrible dragging sensation at period time and then I need to sit down.”

7.10.2. Anal incontinence

Literature is scarce and contradictory in regards to the links between LAM trauma and anal incontinence. Some research demonstrates there is no correlation²³¹. Even so, a more recent study identified LAM avulsion as an independent risk factor for faecal incontinence after primary repair of OASI²³². These findings correspond with case-control research that observed there are more puborectalis muscle abnormalities in women with fecal incontinence²³³.

Anal incontinence is reported to be a debilitating postpartum morbidity, especially in the long term. Women describe altered lifestyles that involve constant vigilance regarding: toileting and shower amenities is required; sufficient change of underwear and sanitary pads, and deodorizers. Work places are usually not helpful and women often have to change careers²³⁴.

7.11 Postpartum perineal dysfunction

7.11.1 Definitions

Perineal trauma may occur spontaneously during vaginal delivery or as an extension to an episiotomy. Damage is described as 1st or 2nd degree tearing and is common in labour ward. Major perineal trauma, however, involves injury to the anal sphincters and anal mucosa and are

known as OASI or third and fourth degree perineal tearing. 3rd degree tears involve a partial or complete disruption of the anal sphincter complex which includes the external anal sphincter and the internal anal sphincter. 4th degree tears involve disruption of the anal mucosa in addition to division of the anal sphincter complex^{234 235 236}. In 1999, Sultan introduced a descriptive classification of the perineal traumas which is based on the clinical examination of the perineum and the anal sphincter following delivery²³⁵. These criteria are now widely accepted and has been used by various national and international scientific societies. [see Table 2 & Figure 12]

Table 2: Classification of Obstetric Anal Sphincter Injury

Classification of OASI	
First degree	Injury to perineal skin only
Second degree	Injury to perineum involving perineal muscles but not involving the anal sphincter
Third degree • 3a • 3b • 3c	Injury to the perineum involving the anal sphincter complex a: Less than 50% EAS thickness torn b: More than 50% EAS torn c: Both EAS and IAS torn
Fourth degree	Injury to the perineum involving the anal sphincter complex (EAS and IAS) and anal epithelium

Table 2 Adapted from: Harvey MA, Perce M. Obstetric Anal Sphincter Injuries (OASIS): Prevention, Recognition, and Repair. SCOG Clinical Practice Guideline. *J Obstet Gynaecol Can* 2015;37(12): 1131-1148 ²³⁶

7.11.2 Clinical implications

Research on perineal damage is much more extensive than LAM dysfunction. In the immediate postpartum period, mothers experience pain from oedema and bruising or inflexible sutures; damage requires regular perineal hygiene. Even so, infection or wound breakdown may occur and lead to urinary retention, problems with defaecation, abscess formation and rectovaginal fistulae, sexual dysfunction and/or dyspareunia. OASI is recognized as the most common cause of anal incontinence (AI) and anorectal symptoms, that may comprise: flatal incontinence;

passive soiling; incontinence of liquid or solid stool and fecal urgency. Effected women suffer from social isolation and emotional trauma and often avoid medical consultation due to embarrassment or they believe symptoms are a normal result of vaginal delivery^{234 235 236}.

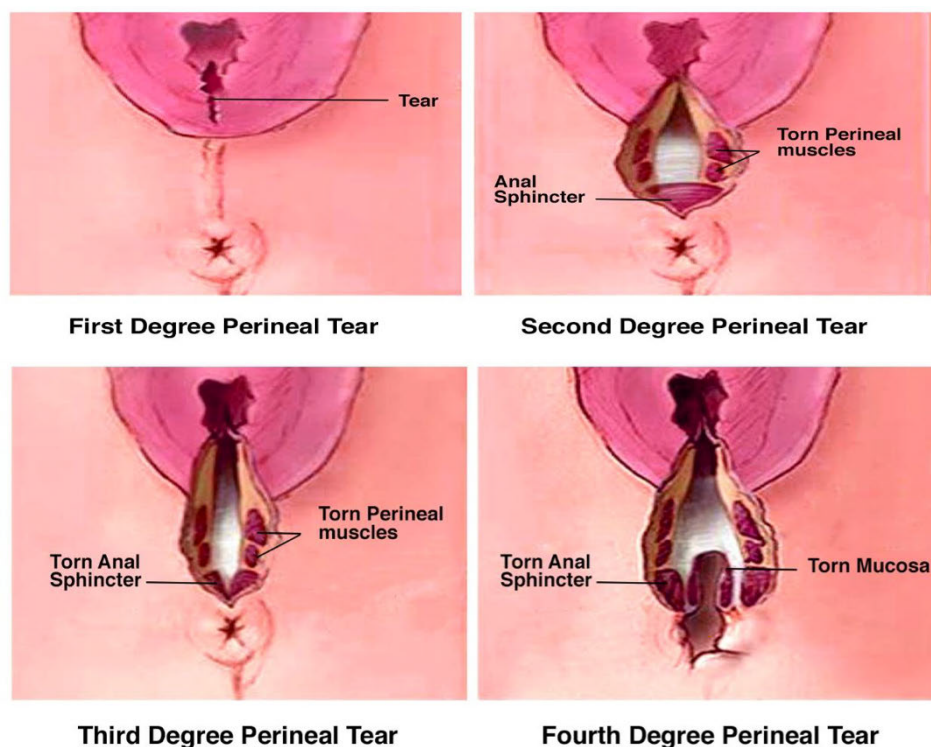


Figure 12: Degrees of perineal tearing as described above. [With permission from Cengage Med, Inc. Image Library ©2017 www.cengage-med.com]

7.11.3 Etiology

The primary etiological cause of anal incontinence (AI)²³⁶ is traumatic vaginal deliveries that result in mechanical and neurological injury to the anal sphincter complex. Mechanical compression, stretching or both, affect the external anal sphincter (EAS) independently or, the internal anal sphincter (IAS), as well as the rectal mucosa. As discussed, the anal sphincter is composed of several cylindrical layers: the innermost layer is the sub-epithelium, that seals off the anal canal or anal cushions¹³³; the IAS, which is a thickened continuation of the circular muscle layer of the rectum into the anal canal; the outermost layer is the striated muscle of the EAS, that is made up of voluntary muscle deriving from the LAM and puborectalis muscle¹¹⁶. Neurologic injury to the sphincters is usually ascribed to pudendal nerve trauma²³⁷, in the form of neuropraxia. Regrettably, women can sustain both mechanical and neurologic injury after

childbirth. In the event of sphincter repair, some women still retain residual defects and AI symptoms²³⁸. Onset of symptoms of AI may occur immediately after birth, several years later or manifest in older age²³³. A high incidence of anal sphincter injuries has been observed in primiparous women without routine episiotomy together with risk factors of babies' macrosomic birthweight and increased duration of second stage of labour²³⁹. As previously noted, intrapartum over-distension of pelvic floor structures, such as the puborectalis component of LAM, can also result in perineal tearing. This ranges from minor tears, involving the vaginal epithelium and skin, to major damage encompassing the entire perineum that involve, full thickness tears of the anal canal including the mucosa^{179 180}. Major 3rd and 4th degree perineal and lateral vaginal wall tears, have been shown to be independent predictors of LAM avulsion; the odds for avulsion in women who have sustained such trauma are 3.44 and 3.35 for major perineal and lateral vaginal wall tears, respectively¹⁶⁰

7.11.4 Incidence

Studies show that the incidence of OASI varies according to: type of episiotomy, lateral, mediolateral, or midline; mode of delivery, spontaneous or assisted vaginal; forceps or vacuum instruments; parity, obstetrical care provider, and ethnicity. Studies examining the incidence of OASI are based on the World Health Organization, International Classification of Diseases²⁴⁰. Reported incidence are 4 to 6 percent of all vaginal deliveries²⁴⁰⁻²⁴³ with higher rates in assisted deliveries (6%) than in spontaneous normal deliveries (5.7%)²⁴⁴. OASI are frequently misdiagnosed at the time of delivery; one study observed that the overall rate of missed OASI ranged from 26-87%²⁴⁵. A prospective interventional study demonstrated that OASI occurred more frequently than previously reported. Many remained undiagnosed and were subsequently classified as occult when identified on anal endosonography. Genuine occult injuries were noted to be rare. Training was recommended in perineal anatomy and recognition of OASI to enhance detection and minimise the risk of consequent anal incontinence²⁴⁶.

7.11.5 Diagnosis

In the past, OASI were diagnosed by digital palpation, anal manometry and electromyography (EMG). Post-delivery diagnosis is typically made by inspection and rectal examination using analgesia, and adequate lighting to provide primary repair²³⁴. This is now achieved by endoanal ultrasound (EAUS)²⁴⁷ and facilitates more optimal management. EAUS was first utilized in 1989, to describe normal sphincter anatomy by Law et al, and was considered the gold standard for anal sphincter imaging²⁴⁸⁻²⁴⁹. Currently, exoanal ultrasound has gained popularity; this modality uses a transperineal or translabial approach²⁵⁰ and is reported to be more accessible, less expensive and more comfortable for women. It can be carried out either in the 2D or 3D/4D mode. EAS defects are considered present if they are greater than 30° in four or more of six tomographic ultrasound imaging (TUI) slices, bracketing the EAS²⁵¹. This standard was derived from a definition of sphincter defects on endoanal ultrasound, that states substantial defects are rated as present if at least two-thirds of the anal sphincter is involved²⁵² [see Figure 13].

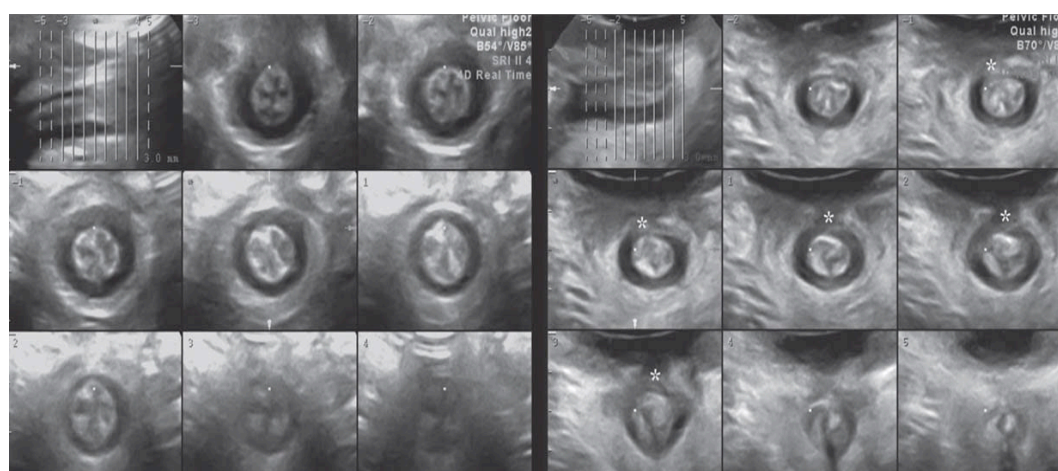


Figure 13: Translabial tomographic ultrasound imaging of the anal canal in a patient with clinically undiagnosed EAS trauma. The eight slices demonstrating a circular structure show coronal plane representations of the distal anal canal. (a) shows an intact EAS at 38 weeks gestation, (b) a complete EAS tear (defects indicated by asterisks) in the same patient approximately 5 months later. There may also be IAS trauma in the top slices in (b). The clinical diagnosis was of a second degree perineal tear. EAS, external anal sphincter; IAS, internal anal sphincter. [Permission from Detz HP. Nepean Medical School The University of Sydney]

7.11.6 Risk factors

Risk factors for OASI include: primiparous women; maternal age greater than 35 years; maternal diabetes; ethnicity; forceps and vacuum deliveries²⁵³⁻²⁵⁵; midline episiotomy; duration of 2nd

stage of labour greater than one hour; malpresentations, particularly shoulder dystocia; oxytocin augmentation of labour; vaginal birth after a caesarean section (VBAC); water birth; macrosomic babies²⁵⁶⁻²⁵⁹. Both EAS and IAS are frequently impacted by vaginal delivery due to their location within the levator hiatus or immediate proximity to the foetal head on crowning. In the past, episiotomy was employed to prevent extension of a perineal midline tear into the anal sphincter. Current research proposes that episiotomy does not protect the anal sphincter²⁶⁰; clinical diagnosis of sphincter tears has been reported to be inadequate^{245 251}.

7.11.7 Episiotomy

This is a surgical enlargement of the vaginal orifice by an incision to the perineum during the last part of the second stage of labour. Research supports a restricted policy for episiotomy. Standard obstetric and midwifery texts typically describe *median and mediolateral episiotomies*²⁶¹. Generally, this intervention is observed to be poorly defined in the literature. Experts propose a need to standardise the practice of *mediolateral episiotomy* to inform clinical practice and prevent major perineal trauma²⁶². The angle of episiotomy is an important determinant of the risk of OASI. Disparities are observed between the angle at which the incision is made during crowning of the head, when the perineum is stretched, and the angle of the surgical wound, once the infant has been delivered²⁶¹.

Classification of episiotomy^{261 262} include: *Median (midline, medial) episiotomy* commences at the posterior fourchette and continues along the midline through the central tendon of the perineal body. *Modified median episiotomy* is achieved by using two transverse incisions in opposite directions above the probable location of the anal sphincter. *'J'-shaped episiotomy* commences with a midline incision and subsequently curved laterally to circumvent the anus. *Mediolateral episiotomy* is the most common incision used; it commences in the midline and is directed laterally and downwards away from the rectum. *Lateral episiotomy* was first described in 1850. It begins in the vaginal introitus 1 or 2 cm lateral to the midline and is directed downwards towards the ischial tuberosity. Lateral episiotomy is mentioned very rarely in the obstetric literature. *Radical lateral (Schuchardt incision)* is observed to be a non-obstetrical

incision. It is infrequently used during complicated deliveries regarding large head, breech or shoulder dystocia. *Anterior episiotomy or de-infibulation* is a procedure that frees scar tissue from fused labia minora associated with female genital mutilation (FGM).

There is strong evidence that the angle of the episiotomy does affect the risk of OASI, particularly midline episiotomy^{263 264 265}. Agreement is lacking regarding the role of mediolateral episiotomy²⁶⁶. Some research demonstrates mediolateral episiotomy is protective against OASI^{266 267 268}, during operative vaginal deliveries²⁶⁹ and for primiparous women²⁶⁸. Notably, one prospective study showed mediolateral episiotomy is a strong risk factor for perineal trauma²⁶⁹. It is generally accepted that suboptimal techniques and varied definitions of mediolateral episiotomy, are likely to be causative factors related to increased incidence of OASI^{270 271 272}.

7.12 Implications for future practice

7.12.1 Kielland's rotational forceps

Current research on the use of Kielland's rotational forceps demonstrates adverse consequences of major maternal and neonatal complications that include: high rates of maternal OASI and LAM injury; postpartum haemorrhage; neonatal facial nerve palsy; neonatal intracranial haemorrhages and skull fractures¹¹. These forceps are named after the inventor, Norwegian obstetrician, Kielland [1871-1941] and were introduced in 1916 for assisted vaginal deliveries that required rotation of the unengaged mal-positioned foetal head¹². Urogynaecological research advise against their use, due to a much higher probability of major maternal trauma, especially to the anal sphincter and LAM, which result in substantial future morbidity¹¹. In the past these instruments were banned but have re-emerged and may be an outcome of health department directives^{33 204} in developed countries, that as discussed urge obstetric clinicians to pursue vaginal birth at all cost¹¹. In the light of this research it seems that future maternity facilities would be best advised to withdraw the use of these forceps, due to the fact they are a primary modifiable factor in the prevention of LAM⁶.

7.12.2 Does somatic LAM birth trauma heal?

Research currently demonstrates that LAM damage is unlikely to heal. An MRI study of 57 participants, found that women with birth related injury to both the puborectalis and ileococcygeous at 6 weeks did not recover to normal at 6 months²⁷³. An imaging study of 367 women, who were evaluated by four-dimensional translabial ultrasound, to observe whether pregnancy and delivery-related changes to levator morphology and distensibility regressed with time, found no evidence of healing. Enquiry compared sonographic data at 3-6 months, 2-3 years after the first delivery. Investigators proposed improvement over time was probable for partial avulsion but less likely for complete LAM avulsion²⁷⁴. In A cohort of 76 primiparous women after a term singleton delivery, only minor improvement in sonographic appearance of the EAS between 4.7 months and 26.4 months on transperineal ultrasound imaging was observed. Hence any significant degree of structural recovery during this time period was unlikely²⁷⁵. In a study of 17 women who underwent levator repairs, direct surgical repair of a levator avulsion was feasible at the time of prolapse surgery. However, its effect on prolapse recurrence and hiatal dimensions was relatively disappointing, suggesting that there often is microscopic trauma and functional muscle impairment in addition to the avulsion²⁷⁶. It was also argued that anatomical recovery seen on ultrasound at 2-3 years was probably due to scar formation between the retracted avulsed muscle and the pubic rami²⁷⁶. Similar findings were observed regarding a prospective observational cohort study of 245 women who underwent anterior colporrhaphy. A 2-year follow-up visit regarding a questionnaire, physical examination, and translabial 3D ultrasonography showed significant recurrence²⁷⁷. In a retrospective cohort study, from the United States of 149,554 women age 20 or older, investigators aimed to determine the incidence of surgically managed pelvic organ prolapse and urinary incontinence. Pelvic floor dysfunction was observed to be is a major health issue for older women, as shown by the 11.1% lifetime risk of undergoing a single operation for pelvic organ prolapse and urinary incontinence, as well as the large proportion of reoperations²⁷⁸. Thus, it more likely preventative measures will demonstrate better outcomes for future mothers. Decreasing the use of forceps, especially

Kielland's, together with informed consent of risk factors¹¹ will allow more optimal outcomes at delivery, together with a bipartisan consensus between midwives and obstetricians.

CHAPTER 8: HISTORICAL OVERVIEW

This chapter presents historical insight into the origins of somatic vaginal birth damage, PTSD and natural birthing methods over the past centuries. It analyses archived accounts from anatomists, physicians and injured mothers, to gain perspective on the substantial barriers faced by women who struggled to manage debilitating somatic and psychological consequences of vaginal birth, that were poorly treated and overlooked.

Enquiry emanated from couples' reports in this thesis [see Chapters 4 & 6], that stated antenatal classes overemphasized 'natural birthing' techniques and, lacked information on risk factors of pelvic floor dysfunction and/or emotional trauma. Birth education was observed to "...lack accountability and responsibility" and women were ill-prepared for complicated deliveries and resultant sequelae. Overt rivalry was also identified as noticeable between doctors and midwives, during high acuity labours and couples reported they felt overwhelmed⁴⁰. Qualitative historical methods sought to understand the origins of the current orthodoxy, that purports vaginal birth is a positive and empowering experience with optimal outcomes²⁷, despite contradictory evidence from imaging studies^{22 23}. Discussion aimed to provide an appreciation of watershed moments that may have guided obstetrics, midwifery and perinatal mental health care practice and thus, reveal insight into related issues that contribute to adverse consequences for this current population of postnatally injured women.

Against this background, this study examines past studies that reveal physicians' attempts to treat birth sequelae and identify causal factors with inadequate understanding of female anatomy. Investigation included the evolution of diagnostic measures and surgical procedures, together with, the development of the sub-speciality of urogynaecology. Enquiry provides insight into the origins of PTSD and its association with postpartum PTSD that has recently been observed to affect a substantial proportion of mothers after traumatic childbirth events. Commentaries are also scrutinized for associated political and socio-economic issues, related to the origins of the *natural childbirth* ethos, that may elucidate the present bias to these methods in 21st Century maternity care.

8.1 Origins of somatic vaginal birth trauma

“...Women wrote of their shock at becoming mothers... of their unpreparedness and wish that they had been better informed... a product of simple ignorance... an astonishing lack of knowledge...about their own anatomy...most suffered in silence with debilitating physical ailments, assuming them to be normal, simply because no one had ever told them otherwise. One letter described how, after the birth of her first child, she suffered from a prolapsed womb... the torture was more than she could describe... Yet this poor woman simply put up with the pain, assuming that it was a normal consequence of childbirth.”^{279 280}

Commentary from: *Maternity: Letters from Working Women*, London, United Kingdom 1915

8.1.1. Early identification of LAM

Pelvic floor muscles were initially described by Vesalius²⁸¹ in 1555, as *musculus sedem attollens*. The more definitive term of LAM was first used in 1847 by Von Behr.²⁸² The *pelvic diaphragm* was subsequently named in 1861 by Meyer, and related anatomy included the terms primitive flexors and abductors of the caudal part of the vertebral column. Three muscles were observed to arise from the coccyx and believed to form the LAM; they originated from the pectinate line of the pubic bone and, fascia of the obturator internus muscle and named *coccygeus*, *ileococcygeus* and *pubococcygeus*³⁸³.

In 1897, a German anatomist, Holl, reported that some of the *pubococcygeus* muscle fibres looped around the rectum, instead of being inserted into the coccyx; he assigned these the name, *puborectalis* muscle. These were noted to form a U-shaped ‘puborectalis sling’ that surrounded the posterolateral aspect of the anorectal junction, bordering the urogenital hiatus²⁸⁴.

In 1899, Peter Thompson, in his text, *Myology of the Pelvic Floor*, described the *levator ani* as a muscle that had been studied extensively, yet “...one about which, we know the least”²⁸⁵.

Despite the early identification of LAM and related pelvic floor musculature, one review notes it was not until the late 19th and early 20th Centuries, physicians identified changes that indicated damage to this pelvic floor structure were related to vaginal childbirth²⁸⁶. These findings were validated by imaging technology^{22 23 286 287} in the early 21st Century. However, clinical observations of intrapartum LAM damage and pelvic floor dysfunction, were evident as far back

as the late 19th Century. Archived case studies from Dickinson, an American obstetrician and gynaecologist, in 1889 reported links between the intricate structure of the '*levator ani muscle*' and vaginal prolapses²⁸⁸. Excerpts from his text, *Studies of the Levator Ani*, state:

"... there is no considerable muscle in the body whose form and function are more difficult to understand than the *levator ani*."

"...mother of six, in fair health; not flabby; first labour was 'terrible' with forceps; feeling of entire loss of power here ever since; prolapses uteri and cystocele; half of uterus out at times... levator powerless." ²⁸⁸

During the early 20th Century, De Lee, an American physician, also identified damage to LAM in his quest to prevent adverse outcomes in obstetric practice²⁶. De Lee's work has often been the subject of polemic discourse between obstetricians and midwives; the former hail him as the *father of modern obstetrics* and the latter apportion him blame for *pathologizing childbirth* and the introduction of the *prophylactic forceps*. Medical historian, Walzer Leavitt offers a different interpretation of De Lee's legacy, pertinent to the identification of somatic birth injury and unpredictability of vaginal birth in the present age²⁸⁹. Leavitt believes this body of work is a valuable contribution to research knowledge and, should be contextualized as a product of a *tumultuous period* in American history, where physicians were often confronted with the prospect of increasing rates of maternal death and resultant morbidities, that were unsupported by the rejection of a national health scheme by the American Medical Association in the 1930s²⁹⁰. From 1900 to the 1930s, US maternal mortality figures are estimated to have been three times higher than in Sweden or other parts of Europe and women typically endured frequent childbearing, without antenatal or postnatal care²⁹¹. In this context, De Lee's treatise, *Principles and Practice of Obstetrics*²⁶, was described as a comprehensive set of guidelines on obstetric factors that were shown to complicate childbirth, prior to the use of ultrasound and modern diagnostic tests. His aim was to warn other clinicians about the unpredictability of birth. An excerpt from his text, reveals his knowledge of the link between pelvic floor and perineal injuries and vaginal birth:

"...The immense amount of invalidism resulting from childbirth is absolutely unmeasurable, but we know that annually hundreds of thousands of women flock to

*our hospitals for the repair of injuries and for relief from the effects of diseases contracted during labor. It is safe to say that 50 per cent, of women who have had children bear the marks of injury, and will, sooner or later, suffer from them. Laceration of the pelvic floor, of the supports of the uterus, bladder, and vagina, occur in every labor”*²⁶.

Historical accounts from women, who experienced traumatic deliveries and debilitating morbidities, are more difficult to acquire. Even so, one source from a British collection of 160 letters in 1915, reveals confronting narratives from the ‘darker side’ of motherhood²⁷⁹. Respective letters depict extreme emotional trauma from unbearable physical ailments after complicated vaginal deliveries. Mothers suffered in silence due to a limited understanding of their own anatomy and non-existent antenatal and postpartum assessment and reported “...unrelenting torture from a prolapsed womb” after the birth of a first child; others relate stories of incontinence and ‘weakened insides’^{279 280}.

Analogous somatic and psychological consequences are evident in interviews with women from this thesis³¹, despite the presence of functional health care systems and evidence-based obstetric and midwifery practice.

8.1.2 Uterine prolapse

Uterine prolapse was initially observed in historical transcripts from Egyptian and Kahun papyri ca.1835 B.C.²⁹² and further descriptions are evident a thousand years later, in the 5th-Century B.C. writings of Hippocrates, the first recorded physician to use the word *hysteria*, that was allegedly linked to the movement of the uterus (*hysteron*)²⁹³ together with women’s labile mental disposition²⁹⁴. Treatments involved removal of the ‘...black or gangrenous part” of the protruding uterus and practitioners advocated tying a woman upside down by her feet until the prolapse reduced²⁹³. Prior to modern anaesthesia, transperitoneal approaches were not used and physicians attempted to manage uterine prolapse using a vaginal approach. This involved applying caustic substances or astringents; using procedures that narrowed the vaginal vault and removing the cervix or even occluding the introitus^{293 295}. One report observes that the ability to achieve long-lasting repairs was problematic, due to a limited understanding of female pelvic

floor anatomy²⁹³. Pessaries were also widely offered to reduce discomfort for women and avoid surgery; these consisted of lint, brass, cork, wood, metal and rubber balls to support the uterus^{295 296}.

8.1.3 Surgical procedures

By the 19th Century, physicians were employing various surgical procedures to correct prolapses. Sims publicized the use of silver sutures for pelvic repair surgery in 1852, and Choppin performed the first vaginal hysterectomy in 1861²⁹³. Donald developed the Manchester repair operation in 1888^{293 295}, the latter of which, is still used today. The procedure involved anterior and posterior colporrhaphy or repair, with amputation of the cervix and was later perfected by William Fothergill^{293 295 97}. Partial *colpocleisis* was developed by Le Fort in 1877²⁹⁵ and entailed the removal of a strip of anterior and posterior vaginal wall and, suturing of the anterior and posterior wall to each other²⁹⁸. This technique was used for older women, who were assumed to be no longer sexually active. In 1898, Watkins, developed *interposition* surgery, for postmenopausal women; it also involved cervical amputation and fixation of the bladder against the posterior uterine wall to elevate the lower uterine segment^{295 298}.

In 1895, Mackenrodt published a more accurate description of the female pelvic floor connective tissue and cardinal ligaments that enabled more insight for surgical procedures. An archived excerpt notes: "...this whole ligamentous apparatus appears so excellent and extensive that it is quite surprising that it has not been recognized previously"^{293 295}.

The problem of suspending the vagina after hysterectomy was approached in various ways, with the now commonly employed technique of sacrospinous fixation first published by Amreich in 1951²⁹⁹. In 1971, two gynaecologists, Randall and Nichols³⁰⁰ from the United States, produced the first English- language paper on surgical outcomes of this procedure for vault prolapse. They found the operation restored the normal vaginal depth and was effective for insufficient uterosacral or cardinal ligament strength; this procedure is still used today. Other methods involved vault and uterine prolapse correction that included, the *iliococcygeus* fixation³⁰¹, high uterosacral ligament suspension^{302 303} and levator myorrhaphy³⁰⁴.

Paradigm shifts in prolapse surgery emerged during the 1990s with the advent of endoscopic procedures and vaginal mesh repairs. Notably, the use of grafts in reconstructive surgery was a forerunner of mesh and, can be traced back to the early 19th Century³⁰⁵. Diverse grafts were utilized to support pelvic organs and these included: autografts or tissue transplanted from the woman's own body; allografts or tissue taken from another person; xenografts or tissue taken from an animal²⁹⁵. In 1955, Moore et al, reported the use of tantalum mesh in the repair of cystoceles³⁰⁶. Notably, the use of mesh procedures for the pelvic floor, were influenced by the use of polypropylene mesh in the correction of incisional hernias^{293 307}. Weakened fascia of the pelvic floor were replaced with a more reliable biologic or synthetic material. These innovations impacted the use of the tension-free transvaginal tape (TVT), a mid-urethral sling, that proved to be clinically effective and was subsequently marketed as an all-inclusive "kit" by medical device manufacturers²⁹³.

In 2001, Petros developed the *infracoccygeal sacropexy* to correct vault prolapse transvaginally by using polypropylene mesh³⁰⁸. Complications of perirectal abscesses and fistula subsequently led to its removal from the market. In 2006, the French health authorities, restricted the use of mesh transvaginal repair of pelvic organ prolapse to clinical research³⁰⁹.

Other mesh procedures for prolapse utilising a transobturator approach, were developed later by Rane³¹⁰ and Fraser³¹¹ in Australia and, in France by Jacquetin³¹². Serious complications that included mesh erosion of the vagina, urinary problems, perforation of organs, bleeding and increased rates of chronic pain, led to disillusionment with these new techniques³¹³. The US Food and Drug Administration (FDA) subsequently, issued two separate warnings in 2008³¹⁴ and 2011³¹⁵, regarding mesh procedures for prolapse and incontinence.

Recent developments in imaging technology have resulted in attempts to address some of the newly discovered underlying anatomical abnormalities in women with pelvic organ prolapse. Reconstruction of a torn puborectalis muscle³¹⁶ and reduction of an enlarged, overdistended muscle and hiatus³¹⁷ have been described and are under evaluation in ongoing trials.

Conservative treatment options are still limited to pessaries of which there is a bewildering variety³¹⁸. Some women report “...pessaries are dehumanizing”⁴⁰, but for many they represent a valid treatment option.

8.1.4 Discovery of LAM damage

During the early 20th century, physicians investigated the anatomy of the pelvic floor muscle, for structural alterations and links with vaginal childbirth; assessments involved digital palpation on cadavers from parous women²⁸. In 1907 a Viennese gynaecologist, Halban, and an anatomist, Tandler, demonstrated “...almost complete loss of the anteromedial aspects of the levator ani muscle.” Findings were published in *The Anatomy and Aetiology of Genital Prolapse in Women: the supporting apparatus of the uterus*²⁵. Reviews note that his thesis proposed the pelvic fascia were like “...a spider’s web” that had the ability to bear the proper weight of the spider, but were unable to support a greater, abnormal burden^{293 319}.

An illustration from a translation published in 1960, demonstrating the levator plate from above is depicted in Figure 1. See below:

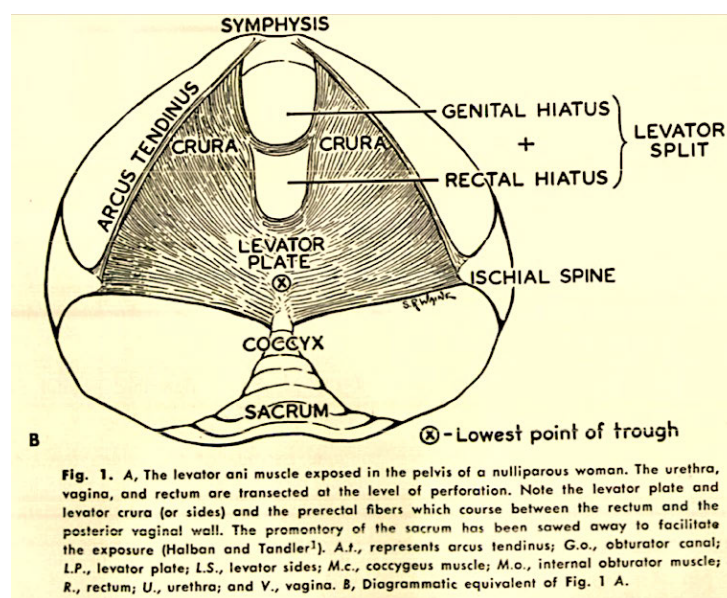


Figure 1: Supporting apparatus of the uterus [Halban J, Tandler J. The anatomy and etiology of genital prolapse in women: the supporting apparatus of the uterus. *Obstet Gynecol.* 1960 Jun;15: 790-6. Translated by Porges RF & Porges JC; Beth Israel Hosp ta. New York 3, NY]

In 1938, De Lee's treatise, *Principles and Practice of Obstetrics*, included evidence of levator tears associated with vaginal birth, as shown in Figure 2.

An excerpt notes:

...The head has passed through the cervix and come to rest on the pelvic floor. When the pelvic floor tears, the vagina usually does also, but it may not. These submucous lacerations of the levator ani are difficult to recognize and hard to repair¹².

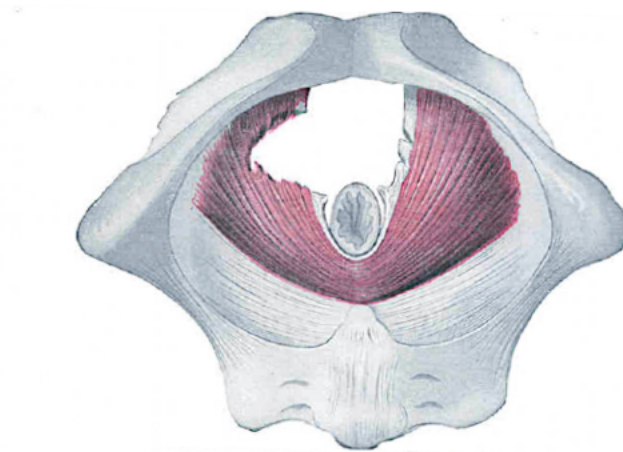


Figure 2: Right-sided avulsion seen from the caudal view. Reproduced with permission from De Lee J. *The Principles and Practice of Obstetrics* (7th Edition). WB Saunders Company, PA, USA (1938).

In 1943, Gainey²⁷, an American obstetrician, published findings from palpation assessments of 1000 women, that he had delivered himself. Gainey detected avulsion damage or complete tearing of the *puborectalis* component of the LAM. The incidence was reported to be about 20% of primiparous women, with a preponderance of right-sided trauma. Findings largely agree with current studies from magnetic resonance imaging (MRI) and pelvic floor ultrasound. Observations were confirmed 12 years later in another paper in 1955³²⁰. This research was regarded as seminal at the time, but was not pursued and had no apparent effect on clinical practice. Thus, the obstetric community overlooked the evidence that LAM injury occurred during vaginal birth and there was a hiatus of 60 years before it was 'rediscovered' by imaging technology in the 21st Century^{6 221}.

In 2003, American researchers demonstrated on MRI²² that visible trauma to the LAM, occurred in women after vaginal birth. Australian investigators, subsequently revealed similar findings on

ultrasound imaging in 2004²⁸⁶ and 2005²³. As noted in Chapter 7, current research indicates that the most common form of macroscopic levator trauma is an 'avulsion'. This is defined as a traumatic dislodgment of the muscle from its bony insertion on the pubic rami. A. commentary notes that currently, obstetrics and gynaecology textbooks contain few references to LAM trauma or links with pelvic floor dysfunction²²³. Some research differentiates between birth related levator damage and major perineal injuries (OASI)^{6 221}, but distinctions are often unclear in other studies that describe somatic birth trauma as synonymous with perineal⁶² and vaginal tears, anal sphincter and pudendal nerve trauma.

8.1.5 Impact of modern imaging

The history of imaging of pelvic organs for diagnostic purposes can be traced to the 1920s. Contrast X-ray techniques were first used to study the bladder contour and mobility for the purposes of investigating lower urinary tract abnormalities and stress incontinence^{321 322}. In the 1950s and 1960s, the technique was standardized for use in incontinence diagnostics^{323 324 325}. Radiographic techniques were additionally evaluated for assessment of prolapse of the vagina and rectum³²⁶ but, the complexity of the technique, impeded widespread use^{89 327}. The availability of real-time ultrasound modalities in the 1980s, resulted in transabdominal^{328 329}, perineal^{330 86}, transrectal³³¹ and transvaginal adaptations³³² to investigate urinary incontinence and some pelvic disorders in women. Currently, perineal and translabial ultrasound are widely used, due to their non-invasive nature and the absence of distortion³²⁷.

MRI of the pelvis was first described by Hricak in 1983⁸⁵. Yang, et al⁸⁷, introduced dynamic MRI in 1991, allowing imaging during Valsalva manoeuvres. More recent developments in MRI, allow for the fast acquisition of images³³³. Even so, MRI is problematic due to assessments being performed in the supine position; the process does not facilitate patient biofeedback during imaging, and it is expensive²⁹³.

Although imaging technology has been used to investigate pelvic floor disorders for over 30 years, usage has progressed more slowly than in other gynaecological specialties such as, reproductive endocrinology or gynaecological oncology. Despite this, imaging for research

purposes has substantially contributed to the understanding of stress urinary incontinence, obstructed defaecation, faecal incontinence and pelvic organ prolapse. A major achievement has been the standardisation of the sonographic assessment for levator trauma¹⁶⁰ and the demonstration of its link with prolapse, especially of the uterus and bladder¹⁵⁸. These advances became possible due to the development of 3D/4D ultrasound which allows the acquisition of blocks of volume data. This has given access to the axial plane in which the levator ani is most conveniently imaged, and in which the plane of the levator hiatus is found³³⁴ for an overview.

8.1.6 Subspecialty of urogynaecology

The discipline of urogynaecology is a subspecialty of gynaecology in the United Kingdom, Australia and other countries and in the United States, it is known as Female Pelvic Medicine and Reconstructive Surgery^{335 336}. Urogynaecologists possess an undergraduate medical degree and a postgraduate degree in obstetrics and gynaecology. They subsequently undertake further training in urogynecology that facilitates accreditation or board certification for this subspecialty.

At present this subspecialty is the only one attending to women with postpartum pelvic floor dysfunction related to FPOP, and urinary and faecal incontinence, that is usually attributed to somatic birth trauma. Currently, obstetricians manage postpartum damage to the perineum and related structures, including OASI. Colorectal surgeons possess expertise regarding anal incontinence and pelvic floor dysfunction related to rectal function and may perform secondary repair of OASI. Ideally, all of these sub-specialities together with physiotherapists, are well placed to collaborate with each other, to enable more optimal outcomes for this population of postpartum women^{335 336}.

Typically, women affected by FPOP are assessed by history taking, pelvic examination and assessment of prolapse on maximal Valsalva, using a validated system known the Pelvic Organ Prolapse Quantification System [POP-Q]¹⁹⁴. This diagnostic measure was adopted in 1996 by the International Continence Society (ICS), after a development stage of three years. POP-Q is currently employed by most physicians in clinical practice and is the standard means by which

to report pelvic organ prolapse in the international literature³³⁷. Prolapse assessment on Valsalva requires forced expiration against a closed glottis, requiring contraction of the diaphragm and abdominal muscles, in order to obtain distinctly increased intra-abdominal pressure²¹.

The origins of urogynaecology in the English-speaking world are often attributed to Kelly, an American gynaecologist, from John Hopkins School of Medicine. His pioneering work in the early 1890s and early 20th Century, produced a textbook on operative gynaecology procedures³³⁸ and facilitated better assessment methods of female bladder dysfunction^{339 340}. In 1913, Kelly first described his *anterior plication stitch*³⁴¹, as a horizontal mattress stitch placed at the urethro-vesical junction that successfully plicated the pubo-cervical fascia. This became known as the *Kelly Stitch* and resulted in narrowing of a patulous urethra with some elevation of the urethrovesical junction and was the essential component of anterior colporrhaphy or vaginal repair for stress urinary incontinence³⁴². Modern Urogynaecology as a subspecialty of Obstetrics and Gynaecology is commonly linked to the name of Stuart Stanton³⁴³ who led the first dedicated department of Urogynaecology at St George's Hospital in London from the late 70s onwards. Urogynaecology has been available in the United Kingdom and Australia since the 1980s and 1990s^{344 345}. One review³⁴⁶ notes that as a consequence of political issues and medical rivalries, it was not introduced into the United States, until 2011, and as noted, is known there as, Female Pelvic Medicine or Reconstructive Medicine. Organizations instrumental in establishing the subspecialty of urogynaecology are: the International Urogynecological Association (IUGA)³³⁵ and the International Continence Society (ICS)³³⁶. These were created in 1971 and 1976 respectively.

8.2 PTSD related to birth

8.2.1 Background

Initial enquiry investigates the origins of non-obstetric posttraumatic stress disorder (PTSD) in the context of wars and civilian disasters. Subsequent review involves the development of perinatal mental health research into the risk factors, prevalence and identification of emotional

trauma symptoms, related to childbirth events, that have been shown to be analogous to those of non- obstetric PTSD. Over the past decade, numerous studies have emerged that are primarily from a team of psychologists in the United Kingdom. Prior to this, despite a few observational studies from obstetricians, during the 1970s, 1980s and 1990s^{347 348 349 350 351 352}, literature on childbirth related trauma appears to be scarce. One commentary notes that this may be attributed to the prevailing orthodoxy that birth is a positive event with minimal adverse outcomes²⁷. Even so, a recent historical commentary, observes that psychological birth trauma in developed countries, was more common than previously realized and that contemporary maternity care has, to date, proven unable to facilitate better perinatal mental health outcomes³⁵³.

Investigation into the antecedents of PTSD, observes that the archaic term 'hysteria,' was used as early as the second millennium BC, to describe women's labile emotional state²⁹⁴, in relation to the spontaneous movement of the uterus or 'hysteron'. Hysteria is observed to be the first mental health disorder attributable to women³⁵⁴. During the 19th Century, 'hysteria' was associated with a concept known as 'traumatic memory', where the mind was proposed to unconsciously repeat and narrate past traumatic events, that current investigators believe was the foundation for the modern notions of PTSD³⁵⁵. Even so, the stigmatizing effect of this culturally specific term, remained connected to women despite their changing roles in society³⁵⁴ until the classification of 'hysterical neurosis' was removed from the Diagnostic and Statistical Manual of Mental Disorders (DSM) in 1980, in DSM-III³⁵⁶. Prior to this it had been firmly established for centuries, as a gender specific diagnosis that described multiple and unexplained physical and psychological symptoms that are currently proposed to be 'conversion disorder' or 'dissociation'³⁵⁷. Hence, women's mental health, cannot be understood without an appreciation of cultural norms and values that, in the past have been predicated on their lesser social status and invariably measured in terms of its impact on men³⁵⁸.

8.2.2 PTSD and wars

PTSD has a longstanding association with military combat and descriptions of soldiers displaying emotional trauma symptoms, similar to the current criteria in DSM⁷, can be observed in classical Greek and Roman war literature³⁵⁹. Common terms employed by anatomists, physicians and psychiatrists, were war neurosis, battle stress, or neurasthenia^{355 360}. In 1798, Pinel, a French physician, first described symptoms of PTSD in his treatise entitled *Nosographie Philosophique*, terminology included: cardiorespiratory neurosis, acute post traumatic stupor and 'idiotism' in both men and women in asylums³⁶¹. In the 1880s, French neurologist, Jean-Charcot³⁶², proposed a new category called 'traumatic hysteria' and explained psychological trauma, as intense fright mediated through unconscious mental processes that could result in physical symptoms³⁵⁹. Pierre Janet, later postulated that *vehement emotion* was stimulated by life events and traumatic mental distress could be isolated in the mind according to the hysterical mechanism of dissociation³⁶³.

During the First World War, men were diagnosed with 'hysteria' but this was categorized within the broader terminology of 'shellshock' or 'war neurosis.' Since then, related symptomatology of anxiety, nightmares and tremor, have shaped modern theories of PTSD. The majority of research on trauma; however, emerged during the First World War from military physicians who reported an epidemic of post-trauma illness in male soldiers, that was termed 'shell shock'. Many believed it had been caused by the toxic effects of exploding artillery shells that resulted in microscopic cerebral haemorrhages³⁶⁴. In 1915, the term 'shell shock' was used by a British physician, Myers, in an article in *The Lancet* describing soldiers suffering from loss of memory, vision, smell, and taste³⁶⁵. Symptoms were analogous to 'hysteria' but evident a year later and a proportion of casualties, who had not been exposed to combat also presented with symptoms^{366 367}.

The Second World War saw soldiers experiencing a syndrome characterized by anxiety, intense autoimmune arousal, reliving and sensitivity to stimuli that were reminiscent of original trauma³⁵⁹. When this war drew to its end, another result of trauma was discovered regarding the experience

of death camp survivors³⁶⁸. The definition of this disorder continues to raise important questions about the relationship between a stressor, the individual experiencing it, and the characteristic symptoms³⁶⁰.

8.2.3 PTSD in civilians

After the Industrial Revolution, in the late 19th Century, PTSD type symptoms were shown to also affect civilians and, the term 'railway spine' was used to describe spinal concussion caused by physical jarring³⁵⁹. In 1889, Oppenheim, a German neurologist, published a treatise on 'traumatic neuroses' based on his clinical observations of railway, factory, and construction accident victims. He proposed that the pathogenic effects of emotional terror injured the nervous system³⁶⁹. In 1943, an Austrian neurologist, Adler³⁷⁰, investigated the psychological effects of distress in civilian settings. Her seminal work on the Cocoanut Grove fire of 1942, in Boston, Massachusetts, that claimed 432 lives, revealed a similar clinical presentation and included epidemiology of this disorder. Survivors were observed to have unsettled grief, changes in personality, guilt, diminished vitality, sleep disturbances and anxiety.

Subsequent research from other investigators, examined the development of two conceptual frameworks to understand the effects of stress as a predisposing factor of mental illness. Selye³⁷¹, a Hungarian physician (1907-82), hypothesized that stress was mediated by biological interactions of the hypothalamic-pituitary-adrenal axis. The word 'stress' was originally devised by Selye to explain his *general adaptation syndrome*. His findings noted that 'traumatic neurosis' was a healthy response to chronic and severe stress. Fenichel, an Austrian psychoanalyst (1897-1946)³⁷² viewed this problem from a psychological perspective and emphasized the role of the unconscious mind and repressed memories of early childhood 'traumata'. This theory led to descriptions relating to mechanisms of defence and, their related function in producing or preventing disease³⁶⁰. More recently, consequences of PTSD have been attributed to natural disasters, mass catastrophes and terrorism³⁷³.

8.2.4 Early DSM criteria for PTSD

Notwithstanding this research, criteria for PTSD only appeared in the official nomenclature of DSM-1 in 1952³⁷⁴, under the name of 'gross stress reaction'. Even then, this terminology was omitted in the 1968 edition of DSM-II³⁷⁵ and changed to 'transient situational disturbances' after a relative period of peace. Alterations did not adequately capture PTSD related symptoms and precluded identification and subsequent psychological assistance for war veterans or civilians. During this period, common prejudices against traumatic disorders that often prevented accurate assessment, were judgements of cowardice and a 'defective' family history³⁶⁰. Against this background and considerable resistance from the psychiatric community, well formulated criteria for PTSD were finally included in DSM-III³⁵⁶ during 1980, five years after the end of the Vietnam War. The new diagnosis was given the general name of *posttraumatic stress disorder*; the *stressor* was defined as so severe that it would produce psychological and/or somatic symptoms outside the range of normal human experience. Requirements regarding the *stressed*, did not include pre-existing normality and, was based on the recognition that individuals vary in vulnerability and resilience. The symptoms were divided into three general categories: reexperiencing (including dissociative-like states), numbing of responsiveness, and cognitive or autonomic symptoms. The onset could be either acute or delayed. None of these developments; however, identified childbirth events as a stressor³⁶⁰.

8.2.5 PND and PTSD

Commentaries observe that the first formal paper on puerperal mental illness was published in 1858 by Marcé, a French psychiatrist. His '*Treatise On Insanity In Pregnant, Postpartum, And Lactating Women*',³⁷⁶ is an extensive monograph that provides clinical descriptions of 'syndromes' from 79 case studies. It summarizes etiological theories that demonstrate women have an increased risk of mental health impairment during and after childbirth. This research, however, was largely overlooked for more than a century, despite results that anticipated the modern rediscovery of major depression regarding acute mood disorders and psychoses during and after pregnancy³⁷⁷. Surprisingly, it was not until 1994 that a separate disease classification,

differentiating PND from major depression in the general population^{378 379} was published in DSM-IV³⁸⁰.

Recent research demonstrates that symptoms of PND are distinct from those of postpartum PTSD^{381 382}. The symptom profile of PTSD requires the gateway criterion of a traumatic event, that results in symptoms of re-experiencing the incident, persistent avoidance of reminders, nightmares, numbness and panic^{64 381}. In contrast, PND is described as a major depressive disorder³⁹³ and is diagnosed if a mother has five or more of the following symptoms for two weeks: insomnia or hypersomnia, psychomotor agitation or retardation, fatigue, changes in appetite, feelings of worthlessness or guilt, decreased concentration and suicidal ideation³⁸². Some studies observe PTSD and PND symptoms can overlap^{381 383}. A common assessment instrument is the Edinburgh Postnatal Depression Scale (EPDS) that was developed in 1987³⁵.

8.2.6 Emergence of postpartum PTSD

Enquiry into PTSD has developed considerably over the past three decades. Initial prospective studies in 2001, noted that 1.5% of women developed chronic PTSD, related to birth events. Symptoms were noted to predominantly occur after birth events, but investigators proposed it was possible the disorder may be a continuation from pregnancy³⁸⁴. The first cases were identified in 1978 from a group of 10 women undergoing obstetric care over a 2-year period, by two French obstetricians, Bydlowski and Raoul-Duval³⁴⁷, who described the condition as “...*la neurose traumatique post-obstetricale*” after complicated and lengthy births, that involved stillbirths and/or “...handicapped babies”²⁴⁷. Mothers exhibited emotional sequelae that presented as: purposeful avoidance of future pregnancies; reoccurrence of symptoms in the last trimester of the next pregnancy. An excerpt notes:

*“...nightmares so terrifying, women presented with conditioned insomnia...parturition especially the first can, by its obligatory violence and confrontation with an imminent and lonely death put the mother under extreme stress”*³⁴⁷.

In 1985, Beech and Robinson observed women suffered nightmares after birth that were experienced years later³⁴⁸. Distress was attributed to “...suffering excessively painful and traumatic deliveries, often with unsympathetic staff.” Other studies in this era^{349 349 350 351}

described disturbing memories for long periods and “missing pieces” about the actual birth event³⁵⁰. In 1995, Ballard et al, published four case studies of postpartum stress reactions that revealed a clinical picture regarding the course of this disorder³⁵². Their findings demonstrated a strong similarity to PTSD criteria from DSM-111-R from 1987³⁸⁵. Mothers described deliveries as emotionally traumatic with staff who withheld pain relief, that included one instance that involved the cardiac arrest of a baby; another that resulted in anaesthetic failure; and that all women exhibited “...trauma beyond a difficult delivery”³⁵². Researchers observed that each of the four patients had ‘early onset’ of PTSD symptoms, within 48 hours of delivery. Two mothers exhibited long-lasting problems bonding with their babies and, one stated the “...infant reminded her of the unpleasant birth experience”³⁵².

8.2.7 Identification of postpartum PTSD

Recent studies note that 3-4% of mothers suffer from postpartum PTSD, together with 15-19%, who have endured high risk pregnancies and preterm complications^{386 387 388} and up to 39% of women, whose babies have died³⁸⁹. Despite this evidence, PTSD remains largely unidentified in maternity facilities and, unlike depression, routine screening is not employed. Hence, traumatized women are rarely identified and/or treated for this condition. Studies observe that recognizing the difference between somatic and psychological symptoms are problematic after childbirth, given that the birth of a baby, requires substantial maternal adjustment and can result in pathologizing childbirth or even under-diagnosing trauma symptoms. At present, diagnostic criteria for PTSD following childbirth are observed to be poorly defined and clinicians may ignore subclinical symptoms³⁸⁶.

A fundamental question is whether childbirth can be described as a traumatic event? Typically, birth is viewed by society as a positive event, despite huge physiological and neuro-hormonal alterations that breach bodily integrity. The prevalence of postpartum PTSD is reported to be more widespread than previously realized and clinicians may overlook symptoms²⁷ that comprise: numbness, detachment, intrusive thoughts, avoidance, blame, panic, nightmares or flashbacks³⁹⁰.

Perinatal risks factors associated with postpartum PTSD are noted to include: mothers fearing for their life or that of their baby; subjective feelings of loss of control during deliveries that involved obstetric interventions and minimal pain relief; lack of support from medical staff or partners, and emergency caesarean sections^{381 391}.

Studies note that a confounding issue for diagnosis of this disorder, is the interface between the severity and duration of the stressor and, resultant coping mechanisms of the individual, who is stressed. Stressor events are observed to be different from non-obstetric related PTSD, in that birth is often believed to be predictable, undertaken voluntarily and generally seen as a positive event. Although the course, duration, etiology and effects of vaginal delivery, may present differently from other stressors that lead to PTSD, the unexpected and sometimes terrifying nature of birth events suggest the symptoms of fear and unpredictability may be subjectively viewed as akin to sexual assault, road traffic accident, or exposure to disasters^{27 391 392}.

Research states that criteria listed in DSM-IV-TR³⁹³, in 2000, are more accurate than the recent version in identifying symptoms of perinatal PTSD, because stressor criteria in this iteration were more applicable to maternal issues and postpartum events. Related event criteria state that, "...stressful situations that a person experienced, witnessed, or were confronted with; an event that involved actual or threatened death or serious injury; or a threat to the physical integrity of self or others; subjective response to events regarding feelings of intense fear, helplessness or horror"³⁹².

8.2.8 Clinical implications of postpartum PTSD

Treatment for postpartum PTSD, is currently hindered by limited evidence-based interventions³⁹⁴. Immediate debriefing after traumatic birth has been shown to be unhelpful and not recommended³⁹⁵. Most women report discussions are preferable at later dates with skilled practitioners who understand their issues³⁹⁶. Despite the positive aspects of this strategy, mothers state clinicians typically avoid such interactions³⁹⁷. There is also evidence that a significant cause of emotional distress after birth, is suboptimal maternity care that has been described as "dehumanising", "disrespectful" and/or "uncaring"³⁹⁸. Investigators recommend

that staff in clinical environments may require training to improve their relationship skills with labouring women³⁹⁸. Current cognitive therapy treatment options that have demonstrated successful outcomes, include trauma-focused cognitive behavioural therapy (CBT)³⁹⁹ and eye movement desensitization and reprocessing (EMDR)⁴⁰⁰.

Reviews note that further research is required to address issues of prevention, assessment and intervention for this population of women^{27 386}. An integral problem is that findings have not generally been translated into clinical practice and PTSD affected women are largely unrecognized in maternity facilities, unlike PND that is routinely screened³⁹⁴. PND instruments such as, the EPDS have been observed to be overused. Women have also reported that emotional trauma has been misdiagnosed as PND⁴⁰¹. Another major challenge has been the lack of validated questionnaires to measure postpartum PTSD. Typically, clinicians use non-obstetric PTSD instruments that are more appropriate for military veterans than postnatal women³⁸⁶. Comparison between general measures of PTSD and specific postpartum PTSD questionnaires demonstrate that agreement between scales on identification of diagnostic cases of PTSD was low⁴⁰². In the past, two questionnaires were created for use in pregnancy and high risk mothers – the Traumatic Event Scale⁴⁰³ that utilizes DSM-IV criteria³⁸⁰ and has adept face validity, but has not been tested psychometrically or validated against clinical interviews; the other is the Perinatal PTSD Questionnaire for use with high-risk mothers⁴⁰⁴. In 2018, a postpartum PTSD instrument was validated by psychologists at City, University of London³⁸⁶. This is noted to be the first specific measure of postpartum PTSD using the more recent DSM-5³³ criteria with good reliability and some indication of validity.

8.2.9 Agreements and disagreements

Research on postpartum PTSD, like its counterpart non-obstetric PTSD³⁶⁰, has faced substantial challenges, particularly regarding identification and diagnosis³⁸⁶. Currently experts have expressed concern that clinical recognition of childbirth related PTSD, may be hindered by changes implemented to DSM-5²⁸ criteria for PTSD that include: a newly created category called 'trauma and stressor-related disorder' that replaced anxiety; the shifting of symptom cluster

structure from three to four clusters; inclusion of new symptoms regarding: 'persistent negative beliefs and expectations about oneself or the world', 'persistent distorted blame of self or others'; 'persistent negative trauma-related emotions'; 'risky' or 'reckless behaviours', and a dissociative specifier⁴⁰⁵ [see Tables 1 and 2].

Prior to the acceptance of this diagnosis in 1980 by DSM III³⁵⁶ emotionally traumatized men and women were less likely to seek professional help and attempted to manage symptoms of flashbacks, nightmares, numbness, avoidance and panic with maladaptive coping behaviours. Likewise, women with major birth damage in this thesis⁴⁰, state psychological symptoms are overlooked and misunderstood; hence mothers have the potential of dealing with trauma in similar ways to non-obstetric PTSD sufferers. However, trauma not only affects the individual, but disrupts baby bonding and causes marital disharmony²⁷. As observed by women interviewed in this research⁴⁰, obstetric and mental health clinicians are reported to disregard women's "...hidden vaginal issues" and psychological trauma as normal birth outcomes, this population appears to be largely unrecognized.

Table 1: DSM-IV-TR, American Psychiatric Association (APA), 2000, criteria for posttraumatic stress disorder [PTSD]. Category: anxiety disorder- 3 symptom clusters

EVENTS:	
Criterion A1:	A1: Exposure to actual or threatened death, serious injury or a threat to physical integrity of oneself or others (including death of family member)
Criterion A2:	A2: Responds to the event involved with fear, helplessness or horror
Criterion B:	The event is INTRUSIVE in one of 5 symptoms that include:
Persistent INTRUSION (re-experiencing)	<ul style="list-style-type: none"> (1) Persistent & intrusive recollections of the event (2) Distressing dreams (3) Flashbacks/reliving of the experience (4) Intense psychological distress at exposure to internal or external stimuli of event (5) Physiological reactivity to internal or external stimuli of event
Criterion C:	At least 3 of 7 symptoms of AVOIDANCE and NUMBING that include:
Persistent Avoidance + Numbing	<ul style="list-style-type: none"> (1) Efforts to avoid trauma-associated thoughts, feelings and conversations (2) Efforts to avoid trauma-associated activities, situations, persons (3) Inability to recall an important aspect of the trauma (4) Markedly diminished interest or participation in pre-trauma activities

(impaired responsiveness)	(5) Feeling of detachment or estrangement from others (6) Restricted range of affect re loving feelings (7) Pessimistic future expectations
Criterion D: Persistent Hyperarousal (increased arousal or startle affect)	At least 2 of 5 symptoms of HYPERAROUSAL that include: (1) Difficulty falling or staying asleep (2) Irritability/outbursts of anger (3) Difficulty concentrating (4) Hypervigilance (5) Exaggerated startle responses
Criterion E	Duration of symptoms [B, C, D] is at least one month
Criterion F	The disturbance causes clinically significant distress or impairment in social, occupational or other areas of functioning.

Adapted from: Schwab W, Marth C, Bergant WB. Post-traumatic Stress Disorder Post-Partum: The Impact of Birth on the Prevalence of Post-traumatic Stress Disorder (PTSD) in Multiparous Women Geburtshilfe Frauenheilkd. 2012; 72 (1): 56-63 DOI:10.1055/s-0031-1280408
Appendix E: DSM-IV-TR Criteria for Posttraumatic Stress Disorder.[accessed 12 Feb 2019] Available from URL: <https://www.ncbi.nlm.nih.gov/books/NBK83241/>

This development has resulted in criticism from perinatal psychologists, who argue that the previous classification in DSM-IV-TR³⁹³ was more appropriate for postpartum populations³⁹² As noted similar discourse occurred regarding lack of identification regarding non-obstetric PTSD³⁶⁰.

Table 2: DSM-5, American Psychiatric Association (APA), 2013; criteria for Posttraumatic Stress Disorder (PTSD) Category: Traumatic and Stressor-Related Disorder-4 symptom clusters

EVENTS: Criterion A	Direct exposure to actual or threatened death; serious injury; sexual violence; witnessing event in person or indirectly by learning friend or family was exposed; repeated or extreme indirect exposure e.g. health professionals, police
Criterion B INTRUSION re-experiencing trauma	The event is INTRUSIVE in 1 of 5 symptoms that include: (1) Recurrent involuntary & intrusive memories of event (2) Repeated traumatic nightmares about event (3) Flashbacks of event (dissociative reactions) from brief episodes, a continuum to loss of consciousness (4) Intense and prolonged distress after exposure to traumatic reminders (5) Marked physiological reactions after exposure to trauma related stimuli
Criterion C Persistent effortful	At least 1 of 2 symptoms of AVOIDANCE that include: (1) Avoidance of trauma related thoughts or feelings

AVOIDANCE of trauma-related stimuli after event	(2) Purposeful avoidance of trauma related external stimuli (e.g. places, people, conversations, smells)
Criterion D NEGATIVE ALTERATIONS IN COGNITIONS & MOOD that began or worsened after the traumatic event	At least 2 of 7 symptoms of NEGATIVE ALTERATIONS IN COGNITIONS & MOOD that include: (1) Inability to remember key features of event (numbing) (2) Persistent and distorted negative beliefs and expectations about oneself or the world (e.g. I am bad/ the world is dangerous) (3) persistent distorted blame of self or others for causing event (4) persistent negative trauma related emotions (e.g. fear, horror, anger, guilt, shame) (5) markedly diminished interest in pre-trauma activities (6) feeling alienated from others (detachment or estrangement) (7) constricted affect: persistent inability to experience positive emotions
Criterion E HYPERAROUSAL reactivity that began or worsened after traumatic event	At least 2 of 6 symptoms of HYPERAROUSAL that include: (1) Irritable or aggressive behaviour (2) Self destructive or reckless behaviour (3) hypervigilance (4) exaggerated startle response (5) problems in concentration (6) sleep disturbance
Criterion F	Persistence of symptoms [in Criteria B, C, D, E] for more than a month
Criterion G	Significant symptom-related distress or functional impairment
Criterion H	Not due to medication, substance or illness

Adapted from: Friedman MJ. *Trauma and Stress related disorders in DSM-5*. National Centre for PTSD. School of Medicine at Dartmouth. United States Department of Veteran Affairs & Defence. [Accessed 12 Feb 2019] Available at URL:

https://www.istss.org/ISTSS_Main/media/Webinar_Recordings/RECFREE01/slides.pdf

DSM-5 changes to PTSD criteria:

- PTSD is included in the category of trauma and stressor disorders. It is no longer classified as an anxiety disorder
- Event criterion A2 from DSM-IV was removed from DSM-5 i.e. response of “fear, helplessness, or horror.” Event criteria, now states that the person has to directly experience or witness actual or threatened death or serious injury or sexual violation.
- 3 cluster of symptoms were previously in DSM-IV now there are 4 clusters in DSM-5

- 2 symptoms were added to Criteria D; 1 symptom was added to Criterion E (see below)
- Unexpected death of family member by natural causes was excluded
- Other symptoms were revised to clarify symptom expression
- All symptoms began or worsened after trauma event
- Separate diagnostic criteria for pre-school children younger than 6 years of age
- New dissociative subtype for PTSD added

New Symptoms in DSM-5

- **Criterion D:** [symptom 3] Persistent distorted blame of self or others for causing the traumatic event or for resulting consequences
- **Criterion D:** [symptom 4] Persistent negative trauma-related emotions (e.g. fear, horror, anger, guilt, or shame)
- **Criterion E:** [symptom 2] Self-destructive or reckless behaviour

8.3 Origins of natural birthing

8.3.1 Background

Enquiry into the origins of *natural childbirth* was precipitated by comments from interviewed women and men, who reported that antenatal birth classes obscured their understanding of potential delivery complications and possibility of somatic damage⁴⁰. It was postulated that maternity clinicians may have advocated these approaches with the view that vaginal birth was a normative event that empowered all women. In addition, it was unclear whether clinicians were cognizant of adverse lifechanging somatic sequelae from recent imaging studies^{22 23}. A current policy directive in New South Wales, Australia is observed to stipulate that obstetricians and midwives, must have sufficient knowledge and skills to implement strategies, that reduce the incidence of CS and increase the vaginal birth rate⁴⁰⁷. Risk factors regarding morbidities associated with complicated vaginal deliveries, are not evident in this document⁴⁰⁷. In the English-speaking world, it appears that currently, childbirth is largely viewed as a predictable and safe event, that is broadly anticipated and positive²⁷. Eighty years after the stemming of maternal mortality in the late 1930s through asepsis and related techniques, the previously ever present *road-to-death* connotation of childbirth⁴⁰⁶ has been relegated to history books and, although mothers experience much safer parturition than their predecessors, the intrinsic unpredictability of vaginal birth has been seemingly forgotten. In the 21st century, the clinical

advantages of evidence-based practice², tertiary educated obstetric and midwifery clinicians, together with lifesaving medications and technologies, have enabled well-organized clinical environments, that are more risk averse than at any time in history. Whilst the spectre of maternal mortality has been notionally minimised, the capriciousness of the nature of childbirth itself appears to have been obscured as a consequence.

Significantly, the history of *natural childbirth* is not as recent as current rhetoric about it might suggest. Historical reviews observe that it originated in the United Kingdom during the 1930s^{410 411} and was initiated by health reformers who espoused eugenicist teachings⁴¹⁴ for women to promote population growth after the devastating loss of life in the First World War. The same methods were advocated in the 1970s by feminists who argued mothers had been disempowered by the medicalization of birth⁴¹⁰. In the context of this research, women in the 21st Century are now saying that idealized natural childbirth methods “...sets [them] up for failure”⁴⁰.

8.3.2 The Read Method of the 1930s

Originally known as the Read Method, the concept of *natural childbirth*, was devised and propagated by a British general practitioner, Dr Dick-Read, whose short treatise of the same name, published in 1933, described childbirth as a “...non-pathological event” that could be managed holistically by exercise, breathing and psychological support⁴¹¹. Dick-Read believed that the “...fear-tension-pain cycle of birth must be broken and, modern women must learn to discipline their emotions and be carefully initiated into the job they are about to perform”⁴¹².

Reviews observe *natural childbirth* was a by-product of the health reform movement that emerged in Britain after the substantial consequent loss of life from the First World War and the Spanish Flu pandemic⁴¹⁰. Due to the subsequent decline in birth rates and the “...existence of an urban residuum of destitute and sickly individuals” new anxieties arose that blamed race degeneration, heritability of disease and social decay^{413 414 415}.

Health reformers and medical practitioners of that era adhered to the ‘new science of eugenics’⁴¹⁶, an ideology that combined theories of environmental improvement with selective

breeding. Proponents believed reproduction should be dissuaded amongst low quality 'human stock' and encouraged in 'good' stock'. Hence, childbearing women of 'superior' stock were urged back into the home to fulfil their function as wives and mothers. In this context, the 'naturalness' of pregnancy and birth functioned on a number of levels and, emphasised women's social role and biological capacity for reproduction, together with their vital economic role as the producers of babies⁴¹⁷. Another British obstetrician, Vaughan, whilst advocating pelvic floor exercises for perinatal women, reiterated this stance by publicly praising women who "...carried out their appointed work" of birthing naturally so as to prevent "...the lamp of Anglo Saxons from burning dimly⁴¹⁹." Mothers who requested pain relief during birth were stigmatized as disloyal to the empire⁴²⁰. As a consequence, health policy became the subject of intense public debate that fuelled the search for national efficiency⁴²¹ where reformers called for preventative public health programs that espoused health and fitness as a means to manage childbirth⁴¹⁰.

Natural childbirth was an appealing holistic approach for eugenicists, since it had the ability of integrating the physiological, psychological, social, and spiritual aspects of reproduction⁴²². Historians note, it was an umbrella term for a variety of different techniques, with a common bias towards physical and mental hygiene in the management of pregnancy and birth⁴²³. Against this background, wealthier women were increasingly attracted to modern obstetric practice, that had been transformed by the use of spinal anaesthesia, inhalation agents, and injectable opioids⁴²⁴. Notably, during the first half of the 20th century, the fear of death in childbirth was an overwhelming reality for many women. A common idiom used during this period, was the *Four Horsemen of Death*, that aptly described the main causes of maternal deaths: 'puerperal pyrexia,' prior to improved asepsis and introduction of sulphonamides; antenatal and postpartum haemorrhage prior to the use of ergometrine and oxytocin; convulsions from toxemia, prior to the development of magnesium sulphate and antihypertensives; and illegal abortion⁴⁰⁶. These developments brought about a change in maternal mortality incidence after 1937^{425 426}. Accordingly, one review notes that it is difficult to understand the appeal of *natural childbirth* to women of this era and proposes that the ethos is best viewed within a political perspective⁴¹⁰. It seemed that proponents claimed an holistic approach to maternity care that was more beneficial

than the supposed destructive, male-interventionalist qualities of obstetrics⁴¹⁰. Their agenda was to persuade women that *spiritual* and *instinctive feminine values* of love, cooperation and altruism would revive a declining birth rate⁴¹⁰.

Notwithstanding Dick-Read's overriding influence, his *natural childbirth* methods were stringently opposed by the then medical profession. Medical journals published scathing critiques confronting Read's limited research evidence and unsubstantiated theories that predicted normal and healthy deliveries, while disregarded the unpredictability of birth^{427 428}

Nonetheless, similar techniques of natural childbirth continued to be propagated at that time by theosophists, Christian Scientists and physiotherapists, within an orthodoxy of pmatalism⁴¹⁰.

8.3.3 Natural childbirth in the 1950s and 1960s

Historians agree that the creation of the National Health Scheme (NHS) in 1948 was a milestone in the history of British maternity care that benefited women and children^{429 430}. However, inquiry into the related costs, identified a 'state of confusion,' observing that more pregnancies than previously expected, were being classified as 'high-risk' due to advanced obstetric knowledge and methods leading many doctors to debate the safety of homebirths and advocate for hospital births⁴²⁹. At the same time, opposition to the medicalisation of childbirth continued to grow and relaxation and breathing programs began to emerge in antenatal classes with instruction from midwives and physiotherapists⁴¹⁰. Briance, whose baby had died following conventional obstetric care, launched the Natural Childbirth Association of Great Britain in 1956 and promoted Dick-Read's teaching⁴¹⁰. In 1961 it was renamed the National Childbirth Trust (NCT)⁴³⁰ and direct links to Dick-Read became obscured, despite proponents strongly advocating the Read Method by attempting to persuade medical boards to increase home births and expedite better conditions in hospitals that allowed fathers to attend deliveries⁴²⁹. Under the guidance of Dick-Read and Mrs Briance, campaigns postulated that natural childbirth encouraged religious morality, improved the race, reinforced family life, and re-established the Empire⁴²⁹. Briance purported that this method produced 'a better type' of babies, that were urgently needed in Britain for a race of good quality men and women⁴¹⁰.

Another organisation that campaigned for analogous approaches in maternity care, was the Association for Improvement in Maternity (AIMS)⁴³¹, launched in 1960 by Willington, another mother, as a response to her negative experiences in an NHS hospital following the birth of her second child. Supporters attempted to address mothers' complaints about inadequate conditions in hospitals where staff lacked sympathy, gave inadequate instruction, were rude and had a complete disregard of mental care or the personality of the mother⁴¹⁰.

8.3.4 Soviet politics and psychoprophylaxis

The early Cold War provided a major contribution to the development of a natural birth ethos. In 1951, Lamaze, a French obstetrician, popularized the psychoprophylactic method of natural childbirth, that he had learnt from a Soviet psychotherapist and hypnotist, Velvoskii⁴³². After the Second World War, the Soviet government faced substantial obstacles in financially rebuilding the USSR. One commentary notes the limited economic climate left hospital staffing and pharmaceutical pain relief depleted, so that psychoprophylactic methods were used as an alternative⁴³³; and were justified in the politically fashionable language of Pavlov and his work on conditioned response⁴³⁴. That included decades of work in hypnosis to offer women so-called 'pain free' childbirth⁴³⁴. Unable to produce nitrous oxide and other remedies widely used in the West, Soviet officials, emphasized that the method did not require any financial expenditure and made it appropriate on a mass scale⁴³³. Hence women were expected to attend antenatal instruction in psychoprophylaxis prior to delivery. The approach spread to France, where husbands were enlisted as coaches and although men were initially sceptical, scientific and rational explanations persuaded them⁴³⁵. One assessment notes that against this background, women were left with no leverage to make demands for change and these historical circumstances appear to raise questions about current practice of childbirth education and labour support⁴³³.

In the United States, the Lamaze method was launched by Karmel, a mother, who published a book entitled, *Thank You, Dr Lamaze*. As a result, numerous women welcomed this promoted active participation in birth that gave presumed benefits of drug-free deliveries. Even so,

Americans did not initially discard medication until the counterculture of the 1960s, and by the 1980's it was abandoned for epidural anaesthesia⁴³²⁻⁴³³.

During this time, Lamaze integrated some of the Read Method into his growing psychoprophylactic movement that resulted in overt rivalry between the two advocates. Lamaze discredited Dick-Read's work as vague, mystical and unscientific, despite their common beliefs regarding unequal gender relations, pronatalism and Freudian theory, that espoused childbirth pain was psychogenic and would resolve underlying female psychological disorders and hysteria⁴³⁹⁻⁴⁴⁰. Curiously, both approaches are variants on a 'natural' view of birth and are opinions still being circulated in the 21st-Century literature on childbirth^{441 442}.

8.3.5 Water births and quiet deliveries

During the 1970s, new obstetric technologies were introduced to control labour and predict decreasing foetal welfare, but natural birth advocates, vehemently objected at their 'overuse'⁴¹⁰. A review of British maternity care after 1948⁴²⁹, observed advances comprised: antenatal ultrasound monitoring as a diagnostic measure for high risk pregnancies; epidurals; artificial rupture of membranes and oxytocic drugs that accelerated labour. Campaigners argued that the recent technology had resulted in more painful labours with increased use of anaesthesia, instrumental deliveries and caesarean sections. Polarized viewpoints fuelled a lengthy public debate about obstetric practices and resulted in the parliamentary report, *Reducing the Risk* that was published in 1977. Most of these issues appear to remain unresolved today⁴²⁹.

In 1974, Dr Leboyer, a French obstetrician published his book *Birth Without Violence*⁴⁴³. He argued that the modern delivery room, bowed to the needs of doctors and women, and disregarded the baby, who was likely to feel pain, anxiety and suffering. He proposed that the "...manner in which babies arrive in the world, shapes the type of adult they will become⁴⁴³." Leboyer advocated avoidance of unnecessary drugs and medical procedures, but focused primarily on minimizing the baby's suffering. The delivery room was to remain quiet and dimly lit, to spare the baby from sensory overload.

Another French obstetrician, Ordent, also emerged during the 1970s and 1980s and, proposed additional birthing innovations^{444 445}. These included: the initiation of breastfeeding during the hour following birth as integral to mother and baby bonding; the use of birthing pools during labour that would decrease pain and the need for intervention; the use of the *gate control theory* of pain developed by Melzack⁴⁴⁶. Many of these methods^{444 445 446} are still used in delivery suites, Western hospitals today.

8.3.6 Second-wave feminism, 1960s-1980s

One review observes that under the influence of second-wave feminism, women were less prepared to accept conventional maternity care and proponents embraced *natural childbirth* as a path to empowerment against a backdrop of perceived patriarchal obstetric authority. Nonetheless, overworked midwives were often faced with substantial staff shortages and large caseloads and left women feeling a sense of abandonment³⁵³. Another commentary notes that although *natural childbirth* was viewed as a more humane experience, midwives of the 1970s believed that fear continued to define hospital births and "...women remained spread-eagled on an operating room table, drugged, confused, frightened and at the mercy of a manipulating man⁴⁴⁷." Hence, Second-wave feminism agitated for homebirths, unlike their predecessors in the early 20th Century, who argued for 'twilight sleep' medication to liberate women from the pain of childbirth⁴³⁷.

Prominent exponents of natural birthing in this period included Gaskin, an American lay midwife⁴⁴⁸ and Kitzinger, a British anthropologist⁴⁴⁹. Both adhered to a Second-wave feminist ideology and proposed women could make their own culture of birth without fear. Gaskin's book, *Spiritual Midwifery*, viewed by advocates today as a classic text for midwives, was written partly about her experiences at The Farm Midwifery Center, she established with her husband in Tennessee in 1971⁴⁴⁸. This was one of the first out-of-hospital birthing facilities the USA, operating with self-taught accoucheurs⁴⁴⁸. She is renowned for the *Gaskin Maneuver*, a technique to reduce shoulder dystocia from obstructed labour, that has been shown to have the potential of causing foetal death in non-medicalized environments⁴⁵⁰.

Kitzinger campaigned for women's choice, decreased medicalization and homebirth and is acknowledged as the '*high priestess of natural birth*'. Historians observe she was inspired by the writings of Dick-Read, and proposed birth should be experienced as a personal, woman-centred social affair, with elements of sensuality and sexuality. Many of her principles are implemented today in midwifery practice⁴⁵¹. Women who were interviewed about their experience after birth trauma in this thesis, did not reflect on their labours and births as either a sensual or sexual experience. Most were trying to understand the reason they may never have normal sexual relations again⁴⁰.

One review notes that *natural childbirth* campaigners of the 1970s, advocated similar birthing approaches to their predecessors in the 1930s; however, proponents were no longer associated with pronatalism and eugenics, but with feminism and consumerism⁴¹⁰. Feminists viewed obstetric technologies as an attempt to control women's bodies⁴⁵². Consumers objected to the reductionism of modern obstetrics and its lack of holistic concern for the women. Both groups sought a different style of maternity care that facilitated the social, psychological, and spiritual dimensions of childbirth^{410 452}. Dick-Read and other health reformers' beliefs of the 1930s, would be viewed today as antifeminist, and the women's movement may be surprised to learn that they had aligned themselves with an ethos that had largely arisen from a conservative reaction to female emancipation⁴¹⁰. Nonetheless, Dick-Read's unproven theories gained access to a receptive audience of maternity care givers and pregnant women, initially during the turmoil of the Great Depression, especially in America, but are still available today. It has been suggested this may be attributed to middle and upper class mothers and fathers, in their search for security in an unstable world¹⁵⁹. On a different level, one medical historian views natural childbirth as: "...a cultural and political critique" regarding "various crises in modern Western society that included, industrialism, capitalism and materialism, to urbanisation and mass culture⁴¹⁰."

8.3.7 The 21st Century

Currently, maternity care in developed countries largely subscribes to vaginal birth without interventions, that seem to be reminiscent of the Read Method and eugenicist teachings from

the 1930s. This partisan approach is characterized by a bias towards physical and mental health and reported by women⁴⁰ and men in this thesis, to advocate that birth is predictable and without risk and appears to overlook a population of mothers who experience complicated deliveries and resultant vaginal birth damage. Whilst current obstetric staff possess considerable expertise in assessing high risk deliveries, many mothers state they rarely see an obstetrician, until during labour when problems arise.

In an environment that propagates vaginal birth is the best option, many new mothers decide to attend privatized classes on calm and meditative techniques to learn more about *natural childbirth* methods. On reflection, most observe their antenatal knowledge of delivery was very limited, despite an abundance of so-called education. They report that during pregnancy the amount of literature available on the merits of vaginal birth was all-consuming and well-meaning friends, inundated them with *earth mother* scenarios, in lavender filled birthing suites attended by committed doulas. Once the day of delivery arrived, they were suitably persuaded their bodies were ready to possess the ability and mindset to perform this momentous feat that would result in euphoric bliss with the birth of a beautiful baby. But their stories did not end well. They remembered "...having to endure the *walk of shame* from the natural birthing suite to labour ward" and experiencing "...horrific births with physical and psychological consequences³¹." They recalled friendships with other expectant mothers from *calm birth* classes and wanted to share birth stories, but felt considerable failure so did not pursue contact. Many described their initial memory of birth was so obscured by emotional trauma that it resulted in a type of detachment from their baby and partner, and resembled PTSD. Men described their experience of birth was like "...helplessly watching a catastrophe unfold" with fears of maternal or neonatal death. Years after traumatic births, this cohort said they felt dismissed by the medical community and invisible to the general population. Most were too embarrassed to seek accurate medical advice and became disempowered by a system that misrepresented birth.

Women reported postpartum physical and mental morbidities were never mentioned prior to vaginal birth and they did not understand the significance of the pelvic floor, until they had sustained major trauma⁴⁰. Most were unaware that forceps or lengthy labours that did not

progress due to mal-positioned large babies could result in serious lifelong injuries. Nor were they privy to information about legally mandated scopes of obstetric practice regarding specific roles of midwives and obstetricians during complicated deliveries. Women and their partners stated they were totally dependent on accurate antenatal education to deliver their baby safely regardless of the source and, this did not occur.

Despite substantial technological advances and risk averse maternity environments of the 21st Century, in developed countries, these maternal experiences reflect conditions from another century, as described at the beginning of this chapter.

"...Women wrote of their shock at becoming mothers... of their unpreparedness and wish that they had been better informed... a product of simple ignorance... an astonishing lack of knowledge...about their own anatomy...most suffered in silence with debilitating physical ailments, assuming them to be normal, simply because no one had ever told them otherwise^{279, 280}."

In the present environment, mothers report *natural childbirth* methods are not realistic and adversely affect decision-making regarding birth options. They regret believing rhetoric that asserts vaginal birth without pain relief is less harmful.

Ignoring the unpredictability of birth on the basis of unsubstantiated theories, is not a safeguard in the prevention of worsening intrapartum complications. Mothers require balanced obstetric care that encompasses bipartisan evidence based guidelines and recommendations.

CHAPTER 9: FINDINGS & INTERPRETATIONS

9.1 Overview

This chapter summarizes the findings and interpretations from six original enquires in this thesis, that explored links between somatic and psychological sequelae related to traumatic vaginal birth. Chapter 2 discussed the results of a scoping review that scrutinized published literature for current knowledge on birth trauma, associated with major pelvic floor dysfunction. Findings predefined the broad objectives of enquiry that, sought the perspective of recent imaging research, together with insight into maternal psychological sequelae. Review assisted in the development of the research problem and related questions, that were involved in the design of additional studies. After establishing these parameters, a focal enquiry was initiated in Chapter 4 to explore the lived-experiences of women effected by birth trauma. Insightful findings highlighted the 'voice' of mothers in an interview study that used quantitative data from maternal pelvic floor imaging research³⁴ in an explanatory sequential mixed methods approach. Amongst identified themes, it was revealed that effected women experienced barriers to mental health care after disclosing diverse emotional trauma symptoms related to birth damage. Hence, the study in Chapter 5 investigated the efficacy of the routinely administered EPDS instrument, in identifying postpartum PTSD symptoms for somatically injured women. Findings demonstrated that the EPDS³⁵ was not useful for this cohort. Enquiry used quantitative and mixed methods with data collected from maternal interviews, pelvic floor function studies³⁴ and scores from EPDS questionnaires. The findings from the study in Chapter 6 showed that men did not understand the relationship between vaginal birth injuries and sexual dysfunction. Enquiry was precipitated by women's distress in the focal study regarding postpartum marital disharmony. A mixed methods approach employed data from maternal pelvic floor function studies to interview men, who were partners of effected women. Findings in Chapter 7 revealed that modern imaging research had clearly identified the etiology, pathophysiology and consequences of the diverse forms of vaginal birth damage, regarding LAM injury and OASI. Review of current knowledge on birth related pelvic floor and perineal structures, had emanated from women's comments that

health providers dismissed symptoms of major birth damage and they faced barriers to care. Chapter 8 appraised historical sources on the origins of somatic vaginal birth injury, postpartum PTSD and the natural childbirth ethos⁴¹⁰. Findings revealed that somatic sequelae of vaginal birth damage were poorly understood in the past and, although modern imaging technology has enhanced research knowledge, findings have not been translated into clinical practice. Review showed that despite substantial research on postpartum PTSD since the early 21st Century, this disorder is still poorly identified in maternity settings. Historical sources also demonstrated that natural birthing methods are unproven theories underpinned by the science of eugenics and pronatalism largely advocated by male health reformers after the substantial loss of life during World War 1. This enquiry was developed after effected women and men reported maternity processes over-emphasised natural childbirth methods, lacked accurate information on risk factors of vaginal birth, exhibited overt rivalry between doctors and midwives and dismissed major birth injuries as normal sequelae of vaginal birth. Findings and interpretations undertaken in Chapters 2 & 4-8 are outlined below. At the commencement of each study a research question is postulated regarding the method of enquiry .

9.2 Enquiry 1 [see Chapter 2: Paper 1]

Prior to this scoping review, the following *research* question was postulated: “...*What is the current literature on postpartum psychological consequences of somatic vaginal birth trauma related to the recently rediscovered LAM injury?*” [Scoping review]

9.2.1 Findings

Critical appraisal of urogynaecology, obstetric, midwifery and perinatal mental health journals, revealed there was a dearth of literature linking psychological and somatic sequelae of diagnosed vaginal birth damage. Postnatal care was observed to be a neglected area of research into maternal perceptions of traumatic birth events and sequelae⁸⁴. Some qualitative studies examined women’s lived experiences of enduring perineal and/or pelvic floor birth damage, but differences between the somatic outcomes of these two distinct injuries were rarely explained and participants did not appear to have been accurately assessed^{30 31}. Reviews reported that

despite the widespread occurrence of birth related somatic morbidities, postpartum health issues were largely overlooked by clinicians and women themselves^{82 84 85}. Maternal perspectives regarding their overall experiences of antenatal, intrapartum and postpartum care, prior to discharge from maternity facilities were largely absent. Studies on the postpartum period revealed some common themes that included: clinicians typically avoided discussion about sexual problems after birth^{65 66}; maternal embarrassment precluded disclosure of sexual health issues after birth^{81 83}; inadequate assessment from postnatal health providers regarding somatic causes of sexual morbidity that adversely impacted maternal social, physical and emotional well-being⁸³; dismissal of vaginal damage by clinicians with limited treatment options that resulted in mothers feeling abandoned and isolated^{30 31}; women managed enduring birth damage by themselves, believing family and friends, who gave them "...false hope" that injuries would heal³¹. A few studies discussed psychosocial issues related to perineal injuries or OASI and, described women's sense of social marginalization, shame and need for support from husbands and friends, due to debilitating consequences of faecal incontinence^{29 86}. Maternal perceptions of dyspareunia and/or decreased sexual function in quantitative research, were usually linked to the effects of episiotomies or OASI^{83 95 234}. Definitions of diverse symptoms of perineal and pelvic floor damage were absent or used synonymously. Some commentaries from urogynaecologists and physiotherapists explained that FPOP and/or pelvic floor dysfunction, resulted in reduced sexual function²²¹, vaginal laxity²²⁵ and decreased pelvic floor muscle strength and marital disharmony^{6 99 219}. Nonetheless, enquiry into the lifestyle effects of FPOP were rare and studies mostly attributed sexual problems to motherhood adjustment issues, breastfeeding, tiredness, loss of libido and self-consciousness about body image^{30 31 81 220}. No research was evident regarding male partners' understanding of sexual dysfunction after childbirth.

Quantitative studies demonstrated substantial evidence that damage to the recently rediscovered LAM resulted in a reduced quality of life for women^{6 15 93} with prevalence rates of 13-36%, according to varying obstetric practices in maternity facilities. Pertinent risk factors were noted to be primiparous women, forceps instrumentation, lengthy second stages of labours and macrosomic babies^{6 167}. Research on birth related OASI, revealed that this form of

somatic birth trauma is much more common than generally assumed⁹⁶. Estimations of the overall cost of pelvic organ prolapse surgery and long term effects of faecal incontinence to government health departments^{97 98} were noted to be substantial. Reviews from imaging experts reported that, until the advent of imaging in the 21st Century^{22 23}, physicians did not associate traumatic vaginal birth with FPOP, despite a few observational studies^{24 25 26} on damage to the LAM in the early 20th Century.

In contrast, current perinatal psychology journals revealed that traumatic birth events qualify as stressor criteria³⁹⁴ for a diagnosis of postpartum PTSD in the older version of DSM-IV-TR³⁹³. Findings proposed that more postpartum women may suffer from this disorder than previously realized, with risk factors that include pregnancy morbidities, complicated deliveries, lack of support from maternity clinicians and partners, neonatal illness or death^{388 389 390 391 392}. Other studies observed that birth related PTSD is poorly identified in maternity settings³⁸⁶ and at present, minimal diagnostic instruments are available, resulting in the use of non-obstetric PTSD measures and limited consultations.

9.2.2 Interpretation of findings

Interpretation of findings from this review demonstrated that links between maternal psychological impairment and somatic vaginal birth injuries were scarce in the literature and postnatal care was poorly researched. Qualitative studies provided insufficient evidence that vaginal damage was accurately diagnosed by clinicians^{30 31}. Distinctions between adverse effects of perineal and pelvic floor morbidities were often unclear or used synonymously³⁰. Some research reported postnatal women faced considerable barriers attaining correct medical evaluation, due to suboptimal expertise of health providers and, were rarely informed of pelvic floor and/or perineal risk factors, prior to delivery³¹. Noticeable omissions in most enquiries included: adverse mental health effects of vaginal birth damage; lifestyle and psychological ramifications of pelvic organ prolapse into the vagina; examination of women's perspectives regarding their care during the antenatal and intrapartum periods. Exclusion of data on the overall birth experience in studies was observed to

preclude women the opportunity to critically reflect on issues that may have contributed to adverse physical and psychological postnatal sequelae, which was an integral aim of this thesis.

Perinatal psychology journals revealed comprehensive information regarding risk factors, prevalence, adverse lifestyle and relationship effects of postpartum PTSD^{27 381 384 390}. Studies demonstrated this disorder, is now shown to be associated with the *terrifying* unpredictability of birth events³⁹⁴ and most symptoms are analogous to those of non-obstetric PTSD, as noted in the criteria for trauma stressors in the recent DSM-5²⁸. A separate classification for this postpartum disorder was not apparent in the DSM. Common symptoms of this serious postnatal maternal mental health problem^{392 394} are observed to include: avoidance, detachment, negative cognitions, re-experiencing trauma and/or nightmares^{67 68}. Current findings reveal risk factors of postpartum PTSD are associated with complicated deliveries that involve multiple interventions during labour, foetal distress or neonatal demise and lack of support from partners and/or maternity staff³⁸¹. Notwithstanding the significance of these risk factors, mental health consequences of lifelong pelvic floor or perineal injuries were largely absent in these studies. Despite research from the United Kingdom that shows 4% of postnatal women suffer from this disorder³⁸⁶, another study reported that symptoms of postnatal emotional trauma, diverse from the routinely screened postnatal depression (PND), were poorly recognized by current diagnostic instruments and inadequate follow-up consultations⁴⁰¹. A review proposed that perinatal clinicians need to widen their knowledge of postnatal mental health problems and define the parameters of birth trauma. This was particularly significant in the face of the prevailing orthodoxy that purports vaginal birth is a predictable and safe event and has positive outcomes²⁷.

A discernible omission in the literature was enquiry into the psychological effects of postpartum sexual dysfunction. One study reported that self-report measures on sexual health were limited and clinicians were poorly trained in taking personal histories on these issues²¹³. It was generally observed that maternal distress arising from pelvic floor and sexual dysfunction after childbirth was rarely acknowledged. Male partners' perspectives of maternal sexual dysfunction related to birth injury were also absent. This oversight was likely to be attributed to the personal nature of marital issues. Most journals used the term 'dyspareunia' or pain on intercourse²²³ and appeared to

overlook birth related somatic consequences. Sexual problems were commonly linked to perineal damage, motherhood adjustment issues, time restraints and sleep deprivation^{30 31 223} or associated with postpartum PTSD symptoms regarding nightmares and avoidance³⁸¹.

Findings from this review assisted in defining the broad objectives and design methods for the proposed enquiry in this thesis. They enabled the use of current imaging knowledge on postpartum pelvic floor dysfunction, alongside research on postpartum PTSD, to explore the birth experiences of effected women. Information from health department guidelines³³ that omitted risk factors of vaginal birth, demonstrated the possibility of adverse implications regarding current maternity practice and facilitated additional enquiries. A conspicuous finding was that empirical evidence from quantitative imaging research revealed a substantial population of primiparous women sustain permanent damage to the recently rediscovered pelvic floor structure, known as the levator ani muscle (LAM)^{22 23}. Damage was shown to be poorly assessed and women suffered debilitating symptoms of pelvic floor dysfunction that remained largely undetected⁶. Although these studies established the enormity of the problem for birthing women, findings were insufficient to understand associations with effected women's postnatal psychological health. Hence, results were instrumental in establishing a mixed methods approach that sought to highlight the 'voice' of injured mothers and explore the research problem that proposed somatic vaginal birth sequelae of female pelvic organ prolapse (FPOP), fecal incontinence and sexual dysfunction were linked to psychological trauma.

9.3 Enquiry 2 [see Chapter 4: paper 2]

Prior to this enquiry the following research question was postulated:

"...How do postpartum consequences of pelvic floor dysfunction from accurately diagnosed LAM injury, affect women's psychological health?" [Mixed methods question]

9.3.1 Background and methods

This interview enquiry is the primary focus of this thesis. It was undertaken with women who had been diagnosed with major somatic pelvic floor damage after vaginal delivery. Findings precipitated additional studies transcribed in Chapters 5, 6, 7 and 8. From the onset, it was evident from

quantitative research⁶ that a substantial proportion of vaginal births resulted in major damage to a recently rediscovered pelvic floor structure, known as the LAM. Debilitating consequences of FPOP, fecal incontinence and sexual dysfunction were shown to be related to obstetric variables that included: forceps, large babies and lengthy second stages of labour^{167 168 187}. An explanatory sequential mixed methods approach [see Chapter 3: Methodology: 3.2.3] employed quantitative data from validated pelvic floor function research³⁴ to explore individual maternal birth experiences of a cohort of women (n=40) diagnosed with LAM injury. Qualitative interview methods, underpinned by the theory of phenomenology⁴¹, sought insight into the research question from the perspective of injured women, regarding associations between adverse somatic effects of vaginal birth damage and impaired psychological health. Mothers were invited to participate in semi-structured interviews that occurred 1 to 4 years after vaginal deliveries. Participants had experienced singleton full-term pregnancies and were deemed low risk prior to birth. Women were selected from a population of 504 primiparous mothers who had volunteered for the Epi-No trial³⁴ and were subsequently assessed at 3-6 months postpartum by a perinatal imaging study at two obstetric units in Sydney, Australia. LAM avulsion was diagnosed by 3D/4D translabial ultrasound. Data used in this analysis, was obtained between May 2013 and October 2014, from the Epi-No trial³⁴ database and corresponding birth records from 2 tertiary hospitals in Sydney Australia. Interview guidelines of open-ended questions investigated: quality of information provided antenatally; intrapartum events; postpartum symptoms and coping mechanisms. Thematic analysis⁵⁸ of maternal experiences utilized the Framework Method⁵⁹ and aspects of the interview method of consensual qualitative research (CQR)⁴⁴ that are supported by the theory of phenomenology, to evaluate prevalence of themes.

9.3.2 Findings

Thematic analysis identified ten statement categories [see Chapter 4: Paper 2 – Table 4]:

1. 29/40 women reported subjectively inadequate antenatal education resulting in 'poor preparedness' for birth (72.5%).
2. 36/40 women stated that antenatal clinicians did not provide information on potential

pelvic floor morbidities (90%).

3. 35/40 reported conflicting advice at all stages of birth from clinicians (87.5%).
4. 21/40 women stated their partners were traumatized by the birth (52.5%).
5. 27/40 women disclosed persistent sexual dysfunction and relationship issues (67.5%)
6. 36/40 women reported resultant injuries were not assessed after birth at all (90%).
7. 35/40 women reported multiple symptoms of pelvic floor dysfunction that included urinary and fecal incontinence, pelvic organ prolapse and sexual dysfunction that caused lifestyle dysfunction (87.5 %)
8. 36/40 women just “put up” with injuries (90%)
9. 27/40 women disclosed 3-4 symptoms of PTSD as per DSM-5 that were not identified by EPDS screening (67.5%).
10. 26/40 received dismissive responses regarding somatic birth injuries from clinicians at postnatal checkups (65%).

Statement categories were further divided into four overarching themes that included:

Theme 1: Lack of accurate information about potential birth complications resulting in pelvic floor morbidities (statement categories: 1-3, 6)

Theme 2: Impact on partner and sexual relationships (statement categories: 4, 5);

Theme 3: Somatic and psychological symptoms (statement categories: 6-9);

Theme 4: Dismissive reactions from postnatal clinicians (statement categories: 5-10).

9.3.3 Interpretation of findings

Somatic vaginal birth sequelae are linked to symptoms of postpartum PTSD

Significant findings after analysis, observed that more than two-thirds of mothers in this cohort⁴⁰, disclosed psychological symptoms related to postpartum PTSD, as per DSM-5²⁸, that were strongly associated with somatic sequelae of major pelvic floor damage. Reported emotional trauma symptoms included: persistent avoidance regarding reminders of birth, panic, detachment, nightmares, flashbacks of birth events during sex and re-experiencing of traumatic deliveries. Some mothers sought counselling, after realizing their symptoms had not correlated with PND items on the

EPDS instrument at 6-week postnatal visits and, were subsequently diagnosed by psychologists with PTSD. One mother was so traumatized that she had considered a termination with a second pregnancy, due to substantial lifestyle alterations that included PTSD.

In view of the fact, postpartum psychological symptoms were disclosed during interviews by women themselves and, were unforeseen research findings, the author subsequently examined DSM-5 criteria²⁸ on postpartum PTSD and related sources^{386 387 388 390} for accuracy. Women were not assessed with a PTSD screening instrument during this study. Even so, it was postulated that other participants in the cohort, may have experienced analogous problems. It was unclear whether the EPDS was useful in identifying postpartum PTSD symptoms. This finding precipitated the study that examined the efficacy of EPDS³⁵ for women with somatic vaginal birth injuries [see Chapter 5: Paper 3]. Another significant result was that postpartum women displayed emotional trauma up to 4 years after sustaining major vaginal birth damage. This observation has clinical implications regarding the likelihood of an unidentified population of women with long-term symptoms of postpartum PTSD. Notably, strong associations between postpartum PTSD symptoms and somatic vaginal birth injuries, are a unique contribution to the body of knowledge for the targeted audience of perinatal clinicians in this thesis. Findings have the potential of assisting clinical identification regarding adverse somatic and psychological outcomes of childbirth, that were reported by women to result in barriers to mental health care. Results are supported by other studies that observe postpartum PTSD is poorly identified due to insufficient screening instruments and poorly defined criteria^{386 394}. Nonetheless, most research on this disorder, demonstrates that a diagnosis of postpartum PTSD is linked to pregnancy morbidities, traumatic intrapartum birth events, death or illness of a neonate and/or unsupportive maternity staff and/or partners^{27 381 392}.

[Inadequate information at all stages](#)

This cohort of injured women⁴⁰, experienced reduced quality of life from symptoms of pelvic floor dysfunction directly related to vaginal childbirth, one to four years after vaginal childbirth, that were observed to be unresolved. Women had been left to manage FPOP, urinary and fecal incontinence, sexual dysfunction and PTSD by themselves and, reported that postnatal clinicians

had insufficient knowledge and/or expertise to assist in treatment options. Most stated antenatal birth classes had urged women to pursue *natural childbirth* methods, but were remiss in addressing risk factors of vaginal birth. Resultant damage was not only unexpected but, rarely assessed during the postpartum period and mothers felt "...emotionally shocked, with no way forward". These findings substantiate research that reports postnatal women face considerable challenges attaining 'correct' medical evaluation, due to limited expertise from maternity clinicians, who rarely inform mothers of pelvic floor and/or perineal risk factors prior to delivery³¹. Many mothers believed that pelvic floor exercises would assist in recovery of dysfunctional pelvic floor morbidities and, when this did not occur, they became emotionally distressed and felt abandoned. Most were confused by poorly explained pelvic floor exercise regimes and attended physiotherapy sessions with minimal outcomes. At present, studies are unclear regarding the benefits of pelvic floor muscle exercises for this population^{217 218}.

Women in this cohort⁴⁰ were all accurately assessed by imaging ultrasound between 3 and 6 months after deliveries as part of the Epi-No trial³⁴. Participants were given comprehensive information about the extent and cause of birth injuries, unlike other studies that largely relied on women's subjective understanding^{30 31}. Nonetheless, mothers reported that prior to their diagnosis of LAM avulsion, they experienced dismissive remarks from clinicians, partners and friends that vaginal damage was "...just part of having a baby"⁴⁰. Many disclosed that limited support and validation of somatic injuries had triggered emotional trauma symptoms and mothers perceived that "...the effects of these hidden injuries are not believed by all and sundry".

During the postpartum period, mothers were not referred to urogynaecology consultations or imaging assessments. Findings of inadequate antenatal and postnatal information are supported by other studies^{30 31 84 85} but links with consequences of somatic injury and postpartum PTSD are absent in this research. Women stated that discussion with the interviewer, who was an informed health professional, had enabled them to debrief about the effects of vaginal damage, that no one else seemed to understand. Although interviews were not taped at the request of all the participants, women were observed to be empowered by reading/editing emailed transcripts of interviews that also enabled validation of birth injuries.

Even so, it was apparent to the interviewer that despite expert imaging assessment, mothers were still emotionally traumatized by the prospect of managing long term birth injuries and sexual dysfunction, that lacked clinical validation. Most had difficulty processing the enormity of unexpected and unexplained birth trauma. One woman displayed significant trauma symptoms eighteen months after a traumatic delivery and, stated that discussion was too distressing and requested that her interview be undertaken on email. Another mother attended a lengthy urogynecology consultation with her husband, a year after her initial pelvic floor evaluation, and stated that..." finally I understood how this all happened... the doctor took time to listen to me". This facilitated an improvement regarding emotional trauma symptoms and assisted marital harmony, despite somatic consequences of FPOP. This original finding reveals that adept postpartum education regarding the cause and effect of somatic birth damage, may decrease PTSD trauma symptoms and marital disharmony. It is observed to complement research knowledge regarding this serious mental health disorder.

Sexual dysfunction

Interviewed women⁴⁰ described feelings of emotional distress and desperation from relationship consequences of sexual dysfunction and marital disharmony. They reported that risk factor of vaginal birth that included sexual dysfunction from the use of forceps, were never mentioned prior to birth. Forceps instrumentation was employed in the deliveries of 18 women in this cohort.

Other findings noted that many women had been told they would regain sexual function, analogous to their pre-pregnant state. When this did not eventuate, women and respective partners experienced substantial marital disharmony; most felt their partners did not believe injuries were severe and they no longer desired sexual relations. Several asked the interviewer to talk to their husband and explain the severity of injuries that made sex "...impossible" due to pelvic organ prolapse. This precipitated the enquiry in Chapter 6 that examined men's understanding of somatic injuries and links to sexual dysfunction.

Significant observations from interviews, included specific reports from individual women regarding dire consequences of birth injuries. One mother described her vaginal delivery as

“...so traumatic that it lacked accountability...I was left with a blown out pelvic floor that resulted in my partner leaving” . This woman pursued legal advice and wondered how these morbidities would affect future sexual relationships; she remained in counselling with a diagnosis of PTSD for 4 years. It seemed reasonable to expect that, due to the reported lack of informed consent about risk factors of vaginal birth prior to delivery, other women may wish to seek similar advice.

Abandoned by the health care system

Overall, most women said they felt abandoned by a health care system that did not provide sufficient antenatal information on risk factors of vaginal deliveries and subsequently failed to acknowledge the extent and effects of injuries after birth⁴⁰. Some thought they were “...just weak” and had not followed *natural childbirth* methods correctly and, blamed themselves. On reflection, mothers thought birth classes had presented conflicting and unrealistic advice and, regretted they had been persuaded to adhere to *natural childbirth*⁴¹⁰ methods. During high acuity labours, women noticed overt conflict between midwives and obstetricians, that caused them to feel “...unsafe”. On reflection, women reported that during these stressful labours, midwives wanted to pursue vaginal birth at all cost, whilst doctors presented options regarding epidurals and theatre admissions. Findings demonstrate that current knowledge regarding risk factors of LAM injury has not been disseminated to maternity clinicians. Conflicting viewpoints precipitated the historical review regarding the origins of somatic birth damage, postpartum PTSD and the *natural childbirth* ethos in Chapter 8. It was hypothesized that the antecedents and prevailing orthodoxies of maternity and mental health care over the previous century, may still influence maternity care in the 21st Century.

This study demonstrates that the sequelae of somatic birth injuries can involve long term somatic and mental health morbidities to a proportion of women. Links between somatic birth damage and psychological impairment are rarely identified by postnatal health providers and this vulnerable population of women suffer in silence.

9.4 Enquiry 3 [Chapter 5: Paper 3]

This original study postulated the following research question: *Is the Edinburgh Postnatal Depression Scale (EPDS) effective in identifying posttraumatic stress disorder (PTSD) symptoms associated with somatic vaginal birth injuries?* [Quantitative and mixed methods question]

9.4.1 Background and methods

Enquiry in this research, emanated from findings in maternal interviews⁴⁰ [see Chapter 4: Paper 2] regarding clinicians' suboptimal identification of postpartum PTSD related symptoms, as per DSM-5²⁸. Women reported that items on the routinely administered EPDS measure, did not match their emotional trauma and, they faced challenges regarding mental health care. Some sought counselling and were diagnosed with postpartum PTSD. It seemed likely that other women in this cohort may have experienced similar problems. The efficacy of EPDS was unclear regarding identification of postpartum PTSD for this population of injured women. Research methods utilized three phases of enquiry that included:

The first phase employed quantitative approach of descriptive analysis [see Chapter 5: Paper 3 – Materials & Methods] to investigate whether total continuous scores of the EPDS questionnaire, administered to the entire cohort (n= 800+) of the Epi-No trial³⁴, at the same time as imaging assessment were associated with LAM avulsion, OASI and obstetric variables of mode of delivery, length of second stage of labour and size of baby.

The second phase analysed data from the interviewed women⁴⁰ (n=40), who had all been diagnosed with LAM injury as a secondary census of damage. Participants were a subset of the entire cohort that were used as a secondary census of women, diagnosed with LAM damage. Explanatory sequential mixed methods analysis assessed whether individual scores of EPDS were associated with maternal symptoms of FPOP, urinary and fecal incontinence and sexual dysfunction disclosed in interviews [see Chapter 5 – Tables 1 & 2].

The third phase also employed explanatory sequential mixed methods of analysis, with the same subset of damaged women (n=40), to examine whether quantitative data regarding pelvic floor

symptoms of LAM injury were associated with disclosed symptoms of postpartum PTSD in interviews [see Chapter 5 – Tables 1 & 2]. This phase was also a secondary census of damage.

9.4.2 Findings

First phase analysis revealed that total scores of the EPDS were not associated with LAM avulsion, OASI and obstetric variables regarding mode of delivery, size of baby and length of 2nd stage of labour.

Second phase analysis, concerning the subset of participants (n=40), revealed individual EPDS scores, were below 13 and, probable depression was not detected. Participants (n=2) disclosed a previous history of depression and were not taking medication. Women (n= 5) reported they had been given diagnoses of postpartum PTSD by counsellors and did not identify with symptoms of PND. Mothers (n=2) had been in counselling for up to 4 years at the time of interview [see Chapter 5 – Tables 1-4]. Women (n=2) exhibited elevated scores of 6 out of a total of 9 for the EPDS-3A anxiety items 3, 4, 5 27.

Third phase analysis of the subset revealed that somatic symptoms of LAM injury were strongly associated with 3-4 emotional trauma symptoms, related to PTSD as per DSM-5²⁸, that included: avoidance of memories regarding the birth, detachment, nightmares of the delivery and panic.

Women (n=35) reported symptoms of FPOP, urinary and faecal incontinence, severe constipation and faecal impaction from FPOP and/or sexual dysfunction that were also documented on the database. During interviews mothers (n=36) disclosed 3 to 4 symptoms of PTSD at 1 to 4 years after birth. Participants (n=38) disclosed no previous mental health problems and had supportive partners. One mother had a same sex partner had also sustained LAM avulsion and was displaying PTSD symptoms that were causing disharmony in their relationship. Women (n=5) reported decreased infant bonding; participant (n=1) wanted to terminate her second pregnancy and disclosed four symptoms of PTSD. EPDS was reported to be only measure clinicians typically employed in assessing postpartum mental health. The EPDS measure was not shown to be efficacious in assessing postpartum PTSD symptoms in this cohort of women with somatic birth injuries and sequelae.

The strength of this study was demonstrated by the use of published data on somatic pelvic floor dysfunction and obstetric variables, obtained from women, who had been retrospectively evaluated by urogynaecologists using 3D/4D ultrasound; data allowed for an objective assessment of major birth damage and sequelae. Selection of the subset of women (n=40), from the interview study gave depth to the study and highlighted the use of qualitative data regarding disclosed pelvic floor dysfunction and PTSD-related symptoms.

9.4.3 Interpretation of findings

Interpretation of findings in this enquiry revealed that the EPDS³⁵, which is an instrument employed to detect postnatal depression (PND), was not effective in identifying postpartum PTSD symptoms in this cohort of women, who had sustained LAM avulsion after vaginal birth. Qualitative data from the previous study of interviewed women⁴⁰ gave depth to this investigation, in that it facilitated a clearer understanding of somatic consequences from major pelvic floor injuries, that had resulted in emotional trauma symptoms. During interviews, it was reported that health providers had not understood the etiology of somatic birth injuries; diverse psychological symptoms of PTSD were also poorly identified and birth related sequelae remained unidentified. Some mothers expressed concern that postnatal clinicians had provided a misdiagnosis of PND by using the EPDS that was perceived as "...useless". As discussed, these participants pursued consultations with psychologists and were diagnosed with PTSD, that required evidence-based treatment regarding CBT³⁹⁹ and EMDR⁴⁰⁰. Other women stated their emotional distress was related to postnatal sexual dysfunction and marital disharmony. Traumatic and complicated birth experiences, coupled with resultant long term damage, elicited traumatic emotional responses in more than two thirds of this cohort. Health care providers appeared to have relied solely on the EPDS that precluded clinical assessment for diverse postnatal emotional symptoms that included PTSD.

This finding is substantiated by recent research, that notes clinicians are remiss in identifying diverse emotional symptoms after birth events that are not associated with PND⁴⁰¹. Despite multiple studies that demonstrate postpartum PTSD is more common than previously realized,

this disorder is currently observed to be unrecognized in maternity settings^{384 387}. Traumatized mothers are reported to largely judge their postpartum mental health against descriptions of PND, and subsequently discover their emotional state is different. Once the EPDS reveals they are not depressed, women feel abandoned and confused in terms of the symptoms they are experiencing⁴⁰¹. The 'gold standard' for diagnosing PTSD, is a structured clinical interview with an assessment instrument that measures trauma criteria relevant to the population³⁸⁶.

Current research observes that the symptom profile of PTSD differs from that of PND^{64 381}. The latter is a major depressive disorder, that involves the interaction between psychological, social, and biologic issues. Symptoms include insomnia or hypersomnia, psychomotor agitation or retardation, fatigue, changes in appetite, feelings of worthlessness or guilt, decreased concentration and or suicidality³⁸². Conversely, PTSD requires a traumatic stressor event that results in symptoms of: avoidance, anxiety, negative cognitions, hypervigilance, detachment, nightmares, numbness and reexperiencing of traumatic events⁶⁴. For a diagnosis of postpartum PTSD, studies demonstrate that birth events are more applicable regarding DSM-IV-TR (2000)³⁹³ criteria due to major alterations of event criteria in DSM-5²⁸ that have received criticism from the perinatal community⁴⁰⁵. Current research reveals that risk factors of PTSD include: pregnancy morbidities, complicated births, sick or deceased infants. Symptom criteria of this disorder are: persistent avoidance of memories linked to birth, anxiety, panic, negative cognitions, hypervigilance, detachment, nightmares, numbness and reexperiencing of traumatic events^{392 394}. Nonetheless, identification of symptoms, has been shown to be inadequate, due to the use of non-obstetric PTSD measures and limited clinical consultations. Mothers in this cohort⁴⁰ reported that health providers, rarely linked somatic injuries with PTSD and, had limited information on pathophysiology of vaginal birth damage. Some attempted to explain consequences, but clinicians lacked knowledge on obstetric issues and assumed these were sequelae of normal birth and offered alternate reasons for maternal distress. Women suffered in silence because their injuries and adverse psychological consequences were not assessed and they experienced barriers to somatic and mental health assessment and treatment options.

EPDS³⁵ was not efficacious in identifying PTSD symptoms in this cohort of women with somatic

birth injury. UK research notes that routine administration of EPDS can result in suboptimal diagnoses. Although the EPDS instrument³⁵ has had substantial success in detecting postnatal depression symptoms over the past decades, the measure can be dangerously misleading if used incorrectly without clinical assessment, as noted by the author in a recent paper [see Chapter 5].

9.5 Enquiry 4 [see Chapter 6]

This original study postulated the following research question: “...*Do men understand somatic consequences of partners’ vaginal birth injuries are related to maternal sexual dysfunction?*”

[Mixed methods question]

9.5.1 Methods and background

Interviews were undertaken with seven male partners of injured mothers from the published study⁴⁰, [see Chapter 4: Paper 2] to explore their understanding of vaginal birth damage related to maternal sexual dysfunction. Enquiry was precipitated after numerous women requested the interviewer explain the severity of birth damage to partners. They reported men had stated women “...no longer desired sexual relations”. Mothers were “desperate to find a way forward in their relationships. An explanatory sequential mixed methods approach utilized data from maternal pelvic floor function research³⁴ and qualitative data from women’s interviews. An interview guide was developed with semi-structured, open-ended questions regarding men’s perspectives of the antenatal, intrapartum and postpartum periods using six domains. Men were difficult to contact despite women stating they were agreeable to interviews and enquiry occurred over four years between 2014 to 2018. Thematic analysis employed a framework method to generate themes applicable to the research question.

9.5.2 Findings

Nine themes were identified within the context of men’s interviews, obstetric details of women partners and characteristics of men [see Chapter 6 – Tables 2, 3 & 4] These included:

Identified statement categories and comments from 7 interviews with men were as follows:

1. Antenatal classes presented an unrealistic expectation of childbirth
2. Couples were not warned about risk factors of vaginal birth

3. Men were ill-prepared for complicated deliveries
4. Men were traumatized by the violent nature of birth
5. Men were angry with clinicians' dismissal of birth injuries
6. Men were distraught about the loss of sexual intimacy after birth.
7. Men lacked medical understanding of vaginal birth injuries
8. Information on vaginal birth damage was unavailable to men
9. Men observed partners were emotionally detached postpartum

After analysis, three following overarching themes were identified:

Overarching theme 1: Men were critical of antenatal education that failed to warn them of women's potential injuries that were later dismissed by clinicians. [see Themes: 1, 2, 5]

Overarching theme 2: Men were traumatized by the perceived violent nature of vaginal births, confused and helpless during deliveries and troubled by women's resultant emotional detachment. [see Themes: 3, 4, 9]

Overarching theme 3: Men believed women's explanations of birth injury but lacked medical knowledge to understand the loss of sexual intimacy as a consequence of birth injury. They attempted to find out information from other men but were unsuccessful and hoped they could "work it out." [see Themes: 6, 7, 8]

9.5.3 Interpretation of findings

Interpretation of findings in this enquiry revealed that men lacked understanding about the somatic implications of vaginal birth injuries. Although men believed partners' reports of vaginal damage, their knowledge of somatic birth effects was limited, due to the fact they were not medically trained. Men attempted to discuss birth consequences with other men to discover reasons their partners were so distressed but were unsuccessful. They stated birth classes presented unrealistic expectations of vaginal birth and "...set couples up for failure". Most perceived that partners' deliveries were traumatic and "...violent " and they were ill-prepared. Many observed women were shocked and emotionally detached for long periods that lasted, in some cases, up to four years. Men stated they were too preoccupied with baby settling, assisting partners and

work commitments to participate in sexual relations for at least 6 months to a year. After this time lapse, men attempted to initiate sexual intimacy with partners, but faced barriers. Contributing issues included: inadequate clinical information to couples regarding consequences of birth trauma prior to delivery; failure to visualize maternal internal injuries and understand related anatomy; women's inability to explain resultant sexual dysfunction to men, due to detachment and avoidance symptoms of PTSD; women's limited medical understanding of the complex nature of LAM damage, despite accurate assessment from experts; men's lack of attendance with women to consultations with urogynaecologists. Overall, sexual dysfunction was observed to be poorly communicated between both men and women. Men realized their knowledge base was deficient and sought further information without success. Causal factors related to clinical practice were: inadequate antenatal education that lacked accurate information on risk factors of pelvic floor and perineal damage; suboptimal postnatal assessment of birth injuries in the immediate postnatal period that resulted in undiagnosed pelvic floor and perineal damage, (prior to assessment for this study); unidentified postpartum PTSD symptoms in women.

Although, men believed their partners had suffered from somatic birth damage, they were unable to understand associations with sexual dysfunction, except to say, they just wanted their wives back and, were willing to help any way possible and, would continue to look for answers. Discussion of sexual relations with men was limited to "...we are working this out" and it was apparent they wanted to protect women's privacy. Most reported that childbirth not been a positive or empowering event that resulted in anger, sadness and self-blame. Participants stated that antenatal classes had presented women with unrealistic expectations and did not prepare them for "...real" birth events. They were disappointed that clinicians disregarded maternal damage as normal birth sequelae and gave limited treatment options.

This study that was underpinned by the theory of phenomenology, reveals unique findings from men's lived experiences regarding partners' adverse effects of major somatic vaginal birth damage. It increases the understanding of men's traumatized emotional state before, during and after complicated birth events that resulted in partners' unexpected and unexplained somatic injuries. Medical knowledge on birth injuries, was observed to be difficult for men to attain, unless

they attended urogynaecological consultations with their partners. One participant attended a consultation with his wife a year after the initial assessment and, stated that information finally addressed issues about risk factors of vaginal birth, changed the dynamics of their relationship and substantially decreased his partner's trauma symptoms of avoidance and detachment. Although, morbidities were problematic, their sexual relationship and communication improved. At present, this population of men appear to be disenfranchised by the lack of antenatal, intrapartum and postnatal education that idealizes vaginal birth and presents unrealistic outcomes, devoid of risk factors. Due to the fact that health providers rarely refer women to specialists for imaging assessment, men face considerable challenges in gaining sufficient understanding of birth injuries. It seems the current maternity system does not assist men to understand medical issues that contribute to sexual dysfunction and they remain silent.

There is an urgent need to inform couples of potential risk factors of pelvic floor, perineal and sexual dysfunction, prior to birth and, adequately prepare men so they can support women. Currently, this cohort returns home after traumatic vaginal births and attempts to manage women's unexplained and undiagnosed somatic and psychological trauma. Qualitative research exploring men's postpartum perspectives of major vaginal birth damage is virtually non-existent.

9.6 Enquiry 5 [see Chapter 7]

Prior to this enquiry the following research question was postulated: "...*What is the current research on the pathophysiology of LAM injury, pelvic floor dysfunction and diverse birth related perineal damage?*" [Review question]

9.6.1 Background

Chapter 7 investigated the current knowledge on the anatomy and physiology, associated with the pre-pregnant, intrapartum and postpartum pelvic floor and perineum. It examined the mechanism of labour to provide an understanding of the unpredictable nature of parturition, in the context of findings from interviewed women in this thesis³¹, who were diagnosed with LAM avulsion and exhibited multiple symptoms of pelvic floor dysfunction, up to 4 years after delivery. Current imaging studies and urogynaecology commentaries, were used

to demonstrate that etiology, risk factors, prevalence and clinical implications of postpartum FPOP and faecal incontinence, that are associated with damage to the LAM during vaginal birth. Although imaging technology revealed these findings more than a decade ago⁶, the cohort of women in this thesis³¹ reported that clinicians typically dismissed damage as normal sequelae of birth and, they were left to manage consequences by themselves. Enquiry included research on obstetric variables that contributed to the diverse and more recognized form of birth injury, known as OASIs, or 3rd and 4th degree tearing.

9.6.2 Findings

Examination of current literature from urogynaecology related MRI²² and ultrasound²³ research, demonstrated that the pelvic floor is a complicated network of structures that includes a recently rediscovered and significant muscle, known as LAM¹⁰⁹. During vaginal birth and crowning of the foetal head, 13-36 percent of primiparous women are estimated, to sustain LAM avulsion. This process involves detachment of the LAM from respective insertion site(s) on the pubic rami⁶ resulting in pelvic organs prolapsing into the vagina^{3 93 161} with consequences of pelvic floor and sexual dysfunction²²¹ and fecal incontinence²¹⁹. Currently surgical repair is noted to have suboptimal outcomes^{316 317}. Risk factors include: forceps instrumentation¹⁶⁶, macrosomic babies and lengthy second stages of labour²⁰⁷. Commentaries state that LAM damage was observed 60 years ago^{24 25 26} as the 'missing link' between vaginal childbirth and FPOP³ but physicians appear to have overlooked these findings until imaging technology, showed the same results^{22 23} in the early 21st Century. Postpartum sequelae are reported to include: pelvic floor dysfunction¹⁵⁵ that involve FPOP¹⁶¹, urinary and fecal incontinence, and sexual dysfunction^{6 11 181}. Studies show that intrapartum LAM damage and OASI are distinct traumas, although OASI and vaginal tearing can also occur as a result of LAM injury¹⁶⁰. Major damage to pelvic floor and perineal structures during vaginal delivery¹⁸² are shown to be associated with the mechanisms of labour and unpredictable nature of parturition, regarding the confounding interaction of three variables of childbirth that include: the passage (vagina and related structures), passenger (size of

foetal head and potential malpresentation) and powers (degree of uterine contractions) can adversely affect pelvic floor and perineal structures¹⁵³⁻¹⁵⁸.

Although urinary continence is often assumed to be affected by LAM damage, imaging research has demonstrated this form of injury, is negatively associated with stress incontinence and urodynamic incontinence²²⁶⁻²²⁸. Studies reveal that alternate childbirth mechanisms are more likely to result in these consequences. These include: denervation regarding the pudendal nerve and respective branches²²⁹; damage to the longitudinal smooth muscle of the urethra that can result in devascularization; pressure transmission mediated through the pubo-urethral ligaments and/or suburethral tissues²¹⁹.

Literature is scarce and contradictory, in regards to the links between LAM trauma and anal incontinence. Some research reports no correlation²³¹, but more recent study has identified that LAM avulsion is an independent risk factor for faecal incontinence²³⁴. These findings correspond with case-control research that observed, more puborectalis muscle abnormalities in women with faecal incontinence²³².

Research on links between sexual dysfunction and PFM strength, are limited in the literature. Even so, intrapartum avulsion of LAM and/or related components, were shown to have a marked effect on pelvic floor muscle strength²¹⁵⁻²¹⁸. Associations between decreased PFM strength, LAM injury and anterior compartment prolapse were evident in research, that reported more postnatal urinary incontinence, symptoms of reduced vaginal sensation and a '...too loose vagina'²²⁵. A recent systematic review²¹² noted that childbirth morbidities, are more serious than previously realized and rarely linked to subsequent sexual problems, due to clinicians' lack of training in obtaining sexual histories. Investigators observed that identification of sexual dysfunction, primarily relied on self-reporting to maximize diagnosis and treatment; the use of valid and reliable questionnaires was recommended. At present clinical assessment of female sexual dysfunction is noted to be rare and, most enquiries are undertaken in research settings²¹¹.

Perineal trauma was observed to be a diverse form of birth injury that occurs spontaneously during vaginal delivery or as an extension to an episiotomy. Damage comprises: 1st or 2nd degree

tearing to perineal skin and muscles; 3rd and 4th degree tearing (OASI), that is more serious and involves major injury to the anal sphincters and anal mucosa. 3rd degree tears involve a partial or complete disruption of the anal sphincter complex, which includes the external anal sphincter and the internal anal sphincter. 4th degree tears involve disruption of the anal mucosa in addition to division of the anal sphincter complex²³⁴. These injuries are evident in most journals and textbooks unlike LAM avulsion, that is absent from a main midwifery text¹⁰⁵.

9.6.3 Interpretation of findings

Interpretation of these findings, revealed that since the early 21st Century, there is an abundance of imaging research^{22 23} demonstrating that a significant proportion of women, sustain intrapartum damage to the LAM^{3 6 161 162 165 202} with sequelae of pelvic floor dysfunction. This trauma is noted to be distinct from OASI and results in diverse symptoms^{234 235 243}, although as noted in the interview study, both injuries can occur together⁴⁰. Notwithstanding the implications of this knowledge to maternity care, current findings are not evident in midwifery¹⁰⁵ textbooks and health departments' guidelines^{33 204}. Hence it is likely that maternity clinicians are unaware of intrapartum LAM avulsion. This oversight was confirmed by women and men in this thesis⁴⁰, who reported that complaints of postpartum birth injury were dismissed as negligible and adverse lifestyle and psychological alterations, were normal outcomes of vaginal birth. Other studies show that postpartum morbidities are more common than previously realized and, have serious consequences to women's health and lifestyle^{6 221}, sexual function^{180 213}, relationships and psychological health^{39 40} that negatively affect utilization of healthcare resources^{97 98}.

In view of these findings, minimal use of intrapartum forceps are noted to be the primary modifiable risk factor for LAM avulsion, consequences of FPOP^{6 11} and anal sphincter damage²³⁴. Nonetheless, obstetric data from interviews with women⁴⁰, revealed that 45 percent of this cohort, had undergone deliveries that, involved the use of forceps with resultant pelvic floor dysfunction. Women stated that antenatal classes gave limited information on these risk factors and most reported that postnatal injuries were rarely assessed or referred to specialists for translabial 3D/4D imaging diagnosis, despite this technology being available for over a decade. Current

research reports that this form of ultrasound is a non-invasive, efficient and inexpensive means of diagnosing LAM avulsion and degrees of FPOP^{5 6}.

Thus it seems that despite a clearer understanding of the etiology and risk factors of major pelvic floor and perineal injuries^{3 6} minimal research acknowledgement, has resulted in ill-informed practice, that has precluded risk management initiatives and negated discourse to improve maternal outcomes. Although these studies demonstrate that there is an increasing prevalence of LAM avulsion and/or OASI^{6 23 221} due to the overuse of forceps¹¹ in some facilities, women report lack of informed consent about unpredictable risk factors of vaginal birth, together with considerable barriers to postnatal assessment⁴⁰. In addition, it seems probable that deficient uptake of this research, has posed problems for maternity staff, who are increasingly confronted with unexpected intrapartum high acuity clinical situations, that lack pertinent clinical guidelines. There is an urgent need to implement evidence based guidelines together with appropriate clinician expertise for this unidentified and vulnerable population of women.

9.7 Enquiry 6 [see Chapter 8]

Prior to this review the following research question was postulated :“... *How do the origins of somatic vaginal birth damage, PTSD and natural childbirth influence adverse maternal postpartum outcomes in current maternity care?* [Historical qualitative method].

9.7.1 Background

This review examined historical origins of somatic vaginal birth trauma, postpartum PTSD and *natural childbirth* methods for associations with maternity care in the 21st Century. It was postulated that an understanding of the history of maternal somatic and psychological birth trauma, over the past century(s), in conjunction with the evolution of obstetrics, urogynaecology, perinatal mental health and midwifery practices, would provide perspective on the challenges faced by women and clinicians, in the present maternity care system. Initial review investigated the origins of somatic vaginal birth damage, the development of diagnostic and surgical procedures for female pelvic floor dysfunction and subsequent evolution of imaging and urogynecology. The second review, explored the antecedents of PTSD for possible links to birth

events and related damage. The third review examined the origins of the *natural childbirth* ethos, that may assist in an appreciation of the present bias towards these approaches in midwifery practice.

Investigation was precipitated by common themes noted in women and men's interviews, that included: lack of antenatal information on pelvic floor and perineal risk factors of vaginal birth; conflicting advice from clinicians during antenatal, intrapartum and postpartum periods; antenatal classes that advocated a preference for *natural childbirth* methods that precluded couples' preparedness for complicated deliveries; observations of conflict between midwifery and obstetric clinicians regarding intrapartum modes of management; men's reports that women were emotionally detached and traumatized after birth, for up to four years; negligible postnatal assessment of somatic vaginal birth injuries; lack of identification of somatic birth injuries and postpartum PTSD symptoms by providers that included misdiagnoses of PND in some women.

9.7.2 Findings

Commentaries on the origins of vaginal birth damage, revealed that over past centuries, postpartum somatic consequences of parturition, have been poorly recognized^{221 293}. The 'disease of women' or uterine prolapse, was well-known in antiquity and physicians utilized a variety of archaic procedures to allay symptoms, that were typically worse than the ailment^{293 295}. During the 19th and 20th Centuries, surgical procedures were developed in an attempt to reconstruct dysfunctional pelvic floor structures^{293 295 297} and some, like the 'Manchester repair', are still used today. Prior to the advent of imaging in the 21st Century, the etiology and risk factors of vaginal birth, were generally unknown, despite some observational studies from physicians^{24 25 26}, that revealed intrapartum damage to the LAM is the 'missing link' between vaginal birth and FPOP. Although overlooked by the medical community at the time, recent imaging studies have demonstrated their findings were accurate^{22 23}. The discipline of urogynaecology that specializes in female pelvic floor disorders, was established in the United Kingdom in 1984. Due to medical rivalries³⁴⁶, it was introduced in the United States as recently as 2011, where it is known as Female Pelvic Medicine and Reconstructive Surgery^{335 336}. The history of imaging of pelvic organs is

evident since the 1920s^{321 322} but real-time ultrasound modalities were not available until the 1980s and have subsequently resulted in transabdominal³²⁸, perineal³³⁰, transrectal³³¹ and transvaginal adaptations³³² to investigate urinary incontinence and some pelvic disorders in women. Currently, perineal and translabial ultrasound are widely employed³²⁷. MRI of the pelvis was first described in 1983²⁹³ and more recently MRI has utilized fast acquisition of images³³³. Even so, this technology, is noted to be problematic due to assessments being performed in the supine position. Despite a plethora of innovative surgical techniques, that include the more recent and controversial mesh surgery³¹⁰, it is well accepted that LAM damage is largely irreparable and surgical repair procedures may have suboptimal outcomes²⁷⁶.

Investigation into the antecedents of PTSD, observed that during the 19th Century, the archaic and female gender specific term 'hysteria'³⁵⁴ became associated with 'traumatic memory' for both sexes, where the mind was proposed to unconsciously repeat and narrate past traumatic events and this development laid the foundation for the modern notions of PTSD³⁵⁸. During the First World War the term 'shellshock' replaced 'hysteria' after military doctors observed men displayed mania, amnesia, tremors and muteness from trench warfare. Symptoms were purported to be linked to artillery shells and brain haemorrhages³⁶⁴. An alternative view, described 'shell shock' as an emotional, rather than a physical injury, since a proportion of men suffered 'shell shock' symptoms without exposure to artillery fire. Other studies revealed analogous symptoms in civilians after major rail and building accidents^{366 367}. In 1980 the term 'hysteria' was removed from the DSM, although female gender specific connotations of this dubious terminology, continue to impugn women's mental health status in the present age³⁵⁴.

Research into women's impaired mental health associated with traumatic birth events, is scarce in the early literature. During the 1970s observational studies from a few obstetricians, revealed that women suffered emotional trauma symptoms, similar to non-obstetric PTSD after a complicated delivery and/or the demise of an infant³⁴⁷. Prior to this, a published treatise on maternal psychiatric disorders during and following pregnancy³⁷⁶, is evident from the mid 19th Century, although emotional trauma associated with birth events, is absent. Even so, these seminal findings, that anticipated the modern rediscovery of perinatal depression, acute mood

disorders and psychoses, were ignored for 150 years³⁷⁷. Current reviews note that research into postpartum PTSD has developed exponentially since the early 21st Century, primarily in the United Kingdom. Recent findings estimate that 3.4 percent of women suffer from this disorder after traumatic birth events, that involve complicated birth interventions, limited support from maternity staff and/or partners, death or illness of an infant³⁸⁶. The symptom profile of PTSD is substantially different from that of PND³⁸¹, although both disorders can coexist³⁸³. For a diagnosis of postpartum PTSD, studies observe that women are required to have been exposed to a trauma stressor regarding events of birth. Criteria include symptoms of: avoidance of any memory associated with the stressor, detachment, negative cognitions, nightmares, persistent re-experiencing of traumatic event^{392 394}.

Enquiry into the history of natural birthing revealed that the concept of *natural childbirth*, originally known as the Read Method, was devised by a British general practitioner, who purported birth was a non-pathological event that should be managed holistically by exercise, breathing and psychological support⁴¹¹. Reviews observe *natural childbirth* was a by-product of the health reform movement that emerged in Britain, after the substantial loss of life during the First World War. The subsequent decline in the birth rate and existence of an impoverished class of people, gave rise to anxieties that blamed race degeneration, heritability of disease and social decay. Health reformers and medical practitioners adhered to the new science of 'eugenics', an ideology that combined theories of environmental improvement with selective breeding or pronatalism^{410 414 416}. During the 1950s, similar methods of *natural birthing* were utilized under a different name, the Lamaze method of psychoprophylaxis. Although this approach originated in the Soviet Union after the devastation of the Second World War and financial restraints, it subsequently became fashionable in America, Europe and Britain. Lamaze's method combined hypnosis, with Pavlovian conditioned response, to offer women 'so called' pain free childbirth⁴³⁵.

In the 1970s, comparable birthing approaches to those in the 1930s and 1950s, were again advocated, some proponents were obstetricians^{443 444} others included a social anthropologist, Kitzinger⁴⁴⁸ and lay midwife, Gaskin⁴⁴⁹. Although these prominent figures, supported the previous Read Method⁴¹¹, reviews note they were no longer associated with pronatalism and eugenics, but

with feminism and consumerism. Feminists viewed obstetric technologies as an attempt to control women's bodies. Consumers objected to the reductionism of modern obstetrics and its lack of holistic concern for the women^{410 435}. Both groups sought a different style of maternity care that facilitated the social, psychological, and spiritual dimensions of childbirth. Many of these methods are still advocated today in maternity settings in developed countries.

9.7.3 Interpretation of findings

Interpretation of these findings demonstrates that postpartum somatic and psychological consequences of parturition have been largely misunderstood and poorly identified over the centuries. Although, uterine prolapse was recognized as the *disease of women*, as far back as antiquity^{292 293}, risk factors were unclear and not linked to childbirth. Throughout the centuries, the term 'hysteria', was connected to an assortment of female mental disorders and their reproductive organs³⁵⁴. During the 19th and early 20th Centuries, middle and upper class women were increasingly seeking higher education and disproportionately, diagnosed with 'hysteria', in an attempt to urge them to fulfil their duties as wives and mothers³⁵⁶. Although anatomists and physicians had identified the LAM, as early as the 16th Century²⁸¹, a limited understanding of female anatomy and physiology, precluded surgical treatment that had successful outcomes. Improvements in anaesthesia in the 20th Century²⁹³, gave rise to various procedures for pelvic floor dysfunction but outcomes were often ineffective, although some methods such as the Manchester repair^{295 297}, are used today. During the 20th Century, a few physicians observed that intrapartum LAM damage was the 'missing link' between FPOP and vaginal delivery²⁴⁻⁶, but findings were overlooked by the medical community. Decades after the introduction of imaging modalities such as MRI and 3D/4D ultrasound that diagnose somatic vaginal birth damage^{22 23}, women report that health providers, rarely refer them for imaging assessment and lack understanding of consequences of vaginal delivery⁴⁰. The subspecialty of urogynaecology that was developed in response to female pelvic reconstruction surgery^{335 336}, may be recognized by some members of the medical community; however, most mothers and fathers are not cognizant

of this discipline and, it appears many health professionals are unaware of its benefits to postnatal women.

Investigation into the historical background of non-obstetric PTSD, observed that symptoms that now would be associated with this disorder were largely unidentified until the First World War^{364 366}, although there was evidence of muteness, deafness, tremor, in archived literature after other battles, as far back as antiquity³⁵⁹. Even so it was not formally recognized by DSM-III³⁵⁷, until 1980 and, this only occurred due to considerable effort from antiwar activists after the Vietnam War. It seemed that governments in Britain, America and Commonwealth countries of the time, were reluctant to support a mental illness that may result in financial compensations to a population of war veterans^{360 364}. Hence, affected men suffered in silence and emotional trauma symptoms were often viewed as alcohol and drug abuse problems, where war veterans attempted to make sense of traumatic events of war and rebuild their lives.

In comparison, postpartum PTSD seems to have had similar opposition regarding recognition. Studies are largely absent until the 1970s^{381 384}, although anecdotal emotional trauma symptoms are evident to some degree, in letters from British mothers who sustained major somatic vaginal damage in early 20th Century²⁷⁹. However, female mental health over the centuries seems to have been impugned by the gender specific term 'hysteria,' that purported all women had the propensity to be emotionally unstable³⁵⁴ and the DSM⁷ only removed the classification as recently, as 1980^{354 357}. Studies on birth related disorders are not evident in the literature, until Marcé's Treatise in 1858³⁷⁶, that demonstrated that the serious nature of maternal consequences of postnatal depression, psychoses and mood disorders and yet, reviews note that this seminal work was also overlooked for 150 years³⁷⁷.

Nonetheless, due to the enduring work of a team of British researchers^{40 384}, since the early 21st Century, there is clear evidence that women suffer from PTSD symptoms after the 'terrifying' unpredictability of birth events. Case studies and observational research currently demonstrate substantial risk factors and prevalence, although identification in maternity settings is still suboptimal³⁸⁶ and women are reported to be misdiagnosed with PND⁴⁰¹, due to routine screening of this disorder and inadequate screening instruments^{387 390 391 394}.

Reviews observe that natural birthing methods of the 1930s and 1950s could be viewed today as antifeminist, due to the fact they arose from a conservative reaction to female emancipation and a pronatal context^{410 435}. Even so, these unproven theories have gained access to a receptive audience of maternity care givers and pregnant women, and are still widely used today. This partisan approach to childbirth is reported by women and men in this thesis, "...to set them up for failure". Most stated that on reflection, idealized birth scenarios did not prevent postpartum somatic and psychological trauma. It seems that a population of mothers who experience complicated deliveries with resultant vaginal birth damage have been disregarded. Whilst current obstetric staff possess considerable expertise in assessing high risk deliveries, many mothers state they rarely see an obstetrician, until during labour when problems arise. This study into the origins of somatic birth damage, PTSD and natural childbirth reveals that despite considerable advances in technology, tertiary education for obstetricians and midwives, risk averse management in clinical areas and evidence based practice, women in the 21st Century appear to be similarly disempowered to their ancestors.

CHAPTER 10: CONCLUDING COMMENTS

Research in this thesis is original and appears to be the only study, to examine links between postpartum somatic injury and psychological sequelae. Interviews with men regarding their perspectives of partners' somatic vaginal birth trauma, are also observed to be unique to the literature. Disclosure of multiple emotional trauma symptoms of PTSD, in more than two thirds of women in this cohort⁴⁰, strongly suggests they are linked to traumatic births and consequences of enduring pelvic floor dysfunction. Although, studies over the past decade, reveal that postpartum PTSD is more widespread than previously realized²⁷, the persistent orthodoxy is that birth is considered an empowering event because the majority of women have a broadly positive experience. PTSD is generally perceived to be attributed to wars and disasters³⁵⁸⁻⁶⁰, yet current research has demonstrated analogous maternal symptoms associated with the stressors of traumatic birth events, that include complicated deliveries, the demise of an infant and inadequate intrapartum support^{381 386}. This thesis establishes that traumatic birth events that cause somatic vaginal damage and consequent debilitating post-natal morbidities are also causes of PTSD.

Although findings from this enquiry, showed women exhibited postpartum PTSD symptoms related to these somatic birth morbidities, similar risk factors are not evident in recent perinatal mental health literature. Studies note that PTSD has a different symptom profile to that of PND and, a diagnosis of PTSD is not possible without the gateway criteria of a traumatic event and an appropriate screening measure³⁸¹. Conversely, PND is often identified with the use of the EPDS instrument³⁵, but research observes that routine use can result in misleading outcomes that have the potential of stigmatizing women and overlooking diverse symptoms³⁴ [see Chapter 5: Paper 3]. Women interviewed in this thesis⁴⁰, confirm these findings due to the fact their emotional distress symptoms, did not match questions regarding PND on the EPDS measure. Hence, it was apparent the EPDS³⁵ was not efficacious in identifying PTSD for women with postnatal somatic morbidities. In addition, mothers were distressed after facing considerable barriers in obtaining treatment options, since health care providers were reported to dismiss adverse somatic and psychological symptoms as normal outcomes of childbirth. This suggests a lack of information amongst clinicians

about the effects of vaginal birth injuries, especially LAM avulsion, as well as postpartum PTSD. Another, related issue that triggered emotional trauma responses in women, was that partners had minimal understanding of anatomical alterations related to maternal sexual dysfunction. Husbands and male partners were observed to have limited knowledge but believed women had sustained severe injuries that they perceived were associated with lack of sexual intimacy and maternal emotional detachment, years after childbirth.

Overall, it seemed that postnatal sexual problems were poorly communicated between couples. Contributing factors included inadequate antenatal and postpartum education about birth trauma, that precluded couples' understanding of subsequent sexual dysfunction, together with, maternal postpartum PTSD symptoms of avoidance and detachment. Men wanted any available information that would assist in their wives' recovery.

From an historical perspective, major advances in obstetric care over the past century, have resulted in significant improvement in maternal and foetal survival⁴⁰⁶. Even so, these achievements parallel the progress in other areas of medicine, that for decades, have fulfilled the expectations of the community and explained the advantages and risk factors of interventions prior to procedures by utilizing the legal requirement of informed consent that is enshrined in common law³². It appears that the present environment of maternity care, has singularly failed to implement this practice.

Although, antenatal classes are the educational medium for all parents, they are typically the province of midwives and lack input from obstetricians. This thesis reported that couples observed attitudinal conflict between midwives and doctors and they received information that was often contradictory⁴⁰. Invariably, antenatal education presented birth from an idealised perspective. It appears that medico-legal factors, as well as changing expectations, demand a review of this antenatal advisory role.

Current imaging research, reports 10-30% of primiparous women, who have a vaginal delivery, sustain intrapartum LAM injury with substantial somatic morbidities that adversely affect their quality of life. Contributing variables include: forceps use, particularly Kielland's rotational forceps, together with unpredictable obstetric variables that include, size and position of baby and, duration and strength of uterine contractions^{6 223}. Vaginal birth is now accepted to be the link between LAM

avulsion and FPOP³, that was previously unknown, despite a few studies in the last century^{25 26 27}. Hence, it is questionable that women would proceed with a Kielland's delivery¹¹, if they were informed of these risk factors.

At present, clinicians in New South Wales are mandated to adhere to a policy directive called *Maternity – Towards Normal Birth*²⁰⁴, that stipulates vaginal deliveries should be promoted and caesarean sections discouraged. This document proposes that vaginal birth is a natural event that does not require technological and/or pharmacological interventions, unless necessary and that women benefit from instruction about diverse labour positions, water births, exercise and relaxation. Content does not acknowledge the inherent unpredictability of birth include risk factors of postnatal pelvic floor and perineal dysfunction. Its language, arguably, bears a striking resemblance to the eugenicist-based⁴¹⁶ *natural childbirth* teachings propagated by Dick-Read in the 1930s⁴¹¹ that were later advocated by Kitzinger⁴⁴⁹ and Gaskin⁴⁴⁸. Their unproven theories⁴²⁷, described childbirth as a non-pathological event, where labour pain could be managed by antenatal instruction in exercise and breathing with psychological support from accoucheurs⁴¹². Whilst in some respects this has become a prevailing orthodoxy that childbirth is a natural event with invariably positive outcomes, women and men in this thesis, reported their experiences were anything but. Their births were "...a nightmare that lacked accountability." Moreover, they reported that the narrow focus of their antenatal education left them unprepared and ill-equipped to deal with the reality of their ordeals in labour wards, where the "...idealized scenarios" about vaginal birth never eventuated.

Interviews in this thesis were distressing to orchestrate and required professional expertise. The author contemplated the benefits of major achievements in maternity care over the past century that have abolished the scourge of maternal mortality in developed countries^{406 425}, but appear at the same time, to have overlooked pelvic floor and perineal morbidities, that have dire consequences for couples' lives. Currently, this vulnerable population of women remain silent and invisible to the maternity community and general populace. Couples manage relationships devoid of sexual intimacy, years after deliveries.

This thesis adds to the growing body of research on postpartum PTSD, by demonstrating a clear connection between this disorder and somatic birth injury attributed to LAM avulsion. Debates about the pros and cons of *natural childbirth*, forceps intervention and/or caesarean section, that have emerged over the past century, do not appear to have been resolved⁴²⁹. An incidence of 10-30% of primiparous women being seriously⁶ and often irreparably damaged²⁷⁸ in the course of childbearing, is too significant a cohort to keep ignoring, especially given the adverse extended impact on families and society presented by postpartum morbidities arising from LAM damage. Findings reveal that PTSD is a significant morbidity, and trauma symptoms are persistently triggered by debilitating sequelae of FPOP, urinary and fecal incontinence and sexual dysfunction, that research states is largely permanent with suboptimal surgical outcomes.

Mandatory requirements, such as the previously mentioned, NSW policy directive³³, that stipulate clinicians should encourage vaginal delivery have the inevitable consequence of a reliance on forceps instrumentation for women who experience complicated deliveries. As discussed imaging studies demonstrate that forceps are the primary risk factor of LAM injury that cause substantial morbidities, especially Kielland's rotational forceps¹¹ that are an archaic product of the early 20th century. It is thus apparent that these same guidelines³³ contribute to the incidence of LAM injury through omission. Vaginal births that are presented in "...idealised" and non-pathological terms, ignore the well documented capriciousness of parturition, thereby "...setting women up to fail"⁴⁰.

CHAPTER 11 : RECOMMENDATIONS & FUTURE RESEARCH

Although the studies in this thesis are not representative of every delivery and, many women in the wider community experience positive birth outcomes, it is essential that the population of mothers with somatic and psychological sequelae are not dismissed or stigmatized. Currently, it appears that qualitative research has been remiss in examining adverse consequences of vaginal delivery that on the surface seem quite difficult to obtain, due to the personal nature of injuries. After commencing these interviews, however, it was apparent postnatal women and their partners, were more than willing to share birth experiences for research purposes and, were also grateful that a clinically current midwife and researcher, had contacted them to discuss issues that many health care providers had avoided.

There is a clear necessity to inform women and clinicians that imaging is available to assess maternal postpartum somatic birth damage. Relevant disciplines include: midwives, general practitioners, obstetricians, gynaecologists, mental health professionals and community health providers. It is evident that any attempt at reducing the considerable health burden of maternal trauma, requires diagnosis to enable identification of this population, due to the fact, LAM avulsion is not routinely detected in clinical practice and, anal sphincter tears are frequently underdiagnosed, sub optimally repaired and/or treated. Hence, the development of competent and accessible diagnostic services seems of paramount importance. Diagnosis has the ability to identify women at high risk of future morbidity, allowing secondary prevention measures together with, facilitating clinical audit and obstetric intervention trials, aimed at reducing maternal trauma. In addition, diagnosis is significant in recognizing women who are at a greater risk of FPOP recurrence after surgery.

Professional education activities are also integral in achieving similar objectives. A recent initiative of IUGA³³⁵, has been to provide an online teaching programme, that has the potential to contribute to substantial dissemination of diagnostic services internationally. Nonetheless, it is evident that there are considerable barriers to establishing services that provide accurate diagnosis of birth

trauma. In resource-poor settings, the financial cost of developing services that require training, equipment and service provision are typically problematic. In resource-rich settings, the main challenges are political, and attempts at establishing maternal birth trauma as a key performance indicator of obstetric services, may be viewed as promoting the medicalisation of childbirth.

From a mental health perspective, it seems that most clinicians require educational development regarding the consequences of somatic birth injuries and associations with emotional trauma symptoms of PTSD. At present, many are reported to have limited understanding of obstetric complications, that result in pelvic floor and/or perineal damage. During the undertaking of this thesis, the author was invited to educate groups of psychologists about the links between somatic and psychological sequelae of birth trauma. The majority of these health professionals appeared to have limited knowledge on both morbidities and, were grateful for instruction stating that it would further assist their understanding of women's postpartum issues. The author was also asked to instruct postnatal midwives about the seriousness of pelvic floor injuries as distinct from major perineal injuries, that are well known by this cohort. Links with postpartum PTSD were also discussed and favourably received. It is proposed that in the future, teaching sessions have the potential to facilitate a 'bridge' between midwives and doctors to assist better maternal outcomes. Both these professions are usually keen to engage in evidence-based research in clinical environments, if given the opportunity. It is acknowledged that time and work restraints in the clinical setting often mitigate these opportunities.

Another significant finding from this research is the need for maternity, mental health clinicians and child and family health nurses, to accurately identify postpartum PTSD symptoms, for a population of women with somatic injuries. At present it seems that emotional trauma symptoms connected to birth events in general, are poorly identified⁴⁰¹. Thus, it is envisaged that substantial education and further research, will also be required to demonstrate that major somatic vaginal damage is also a risk factor for PTSD. Another challenge for busy clinical environments is that, the routine employment of EPDS³⁵, appears to preclude further consultation with psychologists. Although it is

a useful screening instrument for PND, research notes it can be misleading if used without clinical referrals and although PND and PTSD symptoms can overlap, these disorders have diverse symptom profiles as previously discussed [See Chapter 5: Paper 3].

Another consideration is the need for clinicians to validate women's somatic injuries to circumvent symptoms of emotional trauma. Although, only one woman and her husband were observed to seek validation through a lengthy consultation with a urogynaecologist, the outcome was observed to decrease emotional trauma symptoms and assist in the couples' communication. Further research is required into the efficacy of validation through health specific information in terms of etiology of LAM avulsion and morbidities.

It is also apparent that integration of care between maternity and mental health clinicians will provide better postnatal outcomes for this population of injured women. At present these two disciplines often operate apart, due to work and time restraints and women report barriers to care, but sharing of knowledge may decrease clinicians' workloads and enhance identification of morbidities. At present, maternal morbidities of major pelvic floor and perineal damage that have serious consequences to women, partners and their families, are a neglected agenda in global maternity health, requiring surveillance similar to antenatal morbidities as noted in Chapter 7.

Finally, it seems integral to inform mothers of risk factors of vaginal birth prior to delivery to affirm the autonomy of the woman, as noted in Chapter 4. Antenatal informed consent in obstetrics is fundamental in facilitating treatment options, avoiding adverse postpartum somatic and mental health consequences and lawsuits. However, this will involve extensive discussions between various health professionals although other areas of medicine seem to have adapted to this common law requirement.

As discussed, a common theme that emerged from interviews in this thesis, was that women suffered in silence, with enduring consequences of birth trauma, that were rarely validated and invisible to the general populace. These women frequently reiterated feelings of isolation and

abandonment, with limited treatment options. It was postulated by the author that a not-for-profit 'birth trauma' association, would facilitate a 'voice' for effected women to network with others, who suffered from similar birth related issues, together with, providing access to diagnostic assessment for somatic and psychological trauma. In view of the fact, so many participants had disclosed symptoms of postpartum PTSD, the author liaised with perinatal psychologists and researchers at City, University of London in 2015, to discuss emergent research on postpartum PTSD. She was subsequently invited to present her findings, at two forums in London that enabled further discussion with the founder of UK Birth Trauma Association (UKBTA) and colleague, a BBC journalist, who had published on the merits of caesarean section as an alternative to vaginal delivery, and who later relocated to Canada to facilitate improved maternity care from there.

The UKBTA was set up in 2003, four years after the similar Birth Trauma Canada (BTC), was created. Respective exponents, who regularly communicate, advocate that accurate scientific research should be communicated to the maternity community to help identify risks that inform vaginal and caesarean deliveries. At the time, they were unclear about the connection between women's distress and research findings from imaging experts in Australia, regarding intrapartum damage to LAM and serious consequences of FPOP, urinary and fecal incontinence and sexual dysfunction^{3 23}. Hence the research in this thesis, has added to the body of knowledge on somatic trauma internationally, that has been described as an 'epidemic of birth injuries', by the prominent American urogynaecologist, who initially validated LAM injury on MRI in 2003²³. Nonetheless, UK and Canadian proponents were well aware of the serious lifestyle effects of somatic birth injuries, that were frequently observed in media narratives from distressed women and their partners in the northern hemisphere.

The structure utilized by UKBTA combined peer reviewed research with social media and, seemed an ideal approach. Hence, with the assistance of the founders of both associations and the BBC journalist, the author proposed establishing a similar body mainly through a website in Australia, that could involve appropriate lists of urogynaecologists, physiotherapists and mental health

clinicians, provide relevant education for mothers on somatic birth trauma. Concurrent with researching this thesis, the author also spent substantial time liaising with health professionals, researchers and potential stakeholders in Australia and New Zealand.

She was also invited to speak about LAM injury and its effects, on national radio in Australia on two occasions with her supervisor, a urogynaecologist and, presented at several international, state and local conferences, together with newspaper interviews [see next chapter.] In 2016, a mother from Brisbane who had sustained LAM avulsion and OASI after a vaginal forceps delivery contacted the author stating that she wished to raise awareness about these unexpected injuries. This is an extract from her March 30, 2016 email:

...I was fortunate enough to track you down after seeing your work mentioned in an ABC News article recently. I would love an opportunity to connect with you. I had a child 2 years ago and ended up having a high forceps delivery which resulted in a 3b tear and a levator avulsion. It has been life changing. I am now a woman on a mission to raise awareness for this silent epidemic. I have documented my own story and shared it with my followers... From my own personal experience and from talking to many, many women in a similar position to me (I'm on a forum with over 3500 members who suffer from pelvic organ prolapse), very sadly it seems to be the case that obstetricians still don't know the true impact of forceps deliveries.

At the end of 2016 the author with assistance from the founder of UKBTA, a lawyer and the above mother, facilitated registration that enabled the establishment of the Australasian Birth Trauma Association (ABTA). By mid-2019, there are 1000 women members of the private social media site attached to the ABTA's public website. All these women have LAM and/or OASI and the ABTA has provided a point of recognition of their injuries and a means for them to finally have 'a voice'. The ABTA has a seven member, voluntary board that includes: the author, two urogynaecologists, a perinatal psychiatrist, a pelvic floor researcher, a manager of a mental health facility, a mother and a volunteer manager. A national conference on Birth Trauma is also scheduled for August 2019 in Brisbane. As of May 2019, several obstetricians and midwives have joined the online site to understand inherent issues that women face after sustaining unexpected and unexplained somatic

birth trauma. ABTA was developed as a form of action research and to primarily assist mothers and their partners liaise with diagnostic services for somatic and mental health issues after childbirth. In the future, it is proposed that the association will build bridges between midwives, doctors and mental health professionals to address problems in obstetric, maternity and mental health care regarding these unrecognized traumas and thus facilitate solutions to improve clinical practice.

Another outcome of this research was the proposed development of a clinician administered screening instrument for a postnatal population of women, who experience somatic vaginal birth injuries to identify associated symptoms of PTSD. During 2017, the author liaised with a psychiatrist from the same tertiary institution and, spent several months implementing a 5-6 itemed measure as per DSM-5³³ criteria, to be used in postnatal maternity or community health care facilities. She also communicated with a researcher from Auckland University, New Zealand regarding validation of this instrument. Although, this thesis has not included the research involved regarding the implementation of this instrument, it is envisaged that postdoctoral research will enable its facilitation. At present, there are limited measures used for identifying vulnerable women as observed by researchers from City, University of London who recently validated the City Birth Trauma Scale³⁸⁶ for these purposes. Studies demonstrate that this disorder is poorly recognized in maternity settings⁴⁰¹ and hence it is proposed that a clinician administered screening instrument for a population of postpartum somatically injured women, will contribute substantially to improved health outcomes for these vulnerable mothers.

CONFERENCE PAPERS (PUBLISHED & UNPUBLISHED) & MEDIA INTERVIEWS

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Skinner EM, Dietz HP. Psychological consequences of traumatic vaginal birth. *Neurourol Urodyn. Supplement: August 2015. Volume 34, Issue S3*. Pages S1–S461. Presented at 45th Annual Meeting of the International Continence Society (ICS), Montreal, Canada.

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<http://www.marceconference.com.au/posters.php>

Awarded: Dr Albert McKern Scholarship 2015-2017 to investigate causes, prevention and treatment of mental, physical pain and distress during pregnancy, labour and the puerperium A scholarship in collaboration with Sydney, Edinburgh and Yale Universities.

Unpublished presentations at conferences:

Skinner EM, Shek K. *Tokophobia: Who's Crazy, who is sane?*

Organizer: Conjoint Professor Bryanne Barnett AM. St John of God Health Care, Raphael Centre. Perinatal and Infant Mental Health Conference, Baulkham Hills, NSW Australia. 9 May 2014.

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Organizers: Nepean Blue Mountains Local Health District. NSW Nurses' and Midwives' Association. 25th Nepean Annual Midwifery Conference, Clarendon NSW. 11 March 2016.

EM Skinner. *Maternal birth trauma affects both mind and body*

Organizer: Professor Tarnow Mordi, Professor of Neonatal Medicine, NHMRC Clinical Trials Centre Sydney Medical School. Sydney International Update on Advances in Perinatal Care, Novotel Hotel, Sydney Olympic Park, NSW. 5 August 2016

EM Skinner *Psychological consequences of somatic vaginal birth injuries.*

Sydney Medical School, The University of Sydney: Annual Nepean Research Day Nepean Clinical School. Department of Obstetrics & Gynaecology. 27 October 2016.

EM Skinner. *The baby's fine but how are you, Mum?*

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EM Skinner. *Maternal consequences of somatic birth vaginal birth trauma*

Nepean Clinical School. The University of Sydney Department of Obstetrics & Gynaecology: Research lectures to Nepean Hospital Medical staff. 14 June 2017.

EM Skinner. *Postpartum PTSD is a consequence of physical pelvic floor injury after a traumatic vaginal birth.*

Organizer: Associate Professor Sarah Church. London South Bank University.

Barts Health, NHS Trust, Newham University Hospital, Paistow London. UK

Lecture to clinical midwives and Director of Midwifery Services.

July 22, 2017.

EM Skinner. *Understanding maternal consequences of somatic birth vaginal birth trauma*

Organizer: Associate Professor Sarah Church. London South Bank University. United

Kingdom. Lecture to postgraduate degree in midwifery students and course coordinators.

27 July 2017

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Organizer: Professor Bryanne Barnett- perinatal and infant psychiatrist Director of St John of God Raphael Health Services. Presentation to psychologists at Gidget House, Postnatal Depression and Anxiety Unit. McLaren St North Sydney. NSW.

9 October, 2017

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Organizer: Sue Croft Physiotherapist

Guest speaker at Continence Foundation of Australia (CFA). QLD Branch State Conference. 9 March 2018

Skinner EM *Psychological impact of vaginal birth injuries & maternal lived experiences*

Guest speaker at Australasian Birth Trauma Conference Brisbane QLD Australia.

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