Competence and expertise in physiological breech birth

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Declaration

I, Shawn Walker, grant City, University of London, permission to allow the thesis to be copied in whole or in part without further reference to the author.

Abstract

This doctoral thesis by prospective publication aims to provide pragmatic, evidence-based guidance for the development and evaluation of physiological breech skills and services within the context of contemporary maternity care. The research uses multiple methods to explore development of professional competence and expertise. While skill and experience are acknowledged in multiple national guidelines as important safety factors in vaginal breech birth, prior to this research no guidance existed about how skill and experience should be defined, developed and evaluated. The thesis begins with an integrative review of the efficacy of current breech training methods, highlighting a lack of evidence associating any training methods with improved outcomes for breech births. Following this are two papers reporting the results of a Delphi consensus technique study involving a panel of breech experienced obstetricians, midwives and service user representatives. The first outlines standards of competence, training components and volume of experience recommended to achieve competence and maintain proficiency in upright breech birth. The second outlines principles of practice for physiological breech birth, rooted in relationship and response, and divergent from medicalised practices based on prediction and control. Following this is a grounded theory paper exploring the deliberate acquisition of breech competence among midwives and obstetricians with moderate upright breech experience. The paper reports a theoretical model that can inform development of breech teams and training programmes. The final paper reports a mixed methods analysis of data from the Delphi and grounded theory studies concerning breech expertise. The results present a model of generative expertise, underpinned by affinity, flexibility and relationship, which may function to increase the availability and safety of vaginal breech birth. Each paper is followed by critical analysis and reflection. The thesis ends with a discussion of the implications for practice and research in light of the overall body of work.

Chapter 1: Introduction

1.1 Structure of the thesis

This thesis contains work written toward a *doctorate in philosophy* by prospective publication. It is structured to present the required publications alongside critical commentary on the contribution of each paper, and an overall discussion of the project.

In Chapter 1, the introduction will explain the cause for concern by describing how the lack of ability to access care for vaginal breech birth leads to a loss of autonomy for birthing women, resulting in oppression and subjugation. It will then explain how breech presentation at term, the preference for a vaginal birth and a physiological approach, and professional support for these choices are each minority positions that have struggled to be heard within contemporary maternity services. Finally, it will demonstrate how lack of professional skill and experience, with breech birth in general and physiological breech birth in particular, is a significant barrier to women's ability to access support. The introduction is followed by a discussion about the terminology used in this thesis.

Chapter 2 deals with methodology and research design. It will describe my theoretical perspective as critical realism, with influences from constructivist and pragmatic traditions. It will explain the choice of multiple methods to answer multiple questions relating to competence and expertise in physiological breech birth. The chapter ends with a discussion around the experience and perspective I brought with me into this research.

Chapter 3 presents a systematically conducted integrative review of breech training literature, followed by critical commentary. The critical commentaries in this thesis will include a description of each co-author's contribution to the papers, in line with the university's requirements. The thesis incorporates the author version of each published paper, and may not correspond exactly to the final published version. Page number references will be to the published paper.

Chapter 4 begins with two papers reporting different data sets from the same Delphi technique study. These papers are followed by a systematic review of sampling strategies used in Delphi research concerning clinical midwifery practice, providing methodological context for the Delphi research in this thesis. The three papers are followed by critical commentary.

Chapter 5 contains a paper reporting the results of a grounded theory interview study, followed by critical commentary.

Chapter 6 contains a paper reporting the results of an integrative analysis of data from the Delphi and grounded theory studies, followed by critical commentary.

Chapter 7 contains a discussion of implications for practice and research, considering the body of work contained in this thesis as a whole, including volume standards, breech teams and dedicated breech care pathways. This is followed by a reflexive account of some of the influences this process has had on me as a practitioner and researcher. The thesis ends here with a brief conclusion.

References follow the conclusion.

The Appendices contain further information supporting the thesis and doctoral application. Appendix 1 contains a list of related publications I have authored during the period of doctoral study. Appendix 2 contains the author version of one of these publications, an evaluation of a physiological breech training programme based on the research contained in this thesis. Appendix 3 contains a sample of anonymised peer review feedback received during the submission process for the first Delphi paper, to which I refer in the critical analysis of that portion of work.

1.2 Maternal autonomy and human rights

Petrovska et al (2016a, p. 357) conclude their international survey of women's experiences planning a vaginal breech birth by observing, "Access to vaginal breech birth is important for some women; however, this choice may be challenging to achieve." My cause for concern originates with the difficulty, and in some cases impossibility, some women face when they wish to plan a vaginal breech birth.

Maternal autonomy over decision-making regarding mode of childbirth is a human right (Schiller, 2016). Obstetrician Andrew Kotaska explains (2017, p. 1):

> *The Universal Declaration of Human Rights guarantees everyone, including pregnant women, security of person. This includes the right to decline any medical procedure that violates her bodily integrity, even if that refusal increases her or her fetus' risk of death. This right is enshrined in medicine and law as a patient's right to give or refuse consent.*

Yet international literature indicates that maternal autonomy is not universally respected for women carrying a breech-presenting baby at term. In their report of qualitative data from their international survey, Petrovska et al (2017, pp. 43–4) found "Encountering coercion and fear" to be a significant theme in the experiences of women planning a vaginal breech birth, and that this led to emotional wounds from "stress, anger, fear and injustice." Davidson's (2015, p. 113) qualitative study involving women and midwives in the United Kingdom (UK), described the "Loss of Choice and Control" women experience following a diagnosis of breech presentation at term. Homer et al (2015, p. 3)

also reported "Reacting to a lack of choice and control" as one of four themes describing the experience of women planning a breech birth in Australia. Founds (2007, p. 1396) reported, in her study of women's and providers experience of breech presentation in Jamaica, "Primiparas with breech were scheduled for caesarean section if the malpresentation was known antenatally." Many currently recommended breech care pathways operate to undermine personal and physical autonomy in ways that are unacceptable.

Anecdotal literature further indicates that some women value the option of a physiological approach to breech birth (Allen, 2013; Evans, 2005; Sanders and Lamb, 2015; Thurlow, 2009), including upright maternal birthing positions, but that this can be even more challenging to achieve. Mother Anna Berkley (2006, p. 16) describes feeling "enriched and empowered by the experience and achievement" of the unexpected home breech birth of her son, in which she birthed in an upright position. She contrasts this with what she imagines might have happened if she were in hospital:

> *I expect I would have ended up lying on my back, my legs in the lithotomy position with an epidural in situ, with him delivered by forceps or more commonly a caesarean section.*

Her expectations correspond to the then-current Royal College of Obstetricians and Gynaecologists (RCOG) guideline (2006), regarding lithotomy positioning, and common use of caesarean section. Toivonen et al's (2014) study of women's experiences of breech birth set in Finland, a setting with comparatively high support for vaginal breech birth, found that the experiences of women giving birth to breech and cephalic babies did not differ, except regarding choice of birthing position, in which mothers of breech babies experienced less choice. The American consumer advocacy

organisation, Childbirth Connection, published a *Blueprint for Action* policy document following a national conference in 2010, calling for the implementation of "policies and practices that foster safe physiologic childbirth and decrease excessive use of elective procedures and interventions" (Angood et al., 2010, p. S38).

A significant number of midwives and obstetricians have advocated for a more physiological approach to facilitating breech birth, on the grounds of safety (Banks, 2007; Bisits, 2002; Cronk, 1998a; Evans, 2012; Krause, 2007; Louwen et al., 2012). A physiological approach centres maternal agency in the birth process, rather than health professional control. One of the most obvious differences is in the frequent use of upright birthing positions, which many women choose spontaneously, although adoption of an upright position is not a requirement for a physiological approach. This is consistent with national-level guidance in the UK (NICE, 2014) promoting the use of upright positioning in the second stages of labour due to evidence of its efficacy in birth in general (Gupta et al., 2012). It may also affect women's experiences, as Berkley describes. Thies-Lagergren et al's (2013) follow-up study to a randomised controlled trial of birthing position found that women who birthed in an upright position on a birthing stool experienced significantly more positive feelings of choice, empowerment and protection than women who did not. Johansson and Thies-Lagergren (2015) found, in a survey study of 221 Swedish fathers, that upright birthing position had a significant positive impact on fathers' birth experiences as well.

Recent research suggests that use of upright maternal birthing position for breech births in particular may maintain safety and improve some perinatal outcomes. Louwen et al's (2017) retrospective cohort study of 269 successful vaginal breech births found that upright breech birth was associated with

reductions in duration of the second stage of labour, manoeuvres required, maternal/neonatal injuries, and caesarean rate when compared to vaginal birth in the dorsal position. Bogner et al's (2015) smaller prospective observational series of 41 upright breech births also found a higher rate of spontaneous births compared with vaginal birth in the dorsal position, and a reduced rate of maternal perineal injuries.

Access to vaginal breech birth in general, and physiological breech birth in particular, is important to some women, but often challenging to achieve. A significant barrier to accessing support for breech birth is current low levels of skill and experience in many maternity care settings (Catling et al., 2015). When access to vaginal breech birth is obstructed on the grounds of low levels of skill and experience, women effectively lose their human right to refuse the treatment of caesarean section (Kotaska, 2009). Development and maintenance of breech skills and services is important to the provision of humane and dignified maternity care (Lokugamage and Pathberiya, 2017).

1.3 A minority position

Approximately 3-4% of babies present breech at term (Impey et al., 2017). The RCOG (2015, p. 2) classify anything with an incidence of 1/10 – 1/100 as "common." But breech presentation is much less common, compared to vertex presentation, which forms part of the international definition of "normal birth" (WHO, 1996, p. 4). Breech is a minority position.

In most high resource maternity care settings, a significant majority of breech-presenting babies at term are born by caesarean section (Hehir, 2015; Sharoni et al., 2015). In the UK, 2014-2016 national maternity statistics

indicated 0.4% of births were recorded as singleton vaginal breech births or breech extractions (NHS Digital, 2016). Many of these breech babies will have been born prematurely, so the rate of term vaginal births is likely to be lower than 1:10 of term breech presentations. Breech birth at term is a minority event.

In 2014, at a conference on Management of the Term Breech held at the RCOG, consultant obstetrician Michelle Mohajer reported findings from a telephone survey. Her survey found that only 27% of hospitals in England and Wales supported vaginal breech birth (14 October 2014). This figure reflects the global decline in numbers of breech births over the last three decades (Hehir, 2015; Sharoni et al., 2015). The decline accelerated after the publication of the Term Breech Trial (Hannah et al., 2000), a large international randomised controlled trial reporting increased risk of short-term neonatal morbidity and mortality for planned vaginal breech birth compared to planned caesarean section. Following this, several influential professional bodies issued guidelines recommending caesarean section delivery for all women whose babies present breech at term, including the RCOG (Johanson, 2001, p. 3): "The best method of delivering a term frank or complete breech singleton is by planned caesarean section." Although they all subsequently altered this recommendation in response to criticism (Bewley and Shennan, 2007; Glezerman, 2006; Kotaska, 2004), and to reflect the necessity of facilitating maternal choice regarding mode of childbirth (RCOG, 2006), reversal of this strict guidance was not widely reflected at local level in many areas throughout the UK and internationally (Daviss et al., 2010). Institutional support for breech birth at term remains a minority position.

Few UK studies have explored women's preferences regarding mode of childbirth for breech-presenting babies. But three studies have looked at the

preferences of UK maternity care professionals, a subset of the general population. Wright et al (2001) found that, among 279 UK obstetric speciality trainees, 23.6% preferred a vaginal breech birth. Groom et al (2002) found that, among 321 obstetric trainees, 30% of nulliparous respondents preferred a vaginal breech birth and 51% of multiparous respondents preferred a vaginal breech birth. Samarasinghe and Al Baghdadi (2012) found that, among 140 UK obstetricians, paediatricians, theatre staff, midwives and support staff, 37% preferred a vaginal breech birth. In general, preference for a vaginal breech birth is a minority position, although less of a minority than the numbers of women actually achieving a vaginal breech birth.

In 2012, Evans published, "Understanding physiological breech birth," describing her own observations from midwifery practice and building on the work of other midwifery and obstetric colleagues who had been advocating for mainstream recognition of the benefits of this approach (Banks, 1998; Cronk, 1998b; Krause, 2007; Louwen et al., 2012). The cornerstone of the physiological approach to breech birth was, and is, active maternal movement (Banks, 2007), including the use of upright maternal birthing position. The benefits of upright positioning have recently been recognised in UK midwifery textbooks (Bates and Crozier, 2015; MacDonald and Magill-Cuerden, 2011; Marshall and Raynor, 2014). But prior to 2017, while acknowledging the debate, the RCOG recommended (2006, p. 6): "Women should be advised that, as most experience with vaginal breech birth is in the dorsal or lithotomy position, that this position is advised." Professional support for and experience with physiological breech birth has been a minority position, influenced by professional power dynamics.

The 2017 publication of a new RCOG guideline on management of breech presentation, acknowledging the use of "all fours" maternal birthing position

(Impey et al., 2017, p. 5), suggests a shift in attitude. Some have observed increasing interest in supporting vaginal breech birth in general and described the revival of breech skills using a physiological approach as a "phoenix arising from the ashes" (Dresner-Barnes and Bodle, 2014, p. 30). It can take some time for minority voices to be heard in systems designed around the interests of the majority and the powerful. The first aim of this thesis is to clarify and amplify the minority voices of professionals attending physiological breech births, and by extension the minority interests of the women they serve. The intention is not to replace caesarean section with physiological breech birth as the culturally dominant mode of childbirth for breech presenting babies at term. I am working towards a relational model of care, in which maternity care cultures embrace multiplicity and the irreducible voices of minorities – because the individual is the smallest minority (McCartney et al., 2016).

1.4 Expertise enables autonomy

Many factors contribute to women's difficulty when trying to access support for a vaginal breech birth (Petrovska et al., 2016b), but the availability of professional expertise affects both the access to and safety of this option (Homer et al., 2015). Women are aware of this skills deficit (Caukwell et al., 2002). Research with on-line chat forums for women with breech pregnancies indicated lack of training and experience is a matter of public knowledge and discussion (Petrovska et al., 2016c), and "loss of clinical skills" in vaginal breech birth is identified as contributing to "limited care options and lack of choice" in the Childbirth Connection's *Blueprint for Action* (Angood et al., 2010, p. 23).

Low levels of experience are also much discussed in professional commentaries. Thornton and Hayman calculated that the number of vaginal breech births occurring annually in the UK in 2002 meant that the average UK midwife would attend only one breech birth every nine years (Thornton and Hayman, 2002); numbers of breech births have not increased since this calculation. Others point out that continuing to allow experience levels to shrink increases risks for the mothers and infants in cases of breech presentation diagnosed for the first time in labour (Bisits, 2017). And the "option of no option, in which breech presentation in a primigravida automatically forms the indication for caesarean section with no alternative" (van Roosmalen and Meguid, 2014, p. 1863) contributes to the continued decline in skills globally. This in turn leads to increased maternal morbidity and mortality in subsequent pregnancies, in all settings but especially in low resource areas (Vlemmix et al., 2013).

While low levels of skill and experience are widely acknowledged in the literature, professional guidelines insist they are required components of safe breech birth:

> American Congress of Obstetricians and Gynaecologists (2006, p. 137) (reaffirmed 2016): *The decision regarding mode of delivery should depend on the experience of the health care provider. Cesarean delivery will be the preferred mode of delivery for most physicians because of the diminishing expertise in vaginal breech delivery.*
>
> Royal Australian and New Zealand College of Obstetricians and Gynaecologists (2012, p. 2): *Reduced fetal risk from planned*

> *vaginal delivery:* [factors include] *Availability of a suitably experienced obstetrician.*
>
> Society of Obstetricians and Gynaecologists of Canada *(Kotaska et al., 2009, pp. 561–4)*: *Clinical judgement and the experience of the obstetrical team are the essential components of safe breech birth … The health care provider for a planned vaginal breech delivery needs to possess the requisite skills and experience. An experienced obstetrician-gynaecologist comfortable in the performance of vaginal breech delivery should be present at the delivery to supervise other health care providers … [T]he health care provider must evaluate his or her own system of breech selection, intrapartum management, delivery technique, and clinical experience.*
>
> Royal College of Obstetricians and Gynaecologists, United Kingdom (Impey et al., 2017, p. 4): *The presence of a skilled birth attendant is essential for safe vaginal breech birth. Units with limited access to experienced personnel should inform women that vaginal breech birth is likely to be associated with greater risk and offer antenatal referral to a unit where skill levels and experience are greater … All maternity units must be able to provide skilled supervision for vaginal breech birth where a woman is admitted in advanced labour and protocols for this eventuality should be developed.*

All of these guidelines place importance on *requisite skills and experience*, but none of them define what those are. One suggests it should be self-assessed. Medical professionals' *preferred mode of delivery* and *comfort* are also described as important factors, and these will necessarily influence their self-

perceived skill levels. In line with these guidelines and the available evidence on skill and experience among health professionals, "upskilling" has been identified as an important facilitator for supporting vaginal breech births (Catling et al., 2015, p. 141).

Women who wish to plan a vaginal breech birth experience this as difficult or impossible in many settings. Because of the inherent power difference between women and the maternity care professionals they depend on, pressure on women to consent to a caesarean section is a form of subjection, as is pressure on professionals to ensure women consent to caesarean section. Both can be understood as expressions of political violence (Harris, 2000). One of the mechanisms underpinning this imbalance is a self-perpetuating lack of skill and experience. My overall research question concerns the nature and process of upskilling: How can competence and expertise to support physiological breech birth be developed in contexts with minimal current experience?

1.5 "Breech at term" and other terms of interest

The population under consideration in this research is: Maternity care professionals who provide care for women pregnant with a breech-presenting baby at term. The expressions *maternity care professionals, practitioners* and *clinicians* include obstetricians, other medical doctors, midwives and nurse-midwives. *Breech* or *breech-presenting* refers to a baby positioned in the uterus bottom-, feet- or knees-down towards the pelvis, with the baby's head at the top of the uterus in the fundus. *Term* means between 37-42 weeks of pregnancy.

Cephalic or *vertex* presentation means head-down in the uterus.

Mode of childbirth refers to how the baby is born. In this thesis, *vaginal breech birth* or *breech birth* are used as general terms to refer to birth of a breech-presenting baby vaginally. *Vaginal breech delivery* or *assisted breech delivery* are used when referring specifically to literature which uses these terms, or a specific approach to breech birth in which the woman births in a supine position, usually involving the use of routine manoeuvres. *Physiological breech birth* refers to a breech birth in which the woman is encouraged to remain active in labour and assume the position of her choice for the birth. *Caesarean section* refers to an abdominal surgical delivery.

Upright maternal birthing position is a frequent but not essential feature of physiological breech birth, in which the choice of birthing position is a dynamic process led by the birthing woman. *Upright positions* include kneeling, hands and knees, "all fours," asymmetric positions, standing, squatting, using a birthing stool, and variations. *Supine* or *dorsal* refers to a position where the woman lies on her back. *Lithotomy position* is a supine position where the woman's legs are placed in stirrups.

Planned breech birth and *planned caesarean section* mean that the woman and her caregivers have chosen and prepared for this mode of delivery. It does not equate with actual mode of delivery because childbirth does not always go to plan. Identifying the planned mode of childbirth is important in randomised controlled trials and other intention-to-treat analysis of perinatal outcomes.

In maternity care literature, *fetus* is the term used to describe a baby in utero, after the embryonic period and up until birth. *Neonate* or *newborn infant* refer

to a baby who has recently been born, up to one month after birth. In most legal systems, a fetus does not have any legal rights independent of the mother, who maintains the human right to choose her mode of childbirth regardless of potential risks to herself or the fetus (Kotaska, 2017). While this distinction is important for maternity care professionals to make, in this thesis we have also used the general term *baby* to refer to both a term fetus and a neonate because this term is more accessible to the women who use maternity services. Although the population of interest in this research is maternity care professionals, the audience for the research may and should include women who are the recipients of maternity care.

A note about pronouns and names: This thesis is written predominantly in the first person, reflecting my methodological orientation. But when writing about published work that I have authored collaboratively with my supervisors and others, I sometimes also use collective pronouns.

Any abbreviations used in the text are spelled out completely the first time they occur, followed by the abbreviation in parentheses.

Chapter 2: Methodology and Research Design

This chapter outlines the ontological and epistemological underpinnings of this research. Ontology refers to what is known, or what can be said to be known. Epistemology refers to how such knowledge comes to be known. All research adopts a theoretical position that includes an ontological and epistemological perspective. This research adopts the theoretical perspective of critical realism, which uses a layered realist ontology and a constructivist epistemology. The rationale for these choices is explored below.

2.1 Methodology and the '*main point*'

The current controversy surrounding the expert debate on optimal management of breech presentation provides a vivid example of the contested nature of *truth* within the context of modern maternity care culture (Giddens, 2012). Health research articles concerning breech presentation invariably refer to this area of maternity care as being something that is contested, the management of which is controversial (Angood et al., 2010). The focus of the debate has been on whether or not vaginal breech birth is safe, compared to the option of caesarean section. These opening lines from a selection of breech research articles demonstrate how a dominant focus on one aspect of safety, in this case short-term neonatal outcomes, can easily shift into an implicit ethical imperative (***emphasis mine***):

> *About 3-4% of all pregnancies reach term with a fetus in the breech presentation. Data from previously published cohort studies have shown that, in general, planned caesarean section is* ***better*** *than*

> *planned vaginal birth for the fetus that presents as a breech at term* (Hannah et al., 2000, p. 1375).
>
> *A recent randomized trial presented convincing evidence that a planned cesarean section (CS) is* ***better*** *than a planned vaginal birth for the term fetus in breech presentation* (Ulander et al., 2004, p. 180).
>
> *Vaginal deliveries for breech presentations have long been a topic of debate. The Term Breech Trial by Hannah et al, published in 2000, confirmed for many physicians that neonatal risks associated with term breech births are much higher among planned vaginal deliveries and implied that cesarean deliveries* ***should be*** *systematically planned for all such women* (Goffinet et al., 2006, p. 1003).
>
> *The route of delivery in a term singleton breech presentation continues to be debated. The safety of vaginal breech delivery represents the* ***main point*** *of controversy* (Berhan and Haileamlak, 2016, p. 49).

Claims that research results can represent what is *true* or *best* about mode of birth are problematic in that they can be described as being both reductionist and hegemonic. This tendency reveals the positivist framework that dominates breech research, and much of the wider field of health care research (Broom and Willis, 2013).

The body of breech birth research contained in this thesis presents a response to the limitations inherent in the positivist empirical realism that

prevails in the current research literature on this area of clinical care. This response draws on the theoretical perspective of critical realism. Critical realism adopts a layered realist ontology, in which the empirical, that which can be observed or experienced, remains important (Bhaskar, 1997). The critical realist understanding of what *is* also includes underlying layers, described by Bhaskar as the *actual* and the *real*. These cannot be directly observed, but have observable regulatory and generative effects which can be measured empirically (Walsh and Evans, 2014). Critical realism is also described as endorsing a constructionist epistemology as it "attempts to explore and elucidate foundational tendencies that underpin surface phenomena" (Walsh and Evans, 2014, p. e3). This interest in the underlying generative mechanisms (Bhaskar, 1997) makes critical realism a particularly effective theoretical perspective for addressing the causes of social oppression. This aligns with the emancipatory axiology of this research, which aims to increase women's autonomy to choose their mode of childbirth with a breech-presenting baby by increasing professionals' competence and expertise to support this choice.

But in telling the story of this research, it would be inaccurate to say that this work originated in conscious and clear alignment with the critical realist tradition. My early guiding influences were the research traditions of constructivism and pragmatism. In synthesising these approaches I have gradually discovered myself to be working from what could more comprehensively be described as a critical realist perspective. In my methodological discussions and critiques, I will continue to reference literature from the constructivist tradition, which has shaped the way I have approached knowing about social phenomena, and the pragmatic tradition, which has influenced my concern with the practical effect of knowledge and research on observable empirical outcomes. As Niglas describes (2010, p. 6), "[T]he

philosophical positions of most researchers can be most appropriately represented by a number of philosophical continua."

Returning to the critique of the *main point*, constructivists contest the usefulness and viability of scientific universalism, which Reich (2009, pp. 42–3) describes as "implying (or disguising) hegemonic claims to power that run against current pluralistic tendencies and degrees of freedom in scientific discourses." By not revealing the socially constructed value judgements underpinning the description of one reality as *best*, such implicit claims to power also run against the ideals of evidence-based medicine (Greenhalgh et al., 2015) and woman-centred maternity care (Leap, 2009). The reductionist way of thinking inherent in positivist research and its place on the hierarchy of evidence (McCourt, 2005) has led to the subjugation of some women whose values conflict with the dominant discourse (MacKenzie Bryers and van Tiejlingen, 2010), by limiting or preventing their ability to autonomously choose between physiological and surgical modes of birth.

The use of a constructivist epistemology in this research provides an opportunity to circumvent the subjugation tendencies of other methodological approaches. Through the adoption of a position of mutuality and partnership between the researcher and the research subject, constructivism actively acknowledges the perspectives and values that each bring into the process of creating understanding and knowledge (Mills et al., 2006; Taghipour, 2014), and mirrors the approach to woman-centred care I would advocate in practice.

Finally, researchers who hold a pragmatic worldview are interested in "the viability of reality constructions and their practical consequences" (Reich, 2009, p. 42). Pragmatists would critique positivist debates about the *best* mode of birth for breech-presenting infants (the reality construction) on the

grounds that rather than enabling women to make choices about their health care using available evidence, the value judgement implicit in the constructed reality has effectively limited women's choices (the practical consequences). Although almost every researcher contributing to this debate claims to uphold the principle of maternal choice of mode of birth, research undertaken from care recipients' points of view (Homer et al., 2015; Petrovska et al., 2017) reveals a very different reality than that promised by person-centred, evidence-based health care (Greenhalgh et al., 2014, 2015). Neither constructivists nor pragmatists would argue to abandon methodical procedures and rigorous, logical analysis of conditions, interventions and consequences. Contextualised figures representing the risks and benefits of various options concerning mode of childbirth remain important. Striving to reduce unnecessary perinatal mortality remains important. But these are only part of each woman's complex web of reality.

What if we abandon the value-laden comparison with caesarean section? What if we step into the reality of that significant minority of women for whom vaginal breech birth remains a preference or a necessity? The focus then shifts from determining which mode of birth is *best*, to a focus on improving the care pathway and safety of vaginal breech birth. Rather than comparing it with caesarean section, the safety of vaginal breech birth becomes something that is evaluated with reference to *itself*, over time, across contexts and in relation to other available strategies and interventions. Improvement from this perspective means increasing access to experienced support to birth physiologically, while maintaining or improving the perinatal mortality rate. Knowledge is considered *good* and *useful* dependent upon its ability to affect one or both of these changes, when the goal is being able to produce and/or transform experienced realities from our theoretical assumptions (Reich, 2009).

2.2 Research design

This research employs a multiple methods design. I have combined multiple questions and multiple methods to address different aspects of the overall question: How can competence and expertise to support physiological breech birth be developed in contexts with minimal current experience? While I anticipated that the results would work together in some way to give a fuller understanding of the topic, I acknowledged that a multiplicity of irreducible and potentially conflicting results would emerge from each strand, and therefore refer to the overall design as *multiple methods* rather than *mixed methods*. This multiple methods approach was suited to the critical realist perspective, which maintains the importance of certain empirical outcomes, while seeking ways of knowing which enable exploration of the complex underlying mechanisms contributing to these outcomes in ways that may not be easily observable or measured. I will outline the methods I chose briefly below and reflect on these choices more fully both within the papers and in the critical analysis which follows them.

First, I asked: What should be the standards of competence for practitioners attending upright breech births? What are the principles of practice for physiological breech birth? What does 'expertise' mean in the context of physiological breech birth? These questions require descriptive answers, and it was important to answer them from the perspective of professionals with significant experience attending upright breech births. For the purposes of this research, I defined this as attendance at 20 or more breech births. I chose the Delphi consensus development method, delivered via e-survey, as best suited to achieving these objectives. I sought to develop consensus by first gathering

qualitative data in an open-ended survey, and then determining the extent of agreement in subsequent rounds using the quantitative method of Likert scales.

I also wanted to understand about the process of developing competence and the role of expertise, and asked the additional questions: How do practitioners develop competence in physiological breech birth? How does 'expertise' function in the context of physiological breech birth? To answer these questions, I wanted to explore the experience of professionals who were in the early stages of learning about upright breech birth. I chose to conduct semi-structured, in-depth interviews with midwives and doctors, and analyse the transcripts using a constructivist grounded theory framework. Grounded theory methods were suitable to the goal of developing a model of breech competency acquisition which was based on contemporary empirical data and could be tested in future research (Glaser and Strauss, 1967). The constructivist approach, rooted in the pragmatist heritage of grounded theory (Charmaz, 2006), enabled me to focus on meaning and process at the subjective and social levels, rather than rendering an account of overt behaviour.

Finally, I wanted to understand the meaning and function of physiological breech expertise in contemporary maternity care cultures. My initial analysis suggested that blending the perspectives of highly and moderately experienced professionals would enable me to explore the concept from multiple angles (Bryman, 2006). I sought to perform an interactive integrative analysis, incorporating data from both the Delphi and grounded theory arms of the overall project, using a parallel convergent mixed methods design (Creswell and Plano Clark, 2011). I describe this paper as mixed methods because data from two different research methods is blended interactively at

the point of analysis to answer the question: What is the meaning and function of breech expertise?

While this description and Figure 1 represent the overall plan and progression of my work, the process was not completely linear. For example, in the process of analysing the first round of qualitative data from the Delphi survey, it became apparent that the experienced panellists viewed upright maternal positioning as "a tool and not a rule" of physiological breech birth (Walker et al., 2016b). I reflected this insight back on the research question, modifying it and clarifying the focus on principles of *physiological* rather than *upright* breech birth. Similarly, the original ethics approval included provision for comparative analysis of the Delphi and grounded theory data sets, but it did not initially stipulate the shape of this comparison. Only during the course of the parallel analyses did tensions become apparent between the need for expert mentors identified in the grounded theory study, and the resistance to the idea of *breech experts* among the experienced Delphi panel. Comparative analysis on this topic enabled a fuller understanding than just one perspective could provide.

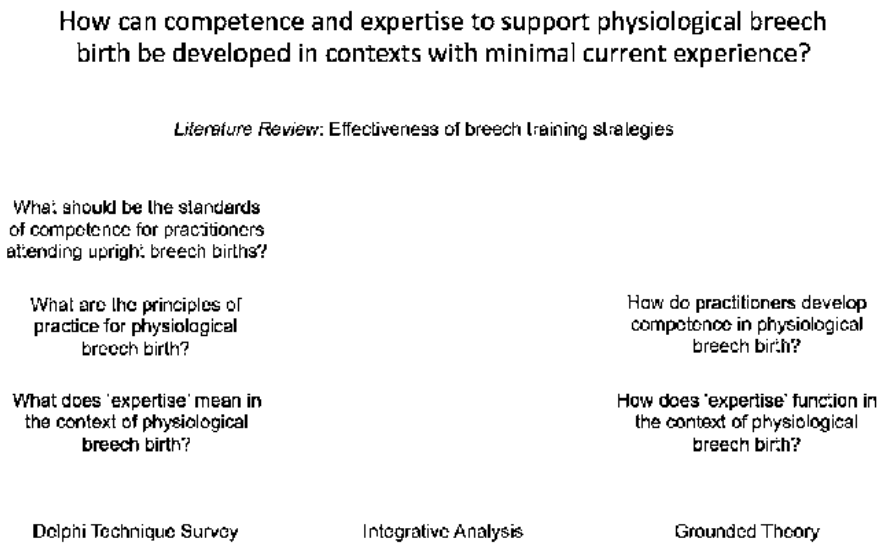

Figure 1. Overall design of the research contained in this thesis

2.3 Researcher's perspective

> *Science is a human activity. Therefore, whatever we scientists do as we do science has validity and meaning, as any other human activity does only in the context of human coexistence in which it arises. All human activities are operations in language, and as such they occur as coordinations of coordinations of consensual actions in conversations that take place in domains of actions specified and defined by some fundamental emotion. The fundamental emotion that specifies the domain of actions in which science takes place as a human activity is curiosity under the form of the desire or passion for explaining. Furthermore, that which constitutes sciences as a particular kind of explaining is the criterion of validation that we scientists use, explicitly or implicitly, to accept our explanations … [W]e scientists become scientists, while operating under the passion for explaining, when we constitute science as a particular domain of explanations by being rigorous in our endeavour to be always impeccable in the application of the criterion of validation of scientific explanations as we generate explanations that we call scientific explanations. It is this manner of constitution of science and the scientist that gives the use of science its particular operational effectiveness in the worlds in which we modern human beings live (Maturana, 1991, pp. 30–1).*

I began the self-reflexive portion of this introduction with an extended quote from constructivist scientist Maturana because it resonates with me. I respond to this passage as an aesthetically beautiful description of how I perceive myself as a scientist and my own methodological orientation to research. My research produces results, expressed as explanations and recommendations,

which are intended to have operational effectiveness within contemporary maternity services. But the achievement of these results is regulated by language and socially shared meanings, which are a continually negotiated through human relationships. And the generative mechanism, the passion, which underpins my commitment to continual negotiation, is an interest in human rights and wish to end the political violence inherent in inhumane maternity care. Before I begin to explain how some maternity care practitioners develop competence and expertise in physiological breech birth, and how I and my co-authors feel that we know about this, I want to bring into awareness my own passions and experiences, which have led up to the particular expression of *passion for explaining* contained in this thesis.

My educational background and first academic passion is in literature, particularly poetry. Literary scholars are interested in things like affective power (*What does this text do, and how does it do it?*), and literary truths are slippery, negotiated and imperfect concepts. These lenses foreshadow my affinities with pragmatist and constructivist approaches to research. Stockwell (2009, p. 30), writing about the cognitive poetics of literary resonance, describes how "The stylistic manner of neglect is the key to resonance." The lost, the unsaid, and the abandoned trouble the experience of literary texts in a way which draws us in. The affective power and resonance of research findings also depend, to a certain extent, on their ability to bring forward into awareness truths, or circumstances, which have become obscured or overpowered by whatever else is currently attracting most people's attention on the topic. It would be fair to say I have had a life-long interest in neglected or obscured voices.

The introduction outlined the presence of a demand for physiological breech birth, emerging research supporting a physiological approach, and the

centrality of professional competence and expertise to address both safety of and access to vaginal breech birth. This reflects the order in which I encountered these sets of circumstances in my own career and the way my perspective on the problem has been shaped by my own experience. My local clinical and research context, the UK, also influences this research. This is reflected in my predominant but not exclusive use of UK professional guidance and literature.

During training and in my early practice of midwifery, I became aware that some women who wished to plan a vaginal breech birth felt that their voices were not heard within their maternity care services. Working as an independent midwife brought me into contact with women who were not getting what they needed within the UK National Health Service (NHS), and looked outside that system for help and support. The problem that confronted me as an independently working home birth midwife was that neither I nor my clients felt that home was the safest place for them to give birth to their breech-presenting babies. Supporting these women to navigate their way back into the NHS system made me aware of the unhelpful tension inherent within the counselling provided to women whose babies were in the breech position. On the one hand, these women were repeatedly told that the level of breech birth expertise was crucial to the safety of their infant. On the other hand, they were warned that the attendance of a health professional with adequate experience of managing breech at their birth could not be guaranteed.

I began to work with local service user representatives on the Maternity Services Liaison Committee to advocate for a care pathway for women pregnant with a breech-presenting baby. The service users were primarily concerned about women receiving balanced information and genuine choices

regarding mode of childbirth. This early experience corresponds with the *a priori* position I have taken in this research: A significant minority of women will prefer to plan a vaginal birth for their breech-presenting babies. Therefore, services and research should focus on how to facilitate this fairly and safely.

Working with management and the multi-disciplinary team, I was able to establish a care pathway within the NHS hospital in which I completed my midwifery training. I worked within that pathway for 20 months as a Breech Specialist Midwife. To date, I have counselled hundreds of women pregnant at term with a breech-presenting baby about their choices. I have attended 15 vaginal breech births, and many others in which a vaginal breech birth was planned but caesarean section was decided to be the safest course of action during labour. Only two of the vaginal breech births I have attended were unplanned, first diagnosed in labour. Some of the births I have attended have been entirely straightforward, physiological events. Several of them have needed assertive intervention. One involved an entrapment of the aftercoming fetal head, resulting in newborn hypoxic ischaemic encephalopathy. This experience has remained present and significant for me, highlighting the importance of the occasional requirement to use complex skills to resolve complications. The purpose of my research is not to deny the risks associated with vaginal breech birth; on the contrary, my emphasis is on recognising that in a minority of cases complications potentially resulting in harm do occur.

My clinical experience and my review of the evidence indicate that women will continue to choose to birth breech babies vaginally when given the choice, and that many would prefer to do this in a way they perceive as *normal,* similar to the cultural norms of birth in general, involving active maternal movement and choice of birthing position. Because of this, striving to find

ways to develop the complex skills required to support the choice of physiological breech birth is a worthy aim of woman-centred health care.

This thesis is proleptically written for and toward a future in which very different assumptions are made about what is *better*. In this envisioned future, the fundamental assumption is that human women give birth to human babies, that many variations of normal are expressed in this spontaneous process and, that interventions in that process are offered but not mandated. Many mothers of breech babies birth their babies vaginally, for many different reasons associated with their unique, individual values. Health professionals acknowledge and work with this wide range of human values when assisting women to make decisions about how they will birth their breech babies. And because breech presentation is a common variant of human birth, affecting 1:25-30 women, health services collectively prepare for the eventuality of vaginal breech births. In these services, being *better* means being honest, balanced, and responsive to individual women's needs and choices.

Chapter 3: Literature review

Knowledge about how professionals develop competence and expertise in physiological breech birth can be applied in the creation of professional development programmes that are potentially more effective at increasing access to and safety of vaginal breech birth. Understanding how others have designed, implemented and evaluated currently existing training programmes provides a context for this doctoral research within the current landscape of clinical education. The integrative review below examined the evaluation literature around existing breech training programmes in order to determine which, if any, current methods of breech training appear effective, and the quality of the evidence to suggest effectiveness. No other published review of literature about breech training was identified, so this review also filled a gap in the literature.

3.1 Effectiveness of vaginal breech birth training strategies

Reference

Walker S, Breslin E, Scamell M, Parker P (2017) Effectiveness of vaginal breech birth training strategies: an integrative review of the literature. *Birth*. 44(2):101-9

Abstract

Background: The safety of vaginal breech birth depends on the skill of the attendant. The objective of this review was to identify, synthesise and report the findings of evaluated breech birth training strategies.

Methods: A systematic search of the following on-line databases: Medline, CINAHL Plus, PsychINFO, EBM Reviews/Cochrane Library, EMBASE, Maternity and Infant Care, and Pubmed, using a structured search strategy. Studies were included in the review if they evaluated the efficacy of a breech birth training programme or particular strategies, including obstetric emergency training evaluations that reported differentiated outcomes for breech. Out of 1040 original citings, 303 full-text articles were assessed for eligibility, and 17 methodologically diverse studies met the inclusion criteria. A data collection form was used to extract relevant information. Data were synthesised using an evaluation levels framework, including reaction, learning (subjective and objective assessment) and behavioural change.

Results: No evaluations included clinical outcome data. Improvements in self-assessed skill and confidence were not associated with improvements in objective assessments or behavioural change. Inclusion of breech birth as part of an obstetric emergencies training package without support in practice was negatively associated with subsequent attendance at vaginal breech births.

Conclusions: Due to the heterogeneity of the studies available, and the lack of evidence concerning neonatal or maternal outcomes, no conclusive practice recommendations can be made. However, the studies reviewed suggest that vaginal breech birth training may be enhanced by reflection, repetition and experienced clinical support in practice. Further evaluation studies should prioritise clinical outcome data.

Keywords: breech presentation, clinical competence, training, integrative review

Introduction

This review identifies and assesses the effectiveness of training programmes intended to improve the skills and knowledge of health professionals to facilitate vaginal breech birth. Approximately 3-4% (1:30) fetuses present breech at term. In the United Kingdom (UK), 2012-2013 national maternity statistics indicated 0.5% of births (1:200) were recorded as singleton vaginal breech births or breech extractions (Health and Social Care Information Centre, 2013). While a majority of breech-presenting infants are born by caesarean section, skills to facilitate vaginal breech birth remain important and have been highlighted as a research priority by the latest Cochrane Review on term breech delivery (Hofmeyr et al., 2015). Additionally, evidence exists that more women would choose to attempt vaginal breech birth (Yee et al., 2015), but many meet resistance from health care providers who prefer a caesarean section delivery due to perceived short-term neonatal benefits (Vlemmix et al., 2014a) and a lack of skill and confidence to safely facilitate vaginal breech birth (Homer et al., 2015, Petrovska et al., 2016a, Powell et al., 2015). Due to a lack of evidence of long-term benefits associated with planned caesarean section for breech presentation (Hofmeyr et al., 2015), and continuing calls to reduce caesarean rates (Caughey et al., 2014; Larsen and Pinger, 2014; van Roosmalen and Meguid, 2014), access to providers with expertise in facilitating vaginal breech births is an important care quality goal.

In this review, we aimed to consider the effect of available training according to 4 levels of evaluation, as described by Kirkpatrick (Kirkpatrick, 1967), and including both intended and unintended outcomes, as recommended by Yardley and Dornan (Yardley and Dornan, 2012):

1. *Reaction*: Do participants like the training? Do they feel it is relevant

and useful to their practice?

2. *Learning*: Have their attitudes changed? (level 2a) Have participants acquired new knowledge? Have their technical clinical skills improved? (level 2b)
3. *Behaviour*: Does the training result in the use of the skills and knowledge gained in practice?
4. *Results*: How does the training impact society? Does it increase access to a skilled provider? (level 4a) Does it improve neonatal or maternal outcomes? (level 4b)

We also sought to gain insights on effective strategies of breech education.

Methods

A search strategy was designed to identify relevant literature and conducted independently by the first and second authors. The initial search was completed in October 2015, with follow-up search of literature in September 2016, following consultation with the City, University of London, academic librarian. The following search engines and databases were used: CINAHL Plus, Medline, PsychINFO, EBM Reviews/Cochrane Library, EMBASE, Maternity and Infant Care, and Pubmed, in order to identify recent grey literature, such as evaluations and conference reports not distributed through commercial publishers. Key search words and Boolean operators included the phrase/MeSH term 'breech presentation' AND one of the following stem words: competence (competen*), confidence (confiden*), training (train*), skill (skill*), simulation (simulat*), mentor (mentor*), OR supervisor (supervis*). A hand search of reference lists was conducted. The search was limited to literature published since 1995 with a title and abstract available to be screened in English. Following elimination of duplicates and initial screening

of titles and abstracts, a total of 303 full-text articles were retrieved. Inclusion criteria were that the article report on a vaginal breech birth training programme involving maternity care professionals. Articles were excluded due to lack of relevance to vaginal breech birth, lack of post-training outcome data, and lack of differentiated outcomes for vaginal breech birth where general obstetric emergency training was evaluated. General surveys of trainees' vaginal breech birth experience as part of obstetric specialist training were excluded. A PRISMA Flow chart of this process is provided in Figure 2 (Moher et al., 2009). Included studies were appraised for relevance and methodological rigour and relevance using a 2-point scale (higher or lower), by agreement of the authors [Table 1]. Critical Appraisal Skills Programme tools were used (Critical Appraisal Skills Programme (CASP), 2014). No study was excluded on the basis of this appraisal, but it informed the subsequent analytic process.

A total of 17 studies, including 16 published papers and 1 conference report, were identified as relevant and included in this review. An attempt was made to obtain the complete study behind the conference report in order to evaluate methodological rigour; this was not provided, but the conference report contained a clear table of relevant information which was included. The studies reviewed included two randomised controlled trials (Buerkle et al., 2013; Crofts et al., 2007), four standardised observational assessments (Deering et al., 2006; Jordan et al., 2015; Noblot et al., 2015; Thornburg et al., 2014), five self-evaluation surveys (Evensen et al., 2015; Johanson et al., 1999; Locksmith et al., 2001; Taylor and Kiser, 1998; Walker et al., 2013), two exploratory analyses using scenario based structured questions (Johanson et al., 2002a, 2002b), two before-and-after outcomes studies (Maouris et al., 2010; Spitzer et al., 2014), a mixed methods process

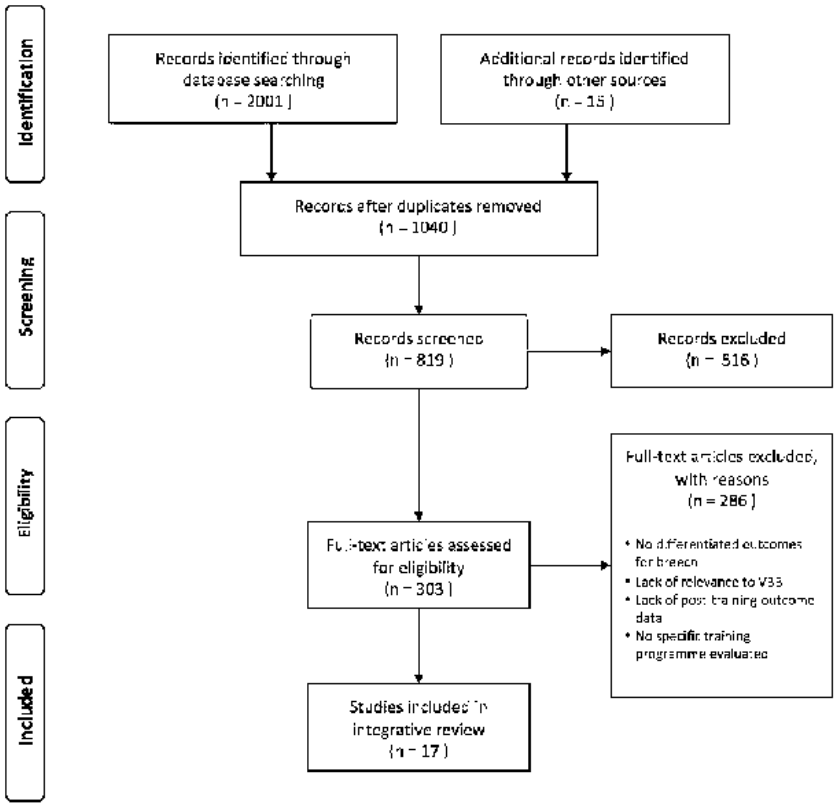

Figure 2. PRISMA flow chart for integrative review of breech training

evaluation with the predominate methodology being qualitative (Ellard et al., 2014), and descriptive report (Dolo et al., 2016). Several of the studies used more than one method of evaluation, and gathered both quantitative and qualitative data. Where evaluations of obstetric emergency training were included, only differentiated vaginal breech birth outcomes were included in this review. Relevant data was extracted using a Microsoft® Excel programme spreadsheet independently by the first and second authors, in consultation with the other two authors. One article was identified that was written in French, and this was translated and data extracted by the second author and the French-speaking scholar acknowledged as a contributor. The findings were then synthesised in a framework based on Kirkpatrick's hierarchy (Kirkpatrick, 1967), as described above. Due to the heterogeneity of the studies identified, no meta-analysis was possible; therefore an integrative narrative approach was used to synthesise the broad range of data and report

the results of the review (Whittemore and Knafl, 2005). Given the identified literature, the results are more useful to hypothesis generation, rather than hypothesis testing, so no attempt has been made to assign strength of evidence to the findings.

Results

Types of training

All studies included simulation-based training, with varying amounts of theoretical instruction, opportunities for repetitive practice of manual skills and facilitated reflection. Nine of the programmes evaluated included vaginal breech birth within a general obstetric emergencies course (Crofts et al., 2007; Evensen et al., 2015; Johanson et al., 1999; Johanson et al., 2002a, 2002b; Maouris et al., 2010; Spitzer et al., 2014; Taylor and Kiser, 1998; Walker et al., 2013). Six programmes evaluated taught vaginal breech birth as an advanced clinical skill, either on its own or along with a small number of other advanced skills (Buerkle et al., 2013; Deering et al., 2006; Jordan et al., 2015; Locksmith et al., 2001; Noblot et al., 2015; Thornburg et al., 2014). Two programmes evaluated included one-to-one support in clinical practice as an explicit part of the training, following theoretical and practical training (Dolo et al., 2016; Ellard et al., 2014). The studies included in this review are organised according to these three broad categories in *Table 1: Vaginal breech birth training: Summary characteristics of included studies*.

Evaluation outcomes

The 17 studies in this review reported evaluation outcomes related to vaginal breech birth training in the following domains: reaction, learning (subjective and objective assessment) and behavioural change. None of the 16 studies

reported impact data, such as changes in neonatal or maternal health outcomes associated with vaginal breech birth training.

Reaction

Where reported, those attending obstetric emergencies training courses rated the breech station highly on relevance and learning value (Johanson et al., 1999). Negative feedback focused mostly on courses being too 'rushed,' with not enough time at each station. While this qualitative feedback was not differentiated for breech, this theme was repeated in feedback from three evaluations of obstetric emergencies training programmes (Johanson et al., 1999; Johanson et al., 2002a, 2002b). Some authors observed participants demonstrating particular interest in repeatedly practising breech birth skills on mannequins, attributed to the rarity with which they encountered breech births in the delivery room (Jordan et al., 2015).

Learning: Subjective assessment

Five studies reported self-assessment data (Buerkle et al., 2013; Locksmith et al., 2001; Taylor and Kiser, 1998; Thornburg et al., 2014; Walker et al., 2013). This data was collected via pre- and post-training questionnaires, most often using Likert or rating scales to assess participants' feelings of confidence and ability to manage vaginal breech births. Each of these studies demonstrated an immediate increase in self-assessed confidence and/or knowledge. However, this effect eroded within 72 hours (Buerkle et al., 2013) or 6 weeks (Walker et al., 2013) in two of the studies. The largest and most sustained increases in self-assessed skill and confidence were observed in training programmes offering multiple opportunities to practice simulated skills throughout the year (Locksmith et al., 2001; Thornburg et al., 2014). Only one study compared different methods of training (Buerkle et al., 2013). In their RCT, Buerkle et al (2013) reported significantly increased confidence

immediately following 30 minutes of hands-on training for European medical students, compared to a 30 minute lecture/demonstration; however, when assessed again at 72 hours, there was no significant difference between the two training groups. There was no difference between the groups at any point in self-assessed performance. Given the previously reported reaction feedback that participants often felt 'rushed' during short training stations, it may be that 30 minutes is too short a time to affect lasting change in learning-related outcomes for vaginal breech birth.

Learning: Objective assessment

Eight studies reported outcomes related to objective assessments of skill and/or knowledge (Buerkle et al., 2013; Crofts et al., 2007; Deering et al., 2006; Johanson et al., 2002a, 2002b; Jordan et al., 2015; Noblot et al., 2015; Thornburg et al., 2014). Change in knowledge was assessed using scenario-related or multiple choice questions. Improvement in technical skill was assessed using objective structured observations of performance in simulated scenarios. Three studies demonstrated no improvement in objectively assessed learning (Crofts et al., 2007; Johanson et al., 2002b; Thornburg et al., 2014), including one in which participants had reported a sustained increase in confidence to manage a breech delivery (Thornburg et al., 2014). In each of these, breech delivery was included as part of an obstetrics emergency course featuring multiple different skills. Two evaluations demonstrated improvement that eroded within a short period of time or was minimal compared to other topics on the training programme (Buerkle et al., 2013; Johanson et al., 2002a). Three studies demonstrated significant and sustained improvement in objectively assessed learning (Deering et al., 2006; Jordan et al., 2015; Noblot et al., 2015). In each of the three demonstrating significant objective improvement, vaginal breech birth training was delivered either on its own or as part of a training package including only a few

obstetric/midwifery skills, each of which provided multiple opportunities for reflection on performance and repetition. This again suggests that effective vaginal breech birth training benefits from an unhurried atmosphere and planned reinforcement of learning. Two studies compared different types of training. Buerkle et al's (2013) trial demonstrated improved immediate outcomes when hands-on training was compared to a lecture/demonstration, but as with the self-assessed learning outcomes, the differences diminished by 72 hours at the training. Crofts et al's (2007) randomised controlled trial compared obstetric emergencies training conducted in simulation centres and local hospitals, and with the inclusion of teamwork training. Neither location nor the use of teamwork training had an effect on the multiple choice question-assessed knowledge scores, and breech was the only component of the training which showed no significant difference between pre- and post-training scores.

Behavioural change

Seven studies reported data related to behaviour change in practice (Johanson et al., 2002a; Locksmith et al., 2001; Maouris et al., 2010; Taylor and Kiser, 1998). Quantitative data indicated a nil or inverse relationship between participation in obstetric emergencies training programmes containing vaginal breech birth and performance of vaginal breech birth in subsequent practice (Locksmith et al., 2001; Maouris et al., 2010; Spitzer et al., 2014; Taylor and Kiser, 1998). This included two studies in which participants reported a sustained increase in comfort with vaginal breech birth skills following training, but with no associated change in numbers of vaginal breech births attended in practice (Locksmith et al., 2001; Taylor and Kiser, 1998). Although the headline result of Maouris et al's (2010) evaluation of interactive, hands-on training of obstetric emergencies in Western Australia was a reduction in the overall caesarean section rate, subgroup analysis of

vaginal breech births as a percentage of all births declined from 1.15% pre-training to 0.4% post-training due to a marked increase in caesarean section for breech. Three studies reported qualitative data indicating participants were using the breech skills learnt in clinical practice (Dolo et al., 2016; Ellard et al., 2014; Johanson et al., 1999). In Ellard et al's (2014) evaluation of an extended training package for non-physician clinicians in obstetric emergencies and newborn care, which included one-to-one clinical support following theoretical and simulation training, participants reported using specific vaginal breech birth skills learnt in clinical practice. 'Several' trainees reported cascading the training to other health care workers and a belief that the vaginal breech birth training had reduced the use of caesarean section for breech. Similarly, in Dolo et al's (2016) descriptive report, the two midwives enrolled on an obstetric clinican training programme, which included an apprenticeship with support in clinical practice, attended 21 vaginal breech births in the 18 months included in the evaluation.

Discussion

The available evidence does not answer the questions of how the safety of vaginal breech birth can be improved, or how access to a skilled provider can be increased. However, time for reflection and repetition, and clinical support in practice appear to enhance the training outcomes evaluated. Reaction data indicated participants valued and were motivated to participate in vaginal breech birth simulation training, but multiple obstetric emergencies courses reported participants felt 'rushed.' In all of the studies where self-assessment data demonstrated initial increases in comfort, confidence and/or knowledge, for most, this difference had declined significantly in follow-up studies, and even sustained increases in confidence were associated with no change in objectively assessed skill and/or no increased likelihood of performing vaginal

breech birth in practice. The objective assessment data revealed no improvement in performance and/or knowledge when vaginal breech birth was taught as part of obstetric emergencies training packages, but did suggest some improvement when vaginal breech birth was taught on its own or with a small number of obstetric/midwifery skills, as part of training strategies that incorporated more repetition and reflection. Behavioural change data indicated a nil or inverse relationship between participation in obstetrics emergency training programmes and subsequent attendance at vaginal breech births in practice, unless this was augmented by support in clinical practice.

The strength of this review is the use of both qualitative and quantitative data from several different vaginal breech birth training packages to provide insight into why some models of vaginal breech birth training appear to affect more lasting or significant change than others, and to suggests avenues for future research. The major limitation is that, due to the wide disparity among the studies, no conclusions can be drawn to recommend changes in practice. Another limitation is that, due to outcome reporting bias, other relevant studies may have been missed (Kirkham et al., 2010). The initial database searches resulted in the inclusion of nine studies, and the remaining eight references were included after conducting a thorough hand-search of all reference lists. The eight that were added all evaluated general obstetric emergencies courses, and most reported negative or eroding results in the vaginal breech birth category. They were likely not retrieved in the initial search because other more successful results were indexed in the reporting, for example significant changes in shoulder dystocia or postpartum haemorrhage management.

The strongest evidence for training programmes is data demonstrating an

impact on neonatal and/or maternal outcomes associated with the implementation of the training. The one study included in this review that did link training to a reduction in Apgar scores <7 also demonstrated a very large reduction in the number of breech-presenting babies actually born vaginally during the same period, and therefore provides no evidence that performance of vaginal breech delivery itself actually improved (Maouris et al., 2010). Similarly, a UK-based study of an obstetric emergencies course reported an improvement in neonatal outcomes following training, but breech presentations were excluded from the analysis (Draycott et al., 2006). The report does not clarify why outcome data for breech-presenting infants was excluded in an evaluation of a course that includes vaginal breech birth training.

The lack of association between sustained or increased levels of confidence and the domains of objective assessment or behavioural change demonstrated in these studies, suggests that at best self-assessment as an evaluation feature has limited usefulness, and at worst may introduce false confidence. This finding aligns with the results of a systematic review indicating lack of accuracy of physician self-assessment compared with observed measures of competence (Davis et al., 2006). However, improvement in objectively assessed simulated performance and knowledge is also only useful if the change in performance actually results in an improvement in safety; rigid adherence to a rote set of behavioural procedures could potentially limit problem-solving ability in complex scenarios (Kolb, 1984). Without data linking subjective or objective assessments to neonatal outcomes, it is impossible to know for sure which if either will influence safety outcomes. Future training evaluations should strive to include safety data.

Training may also be enhanced by co-ordination with specific strategies to ensure experienced clinical supervision. In one of two studies in this review including one-to-one support to implement training in clinical practice, participants subjectively reported decreased use of caesarean section for breech and increased ability to manage vaginal breech births in practice (Ellard et al., 2014), and in the other they reported attending a significant number of VBBs in the 18 months post-training (Dolo et al., 2016). In their review of factors associated with adverse clinical outcomes among obstetrics trainees, Aiken et al recommended undertaking more directly supervised procedures may reduce adverse outcomes (Aiken et al., 2015). Gannard-Penchin et al reported excellent neonatal outcomes where over 60% of vaginal breech births were managed by trainees under direct supervision, in a unit where specific training in vaginal breech birth is offered to all trainees (Gannard-Pechin et al., 2013).

It may seem obvious that clinical supervision by experienced mentors would enhance training, but in the UK, for example, a recent study found only 66% of trainees who had attended vaginal breech births had received supervision in practice (Dhingra and Raffi, 2010), and as recently as 2015 a UK coroner wrote to the Chief Medical Officer to emphasise the importance of having a consultant present at all breech deliveries (BBC, 2015). This suggests adequate clinical supervision strategies are not universally in place, perhaps because not all obstetric consultants are confident to supervise vaginal breech births (Catling et al., 2015). It may also be that trainees passing objective structured assessments of simulated performance have been deemed 'competent' to facilitate vaginal breech birth, and are therefore perceived as not requiring continued supervision. The results of this review suggest it would be worthwhile to evaluate training that specifically includes a strategy to provide clinical supervision by identified vaginal breech birth

specialists (e.g. professionals who attend at least 3-6 vaginal breech births per year) (Walker et al., 2016a) in a setting with a low average perinatal mortality rate. Maier et al (2011) and García Adánez et al (2013) have demonstrated on-call arrangements can achieve good neonatal outcomes while facilitating women's vaginal breech birth choices.

Finally, although many of the studies reviewed included midwives in the training and evaluation, all of the studies and training packages were led by obstetricians. McKenna et al (2011), in their review of midwifery educational leaders on the use of simulation in midwifery education, noted a need to develop approaches that reflect midwifery care provision in the context of a woman-centred, holistic approach to care. Greater interdisciplinary input, especially from midwives and the women who use maternity services, alongside obstetric expertise, will be required to develop and evaluate training packages including vaginal breech birth skills within a paradigm of complex normality (Walker et al., 2016b).

Conclusion

This review highlights the paucity of evidence supporting current strategies of vaginal breech birth skills training, none of which have been thoroughly evaluated to determine their effect on clinical outcomes. No research was identified correlating a specific vaginal breech birth training programme with neonatal or maternal outcome data, and this is a research priority. Centres reporting outcome data related to vaginal breech birth should report training and competence assessment strategies as well as practice parameters. The currently available research suggests directions of potentially fruitful enquiry, rather than strong practice recommendations. However, the review calls into question the evidence base for providing vaginal breech birth skills training via general obstetrics emergencies courses. The most successful objective

results were seen in training programmes focusing on vaginal breech birth alone or with a small number of other advanced obstetric/midwifery skills. In order to support women's informed choice of vaginal birth, breech training may benefit from programmes that provide time for reflection, repetition and self-directed practice of manual skills. One-to-one support in clinical practice from someone who attends vaginal breech births regularly appears to enhance trainees' and professionals' confidence to actually attend vaginal breech births.

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Table 1. Vaginal breech birth training: Summary characteristics of included studies

Author / Date / Setting	Training / Sample	Methods / Rigour / Relevance	Results
General obstetric emergencies courses			
Crofts et al, 2007, UK	Obstetric emergencies training; 1 or 2 day courses +/- teamwork training. 140 doctors and midwives, junior and senior	RCT; multiple choice questionnaire Rigour 1 / Relevance 1	Breech only component that showed no significant improvement
Evensen et al, 2015, Ethiopia	Obstetrics emergencies courses, 1-2 days or 2-3 days. 111 health care workers (doctors, midwives, paramedics)	Validated Likert scale survey of self-assessed confidence pre-, post- and 6 months after training Rigour 2 / Relevance 1	Immediate post-course increase in confidence; by 6 months breech was only station with no difference to pre-course scores
Johanson et al, 1999, UK	Obstetric emergencies training, 2 days theory and simulated practice. 30 specialty trainees in obstetrics	Post-training survey; rating scale on relevance and learning value; free text Rigour 2 / Relevance 1	Considered relevant (9.6/10), with learning value (8.9/10); 2/19 free text answers indicated performing VBB better in practice
Johanson et al, 2002, Armenia	Obstetric emergencies training, 2 days theory and simulated practice. 8 obstetricians	Composite score: scenario-based structured questions, objective assessment of simulated performance by instructor Rigour 2 / Relevance 1	Breech one of only two scenarios that did not demonstrate improvement
Johanson et al, 2002, Bangladesh	Obstetric emergencies training, 2 days theory and simulated practice. 9 obstetric staff (3 consultants, 2 registrars, 4 medical officers)	Composite score: scenario-based structured questions, objective assessment of simulated performance by instructor Rigour 2 / Relevance 1	Minor improvement in breech, compared to other stations, at least one candidate performed worse following training
Maouris et al, 2010, Western Australia	Obstetric emergencies training, 1 day. Each of 14 rural and remote hospitals in WA, small teams of 4-8	Retrospective analysis of pre-training and post-training outcomes Rigour 2 / Relevance 1	Vaginal breech birth rate declined from 1.15% to 0.45% of total birth rate (statistically significant)
Spitzer et al, 2014, Kenya	5-day obstetric emergencies course. 80% of hospital staff received training	Prospective analysis of pre-training and post-training outcomes Rigour 2 / Relevance 1	Non-significant decline in vaginal breech births as % of total birth rate
Taylor & Kiser, 1998, USA	Obstetric emergencies course. 275 doctors and midwives	Self-assessed comfort, performance in practice Rigour 2 / Relevance 1	Increase in comfort between pre-training and 1 year post-training; no change in % attending vaginal breech in practice
Walker et al, 2013, Australia	Obstetric emergencies course. 165 midwives and doctors	Prospective repeated measures survey, pre-, post- and 6 months after training Rigour 2 / Relevance 1	Increase in self-assessed knowledge and confidence; levels declined by 6 weeks, including all 3 measures related to breech
Vaginal breech as an advanced clinical skill			
Buerkle et al, 2013, Germany	30 min demonstration or 30 min hands-on training. 172 medical students	RCT; OSATS scores, self-assessment, global rating, performance time Rigour 1 / Relevance 2	Short-term evaluation outcomes improved with hands-on training; no difference at 72 hrs

Deering et al, 2006, USA	Impromptu simulated scenario, videotaped, training, discussion; repeated 2 weeks later; breech only skill taught. 20 residents in 2 obstetrics & gynaecology training programmes	Standardised objective assessment, blinded to training status Rigour 2 / Relevance 1	Improvement in 8/12 key skill components; Improvement in objectively assessed performance and safety
Jordan et al, 2015, France	1 day simulation course, cephalic and breech delivery, theory, assessed simulated performance; taught alongside 2 gynae surgery skills. 20 residents (17 in OB/GYN, 3 in medical gynecology)	Simulation assessed by senior resident, 3 months apart Rigour 2 / Relevance 1	Score improved between sessions; participants felt feeling of progress after 1st and 2nd sessions; 3/20 felt confident to facilitate breech; Liked hands-on breech practice
Locksmith et al, 2001, USA	Training including routine use of Laufe-Piper forceps at caesarean section. 43 trainees from study centre and 89 controls	Survey of self-assessed comfort and skill with LPF, experience with forceps for breech, likelihood of attending a breech in practice Rigour 2 / Relevance 2	Self-assessed comfort and skill increased; no affect on level of experience of forceps for breech, or likelihood of attending vaginal breech birth in practice
Noblot et al, 2015, France	1 day course in complicated breech and shoulder dystocia (3 hrs each). 250 doctors, midwives & nursery nurses in small groups of 2-3	Video-taped simulation performance assessed on pre-established grid (score/100) Rigour 2 / Relevance 1	Significant overall improvement, especially domains of know-how, technique, communication with patient, safety
Thornburg et al, 2014, USA	Periodic lectures and simulation training in rarely observed and used obstetrical skills; end of year assessment. 21 obstetric residents	Identification and knowledge based questions; simulation judged by single observer Rigour 2 / Relevance 1	Significant increase in self-assessed knowledge over 1 year; no change in objectively assessed knowledge
Training programmes featuring an explicit 'support in clinical practice' component			
Dolo et al, 2016, Liberia	2-year apprenticeship training programme in obstetric procedures, combining theory and practice. 2 midwives	Descriptive report; number of vaginal breech births attended in 18-month apprenticeship period following theoretical training Rigour 2 / Relevance 1	21 vaginal breech births managed by 2 midwives in 18-month period
Ellard et al, 2014, Malawi	Obstetric emergencies training; additional 1:1 clinical support, leadership training. 54 non-physician clinicians	Mixed methods process evaluation; predominately qualitative Rigour 2 / Relevance 1	Thematic analysis of interviews included reports of improved VBB practice (2/39), cascading learning, reduced CS for breech

Rigour and relevance were assessed on a 2-point scale by agreement of the authors following critical appraisal. Rigour pertains to the design of the evaluation and the strength of the evidence it is able to provide. Relevance pertains to the study's applicability to the design of training for qualified obstetricians and midwives. No study was eliminated on the basis of this appraisal, but it informed the analytic process.

3.2 Critical Analysis

The overall aim of the research contained in this thesis is to explore how competence and expertise in physiological breech birth can be developed, in order to increase access to and the safety of this option. The purpose of conducting this review was to learn how existent breech training programmes have been designed and evaluated to achieve these purposes. In line with the critical realist approach, certain empirical outcome measures remain important. But this critical analysis will also explore how valuing of constructivist ways of knowing may be a useful adjunct to achieving these aims, where more positivist methods have fallen short.

This integrative review focused on the outcomes which had been measured and reported. It did not include reflection on the types of training programmes evaluated and the types of measures used, but this is relevant to the overall project in this thesis, so it is included here. A majority of the studies included in the review evaluated training programmes that were structured as formal teaching activities, in which participants were expected to learn and perform standardised methods of managing a breech delivery. The learning activities followed a behaviourist model, which views learning as a change in performance and emphasises procedural knowledge (Michels et al., 2012). This reflects an *a priori* belief that standardised performance improves outcomes (Ennen and Satin, 2010). The grounded theory research reported later in this thesis challenges this assumption. Participants in the grounded theory study reported becoming aware of their own competence and confidence as they abandoned systematic approaches, and began to use their own holistic understanding of breech birth to solve unique clinical problems. One participant described standardised approaches perceived as inherent in mainstream models of breech training and practice as a "cooking

cutter model," and directly contrasted this with teaching and learning arising out of lived experience.

The structure of evaluated breech training programmes may also reflect how a dominant positivist research paradigm has influenced the way learning is understood, and learning activities are structured. Complex interventions are notoriously difficult to evaluate within a positivist paradigm (Kotaska, 2004). The more complex a skill is, the more challenging it is to identify which aspect of the intervention is associated with which observable outcomes. It may be that standardisation for the sake of measurement and evaluation has itself influenced the perceived value of that standardisation, and the actual content of the training programmes. This is a central tenet to the constructivist epistemology and its critique of positivism. As Steedman puts it (1991, p. 54), "We do not deploy seeing in the activities of observation with a mind purged of all its contents; just the opposite is true, we need to know what *sort* of thing we are looking for before we find anything to which we could give a name." Standardisation of procedures for the sake of measuring their effects makes them visible and potentially influences participants, instructors and researchers to see them as more valuable.

The most significant contribution of our review is the revelation that no current breech training programme is underpinned by evidence of improved perinatal outcomes, for neonates or mothers. Measurement of clinical outcomes is considered the gold standard for training evaluation (Kirkpatrick, 1967). Although a majority of the papers reviewed adopted positivist methods of evaluation, they fell short of producing the highest standard of evidence in this paradigm. Instead, papers reviewed reported results related to perceived usefulness, change in feelings of confidence, change in knowledge and performance, and behavioural change in practice, e.g. whether participants

attend more or fewer breech births after training. Another significant finding was the lack of correlation between self-reported outcomes and objectively assessed outcomes. This suggests a weakness in these methods of evaluation, as one measurement cannot be considered a proxy for the other, and it remains unclear whether either is associated with changes in access to and safety of vaginal breech birth. Without further correlation with clinical outcome data, neither self-reported outcomes nor objectively assessed outcomes can be associated with improved clinical practice or outcomes in practice.

This suggests one possible benefit of the multiple methods approach taken in this doctoral research. Methods using practitioners' own words, exploring their meanings and perceptions of how they have learned breech skills, step aside from the *a priori* assumption that standardised approaches used in formal training programmes are effective. This potentially allows for exploration of the generative mechanisms of breech confidence and competence, which may not be easily observable or measurable. For example, only two of the studies in the integrative review included mentorship in clinical practice as a specific, organised component of the training programme itself (Dolo et al., 2016; Ellard et al., 2014). These were also the only two studies in which attendance at actual breech births appeared to increase following training. The increase was subjectively reported by participants rather than objectively measured. In one sense, a subjective account of events which could be measured objectively is less accurate; in another sense it suggests that trainees' confidence increased as well. This finding resonates with the perceived importance of clinical mentorship from experienced practitioners with generative expertise reported in the mixed methods paper on *Expertise* contained in this thesis (Walker et al., 2017c). The holistic value of clinical

mentorship, based on relationship, may not be reducible to measurable components, performable behaviours or demonstrable skills and knowledge.

A key strength of this integrative review of breech training strategies is multi-disciplinary input in the review process, reflecting the commitment to co-creation of shared knowledge. As lead author, I conducted the literature search, built the tables used in analysis and synthesis of our findings, led the interpretation and wrote the paper. The second author, Mr Eamonn Breslin, is a consultant obstetrician. His role was to repeat and verify the literature search, independently extract relevant data, contribute to the analysis, synthesis and interpretation of the findings, and critically review and suggest revisions to our paper. My PhD supervisors, Dr Mandie Scamell and Professor Pam Parker, provided on-going advice and feedback throughout this process, including during the design of the review, and they contributed to the critical review and revision of the final paper. I began this thesis by recognising how the marginalisation of minority voices and hegemony of the majority operates to subjugate women, denying them autonomy over what happens to their bodies. The choice of methods at each stage sought to avoid a similar imbalance in this research. Involving a consultant obstetrician helped avoid the pitfalls of myopic interpretation of the results from a midwifery viewpoint, as skills for vaginal breech birth are a concern shared jointly between the midwifery and obstetric professions. Multi-disciplinary research practice also models the multi-disciplinary clinical collaboration that emerged as fundamental to breech care in the research that follows this review.

An apparent weakness in the review, mentioned by one reviewer, is the paucity of studies identified and their diversity, which made it difficult to make meaningful practice recommendations. Although we did evaluate the quality of the studies included, not enough literature was identified to make a systematic

review and meta-analysis of only positivist studies useful or relevant. The review adopted an integrative approach and narrative report (Whittemore and Knafl, 2005), which enabled use of the diverse literature and various types of data contained in evaluation reports. Without the expansion of paper selection afforded by the integrative approach, the review would not have included the repeated qualitative feedback that participants in obstetric emergencies courses felt 'rushed,' which helped shed light on why such courses demonstrated minimal sustained changes in confidence and knowledge when assessed using quantitative methods. The integrative approach helped to identify what type of evaluation and/or research would be useful in the future, but did not draw strong conclusions about current methods.

In the context of this thesis, it is also a drawback that all of the training programmes evaluated focused on methods of breech delivery where the woman births in a supine position and manoeuvres are almost always required, rather than a physiological approach including upright maternal birthing positions. This is further evidence of the hegemonic discourse and dominance of this approach within breech clinical practice and research. Although the review indicates that the evidence is not of a high standard, these methods are the only approaches for which any evidence of efficacy exists.

Despite these shortcomings, the results of the review are relevant to current professional debates about breech training. While the evidence in this review indicates that skills for vaginal breech birth are commonly taught as part of obstetric emergencies courses, midwives have argued that breech birth is an unusual normal (Banks, 2007; Cronk, 1998a; Evans, 2012; Walker, 2012), and should be taught as an advanced midwifery skill (Sloman et al., 2016). The evidence was not strong enough to establish a definite correlation

between teaching breech birth skills as part of an obstetric emergencies course and a decline in vaginal breech births, but the results of the review do suggest an association is likely. The lack of strong evidence for evaluated methods of formal training makes exploration of other methods of training and learning a reasonable undertaking.

Resonance with existing literature and results reported in this thesis suggest the fruitfulness of approaching the study of complex educational interventions using multiple methods of enquiry, which maintain the importance of observable clinical outcomes such as perinatal mortality, but adopt a more open and relational approach to understanding how they are achieved. The qualitative data reported from the evaluations contributed significantly to interpretation of the quantitative results. As von Glasersfeld describes (1991, p. 24), "[T]he constructivist teacher will not be primarily interested in observable results, but rather in what students *think* they are doing and *why* they believe that their way of operating will lead to the solution of the problem at hand." In the context of breech skills, observable results in the realm of clinical and attitude outcomes remain important: perinatal morbidity and mortality, ability to access support for a vaginal birth, changes in confidence among practitioners and satisfaction among women. But collecting observable short-term results for compartmentalised formal training programmes may be less relevant than gathering qualitative data exploring how participants understand what they are doing and why.

Since this review was conducted, I and my training colleagues have published our own evaluation of the physiological breech birth training programme based on this research (Walker et al., 2017b). This is included in Appendix 2. We used similar measures to those reported in the literature to enable a basis for comparison, but also reported qualitative data providing insight about how

understanding was achieved. We have also begun a further evaluation, including the perinatal outcome measures we identified as important but missing in this research.

Chapter 4: The Delphi method

This chapter includes two published papers reporting the results of the Delphi arm of the research, one methodological review, and a critical analysis.

4.1 Standards for professionals attending planned upright breech births

Reference

Walker S, Scamell M, Parker P (2016) Standards for maternity care professionals attending planned upright breech births: A Delphi study. *Midwifery* 34:7–14.

Abstract

Objective: to establish a consensus of opinion on standards of competence for professionals attending upright breech births.

Design: a three-round Delphi e-survey.

Setting: multi-national.

Participants: a panel of thirteen obstetricians, thirteen midwives and two user representatives. Clinicians had attended >20 upright breech births, or >10 upright among >40 total breech births. Mean level of experience = 135 breech births, median = 100 breech births.

Methods: an initial survey contained open-ended questions. Answers were coded and amalgamated to form 164 statements in the second round and 9 further statements in the third round. Panellists were asked to evaluate their agreement with each statement using a 5-point Likert scale. The pre-determined level of consensus was 70% of respondents indicating agreement or strong agreement with the statement.

Results: the panel returned a consensus-level agreement on 63 statements under the theme, 'Standards of Competence.' Panellists supported teaching breech as a 'normal' skill rather than an emergency, including optimal mechanisms and breech-specific progress measures, upright variations of classical manoeuvres, the initiation of resuscitation with the umbilical cord intact, birth videos as learning tools, and the development of breech teams to support the wider team in all maternity care settings.

Conclusions: while every health professional should maintain basic competence to assist unanticipated breech births, establishing enhanced training and standards for those who support planned breech births may help protect users and providers of maternity services, while introducing greater choice and flexibility for women seeking the option of vaginal breech birth.

Keywords: breech presentation; midwifery; obstetrics; training; clinical competence; Delphi

Introduction

Mode of birth for breech presentation (approximately 3-4% at term) remains the subject of much controversy. Vaginal breech birth (VBB) carries a two-to five-fold greater relative risk of short-term morbidity and mortality than caesarean section (CS) (Berhan and Haileamlak, 2016), but long-term outcomes (serious neuro-motor delay or death at 2 years) appear similar when either VBB or CS is planned (Hofmeyr et al., 2015). Despite the unfavourable short-term comparison to CS outcomes, a recent meta-analysis demonstrated that the absolute risk of VBB is lower and more similar overall to cephalic vaginal birth than previously believed, with 0.3% perinatal deaths from 75,193 deliveries (Berhan and Haileamlak, 2016). The further issue of increased risks in future pregnancies due to a scarred uterus means that VBB remains some women's preferred option (Guittier et al., 2011; Homer et al., 2015). It may also be the only option where breech presentation is diagnosed late in labour. As noted by the most recent Cochrane Review on the topic, strategies to reduce the risk of VBB by means other than CS remain important (Hofmeyr et al., 2015).

Another area of controversy concerns the most advantageous position for the mother to adopt when a VBB does occur. On the basis of the majority of providers' experience, the RCOG guidelines currently explicitly recommend lithotomy (2006). However, the RCOG note some very experienced providers suggest upright maternal positioning (eg. mother kneeling, hands/knees, on a birthing stool, standing) affords physiological advantages (Banks, 2007; Evans, 2012; Louwen et al., 2012). In addition, service user representatives and mothers telling their own stories have advocated for more choice with regard to VBB and maternal positioning (Berkley, 2006; Thurlow, 2009).

These calls for more flexibility resonate with research indicating that women feel a lack of involvement in decision-making around the time of birth when in lithotomy position (Molkenboer et al., 2008), that choice of position is restricted for breech births more than for cephalic births, (Toivonen et al., 2014) and that upright positioning may lead to greater maternal satisfaction in childbirth (Thies-Lagergren et al., 2013).

However, while enabling women to make an informed choice about both mode of birth and position of birth is an important ethical principle, professionals are also required to practice within the limits of their own training and competencies (GMC, 2013; NMC, 2012). The achievement of clinical competence in even mainstream lithotomy methods of breech delivery is a real concern given the decline in VBBs over the last few decades (Paterson-Brown and Howell, 2014; Thornton and Hayman, 2002). The research reported in this manuscript addresses a need to consider the contextualised meaning of competence adequate for the safe support of planned VBBs in contemporary maternity care.

Further objections to the use of upright and active maternal positioning for VBBs revolve around the lack of evidence for the efficacy of this practice (Beech, 2003). Although MRI pelvimetry studies support the theory that upright and active positioning create greater space in the pelvis (Reitter et al., 2014), only limited comparative safety data is available from practice. One small study has indicated hands and knees maternal positioning significantly reduces severe perineal trauma with no clinical difference in neonatal outcomes compared to classical lithotomy methods (Bogner et al., 2015), but larger studies are needed to confirm these observations. On the other hand, lack of significant comparative data also provides little justification for the continued intervention of lithotomy position in place of maternal choice of birth

position, recommended for other normal births (NICE, 2014). Impetus for a cultural shift to include training in active maternal positioning for VBBs will require more definitive safety research. Potential trials exploring the effects of maternal positioning and professional training on outcomes for VBB require the intervention be well defined, including a full description of standards of professional practice and competence; this research seeks to provide that description.

Methods

A Delphi e-survey was used to establish a consensus of opinion among breech-experienced midwives and obstetricians on standards of competence for professionals attending upright VBBs. The purpose of the Delphi method is to develop consensus through a series of sequential questionnaires known as 'rounds,' interspersed with controlled feedback. Initial data from open-ended questions is coded and amalgamated to formulate statements, which are then put to the panel for evaluation in subsequent rounds. The process continues until a pre-determined level of consensus is achieved, usually over three rounds. This methodology is particularly useful when, due to a lack of available empirical evidence, a structured group opinion is sought, but convening the desired group is practically difficult. The Delphi method has been applied in many areas of medical and midwifery practice, including analysis of professional characteristics and competencies, developing education programmes, exploring clinical skills, and enabling expansion of the midwifery sphere of practice to include a specialist skill set (Eskes et al., 2014; Fullerton et al., 2011; Michels et al., 2012; Walker et al., 2015a).

Participants

The perceived expertise of the panel underpins the credibility of the Delphi method, and therefore sampling is a fundamental methodological concern that is described in detail (Cornick, 2006; Hasson and Keeney, 2011). This study prioritised experience in the niche area of practice under consideration. The selection criteria for inclusion on the panel of experienced practitioners was: 1) attendance at a minimum of 20 upright VBBs or at least 10 upright VBBs and a minimum of 40 VBBs overall; and 2) involvement in teaching about VBB. *Upright breech birth* was defined as a vaginal breech birth in which the woman is encouraged to be upright and active throughout her labour, and is able to assume the position of her choice for the birth. The number 20 was chosen based on the career total of 25 VBBs attended by Mary Cronk, MBE, referred to as one of "the most skilled midwives in the UK" in a published report of a breech birth conference that took place at the RCOG in 2003 (Beech, 2003, p. 5). The criteria was modified to 10 upright and 40 total to enable the inclusion of more experienced obstetricians on the panel.

Seventy-eight (78) potential panellists were identified initially from a review of recent literature concerning VBB and conference activities (*purposive sampling*). Invites were sent to professionals who had published recent peer-review articles concerning VBB management or observational series, or spoken at conferences concerning VBB. It was often not possible to determine if upright positions were part of these professionals' practices, or to what extent, so this criteria was not applied during these recruitment activities. Each respondent from this initial group was also asked to nominate others in their professional network important to include in the research, and each of the additional forty-five (45) professionals who were not already contacted were invited to participate (*network sampling*). The response rate to these invitations was 46% (56/123). Finally, information about the research was posted on social media sites: Coalition for Breech Birth (Facebook), Breech

Birth Network (Facebook), Breech Birth Professionals (LinkedIn), and the breechbirth.org.uk website (*social media sampling*). This resulted in another 23 expressions of interest. Of the initial 79 respondents, 40 did not join the panel due to the eligibility criteria. The recruitment process resulted in:

- purposive sampling: 29 expressions of interest, 22 participants
- network sampling: 4 expressions of interest, 2 participants
- social media sampling: 6 expressions of interest, 4 participants

Delphi surveys in niche areas of professional practice typically involve small panels; approximately 20 participants is considered acceptable, and the inclusion of service users is recommended (Baker et al., 2006; Walker et al., 2015a). Multi-professional panels are preferable, to ensure no one professional interest dominates (Hutchings and Raine, 2006), and this study balanced midwifery and obstetric expertise. This study's final panel included 13 obstetricians, 13 midwives and 2 service user representatives from the following countries: Australia, Austria, Brazil, Canada, Germany, Mozambique, New Zealand, United Kingdom, and United States of America. The experience level of the panel is summarised in *Table* 2. Panellists worked clinically in a variety of settings; at least half worked primarily in hospitals, but the panel's experience also included birth centres and home births. In addition, two service user representatives involved in national organisations were invited to participate, to incorporate the perspective of consumers who have acquired expertise by virtue of having experienced the impact of breech pregnancy, and supported others in a similar situation (Powell, 2003).

Table 2. Self-reported experience levels of Delphi panel members

	Years of experience	Total breech births	Breech births in upright positions
All	**693**	**3511**	**2030**
range	5-60	20-400	8-400
mean	27	135	78
median	25	100	30
Midwives	**335**	**1116**	**904**
range	5-50	20-400	10-400
mean	27	86	70
median	25	50	25
Obstetricians	**338**	**2395**	**1126**
range	12-60	40-400	8-225
mean	25	184	87
median	22	150	60
Two service user representatives were also included on the panel.			

All participants consented to participate. Each panellist received a list of fellow participants at the end of the second round of the survey *[Table 3]*, but all responses remained anonymous. Ethical approval was obtained from the Research Ethics Committee of the City University London School of Health Sciences (Ref: PhD/14-15/13).

Table 3. Delphi Panellists

Prof Melania Amorim, Professor of Obstetrics and Gynaecology, ISEA and IMIP, Campina Grande and Recife, Brazil

Dr Maggie Banks, Home Birth Midwife, Midwifery Educator, New Zealand

Dr Andrew Bisits, FRANZCOG, Director of Obstetrics, Royal Hospital for Women, Randwick, NSW, Australia

Dr Gerhard Bogner, Senior Consultant and Acting Manager for the Department of Obstetric and Gynecology, Paracelsus Medical University, Salzburg, Austria

Cynthia Caillagh, Traditional Midwife, Certified Professional Midwife (NARM), Licensed Midwife, Wisconsin, USA

Mary Cooper, Senior Community Midwife, Ohio, USA

Mary Cronk, MBE, Retired Independent Midwife, UK

Prof Hannah Dahlen, Midwife in Private Practice, Professor of Midwifery, University of Western Sydney, Australia

Jane Evans, Independent Midwife, UK

Dr Annette Fineberg, Obstetrician, Sutter Davis Hospital, California, USA

Dr Stuart Fischbein, FACOG, Home birth obstetrician, California, USA

Julie Frohlich, Consultant Midwife, St Thomas' Hospital, London, UK

Diane Goslin, Certified Professional Midwife, Pennsylvania, USA

Robin Guy, Consumer Advocate; Co-founder, Coalition for Breech Birth, Ottawa, Canada

Dr Michael Hall, MD, FACOG, Assistant Clinical Professor, Swedish Hospital and University of Colorado Health Services Centre, Denver, Colorado, USA

Dr Dennis Hartung, MD, OB/GYN, FACOG, Hudson Hospital, Wisconsin, USA

Sherri Holley, Certified Professional Midwife, Oregon, USA

Dr Andrew Kotaska, MD, FRCSC, Clinical Director of Obstetrics and Gynecology, Stanton Territorial Hospital, Yellowknife, Canada

Dr Michael Krause, MD, Obstetrician, Klinikum Nuremberg, Nuremberg, Germany

Dr Jorge Kuhn, MD, OB, São Paulo, Brasil

Dr Katharina Lüdemann, Obstetrician, St. Josef-Stift, Delmenhorst, Germany

Dr Michel Odent, MD, Obstetrician, Founder of Primal Health Research Centre, London, UK

Whitney Pinger, Certified Nurse Midwife, Associate Clinical Professor, Director of Midwifery Services, George Washington Medical Faculty Associates, Washington DC, USA

Dr Anke Reitter, FRCOG, Obstetrician and Gynecologist, Fetal Maternal Medicine Specialist, Frankfurt, Germany

Margarett Scott, Certified Professional Midwife, Oklahoma, USA

Dr Rhonda Tombros, Co-Founder, Breech Birth Australia and New Zealand, Consumer Representative

Gail Tully, Certified Professional Midwife, Minnesota, USA

Stephanie Williams, Clinical Director and Certified Professional Midwife, Mozambique

Data Collection and Analysis

The process of this Delphi e-survey is depicted in *Figure 3*. The study took place between June 2014 and June 2015. FluidSurveys on-line software was used to administer the surveys. A secure link to the web-based survey was sent directly to each panellist's professional e-mail address, along with a participant information sheet containing a brief literature review. Answers

were downloaded collectively on a Microsoft® Excel programme spread sheet containing only the participant's responses and identification code, while personal identities were kept in a separate file. Only the researcher had access to these files, which were stored on a secure university server and encrypted laptop, in accordance with university guidelines. Data analysis was performed using QSR International's NVivo 10 qualitative data analysis Software for Mac. The researcher and two research supervisors had previously published peer-reviewed research using Delphi methods or other qualitative methods.

In line with classic Delphi method (Keeney et al., 2010), the first round of the survey contained mostly open-ended questions, designed to gather rich data (Hasson and Keeney, 2011). These initial 30 questions were grouped under the following topics on separate pages: panellist background, defining 'normal for breech,' defining deviations from 'normal for breech,' identifying core competencies, achieving competence, professional updating, and expert practitioners. Participants were also asked whether standards for achieving competency in breech birth should be the same for doctors and midwives (yes/no). Following agreement in the first round by 83% of the panellists that they should, the remainder of the research was structured to reflect this premise.

Responses from the first round were amalgamated using a coding process, in which data containing similar opinions were grouped and compared to contrasting views found in other participants' responses. Representative statements were then chosen for each code, using the exact language of the participants wherever possible, and ensuring minority viewpoints were recommended. Where a completed statement was required for a particular code, but could not be obtained verbatim from the data, one was formulated

that encapsulated the data under that code. Completeness was checked by highlighting all of the coded data, confirming that all participant responses were reflected in the representative statements.

As a result of this amalgamation process, 164 statements were formed reflecting the panellists' views. Statements were then sorted into 10 organisational categories, suggested by the data: first principles, maternal positioning, birth setting, fetal positions, assessments, assisting, additional skills, basic competence, maintaining proficiency, and expertise. In the second round, participants were presented with the statements grouped under these categories, each allotted a separate page in the survey. Questions were randomised within each page. Participants were asked to rate their level of agreement with each statement on a 5-point Likert scale (5=strongly agree, 4=agree, 3=neutral, 2=disagree, 1=strongly disagree). The level of consensus was pre-set at 70% of respondents indicating agreement with the statement (answer 4 or 5).

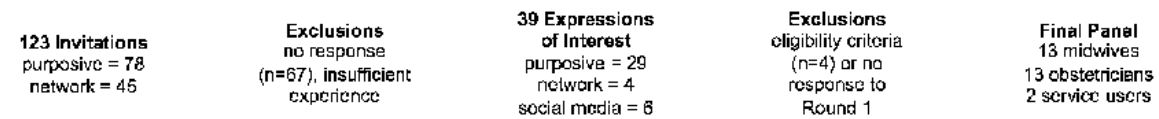
Of the original 28 panellists, 82% contributed to the second round of the Delphi survey, with 96% completing every page of the survey (completion rate). The survey did not require a response to every question, and in the second round, 74% of participants rated every statement (completeness rate). Figures for each statement were calculated individually according to the number of responses for that statement (range 20-23). Some additional open-ended questions were included in the second round to seek the wider panel's views on numbers of births required, after participants suggested numbers were a relevant consideration in the first round. Participants had an opportunity to make optional comments on each category page of the survey and were able to navigate between pages of the survey to review and change their answers before submitting. They were also able to return to the survey

multiple times in order to complete it. Nine (9) statements in the third round were formed from panellists' comments, clarifying or modifying statements from the previous survey. 82% of the original panel participated in the final round, with 100% completion and completeness rates.

The data analysis and design of each survey round was closely supervised by two experienced researchers, who reviewed the data, coding and completeness. The second round survey was piloted prior to distribution by two health professionals with moderate breech experience, to assess the clarity of the statements arising from the first round data, as well as the usability and functionality of the electronic Likert questionnaire. In the case of one multiple entry for the second round from the same computer, the second data set was eliminated prior to analysis.

At the conclusion of the study, for the purpose of thorough reporting, the 125 categorised statements were aggregated under the following themes: Standards of Competence; Principles of Practice; Qualities Associated with Expertise. This paper reports the results under the theme, 'Standards of Competence,' as these results have general applicability to all breech births. Other themes will be reported in separate publications. The Standards of Competence theme covers the following 5 organisational categories: assessments, assisting, additional skills, basic competence, maintaining proficiency.

Sampling and Recruitment



Round 1 of Survey

Figure 3. Delphi e-survey process

Results

The experienced panellists participating in this Delphi survey research returned a consensus-level agreement on 63 statements under the 'Standards of Competence' theme. These statements are reported in *Tables 3 & 4*.

The panel established a consensus on a list of core skills and attributes for professionals attending VBBs that could be included in training programs or structured reflections to develop competence and confidence [*Table 4*]. The ability to facilitate an informed consent discussion that demonstrates respect for maternal intelligence and autonomy, while being realistic about the inability to guarantee a perfect outcome, was recognised by the panel as a unique clinical skill requiring training and practice. This statement was formulated from the response of a service user representative, and achieved the highest

level of consensus of any statement in this research, illustrating the value of including consumers in research of this type.

The manoeuvres described by the panel to assist upright breech births resemble in principle those used to assist lithotomy births, such as Mauriceau (manual flexing of the head, following the sacral curve), Løvset (rotational manoeuvres for the arms) and suprapubic pressure. The panel also indicated consensus-level support for new manoeuvres, specific to upright births attended from the dorsal aspect of the woman, involving subclavicular pressure on the fetal torso to achieve head flexion, as described by Evans (2012). Some of the identified skills have not previously been articulated in obstetric literature, most of which focus only on lithotomy births requiring assistance. The recommended skill set is outlined in *Table 4*.

Despite having attended on average almost as many classical lithotomy VBBs as upright VBBs, the panel suggested that 'physiological breech birth' should be the standard of basic competence for all professionals, including the use of active maternal positioning and teaching the facilitation of VBB as a 'normal' skill rather than an emergency. This departs significantly from obstetric paradigms asserting that spontaneous breech deliveries occur mostly in preterm births and are not recommended at term (Winter et al., 2012). The panel recommended assessment skills such as understanding the optimal mechanisms and progress specific to VBBs, acknowledging the ability to recognise the need (or lack of need) for intervention as equally important to the ability to perform manoeuvres. In line with their overall valuing of an optimal physiology approach, the panel also returned a consensus that those attending VBBs should be competent to initiate neonatal resuscitation (transition to life) with the infant attached to the umbilical cord.

Although VBBs are typically associated with the liberal use of technological assessments, such as detailed ultrasound of fetal biometrics and position, and electronic fetal monitoring (RCOG, 2006), the panel's consensus statements revealed reservations about the assumed benefit and awareness of the limitations of these technologies. Instead, the results emphasized the importance of well-developed clinical skills, such as palpation and close observation of labour and fetal wellbeing.

The establishment of minimal requirements concerning the number of births required to achieve and maintain competence proved highly controversial despite a consensus-level agreement that such a number would be useful [*Table 5*]. Some panellists declined to return an answer, and many explained that competence is both individual- and context-dependent. Individuals acquire skills and knowledge at different rates, and 35% of the panellists expressed concern that any requirement to attend certain numbers of breech births with a mentor or annually would be difficult to achieve, entirely eradicating the practice of VBB in many areas. Consequently, the panel's highest level of agreement was reached around the principle that while a minimal number may be useful as a guideline, more emphasis should be placed on the individual practitioner's ability to adapt and acquire the necessary skills to support VBBs. Rather than asking the panel to validate a single number, the guideline numbers have been reported as a range bounded by the mode (most common answer) and median (mid-range answer) of all responses. For achieving competence, the data suggested attendance at 10-13 VBBs with a mentor. For maintaining proficiency, the data suggested attendance at 3-6 VBBs per year.

Given the general depletion of VBB skills and opportunities, one of the hospital-based panel members suggested a 'specialist' breech team in every

labour setting with at least one member on each shift (or on-call) would be advantageous, and this statement met consensus-level agreement. However, the panel agreed the role of 'specialists' is to mentor and support breech skills development throughout the entire maternity care team, rather than functioning as experts of an exclusive skills set.

Table 4. *Consensus statements on skills for professionals attending upright vaginal breech births*

Percentage of panel in agreement, Likert mean and standard deviation (SD)
Likert scale: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

Statement	*%*	*Mean*	*SD*
Assessment Skills – *Breech care providers should develop the following assessment skills:*			
Assessment of optimal and delayed progress specific to breech labours	100	4.73	0.46
Ability to closely assess fetal well-being	100	4.68	0.48
Ability to closely observe mother-baby unit	100	4.59	0.50
Identification of optimal mechanisms	95	4.45	0.60
Perform a detailed clinical assessment using palpation	86	4.50	0.86
Determine whether baby is coming freely or is stuck by the signs of the baby part that is visible	86	4.18	0.80
Identification of level of pelvis where head entrapment has occurred	75	4.05	0.76
Visual assessment of umbilical cord	73	4.05	1.09
Use of Technology			
Practitioners should have an awareness of the limitations of CTG monitoring in the second stage of labour.	91	4.27	0.63
Ultrasound is not necessary to the safe support of breech births, but can occasionally be useful.	73	3.82	1.14
Assisting and Manoeuvres – *Health professionals attending upright breech births should be competent to assist in the following ways:*			
Rotational manoeuvres for the arms	86	4.23	1.02
Moving baby's body to mum's body, so that baby's body follows the curve of the woman's sacrum	86	4.05	0.95
Sweeping down the arms	82	4.23	0.87
Suprapubic pressure	82	3.91	0.92
Assisting rotation of the fetal back to anterior (when the mechanism has deviated from normal)	77	4.00	0.69
Manual flexing of the head	73	4.05	1.09
Sub-clavicular pressure and bringing the shoulders forward to flex an extended head	73	3.95	1.05

Pressure in the sub-clavicular space, triggering the head to flex	73	3.91	1.02
Additional Core Skills – *The following should also be considered core skills and/or attributes for health professionals attending breech births:*			
Facilitating an informed consent discussion that demonstrates respect for maternal intelligence and autonomy, while being realistic about the inability to guarantee a perfect outcome	100	5.00	0.00
Patience	100	4.91	0.29
Competence and confidence supporting physiological birth whether the baby is breech or cephalic	100	4.91	0.29
Effective communication	100	4.91	0.29
Willingness and ability to observe labours closely and carefully	100	4.86	0.35
Remaining calm in a stressful environment	100	4.86	0.35
Good inter-professional team working	100	4.82	0.39
Inspiring confidence in women	100	4.82	0.39
Avoiding interference unless indicated	100	4.77	0.40
Trust in birth	100	4.73	0.46
Escalating and acting appropriately in an emergency	100	4.73	0.46
Manage the distress of others (birth supporters, family members, health professionals)	96	4.64	0.58
Neonatal resuscitation (transition to life) while attached to the umbilical cord	91	4.64	0.66
Assisting births without medications	91	4.59	0.67
Determination	77	4.23	1.02
Basic and Location-Specific Competencies			
Providers working in out-of-hospital settings should have a high level of competence in neonatal resuscitation.	100	4.59	0.50
Doctors should also be competent at aspects of medical and surgical management of breech births, e.g. the use of oxytocin, caesarean section.	91	4.18	0.59
The ability to facilitate a physiological breech birth should be the standard of competence for all professionals.	82	4.00	1.11

Table 5. *Consensus statements on training for professionals attending upright vaginal breech births*

Percentage of panel in agreement, Likert mean and standard deviation (SD)
Likert scale: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

Statement	%	*Mean*	*SD*
Education and Training – *The following should be included in breech education and training:*			
Hands-on simulation (skills and drills)	100	4.82	0.39
Regular opportunities to discuss experiences with peers and mentors	100	4.77	0.43
Watching breech birth videos	100	4.77	0.43

Theoretical instruction in anatomy, physiology, mechanisms, and manoeuvres	95	4.68	0.89
Mentorship and supervision in clinical settings	91	4.68	0.65
Evidence of Basic Competence			
Direct observation by a senior mentor	95	4.27	0.88
Practical exam (simulation assessment)	91	4.05	0.84
Evaluation of outcomes following training	81	4.05	0.80
Attending a minimum number of births with a mentor	77	4.05	1.00
Numbers Associated with a Mentorship Period (Acquiring Competence)			
Range *(mode-median):* 10-13			
While a minimum number may be useful as a guideline, more emphasis should be placed on the individual practitioner's ability to adapt and acquire the necessary skills to support breech births.	95	4.59	0.59
Professional Updating Activities			
Practical session on optimal mechanisms and manoeuvres to help	100	4.55	0.51
Regular opportunities to discuss experiences with peers and mentors	100	4.55	0.51
Viewing and discussing breech videos	100	4.45	0.51
Scenarios with hands-on simulation	95	4.55	0.60
Actively supporting mothers to birth breech babies on a regular basis	95	4.50	0.60
Update on the latest research, projects, and theories	95	4.27	0.55
Attending breech births with other practitioners	91	4.45	0.67
Team training activities	91	4.32	0.65
Attending conferences	77	4.00	0.69
Evidence of On-going Proficiency			
On-going evaluation of outcomes	86	4.09	0.61
A skills exam, much like neonatal resuscitation	77	3.91	0.97
Numbers Associated with Skill Maintenance			
Range *(mode-median):* 3-6 per year			
General Principles			
Every midwife or doctor should be prepared for a breech baby at any time and have regular practice/simulation and discussion in regard to breech birth.	100	4.86	0.35
Breech should be taught as a 'normal' skill rather than an emergency.	100	4.77	0.43
Hospitals and midwifery communities should identify those individuals who are competent with breech and 'apprentice' others to them in order to bring skills up across the community.	100	4.50	0.51
The role of 'specialists' is to mentor and support breech skill development throughout the entire maternity care team.	90	4.33	0.80
Health professionals should share their training background openly with women who seek care and support for a breech birth, with reference to	87	4.43	0.84

standards set out by their professional certifying body.			
A 'specialist' vaginal breech team in every labour setting with at least one member on each shift (or on-call) would be advantageous.	86	4.36	0.85

Discussion

The panel of experienced practitioners in this research returned a strong consensus about the need for balanced counselling. This resonates with recent research from Catling *et al* (2016) concerning the importance of discussing risk in a calm manner, in light of current evidence and women's own preferences and values. Kok *et al*'s (2008) study of the preferences of women and their partners indicated that when such a balance is achieved in counselling about breech childbirth options, approximately 35% prefer to attempt a VBB, yet this figure is far below the percentage of women planning a VBB in most Western settings. Further research concerning how women's birth choices are associated with the skill and experience levels of professionals responsible for their care may shed light on this disparity.

In line with this research panel, Sartwelle and Johnston (2015) have raised concerns about the role of electronic fetal monitoring in modern obstetric care. Although the use of continuous monitoring was not associated with higher or lower perinatal risk in a large randomised controlled trial (Su et al., 2003), its use is almost universally recommended for breech labours, with little research demonstrating the potential benefits or risks. Similarly, although most obstetric guidelines refer to strict selection criteria, usually involving ultrasound assessment, as a means of reducing the risk of VBB, recent population-level research in the Netherlands indicates that stricter selection criteria have not improved outcomes for breech infants born vaginally (Vlemmix et al., 2014a). Given the association between experience and outcome in VBB, overly

restrictive selection criteria may potentially be counter-productive, and this warrants further investigation.

The panel's consensus that professionals attending physiological VBBs should be able to initiate resuscitation with the umbilical cord still attached is also in line with emerging trends in neonatal management. Gruneberg and Crozier (2015) suggest that delayed cord clamping may be just as important if not more to the potentially compromised infant as the UK Resuscitation Council and national intrapartum guidance suggest it is for uncompromised infants (NICE, 2014; Resuscitation Council (UK), 2010).

The collection of activities agreed by the panel as appropriate education, training and updating resembles a deliberate practice approach to the acquisition of expertise (Ericsson, 2008). In such an approach, active engagement in the deliberate and repeated practice of particular tasks, immediate feedback, and time for problem-solving and evaluation have been shown to be more effective than the length of experience traditionally associated with achieving professional expertise. Other research has demonstrated the utility of videos in enabling practitioners to reflect on their own performance of complex clinical skills and clarify details which can be used to train others (Bahl et al., 2009). The use of videos as recommended by this panel may enable practitioners to develop complex pattern recognition associated with experience of real-life events, despite the paucity of actual VBBs available for most professionals to attend.

Given the rarity of VBBs, acquiring clinical experience in VBB requires significant determination, as suggested by the panel. In the largest randomised controlled trial concerning VBB, the only intervention associated with a reduction in risk when a VBB was planned, was the presence of an

experienced clinician, defined as one "who judged him or herself to be skilled and experienced at vaginal breech delivery, confirmed by the Head of Department," rather than a licensed obstetrician or a clinician with over 10 or 20 years experience (Su et al., 2003, p. 742). The most effective category included midwives and trainees, and placed emphasis on confidence and self-selection rather than a particular qualification or length of experience. The proposition that self-selection and deliberate development of VBB attendants could influence outcomes more than antenatal predictive criteria deserves more exploration.

Finally, the panel's suggestion that specialist teams be organised to attend planned VBBs wherever possible, supporting skill development among the entire team, is a practical strategy that has been suggested by others (Daviss et al., 2010; Maier et al., 2011). Such teams enable a small number of practitioners to develop significant levels of experience in support of a safe service. Some institutions have developed such multi-disciplinary breech teams (Dresner-Barnes and Bodle, 2014; Marko et al., 2015), increasing the likelihood that VBBs are attended by professionals with recent experience, as well as the panel-recommended ability and willingness to closely observe these labours. Given the proven safety benefit of experienced attendance (Su et al., 2003), such strategies may be protective for women, neonates, professionals and organisations. The impact of breech teams warrants further investigation.

The results of this Delphi study should be interpreted with caution. These results reflect consensus of one particular panel, but do not necessarily provide the 'right' answer, and a different panel could produce different results (Baker et al., 2006). Similarly, the results of this Delphi study represent one experienced panel's collective opinion on how VBB may be made safer, but

they do not provide evidence that the strategies advocated are safe or effective. Additionally, the use of 70% agreement as a measure of consensus leaves room for a statement to be included within the results without the agreement of a portion of the panel. Therefore, the exact percentage of agreement has been reported, along with the mean from the Likert scale and the standard deviation, in an effort to be transparent. Some of the divergences indicate areas where further exploration using different methods may be fruitful.

While data obtained from randomised controlled trials to establish the most effective strategies and interventions would be ideal, due to the rarity of VBBs such data is impractical to obtain. Current recommended techniques to assist VBBs are founded on tradition and established professional opinion, rather than experimental evidence (Prusova et al., 2014). This Delphi study makes the foundation on consensus opinion explicit, while avoiding the bias that can occur in face-to-face consensus meetings, resulting from disparities in power and strength of character (Mead and Moseley, 2001). The use of an e-survey also enables participation of a broader range of practitioners than would otherwise be feasible, ensuring membership is not confined to those who have time and funding to travel to a consensus meeting.

One of the strengths of this research is the significant experience level reported, considerably higher than averages reported in Western countries (Carcopino et al., 2007; Chinnock and Robson, 2007). Dhingra and Raffi (2010) reported that after 4 or 5 years of training only 53% of UK obstetric speciality trainees had attended more than 10 vaginal breech deliveries. The participants in this study reported significant levels of experience in both lithotomy and upright methods of VBB, enabling a comparative perspective unavailable to clinicians who have no familiarity with using upright positions

for VBB. Their activities teaching and mentoring others, a requirement for panel membership, give them particular insight into their own learning process as well as that of other professionals. The quantified description of birth numbers makes transparent the meaning of 'experience' among this panel, who had all demonstrated their ability to sustain a practice inclusive of VBB in a contemporary context. Although individual numbers have not been verified, the consent form and second round of the survey made clear that participants' names would be published with the results.

In conclusion, the practice of facilitating VBBs with the woman in an upright position of her choice departs from practice norms familiar to most practitioners. The results of this Delphi survey around the theme of 'Standards of Competence' suggest a structure for training programmes aiming to develop professional competence and confidence in physiological VBB as a normal practice, but many are relevant to VBB in general. Such training programmes could enable professionals offering a VBB service to provide credible evidence of basic competence on an individual level, assist maternity services to strategically plan clinically appropriate and woman-centred service provision, and guide future research into the efficacy of these techniques. The panel's guidelines for minimum numbers of births to achieve competence and maintain proficiency will be difficult to achieve for a majority of practitioners in most settings. Where attendance of a clinician meeting these standards cannot be provided, professionals can use this research to provide women with a framework for understanding and evaluating the level of experience available, in order to facilitate informed decision-making.

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4.2 Principles of physiological breech birth practice

Reference

Walker S, Scamell M, Parker P (2016) Principles of physiological breech birth practice: A Delphi study. *Midwifery* 43:1–6.

Abstract

Objective: to establish a multi-professional consensus on shared principles underlying the practice of physiological breech birth.

Design: three-round Delphi e-survey.

Setting: multi-national.

Participants: a panel of thirteen obstetricians and thirteen midwives, experienced in facilitating physiological breech births in varied settings, and involving varied maternal birthing positions, and two service user representatives.

Methods: an initial survey contained open-ended questions. Answers were coded, amalgamated and categorised. A total of 164 statements were put to the panel in the second round, and 9 further statements were proposed in the third round. The panel indicated the extent of their agreement using a 5-point Likert scale. The pre-determined level of consensus was 70% of respondents indicating 4 or 5 on the Likert scale (agreement or strong agreement).

Findings: the panel indicated consensus on 37 of 66 proposed statements under the theme, 'Principles of Practice.' Negative data (29/66 statements) are also reported, highlighting areas of divergence. The findings suggest a paradigm shift away from management strategies based on prediction and control, and towards facilitation strategies based on relationship and response.

Conclusion
Concepts of breech-specific normality require further exploration. The principles articulated in this research can be used to design further researcher exploring the influence of physiological breech practices on neonatal and maternal outcomes, including women's experiences of maternity care.

Keywords
Breech presentation, midwifery, obstetrics, Delphi, physiological birth, models of care

Introduction

This paper outlines a set of guiding principles for the practice of physiological breech birth, as determined by a Delphi consensus technique survey involving experienced midwives, obstetricians and service user representatives. It addresses an apparent disparity between practices which have been thoroughly researched, and thus used to provide evidence-based guidelines, and differing practices as described by a group of professionals and women experienced in physiological breech birth, which have been much less thoroughly researched. In order to create meaningful studies to determine the safety of these new practices, it is useful to consider how physiological breech practices differ from mainstream practices at the most fundamental and even philosophical levels, which often remain tacit when more practical guidelines and training manuals are written.

Breech presentation at term, where the fetus presents bottom- or feet-first at the time of birth, affects approximately 1:25 women (Ferreira et al., 2015). Mode of birth is controversial (Caughey, 2007), with many breech presenting infants being born by caesarean section, but there is renewed interest in vaginal breech birth (Marko et al., 2015). Prior to this research, professional literature indicated some midwives and obstetricians were facilitating vaginal breech births (VBBs) in ways differing significantly from the assisted breech delivery protocols used in randomised controlled trials informing practice recommendations internationally (ALSO, 2010; Winter et al., 2012; RCOG, 2006). Practitioners advocating fundamental changes in practice have argued that upright maternal positioning, in particular, promotes spontaneous physiological birth (Banks, 2007; Cronk, 1998a; Evans, 2012; Krause, 2007; Reitter et al., 2014). Additionally, anecdotal and women's advocacy literature

indicates that at least some women preferred a more active, physiological approach to VBB (Berkley, 2006; Sanders and Lamb, 2015). However, the most recent Cochrane Review comparing the safety of VBB with caesarean section delivery (CS) made clear the results cannot be generalised to "methods of breech delivery which differ materially from the clinical delivery protocols used in the trials reviewed" (Hofmeyr et al., 2015, p. 3), in which supine maternal positioning and routine assistance were standard practices. This point has also been made previously by midwifery critics (Fahy, 2011). Therefore, a meaningful gap in the evidence exists concerning whether or not use of upright maternal positioning constitutes a *materially different* VBB method, and whether or not such differences result in materially different outcomes.

Although the Cochrane review suggests that 'materially different' methods may affect the outcomes of planned VBB, to date only a small study by Bogner et al (2015) has provided outcome data concerning the use of upright positioning. In Bogner et al's study, use of hands/knees maternal positioning appeared to be similarly safe for the infant as supine positioning, however they reported a significant variation between rates of perineal damage for upright VBB (14.6%) and lithotomy VBB (61%). This suggests a material difference between either the necessity or the inclination to perform an episiotomy when upright positioning is used, which affects maternal morbidity outcomes. In order to affirm or discount this variation, future research would need to acknowledge and measure this difference in practice. Because other differences may produce similar important changes in outcomes, establishing a set of agreed principles underpinning the practice of physiological breech birth using a multi-professional consensus technique is an essential step towards improving practice, evaluation and research design in this area of care.

The primary purpose of this Delphi study was to establish such a consensus on standards of competence for the practice of upright breech birth, defined as *a VBB in which the woman is encouraged to be upright and active throughout labour and able to assume the position of her choice for the birth*, and the results of this aspect of the study have been reported separately (Walker et al., 2016a). However, due to the potential material differences as described above, it was necessary to explore the underlying principles of practice as they emerged in the research, and not assume that upright VBB will share such principles with mainstream assisted breech delivery methods. In the process, it became immediately apparent that participants perceived upright positioning itself to be a product of the underlying principle of optimising labour and birth physiology, rather than an essential feature of practice – upright positioning is a *tool* and not a *rule* of physiological VBB practice. Therefore, adopting this participant-led focus, a secondary aim in the research was to establish a set of guiding principles for the practice of physiological VBB. These principles of practice are reported in this paper.

Methods

This research consisted of a three round Delphi e-survey, conducted from June 2014 – June 2015, involving an initial round of open-ended questions, followed by two rounds in which participants rated their level of agreement with an aggregate set of statements in order to establish a consensus (Walker et al., 2016a). Participants were recruited by purposive, network and social media sampling, and worked in a wide variety of settings internationally. The 28-member panel which participated in the Delphi study included 13 midwives and 13 obstetricians working in the following countries: Australia, Austria, Brazil, Canada, Germany, Mozambique, New Zealand, United Kingdom, and

the United States of America. At least half worked primarily in hospitals, but the panel's experience included home and birth centre settings. The professionals' mean years of experience was 27 (range of 5-50) and mean number of total breech births attended was 135 (range of 20-400). The research also involved two service user representatives identified as leaders of national advocacy organisations. These women were also considered 'experienced' due to their personal encounters with breech pregnancy and their extensive involvement supporting other women planning VBBs, albeit the nature of their experience was different from the professionals'. Ethical approval for this study was obtained from the Research Ethics Committee of the School of Health Sciences, City, University of London (Ref: PhD/14-15/13).

A more detailed account of the methods and recruitment process of this study have been reported in a complementary paper, along with results pertaining to the theme, Standards of Competence (Walker et al., 2016a). This paper reports results from the same study under the theme, Principles of Practice. Results have been reported separately to enable a fuller discussion of the philosophical implications of these principles. This paper includes one variation from the previously reported methods. In the second round (R2), a multiple-choice question (MCQ) was added to ascertain the variety of participants' experience with maternal birthing positions described in the first round, in answers to open-ended questions. The MCQ enabled all relevant options to be checked and included an 'other' box. The principles of Practice theme included 66 statements grouped into the following categories: first principles (14 statements), maternal positioning (12 statements and 1 MCQ), birth environment (18 statement), fetal positions (14 statements), and safe progress (8 statements). This theme contained 60 statements and 1 MCQ in R2 and 6 statements in R3.

The findings reported below also differ from classical Delphi methods in an important way. Items failing to reach a 70% rate of agreement (*negative results*) were removed from further consideration, rather than re-evaluated in R3. Instead, 6 modified statements formed from the panel's feedback were included in R3. Negative results are also reported in this paper. Delphi studies have been criticised for tending to force a consensus and masking evidence of dissent, such as bimodal results indicating a meaningful split in opinion (Thangaratinam and Redman, 2005). To avoid a potential bias toward consensus, this study has reported the significant number of positive results where a strong (>70%) consensus was achieved, as well as the statements which were not supported at this level.

The experienced panellists participating in this Delphi survey research returned a consensus-level agreement on 37 statements under the Principles of Practice theme. These statements are reported under the categories they were grouped into during the research in *Table 6*, along with the percentage of respondents who agreed with that statement, the mean of the responses on a 5-point Likert scale (1=strongly disagree; 5=strongly agree) and the standard deviation (SD). Negative results, those which did not achieve a minimum 70% rate of agreement among respondents, are reported in *Table 7*. Language taken directly from the consensus statements is in italics in the text descriptions below.

Participant responses in the first round, including comments about the research question, indicated that most viewed upright maternal positioning to be a product of a facilitative approach aiming to optimise physiology. Responsiveness to feedback and member checks is a central aspect of trustworthiness in Delphi research (Hasson and Keeney, 2011). Therefore,

most statements proposed reflected the panellists' orientation and used the phrase, *physiological breech birth*, rather than imposing the researcher's original language, *upright breech birth*.

Findings

First Principles

Participants in the research referred to *first principles* and the *teaching of principles* in their responses. Therefore, statements concerning fundamentals or philosophical approaches to practice were grouped into this category for consideration. The panel strongly agreed that the purpose of upright positioning was to *optimise physiology*, facilitating *the mother's ability to birth her baby with maximum efficiency*, and that optimising this physiological process could increase the *safety* of VBB for both mother and baby. The principles achieving consensus in this study reflect a philosophy of care which recognises the locus of greatest efficacy as lying within the mother-baby unit, as opposed to the active management strategies and procedures performed by professionals, which are the subject of most contemporary guidelines. The phrases *power from above*, *uncompromised baby moves in ways which assist his/her own birth*, *the mother's attitude*, *no routine manoeuvres*, *uncommon to need to do anything*, *woman-led positions*, all suggest a perceived effectiveness inherent to the physiological process, dependent on contributions from both mother and baby. The participants' consensus statements suggested they perceive a strong but not absolute tendency toward success within this physiological process, which again differs significantly from training programmes suggesting spontaneous breech birth at term is uncommon (Winter et al., 2012).

Although in this approach attendants may appear to 'do' less than they would in an assisted breech delivery, the panellists' view that the attendance of

skilled and experienced professionals significantly impacts the safety of VBB gained the highest level of consensus in this category. Clinical actions consistent with a physiological VBB approach may be facilitative, using *judicious guidance* to contribute to physiological optimisation, or they may be responsive to a perceived problem. In contrast, although the result was borderline, the panel did not reach a consensus-level agreement around the view that *antenatal screening … has a significant impact on the safety* of VBB, nor did they recommend stricter screening criteria as a means of reducing risk where available skill and experience were minimal. The results in the first principles category emphasised relationship, such as within the mother-baby unit and with caregivers, and response, such as the experienced attendant's on-going assessment of steady progress. They de-emphasised models of care based on prediction of risk, the foundation of antenatal screening, and control, such as further limiting the ability of women to access VBB based on narrower selection criteria, although this strategy is a mainstay of national-level breech delivery guidelines ((Kotaska et al., 2009; RCOG, 2006).

Maternal Positioning

The statements which achieved consensus in this category reflected an approach to maternal positioning that was enabling and responsive, rather than prescriptive and directing. Again, the locus of greatest efficacy was within the mother-baby unit, with attendants recognising this inherent ability and responding to the unfolding process rather than controlling it. Phrases such as *variety of maternal positions*, *judicious guidance … to resolve delay*, *the mother's ability to move*, and *spontaneous positioning … guided by interactions with the baby*, encapsulated this philosophy within the consensus statements. The embodied knowledge of mother and baby was privileged in the caregiving relationship, and the clinical ability to enable the birth process,

rather than control it, was linked to *skill which develops with time and experience*.

The participants reported experience supporting VBBs in a variety of maternal positions, including water births. Figure 4 illustrates the percentage of respondents (n=20) reporting experience with the 10 different maternal birthing positions described; one service user declined to respond as her baby had been born by CS. This variety confirmed the panel's initial feedback that upright position was a tool and not a rule of physiological VBB, although more of the panel reported experience with kneeling and hands/knees positions than the others. In contrast, statements promoting a directive or restrictive approach to maternal positioning did not achieve consensus support with this panel. The experience and consensus statements also differ significantly from most international guidelines and training programmes which direct attendants to place women in a lithotomy position in order to assist a breech delivery.

Birth Environment

The statements which received consensus in this category emphasised the importance of *calm*, *supportive* and familiar relationships within the birth environment, and the detrimental effects of conflict and *fear-based language*. The panel indicated strong agreement around the premise that the quality of relationships, between women and caregivers, and breech attendants and the wider multi-professional community, impacts both the physiological process and the overall safety of VBB. Although the panel clearly valued *skilled and experienced* professional attendance, they did not agree that *access to skilled midwifery and medical care* is the *most important* aspect of birth setting. This appeared to be because the panel considered that attitude and other environmental factors also contribute significantly to birth safety. The panel

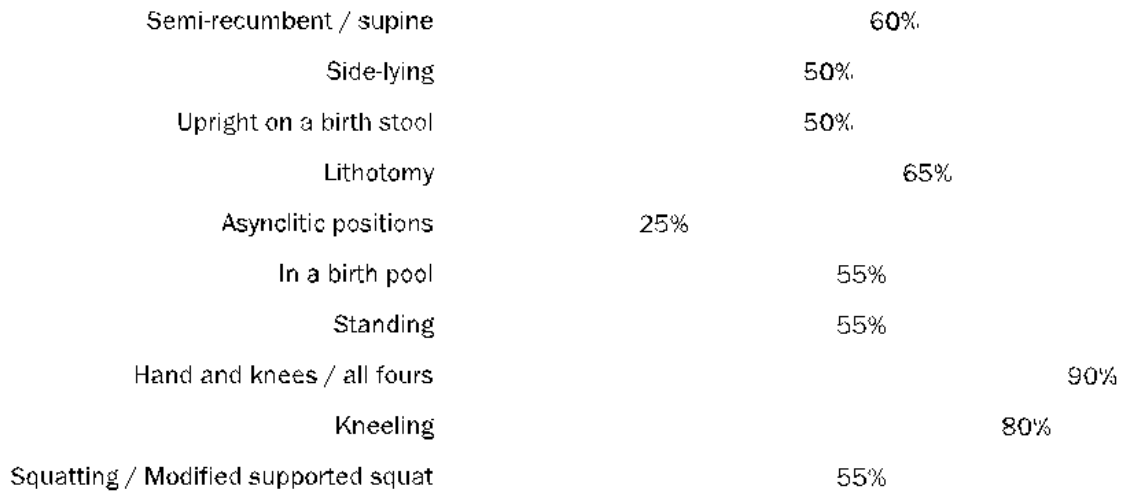

Figure 4. *Percentage of Delphi panel members who had experience supporting breech births in various positions*

did not return a consensus on any statements regarding particular birth location, which probably reflects the multi-professional diversity and differences in practice settings within the panel. However, they did agree that restrictive policies and negative attitudes affect the ability of both women and skilled providers to access hospital-based birth settings.

Fetal Positions

The statements achieving consensus in this category reflected a new approach to evaluating the relative safety of proposed VBB in relation to fetal position. A consensus-level number of the panel were willing to support the range of longitudinal fetal positions (legs extended / *frank*, legs flexed / *incomplete*, one or more hips extended / *footling*) as potential candidates for a safe VBB, although not necessarily recognising them all as '*normal*.' Negative data indicated that strategies of attempting to predict outcomes from supposed static fetal positions and applying limiting pre-labour selection criteria received little support. Instead, the panel supported the more open and responsive approach of assessing the advisability of proceeding with a

VBB throughout labour, using criteria similar to those used in cephalic births – *lack of descent or lack of fetal well-being at the time of labour.* This also contrasts many contemporary guidelines which permit a trial of labour for only frank or complete breech presentations, and sometimes only frank breech presentations.

Safe Progress

Only one statement in this category achieved consensus-level agreement. Panel members considered a period of passive second stage, *a pause after full dilatation and before active pushing begins,* to be common and unproblematic. The variety of statements which failed to reach a consensus again suggests the panel's preference for a responsive, rather than prescriptive, approach to assessing progress within the unique complex of each individual birth, and in relation with each individual woman.

Table 6. *Consensus statements on principles of practice for professionals attending physiological breech births*

Percentage of panel in agreement, Likert mean and standard deviation (SD)
Likert scale: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

Statement	%	*Mean*	*SD*
First Principles			
Ensuring skilled and experienced professionals attend the birth has a significant impact on the safety of breech birth.	100	4.82	0.39
The primary purpose of upright breech birth is to optimise physiology, e.g. facilitate the mother's ability to birth her baby with maximum efficiency.	100	4.77	0.43
The safest breech birth exhibits optimum physiology: e.g. labour begins spontaneously at or near term and progresses steadily.	100	4.77	0.43
Power from above is safer than pulling from below.	100	4.73	0.46
In a physiological breech birth, a healthy, uncompromised baby moves in ways which assist his/her own birth.	100	4.64	0.49
Optimising the physiological process increases the safety of breech birth for the baby.	96	4.68	0.57
The mother's attitude and approach to birthing a breech baby has a significant impact on the safety of breech birth.	96	4.55	0.60
Optimising the physiological process increases the safety of breech birth for the mother.	91	4.55	0.67
Episiotomy is never, or rarely, needed to assist an upright breech birth.	91	4.50	0.67

In a physiological breech birth, there should be no touching of mother or baby unless there is a problem requiring assistance. There are no routine manoeuvres.	91	4.43	0.81
It is the mother's ability to move at the time of expulsive efforts that supports the physiological process.	87	4.35	0.71
It is uncommon to need to do anything in physiological breech birth, that is, non-medicated woman, baby at term, spontaneous labour with woman-led positions.	74	3.95	0.95
Maternal Positioning			
Care providers should develop skills to facilitate breech births safely in a variety of maternal positions.	100	4.86	0.36
Sometimes maternal-led positioning is most conducive; sometimes judicious guidance is appropriate, especially to help resolve delay.	100	4.61	0.50
Care providers should not disturb women's spontaneous movements in an otherwise normally progressing breech birth.	95	4.73	0.55
Ability to support breech births in a variety of maternal positions is a skill which develops with time and experience.	95	4.55	0.60
Care providers should share the evidence base concerning the affect of birth positioning on outcomes for women and their babies.	95	4.55	0.60
Care providers should share their preferences and experience levels regarding maternal birth positions.	91	4.32	0.65
Care providers should actively support a woman not to push if a premature urge to push occurs, such as in a footling birth.	86	4.09	0.75
Mother-led positioning offers the greatest physiological advantages.	82	4.18	0.85
When the mother is able to move freely during birth, her spontaneous positioning can be guided by interactions with the baby.	77	4.23	0.81
When facilitating a physiological breech birth, care providers proactively use maternal position (or change in position) to promote normal descent.	77	3.95	0.79
Birth Environment			
The appropriate setting for a breech birth is in a calm and supportive room with competent and kind caregivers.	100	4.86	0.35
A calm, quiet, warm environment enhances a woman's ability to give birth.	100	4.82	0.39
Having to fight to be 'allowed' to birth her baby physiologically over the last few weeks of her pregnancy is frequently detrimental to the physiological processes that occur during this time and therefore will effect the birth.	100	4.30	0.47
Many doctors and midwives who attend breech births face extreme hostility for doing so, and this sometimes limits their access to facilities and the skills of the multi-professional team.	96	4.48	0.73
The introduction of strangers in the birth environment interferes with a woman's ability to give birth.	95	4.27	0.70
Birth environment affects a woman's ability to give birth.	95	4.67	0.58
Conversations about risk and fear-based language in the birthing space interfere with a woman's ability to give birth.	91	4.50	0.80
A suboptimal birth environment leads to unnecessary intervention.	91	4.41	0.67
While non-interference in a well-progressing birth is an important principle, some women appreciate and benefit from supportive, encouraging touch during labour.	91	4.26	0.92
Mothers are aware of hospital politics and negativity towards breech birth, and this is a deterrent for some mothers who might otherwise prefer to be there.	86	4.38	0.86
Fetal Positions			
An incomplete breech (one leg up, one leg folded) can be born safely but requires attentive professional support.	91	4.09	0.68
A diagnosis of 'abnormal' breech position (unsafe for vaginal delivery) should be determined by lack of descent or lack of fetal well-being at the time of labour.	82	4.00	1.07

Frank breech is the optimal position for a breech birth.	77	4.00	0.69
A footling presentation can be born safely but requires attentive professional support.	77	4.05	0.84
Safe Progress			
There is often a pause after full dilatation and before active pushing begins. This is not problematic.	86	4.18	0.68

Table 7. *Negative data: Statements on principles of practice for professionals attending physiological breech births which did not achieve consensus*

Percentage of panel in agreement, Likert mean and standard deviation (SD)
Likert scale: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

Statement	%	*Mean*	*SD*
First Principles			
Antenatal screening of candidates has a significant impact on the safety of breech birth.	69%	3.95	1.09
Where the availability of skilled and experienced attendance is minimal, screening criteria will need to be stricter.	57%	3.68	0.95
Maternal Positioning			
Care providers should instruct women to assume a physiologically advantageous position for the birth.	64%	3.64	1.05
Care providers should ensure the mother's bottom is off the bed/floor enough for the baby to be born.	64%	3.68	1.09
Birth Environment			
The appropriate setting for a breech birth is the place chosen by the mother where she and the provider feel comfortable and safe. It can be the home, a birth centre or hospital.	68%	3.81	1.4
Access to skilled midwifery and medical care is the most important aspect of birth setting.	68%	3.77	0.87
Breech births should ideally take place in a setting where emergency services (caesarean section and neonatal services) are readily available.	68%	3.68	1.25
The appropriate setting for a breech birth is where the woman feels safe and confident. For some this will be in a hospital setting and for some this will be in their own homes.	64%	3.86	1.25
A co-located midwifery-led unit (hospital-based birth centre) is an appropriate setting for a breech birth.	50%	3.59	0.91
An obstetric-led unit is the appropriate setting for a breech birth.	36%	2.95	1.05
The appropriate setting for a breech birth contains just one experienced and silent birth attendant.	32%	3.0	1.02
Breech births should only occur in hospitals which have over 1500 deliveries per year.	9%	1.95	1.17
Fetal Positions			
Complete breech is the second most optimal position for a breech birth.	68%	3.68	0.78
With multiparous women, fetal position is less of an issue.	64%	3.63	0.90
No breech presentation is 'inappropriate' for a vaginal breech birth, so long as the mother has made an informed choice.	59%	3.68	1.17
The diagnosis of a footling breech should be made in labour with ruptured membranes, by determining whether or not the buttocks have engaged in the pelvis.	48%	3.33	0.85
Any presentation is 'normal' until there is a problem.	41%	3.23	1.15
The optimal breech position at the start of labour is Right Sacrum Anterior/Lateral.	36%	3.36	0.79
An extended head on ultrasound in labour (chin higher than the occiput) is unsafe for vaginal delivery.	36%	3.36	1.00

A knee-presenting baby normally starts labour in a posterior position.	29%	3.38	0.80
A footling presentation (at least one hip extended) is unsafe for vaginal delivery.	27%	2.77	0.97
A dorsoposterior position is unsafe for vaginal breech birth.	9%	2.68	0.65
Safe Progress			
Ideally, the birth should be complete within one hour of active pushing.	68%	3.67	1.11
Ideally, the birth should be complete within two hours of active pushing.	64%	3.77	1.02
Physiological breech births progress similarly to cephalic births.	55%	3.5	1.08
Following the birth of the buttocks, the head should ideally be born or delivered within the next 3-5 minutes.	55%	3.72	1.16
Progress should be rapid from the birth of the umbilicus to the birth of the head.	45%	3.36	0.90
Physiological breech births usually progress more quickly than cephalic births.	36%	3.0	0.98
Physiological breech births usually progress more slowly than cephalic births.	14%	2.68	1.04

Discussion

This is the first research to describe a set of principles underpinning the practice of physiological VBB agreed by an experienced multi-professional panel including both midwives and obstetricians. In areas of professional practice where experimental evidence is not available, use of a consensus method like the Delphi survey makes the process of expert opinion development transparent and collaborative. The significant number of statements which achieved 100% consensus in this process demarcate a clear common ground in the practice of physiological VBB among obstetricians and midwives working in very disparate settings, which is unlikely to be attributable to a localised cultural norm. Four out of the ten universally agreed statements contained the word 'safety.' We therefore propose that this common ground can be used to inform the design of future research to test the safety of practices based on these principles, using quantified methods.

The negative results reported in this paper also enable the identification of areas where further research is needed to answer questions which were important to this panel, but remained undecided. One of these areas

concerned what sort of progress in labour should be considered 'normal for breech,' as evaluation of normal progress was considered a key safety concern. As the negative data [*Table 7*] indicate, the panel's open-ended responses in R1 suggested that the progress of breech labours could be generally quicker, slower, or roughly similar to cephalic labours, but none of the associated statements achieved a consensus-level agreement. Similar discrepancies occurred in the fetal positions category. This suggests that these topics require further consideration using different methods. Descriptive studies involving a population of unmedicated labours and births attended by experienced physiological practitioners would be a useful contribution to the research basis concerning what is 'normal for breech.'

The lack of a clear consensus that antenatal screening significantly improves safety was an unanticipated finding, although it is important to note that this result was borderline, and the principle did still achieve majority support. Professional guidelines and research reports commonly list a set of criteria used to identify a sub-group of women and breech-presenting fetuses for whom a VBB is considered to pose comparatively less, or more, perinatal risk, usually based on expert opinion (Kotaska et al., 2009; RCOG, 2006). Strict application of selection criteria is credited with improved perinatal morbidity and mortality outcomes observed in some settings (Borbolla Foster et al., 2014; Goffinet et al., 2006), although criteria and rates of VBB vary considerably between settings (Michel et al., 2009). However, some before-and-after studies have indicated that stricter application of selection criteria and an increased CS rate has not resulted in improved perinatal outcomes among the remaining VBBs (Hartnack Tharin et al., 2011; Hehir et al., 2012; Vlemmix et al., 2014a). The panel's consensus statements suggested that, while physical variables pertaining to women and their babies may correlate with certain birth outcomes, other variable characteristics pertaining to

provider, environment and relationships may affect the safety of VBB. These elements deserve further attention to balance the current focus on 'risk factors' in assessing suitability for VBB.

The finding that 91% of a panel with this level of experience feel that *episiotomy is never, or rarely, needed* to assist an upright breech birth is significant, given that cutting a timely episiotomy has been identified as a key skill in assisted breech delivery in other research (Jordan et al., 2016; Maslovitz et al., 2007; Secter et al., 2015). This suggests that the lower maternal morbidity noted in Bogner's study (2015) is likely to be replicable in further research into physiological VBB practices. Similarly, the panel's consensus that *the mother's attitude and approach to birthing a breech baby* is a significant safety concern resonates with research indicating that strength of preference for vaginal birth is significantly predictive of ultimate mode of birth (Wu et al., 2014). Future VBB research should take account of maternal attitudes and self-perceived efficacy as potential safety factors, and take into consideration the likelihood that women with a strong preference for a particular mode of childbirth are less likely to consent to randomisation.

Considered in light of their divergence from most current international guidelines and research, the findings of this consensus research suggest within this panel a shift away from programmes of management based on prediction and control, and toward a philosophy of facilitation based on relationship and response. This is particularly evident in the openness around maternal birth position. Although an enabling approach to positioning is often associated with greater maternal satisfaction (Priddis et al., 2012; Thies-Lagergren et al., 2013), the panel's consensus statements associate it with greater safety, a position that warrants further investigation. A responsive approach is also suggested in other areas such as using the individualised

evaluation of progress of labour and fetal well-being as the main indicators of appropriateness for vaginal birth, compared to the current emphasis on predictive selection criteria based on generalised relative risk.

Conclusion

Within this panel's physiological VBB model, the locus of greatest efficacy is considered to be within the mother-baby unit. Caregiver activities are primarily aimed at enhancing the mother-baby unit's self-efficacy, by judicious guidance and the maintenance of a facilitative environment, founded on supportive, collaborative relationships. In the facilitative approach described, perceived safety depends on the attendant's ability to recognise and respond to actual emerging problems in the individual situation, rather than anticipate potential risk based on generalised quantified data. This panel viewed attendants' ability to do less and enable more as a function of skill and experience, the need for which achieved the highest level of agreement as a safety concern. These elements are difficult to measure in quantitative studies based on clinical criteria and outcome data, but more creative methods of assessing competence and clinical decision-making surrounding VBBs may be fruitful. Given evidence that some care providers are actively obstructive to women wishing to attempt a VBB and the professionals supporting them (Catling et al., 2015; Powell et al., 2015), and the possibility raised in this research that such failure to collaborate has safety implications, research into outcomes of VBB should strive to include some measurement of environmental and relationship factors perceived by women and professionals within the care episode.

This Delphi study reports the consensus agreements of a very experienced panel by modern standards. A 2007 survey of Australian obstetric specialist

trainees indicated final-year trainees had attended a mean of 12 VBBs (Chinnock and Robson, 2007), compared to the panel's mean of 135. However, it is important to remember that the agreed principles of an experienced panel are not equivalent to safety data. Rather, the results of this research should be used to guide future research into the safety outcomes associated with these practices. The results may also be used to enable individual practitioners and institutions to consider the principles which underpin their own breech practices, and whether they are based on stronger evidence than presented here. Given the preference for physiological birth strategies expressed by at least some women requesting a VBB, individuals and institutions may also want to consider whether they are open to change by reflecting and comparing their own principles and strategies to those presented here.

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Declaration of Interests

The first author has been funded to provide physiological breech birth training, as well as obstetric emergencies training in assisted breech delivery.

4.3 Sampling and expertise in Delphi research concerning midwifery practice

Sampling and expertise in Delphi research concerning clinical midwifery practice: A methodological review

Authors: Walker S, Scamell M, Parker P

Abstract

Introduction: The Delphi is a consensus-development technique that has been used to guide clinical practice especially in the absence of robust evidence. The aim of this review was to critically examine the selection of panel members, and the role of expertise, in Delphi studies concerning clinical midwifery practice in order to make recommendations for future use of the method.

Methods: A literature search was conducted in November 2016, using CINAHL Plus and Medline Plus. The search returned 178 unique studies, and 25 were included in this review after application of inclusion and exclusion criteria. Included were Delphi studies concerning clinical care or the development of skills for clinical care, of pregnant and parturient women, involving midwives. Exclusions included studies focusing exclusively on research priorities, management, academic practice, those which included midwifery as a sub-group of general nursing, and those focusing on infertility care. No papers were eliminated on the basis of quality appraisal because the purpose of the review was methodological exploration. The included papers were scrutinised for detail about the sampling process and the function of expertise in panel member selection.

Results: We identified three areas of methodological tension: panel size, panel-audience alignment and appointment authority. Panel size was influenced by the scope of the project, the type of expertise included on the panel and the involvement of multiple panels. Membership ranged from 5-1918 with a median size of 34. In relation to target audience, Delphi panels were either closely aligned or constructively misaligned in ways that enabled credibility, influence or regulation of different groups. Researchers had greater or lesser degrees of control over the appointment of panel members depending on the type of sampling strategy used.

Discussion: When considering sampling strategy in studies concerning clinical practice, researchers using the Delphi technique should carefully consider the methodological, philosophical and political reasons for decisions around sample size and types of experts represented on the panel.

INTRODUCTION

The purpose of this paper is to critically examine the selection of panel members and the function of 'expertise' within Delphi technique research concerning midwifery clinical practice. The Delphi technique is a consensus research method conducted through an iterative survey and feedback process in order to determine, predict and explore group attitudes and priorities (Keeney et al., 2001). Since the results of Delphi studies have been used to influence clinical practice and standards in maternity care (Fullerton et al., 2011), critical reflection on how Delphi panels have been assembled is essential for appraising the validity of this influence.

Traditional Delphi surveys begin with open-ended questions put to the panel of 'experts;' the modified Delphi begins with a literature review (Keeley et al., 2016). Statements are then developed by the researchers, reflecting the content of participants' answers and/or the literature review. In subsequent surveys, known as 'rounds,' participants are asked to rate their agreement with the statements, or rank them, or a similar variation. The results of a Delphi study are a collection of statements which have achieved consensus, according to a pre-set measurement, such as 70% of the panel in agreement (Meskell et al., 2014). A key feature of the Delphi process is its anonymous response process. Panel members are often anonymous to each other and never have access to other members' answers; this mitigates the influence of dominant personalities (Kennedy, 2004). Delphi studies are also able to be conducted remotely via post or increasingly via e-survey platforms, enabling a wider range of participants than would be able to assemble face-to-face (Schneider et al., 2013).

The Delphi technique originated as a forecasting method using expert opinion within military and technology industries to predict the consequences of multiple courses of action (Cuhls, 2005), but the method has evolved to serve a variety of purposes within health care (Jones and Hunter, 1995). Uses include development of competency frameworks and educational programmes (Fullerton et al., 2003), identification of research priorities and frameworks (Wu et al., 2012), and descriptions of core outcome measurements to assess service quality (Devane et al., 2007). As variations in purpose and process of Delphi studies in health have proliferated, so have sampling strategies and criteria for selection of panellists. Panel members are chosen for their relationship to the topic under consideration and the perceived value of their opinions on that topic (Mullen, 2003). The qualities which underpin this participant selection judgement, and who is making it, vary among Delphi studies, but the term 'expertise' is widely discussed and debated in the literature (Baker et al., 2006; Keeney et al., 2006, 2001). Sample size is also debated, with recommendations ranging from a panel of 7 to hundreds of members (Mullen, 2003).

In this paper, we report the results of a literature review of Delphi technique in research specifically concerning clinical midwifery practice. Within the identified literature, we critically explore sampling decisions by focusing on three areas of methodological tension: panel size, panel-audience alignment, and appointment authority. The results may help future Delphi researchers in midwifery and health services to consider methodological decisions around sampling and expertise.

LITERATURE REVIEW

In order to explore the selection of panel membership in Delphi studies

concerning clinical practice in midwifery and maternity care, we conducted a methodological review using a systematic literature retrieval process. The retrieval was conducted by the first author in November 2016, using CINAHL Plus and Medline databases. Search terms and Boolean operators were 'Delphi' AND 'midwif*.' Included in the review were Delphi studies concerning clinical care or the development of skills for clinical care, of pregnant and parturient women, involving midwives. Exclusions included studies focusing exclusively on research priorities, management, academic practice, those which included midwifery as a sub-group of general nursing, and those focusing on infertility care. The search returned a total of 178 unique studies after duplicates were removed. Following application of the inclusion and exclusion criteria, 25 studies were included in our review. No methodological quality exclusions were made, as the purpose of the review was methodological exploration. The 25 studies were scrutinised for the way participants were selected, particularly with regard to the way expertise functioned in sampling of panel members.

FINDINGS

Within studies concerning clinical midwifery, Delphi technique has been used to identify professional competencies, quality standards and reporting measures, outline workplace needs, negotiate spheres of practice with other professional groups, and explore constructs and definitions of midwifery practice (Table 8). We explored three key areas of tension in relation to sampling strategy in the 25 Delphi studies under consideration (Table 9): panel size, panel-audience alignment, and appointment authority. We discuss each of these areas below in light of analysis of the literature.

Table 8: Uses of Delphi technique within midwifery clinical practice

- Identify quality criteria (de Bruin-Kooistra et al., 2012; Nieuwenhuijze et al., 2014; Sandin Bojo et al., 2004; Smit et al., 2013b) and professional competencies (Fullerton et al., 2003, 2011; Pincombe et al., 2007)
- Identify outcome measures (Devane et al., 2007) and standard reporting data sets (Rukanuddin, 2006; Voerman et al., 2013)
- Develop standards for clinical teaching programmes (Thellesen et al., 2015), clinical textbooks (Misato Kaso et al., 2011) and specialist areas of practice (Walker et al., 2016a, 2016b, 2015a)
- Outline the workplace needs of midwives (Hauck et al., 2012; Noseworthy, 2002; Slome, 1983)

Areas of methodological tension

1 Panel size

The number of panel members involved in the studies reviewed ranged from 5 to 1918, and the median size of panel membership was 34. The median point is a good measure of central tendency in instances where the mean is susceptible to being skewed by outliers (Black, 2006). Panel size was influenced by the scope of practice under consideration, the type of experts included on the panel, and the use of multiple panels.

1.1 Scope of practice

Lomas suggests that panel membership should reflect the chosen focus and the target audience of the consensus exercise (Lomas, 1991). To explore the influence of focus, we divided the 25 papers reviewed into three categories, reflecting the scope of focus under consideration: broad, intermediate and narrow. Within our categories, studies with a broad scope of focus concerned competencies, central concepts or quality indicators for midwifery practice in general. Studies with an intermediate scope of focus concerned a narrower

area of midwifery practice, such as normal physiological birth, community-based care, or breastfeeding. Studies with a narrow scope of practice concerned very specific or specialist areas of practice, such as cardiotocography training, and management of postpartum haemorrhage in the community. Table 9 reflects the categories we used and how we classified the papers within these categories, as well as the range and median for each grouping.

The papers reviewed reflected a tendency for larger panel memberships within studies concerning a broader scope of focus (***Figure 5**: Sample sizes of Delphi studies concerning clinical midwifery practice*). Median panel sizes ranged from 67 within the broader scope studies down to 20 within the narrow scope studies. The outliers showed more disparity and did not necessarily align with the general trend. At the top end of the range among the studies with broad scope, Fullerton et al's (2003) paper reporting the International Confederation of Midwives (ICM) study of essential competencies for international midwifery practice involved 1918 total participants (Fullerton et al., 2003). This was a noticeable outlier, with significantly more participants than other studies. The study with smallest panel membership had an intermediate scope of focus; Voerman et al focused on quality indicators for community-based midwifery care and involved only five participants (Voerman et al., 2013).

1.2 Type of experts

All midwives are expected to provide skilled, knowledgeable, compassionate and competent care to pregnant and parturient women (Renfrew et al., 2014), and can be considered experts in this practice. But some topics required additional expertise and/or collaboration with other groups. Lomas describes three different types of expertise reflected in consensus group membership

Table 9: Delphi papers reviewed, classified by their scope of practice

Broad	Intermediate	Narrow
Range 15 – 1918	Range 5 – 273	Range 8 – 42
Median 67	Median 50	Median 20
Fullerton et al 2003; essential competencies for midwifery practice; 1918 participants	McKenna et al 2002; identifying non-midwifery duties performed by midwives; 273 participants	Thellesen et al 2015; development of cardiotocography education programme; 42 participants
Fullerton et al 2011; update to essential competencies; 232 participants	Nicholls et al 2011; perceptions of a good midwife; 226 participants	Walker et al 2016 a&b; standards and principles of physiological breech birth practice; 28 participants
Devane et al 2007; core outcome measures for maternity care, required evaluation expertise; 218 participants	Kennedy et al 2000; model of exemplary midwifery practice; 132 participants	Walker et al 2015; standards for midwife practitioners of external cephalic version; 20 participants
Slome 1983; future settings of nurse-midwifery practice; 97 participants	Hauck et al 2012; workplace needs of midwives; 114 participants	Smit et al 2013; quality indicators for prevention and management of postpartum haemorrhage; 13 participants
Pincombe et al 2007; registration requirements for midwives; 36 participants	Nieuwenhuijze et al 2014; shared decision-making; 52 participants	Noseworthy 2002; caseload management for midwifery lecturers; 8 participants
Rukanuddin et al 2006; developing standardized midwifery nursing health dataset; 25 participants	Perdok et al 2014; integration of moderate risk care during labour; 50 participants	
Cardoso et al 2010; central concepts in midwifery and maternity nursing; 18 participants	Kaso et al 2011; breastfeeding information in midwifery textbooks; 32 midwives	
MacVane 2013; construct of midwifery knowledge; 15 participants	De Bruin-Kooistra et al 2012; indicators for quality low-risk midwifery care; 28 participants	
	Kennedy et al 2015; consensus statement on normal physiological birth; 21 participants	
	Bojö et al 2004; instrument to measure quality care in normal birth; 6 participants	
	Voerman et al 2013; developing quality indicators for community-based maternity care; 5 participants	

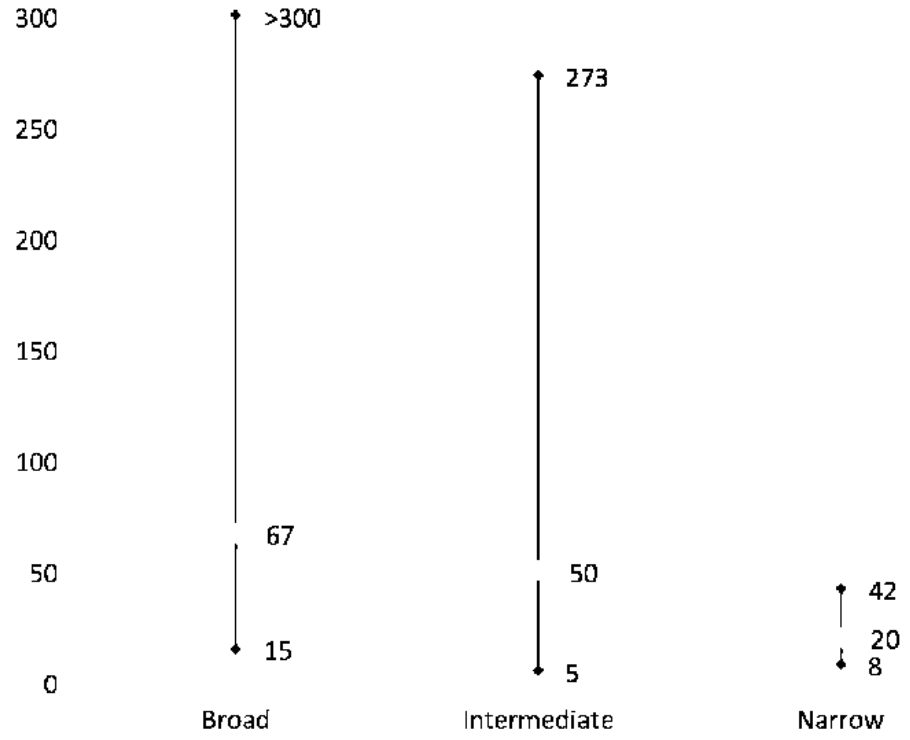

Figure 5. Sample sizes of Delphi studies concerning clinical midwifery practice
Range and median sizes of Delphi panels, according to the scope of practice under consideration.

(Lomas, 1991). *Clinical experts* work mostly or entirely in clinical practice, and tend to focus on safety and effectiveness. *Scientific experts* have additional academic or policy-making experience, and contribute both clinical and broader theoretic knowledge of the topic. Lomas includes *expert consumers* in this group. He also identifies *nonexpert panels*, who broaden the debate around a certain topic, rather than resolving conflicts within a well-defined arena. The use of expertise in the studies reviewed can be considered in light of Lomas's categories and their influence on panel sizes.

Studies reviewed which involved mostly clinical experts generally involved a larger number of panel members. For example, McKenna et al involved a panel of 273 clinical midwives and student midwives to identify non-midwifery tasks performed by midwives. Some studies intentionally prioritised clinically

active midwives on panels which also involved multiple types of expertise and/or stakeholder groups, usually when the aim was to influence the international landscape of midwifery practice. These also tended to involve larger panels. Devane et al's (2007) international study of core outcomes for maternity care involved 218 participants representing multiple geographic areas, practice environments and professional affiliations, as well as representatives from women's advocacy organisations.

In contrast, among the studies reviewed, those which relied more or exclusively on scientific experts tended to use smaller panels. Similarly to Voerman et al's panel of five (Voerman et al., 2013), Sandin Bojö et al (Sandin Bojo et al., 2004) convened a panel of only six professionals to develop an instrument to measure quality of midwifery care during normal birth. The panel included two clinical midwives, two teachers of midwifery with higher degrees and two obstetricians with PhDs, all of whom were invited either "at a meeting about midwifery research" or purposefully sampled because they were "known to have an interest in research" (p. 78). The study participants were also geographically contained to one country, Sweden, although it is not clear that the study's target audience was confined to that country. The panel size and membership is markedly different from studies with similar aims which prioritised the involvement of clinically active midwives (Devane et al., 2007; Fullerton et al., 2003, 2011; Nieuwenhuijze et al., 2014).

1.3 Multiple panels

Studies with larger panel memberships sometimes subdivided the membership or used smaller panels of different members at various stages of the Delphi process. We have not included the smaller panels in the overall quantification of panel sizes in this review. The type of expertise included on the smaller panels was either reflective of or different to the main Delphi

panel, depending on their purpose. Eight papers reported using a smaller panel of similar composition for pilot testing or validation of the survey instruments (Devane et al., 2007; Fullerton et al., 2003, 2011; McKenna et al., 2002; Rukanuddin, 2006; Sandin Bojo et al., 2004; Walker et al., 2016a, 2016b, 2015b). Two studies described use of a 'project group' to extract information from a literature review in the first round of modified Delphi studies (de Bruin-Kooistra et al., 2012; M Kaso et al., 2011), or to shape the survey before submission to a larger panel (Fullerton et al., 2003, 2011). Two studies used a 'research jury,' reflecting composition of the panel, to assist in data analysis (Kennedy, 2000; Kennedy et al., 2015). Three studies involved a smaller panel or 'task force' which adjudicated final decisions in the outcomes of the Delphi process (Fullerton et al., 2003, 2011; Rukanuddin, 2006). One study used a panel of pregnant women to validate the findings of the Delphi process (Voerman et al., 2013). In most studies, the panel of author-researchers served the purposes outlined above, and in one study most of the authors were also panellists in the Delphi process (Smit et al., 2013a).

The phase at which panel members were involved, whether in the main panel or one of these smaller panels, influenced the degree of influence they had on the Delphi process. Earlier involvement afforded more opportunity for influencing the direction and content of the consensus activities. For example, Niewenhuijze et al (2014) report that the "responses [of user representatives] to the open-ended questions of Round 1 were of high value for the development of statements for rounds 2 and 3" (p.8). This provides an example of how nonexpert panel members can widen the debate around a topic in the way Lomas describes. In contrast, Voerman et al (2013) involved a panel of 13 pregnant women to validate the results at the end of a Delphi process completed by 5 health care professionals, concerning development of quality indicators for community-based midwifery practice. Although the

women on the verification panel suggested additional items be included, these were not put before the panel for consideration and not included in the results. Involvement of a different group for verification purposes only may contribute to the critique of the Delphi technique's potential to force consensus while limiting debate (Keeney et al., 2001).

2.0 Panel-audience alignment

Much Delphi methodological literature discusses the concept of a 'target audience,' that is the audience whose practice the study hopes to influence. Powell suggests that members should be chosen for their work in the chosen area and credibility with the target audience (Powell, 2003). Black says, "Given that the purpose of the exercise is to make decisions that will be well-received and have an impact on existing policy or practice, the key issue when selecting participants is that they represent the target audience for the output" (Black, 2006, p.3). But credibility with and representation of a target audience are different functions, which may or may not overlap. Our literature sample indicated both alignment and disparity between panel membership and target audience in Delphi studies concerning clinical midwifery practice.

2.1 Alignment / Representation

The largest study, Fullerton et al's (2003) study conducted on behalf of the International Confederation of Midwives (ICM) had both broad scope and broad target audience, aiming to determine a consensus on core midwifery competencies applicable internationally. The study involved 1918 total participants, including practising midwives (1271), students (333), midwifery regulators (20), and educators (312) from 22 different countries. In the ICM study, 'expertise' is equated with experience of practising, teaching and learning midwifery. The broad diversity of the panel helps foster a sense of 'ownership' (Black, 2006) among those with both clinical and scientific

expertise, and establishes credibility among the member nations within which the ICM would hope to exercise standard-setting authority. At the smaller end of the spectrum, Noseworthy's (2002) study involved New Zealand midwifery lecturers who maintained clinical caseloads, a unique subset of lecturers, and managers of midwifery education programmes who managed them, to develop a set of practice recommendations around how the competing demands of caseloading lecturers can be effectively managed (Noseworthy, 2002). The target audience was geographically and professionally specific, the scope narrow, and the study had a correspondingly narrow panel membership of eight. Inclusion of both stakeholder groups ensured credibility among those who must collaborate in order to implement the results.

2.2 Constructive Misalignment: Credibility, Influence or Regulation

Some studies used panels comprising members of groups with expertise different from the target audience. Kaso et al (2011) used a panel of 32 experienced midwives and breastfeeding educators to determine criteria for evaluating breastfeeding information in midwifery textbooks in Japan stating, "Survey participants should be those who would be most affected by results of the survey" (p. 3). Geographically, the panel reflects the authors' national-level target audience, as participants were recruited from a variety of different maternity care and education institutions across Japan. Although some academics (scientific experts) were included, front-line clinicians (clinical experts) constituted the majority of the panel, and give the results credibility with this audience. But the audience whose practice the Delphi study seeks to influence is primarily academic: the writers and editors of midwifery textbooks. The constructive mismatch addresses a potential power imbalance by enabling front-line clinicians and educators to guide and influence publishing standards, which in turn influence their own practice.

Other authors involved significant numbers of service users on panels to define "good" (Nicholls et al., 2011) and "exemplary" (Kennedy, 2000) midwifery practice. In Kennedy et al's (2015) Delphi-developed consensus statement on normal physiological birth, the 21-member panel purposefully included representatives from the three leading midwifery organizations and consumer advocacy groups in the United States. Their process also involved soliciting feedback at conferences and through stakeholder review, ensuring that all major groups whom the statement would affect participated in ownership of the project. Although the perspective of service users is fundamental to such definitions, the target audience is members, leaders and educators of the midwifery profession. This constructive misalignment enables women to have a voice of influence within the profession.

Among the studies with a narrow scope, all but one used a panel composed mostly of clinicians with significant experience in the specialist area under consideration. In contrast to this, Smit et al's (2013) Delphi study concerning the prevention and management of post partum haemorrhage in primary midwifery care settings, exemplifies some of the tensions surrounding the methodological decision not to align panel membership primarily with the clinical practitioners for whom practice standards are being decided. Smit et al's (2013) paper concerned the development of care quality indicators for prevention and management of postpartum haemorrhage in the Netherlands, and covered a narrow scope of practice among a select group of midwives, specifically those working in primary care settings. Among the panel of 13 members, only five are midwives; it is unclear how many of these actively work in primary clinical care, and one of the midwives is an author on the paper. The remaining panellists include seven obstetricians, three of whom are authors, and one ambulance paramedic. The results are intended to influence the practice of midwives working in primary care, but the lack of

clear representation on the panel by clinical midwives working primarily in community settings raises questions about the potential for misaligned Delphi studies to enable one professional group to effectively regulate the practice of another.

3.0 Appointment authority

Appointment authority can be understood as researchers' ability to influence the panel membership and, as a consequence, the construct of expertise. The high potential for bias in this process has been highlighted as a weakness of Delphi research (Mullen, 2003).

3.1 Controlled appointment authority

Purposive sampling in these studies was often based on the authors' personal knowledge and perception of other professionals, although not always with clear criteria for how selection occurred. For example, Pincombe et al. (2007, p. 373) defined "midwifery experts" as "midwives and/or midwifery educationalists who had knowledge and experience of the issues being investigated." The authors were transparent that they used their combined knowledge of the target population to purposively sample a diverse panel of 36 experts.

Related to this was the sampling of experts based on their 'activity' in the field of interest. In their study on shared decision-making practices, Nieuwenhuijze et al (2014) clearly stated that their definition of expert encompassed both theoretical knowledge and knowledge from experience. Their purposive sampling process included inviting "authors of key articles" and "international opinion leaders" (p. 3), which incorporated some aspect of public and/or peer review, and also practitioners in various maternity care settings, whose activity was less clearly defined.

3.2 Dispersed appointment authority

Nomination by others featured in a number of studies. Some studies, such as Devane et al. (2007), and our own studies of practice in the management of breech presentation (Walker et al., 2015a, 2016a, 2016b) used purposive sampling as above but incorporated snowball or network sampling to ensure some potential panellists were identified by others. In an example of network sampling, Thellesen et al. (2015, p. 870) defined "experienced" as "midwives and obstetricians with CTG teaching experience and more than 5 years of clinical experience." They provided these inclusion criteria to the heads of maternity departments and asked the managers of all Danish maternity services to nominate one midwife and one obstetrician for participation. This method resulted in the dispersal of appointment authority out of the hands of the researchers.

Dispersal of appointment authority was also achieved through convenience sampling, for example inviting all staff at one hospital or those attending a conference. In their study of the workplace needs of midwives, Hauck et al (2012) invited all midwives working at each of five study hospitals to participate in each round, regardless of whether they had participated in preceding rounds. Convenience sampling was only used when the sample was composed exclusively clinical experts. Some studies used multiple sampling strategies, which resulted in varying degrees of appointment authority over the final composition of the panel.

DISCUSSION

This review explores the ways Delphi researchers have negotiated methodological decisions about sampling in studies concerning clinical

midwifery practice. We found variations in panel size, influenced by the scope of the study's focus, the type of expertise reflected on the panel, and the use of multiple panels to guide various stages of the Delphi process. Baker et al (2006) suggest that heterogeneous samples use larger sample sizes to validate the results, but in the literature we reviewed, sample size was more influenced by the scope of focus under consideration and the type of expert included on the panel, e.g. clinical and/or scientific experts. Meskell et al (2014, p. 34) suggest for Delphi panels a range of 10-30 members, with a maximum of 50, depending on "the complexity of the issue," but many of the Delphi studies in this sample had more than 50 participants. Previous methodologists, such as Keeney et al (2008, p. 208), have acknowledged a lack of guidance concerning minimum and maximum panel size in Delphi studies, suggesting that final numbers are related to "common sense and practical logistics," but also questioning the assumption that larger groups produce more reliable results (Hasson and Keeney, 2011). In studies aiming to encourage collaboration across a range of stakeholders, larger panels likely reflect a participatory philosophy and effort to obtain buy-in from various groups, rather than a methodological strategy related to increased reliability.

We found that panel alignment with the study's target audience was in some studies closely aligned and others misaligned. Constructive misalignment had the potential to empower other stakeholders to influence midwifery practice, but misalignment also had the potential to enable other professional groups to influence the regulation of midwifery practice. This possibility should be considered when the majority of panellists on a study concerning midwifery practice are representatives of a different professional group. We also observed that degree of appointment authority gave researchers different amounts of influence on the composition of the Delphi panel. Purposive sampling gave researchers the most control over panel appointments, while

snowball and convenience sampling dispersed appointment authority to other stakeholders.

Implications for Research Practice

When considering sampling strategy in studies concerning clinical practice, researchers using the Delphi technique should carefully consider the methodological, philosophical and political reasons for decisions around sample size and types of experts represented on the panel. Median panel memberships among these studies ranged from 20-67 members, depending on the scope of the study and type of experts included. Participation on Delphi panels may enable multiple stakeholders to contribute to guiding clinical midwifery practice, particularly when they are involved in the entire Delphi process, but careful attention should be given to ensure that clinically active midwives are well represented in studies which seek to influence midwifery practice. Although purposive sampling has an important role in identifying publicly visible experts, the use of multiple sampling strategies may reduce potential bias due to exclusive appointment authority in the hands of researchers.

4.4 Critical Analysis

The papers in this chapter each discussed the increasing use of Delphi consensus-development methods within health sciences. This critical analysis explores the use of Delphi method in the context of this thesis. This includes a discussion of the contribution of a consensus methodology to the overall project, key methodological decisions, some of the resulting strengths and weaknesses and implications for future research.

Contributions to the papers in this chapter are as follows: I designed the research in consultation with my doctoral supervisors. I was responsible for recruitment and every aspect of liaising with participants. I created the on-line surveys used to conduct the research, and downloaded and analysed the results. For the methodological literature review, I conducted the literature searches and selected relevant articles for inclusion. Co-authors provided reflexive supervision at monthly meetings and *ad hoc* as required. I wrote the initial draft of each paper and produced revisions based on feedback from co-authors and peer review, where applicable.

Consensus and evidence-based practice

When we sought publication for these Delphi studies, a peer reviewer critiqued the results on the basis that they are:

> *[A] list of opinions which are shared by 26 health care professionals. In obstetrics we are aware how strongly held views about management have been shown to be wrong when subjected to critical scientific examination* (Appendix 3).

This critical analysis will begin by considering the interplay of consensus and *critical scientific examination* in evidence-based practice. Consensus methods are a cornerstone of modern health care governance. Local, national and international practice guidelines are all developed through consensus and peer review processes (Black et al., 1999; NICE, 2012; RCOG, 2015; WHO, 2012). The purpose of guidelines is to guide safe professional practice with best evidence, but they also become the standards against which practice is measured and judged (Wright et al., 2011). Consensus-based guidelines are a vehicle of professional communication and control, as evidence-based medicine holds what Charles et al (2011, p. 597) have described as a "position of symbolic authority in clinical decision-making." Judicial framework in relation to the Bolam judgement also works in the same way: "[H]e (sic) [the practitioner] is not guilty of negligence if he has acted in accordance with a practice accepted as proper by a responsible body of medical men (sic) skilled in that particular art (McNair, 1957)." In other words, consensus among experts historically wields legal as well as regulatory power.

Recent critiques of professional guidelines have attempted to make transparent the contribution of professional opinion to guideline recommendations (Wright et al., 2011). Prusova et al reviewed then-current RCOG guidelines in 2014 and determined that only 8% of obstetric guidelines were based on the best quality (A-grade) evidence. In contrast, 40% were based on "recommended best practice based on the clinical experience of the guideline development group" (Prusova et al., 2014). The RCOG publishes its procedure for guideline development, which includes peer review and an informal consensus method among the Clinical Guidelines Group (GDG) in order to agree best practice recommendations (RCOG, 2015). Membership in the CDG and as Lead Developer for new guidelines or revisions is through

legacy, e.g. the Lead Developer for the previous version, or appointment by the CDG. This method of admission into the arena of guideline decision-making potentially makes it difficult for innovative practices outside the *status quo* to gain credence within the professional body. It also obscures the possibility that a different set of equally experienced professionals may hold a completely different set of beliefs, leading some to criticise evidence-based medicine as "eminence-based medicine" (Prusova et al., 2014, p. 706).

The challenge this research offers to contemporary breech guidelines and research *is* the evidence that a different set of 26 health care professionals can reach a consensus on some significantly different opinions not currently reflected in guidelines or research. Writing about scientists working at the intersection of constructivist and pragmatist ways of knowing, Reich (2009, pp. 41–2) describes the "the predicament that there may be different accurate or right versions of the world coexisting at a given time or contending for each other's claims." Von Glasersfeld (1991, p. 13) describes, "The original seed of constructivist ideas was undoubtedly the sceptics' realization that we can have no certain knowledge of the real world, because, even if we could discover how our knowledge is derived from experience, there is no way of discovering how our experience might be related to what there is before we experience it." This research introduces a sceptical challenge to the symbolic authority of professional guidelines as an exclusive representation of *best practice* by demonstrating that a different set of professionals with different experiential backgrounds can collectively arrive at a different representational set of beliefs. For the same reasons, these Delphi results cannot be said to represent an accurate or ultimate truth about physiological breech birth practice or learning. Rather, they represent a collaboratively constructed knowledge about what is important to a group of professionals who have embraced a particular innovative practice in this contemporary moment.

The constructivist critique also problematises the research agenda, pointing out that what is seen as worthy of study is itself determined by the beliefs and experiential context of those who will be doing the observing. This problem was made clear for many by Thomas Kuhn in *The Structure of Scientific Revolutions* (2012, p. 157):

> *The issue is which paradigm should in the future guide research on problems many of which neither competitor can yet claim to resolve completely. A decision between alternate ways of practising science is called for, and in the circumstances that decision must be based less on past achievement than on future promise … A decision of that kind can only be based on faith.*

Making this faith visible by making these *strongly held opinions* explicit is a first step to enabling them to be subjected to *critical scientific examination.* Because health care is a social activity, only practices which have achieved some sort of consensus definition can be measured using rigorous quantitative methods. Positivist methods of evaluating the outcomes of health care are important, but they remain of limited and potentially limiting value to the extent that they have not embraced a multiplicity of values and perspectives on the problem at hand.

Strengths and Weaknesses

Some, including a peer reviewer (Appendix 3), have criticised the validity of the Delphi method on the basis that those who respond to an invitation to participate are more likely to be interested in the topic, and therefore the sample and results will be biased (Keeney et al., 2006). The results of the

grounded theory study and integrative analysis reported later in this thesis challenge the assumption that a biased sample will result in research of limited value. These results suggest that participants in both arms of this research viewed affinity and joy in breech birth practice as essential to the ability to develop competence and expertise. While it is true that both samples are likely to be biased in this way, it is pertinent to consider the instrumental value participants placed on their passions and biases, and that of others they perceived as having competence and/or expertise. It is also relevant to question the value of including the opinions of professionals who lack an interest in physiological breech birth, in research designed to explain how professionals develop competence and expertise in this practice. Minimising bias is a central aim of positivist research, in which probabilistic samples are sought (Teddlie and Tashakkori, 2009). Foregrounding and even embracing bias are more appropriate to methods working within a constructivist paradigm. Purposive samples may be more likely to produce pragmatically useful results that 'fit' their intended audiences (Schubert and Cavarocchi, 2012). Making the shared opinions of a minority explicit enables them to be subjected to *critical scientific examination*.

With these critiques in mind, one strength of the Delphi research in this thesis is the transparent and open panel selection process. Multiple methods of sampling, eg. purposive, network and social media sampling, enabled contact with a heterogeneous sample of obstetricians and midwives who had significant experience with physiological breech birth. Some of the sample were strong academically and had been invited purposively for their involvement in breech research. Additional potential panel members were nominated by professionals in their network for their known involvement with breech birth. Others were self-nominated, having encountered calls to express interest in the research via social media channels. The criteria were

clear and based on self-reported experience, resulting in a panel with a high average experience level (mean = 135 breech births), which was reported along with the results (Walker et al., 2016a). The actual numbers were not confirmed, and this is a potential weakness in relying on self-reported measures. But the inclusion of panellists nominated by other professionals does suggest a professional identity association with breech practice.

The panel was also balanced between midwives and obstetricians, ensuring that the professional interests of one group would not dominate over those of another (Hutchings and Raine, 2006). The review of sampling strategies in research concerning clinical midwifery practice, included in this chapter, suggests that our panel size of 13 midwives, 13 obstetricians and 2 service user representatives was balanced and in line with other research dealing with areas of specialist practice. This balance also contributes to the credibility of the results, which cannot be attributed to the dominance of one professional group, the influence of an institutional/non-institutional birth setting or any specific national setting. The use of Delphi method on this project enables marginalised practitioners to unite, thus strengthening the impact of these minority voices.

The inclusion of two service user representatives also ensured that the interests of women and families were represented (Baker et al., 2006). The benefits of patient and public involvement (PPI) in research, and importance of reporting this involvement, are becoming increasingly clear (Staley, 2009; Staniszewska et al., 2011). The decision to ensure service user representatives also builds on experience of previous Delphi research (Walker et al., 2015b), also completed and published during the period of doctoral study. The paper on *Standards for midwifery practitioners of external cephalic version* (ECV) discusses how the non-inclusion of service user

representatives may have omitted an important viewpoint from the results. The two service users on this Delphi panel made important and influential contributions during the initial qualitative round. The data indicated that they perceived and prioritised different skills from the professionals, especially around counselling and informed consent, yet these were recognised and achieved consensus when articulated in subsequent rounds. Keeley et al (2016) also note meaningful discordance between the emphasis of service users and health care professionals in their discussion of using qualitative methods to inform Delphi survey development. The review of Delphi sampling methods indicated that participants involved in earlier rounds had more ability to influence the direction of the research, rather than being restricted to validation at the end of the process. This is consistent with a recent systematic review of the impact of PPI, which reported that service user involvement resulted in a wider set of topics than when health professionals or academics had been working alone, and that their involvement from the earliest stages helps to shape the direction of the research (Staley, 2009).

The significant contribution service users made to the project contained in this thesis affirms the importance of involving them from the very beginning of a Delphi project. The sample of service users was not equivalent to the members of professional groups because the focus of the research was on professional standards as perceived by experienced practitioners. While they appreciated the opportunity to contribute to the first round, the two service users who participated on the panel did express reservation about ranking some of the statements pertaining to specific professional skills, which they did not feel qualified to judge. This strategy appeared to achieve the right balance on meaningful involvement without obscuring the nature of the study as a consensus of experienced professionals.

In some areas of interest to the panellists, the Delphi process was not able to produce results. Publishing the negative results in the *Principles* paper highlighted these areas where opinion diverged. In some instances, this may have been because the Delphi technique is not the most appropriate method to address these topics. For example, the panel, which included midwives and obstetricians working in different settings, did not reach a consensus about place of birth. This may be because an opinion on this topic is of limited value, as the decision should be the result of quantitative evidence about outcomes in different settings, balanced with the preferences of the women who give birth. The panel did return a consensus about psycho-social aspects of the birth setting, which are translatable across environments, and this suggests that such aspects should be taken into account in research evaluating these settings.

The Delphi process used in this arm of the research incorporated feedback but did not ask participants to re-evaluate statements they had already considered. Reported statements were those which achieved a consensus in the second round and third round, which contained new or re-worded statements suggested by participants' feedback, an approach taken previously by Salmond (1994) and used in the Delphi research on ECV competencies (Walker et al., 2015b). This decision was primarily taken due to the potential for attrition, which can be common in Delphi surveys (van Teijlingen et al., 2006). This effect would be compounded with a relatively small panel and a large number of items to consider. There was a need to balance the potential gain of reporting the results of a survey taken after consideration of others' answers and feedback, with the need to ensure a high enough response rate for the results to be credible. Keeney et al (2010) have noted that a response bias can occur with substantial attrition, and a 70%

response rate across each round is needed to maintain rigour. There was an 82% participation rate in the second and third rounds of the Delphi survey.

Some authors have claimed that differences in participants' answers between rounds are the result of shift in opinion during the Delphi process (Becker and Roberts, 2009; Cornick, 2006; Gill et al., 2013; Hasson and Keeney, 2011). An accident during the course of this research challenged this assumption. In Round 2, one participant accidentally returned two sets of answers, some of which were significantly different to those provided in their initial set of answers. We chose to use the first set and eliminate the second set. But the difference disputes the notion that answers change due to consideration of other participants' feedback. At best, results of a Delphi survey can only be considered a snapshot of one set of panellists' opinions at a given point in time. The stronger the result, e.g. the closer to 100% agreement, the more stable the result is likely to be, and this is an argument in favour of setting higher levels of agreement as the bar for consensus (Keeney et al., 2006). More borderline results may be more subject to shift for any number of reasons, including variable interpretations of the questions, reconsideration of responses after feedback, error (e.g. ticking the wrong box), or change in opinion due to recent personal experience. For this reason, we reported the group's central tendency as the percentage of agreement and the dispersal of agreement as the standard deviation for all of our results (Black, 2006).

Our methodological review of sampling in Delphi studies relating to midwifery practice helped us to contextualise our own sampling decisions in light of other research done in this area. We prepared the manuscript for publication, but shortly before submission to a journal, I discovered a Delphi study concerning intrapartum practice in the U.K. which did not include midwives on the panel (Sibanda et al., 2013), and therefore was not returned in the

systematic search. The existence of such research provides further evidence that unrepresentative sampling strategies in Delphi methods can enable one professional group to effectively control or regulate another. But it also highlights a weakness in this paper and suggests that it needs to be revised before submission for publication.

Implications for future research

The results of this research suggest the value of employing consensus methods to understand the practices of health care practitioners whose practices constitute a significant minority. These may not be reflected in mainstream guidelines, whose self-replicating nature may obscure or obstruct potentially useful advancements.

Areas of significant lack of consensus may indicate the need to employ different methods or modifications to the Delphi process. For example, on the subject of 'Fetal Positioning,' the panel returned a lack of consensus more often than a consensus on the statements formed from the qualitative round. This is an important area to develop further, in part because the panel did reach a consensus-level agreement on the statements indicating both incomplete and footling presentations can be safe for vaginal breech birth. Footling presentation is often considered a contraindication to vaginal breech birth (Impey et al., 2017). But the research basis for this recommendation is not strong, and there is no widely agreed nomenclature ensuring that professionals refer to the same set of circumstances when using the expression 'footling.' Further consensus-based research about types of presentation may benefit from a literature review prior to the initial round, a feature of some Delphi surveys. A consensus about nomenclature may also be an important first step, to ensure that terms used are consistent. Use of a

different consensus method, such as nominal group technique or a consensus development meeting (Black, 2006; van Teijlingen et al., 2006), may also enable more discussion and debate as part of the process.

Further implications for research, considered in light of the project as a whole, will be addressed in the Discussion chapter.

Chapter 5: Grounded theory

5.1 Deliberate acquisition of competence in physiological breech birth

Reference
Walker S, Parker P and Scamell M. Deliberate acquisition of competence in physiological breech birth: a grounded theory study. *Women and Birth*. In Press.

Abstract
Problem: Research suggests that the skill and experience of the attendant significantly affect the outcomes of vaginal breech births, yet practitioner experience levels are minimal within many contemporary maternity care systems.

Background: Due to minimal experience and cultural resistance, few practitioners offer vaginal breech birth, and many practice guidelines and training programmes recommend delivery techniques requiring supine maternal position. Fewer practitioners have skills to support physiological breech birth, involving active maternal movement and choice of birthing position, including upright postures such as kneeling, standing, squatting, or on a birth stool. How professionals learn complex skills contrary to those taught in their local practice settings is unclear.

Question: How do professionals develop competence and expertise in physiological breech birth?

Methods: Nine midwives and five obstetricians with experience facilitating upright physiological breech births participated in semi-structured interviews. Data were analysed iteratively using constructivist grounded theory methods to develop an empirical theory of physiological breech skill acquisition.

Results: Among the participants in this research, the deliberate acquisition of competence in physiological breech birth included stages of affinity with physiological birth, critical awareness, intention, identity and responsibility. Expert practitioners operating across local and national boundaries guided less experienced practitioners.

Discussion: The results depict a specialist learning model which could be formalised in sympathetic training programmes, and evaluated. It may also be relevant to developing competence in other specialist/expert roles and innovative practices.

Conclusion: Deliberate development of local communities of practice may support professionals to acquire elusive breech skills in a sustainable way.

Keywords
breech presentation, clinical competence, physiological birth, sustainable models of care, constructivist grounded theory, communities of practice

1. Introduction

Approximately 1:25 women pregnant at term will carry a fetus presenting breech, bottom- or feet-first (Ferreira et al., 2015). Although debates about the safety of vaginal breech birth compared to elective caesarean section have run for decades (van Roosmalen and Meguid, 2014), research and advocacy literature indicates that there is a demand for vaginal breech birth (Angood et al., 2010; Kok et al., 2008), that women have difficulty accessing this service (Homer et al., 2015; Petrovska et al., 2016a), and that providers experience cultural resistance when attempting to facilitate breech births (Catling et al., 2015; Walker et al., 2016b). Some experienced midwives and obstetricians have advocated a change towards innovative, physiologically compatible practices for vaginal breech birth (Krause, 2007; Reitter et al., 2014; Walker et al., 2016b), commonly involving upright maternal birthing positions, such as kneeling, standing, squatting, or sitting on a birth stool. Recent research has suggested that the safety of physiological breech birth is comparable to methods involving supine maternal birthing positions, and it may afford some maternal benefits (Bogner et al., 2015; Louwen et al., 2017). But implementing the option of physiological breech birth requires professionals to learn complex skills not readily available or supported within their local practice settings, with minimal opportunity to practice under the guidance of experienced mentors.

In a large randomised controlled trial (Su et al., 2003, p. 742), the attendance of "a clinician who considers him or herself to be skilled and experienced at vaginal breech delivery, with confirmation by the individual's Head of Department" reduced the risk of adverse perinatal outcome at breech births to a 0.30 odds ratio compared to births where a clinician meeting this definition was not present (p=.004). Yet studies from around the world indicate that obstetric training programmes do not necessarily provide new consultants with the experience and confidence to support vaginal breech births (Chinnock and Robson, 2007; Devarajan et al., 2011; Dhingra and Raffi, 2010; Gratius et al., 2010; Shaaban et al., 2012). A recent systematic review (Walker et al., 2017a) reported no evidence that current training programmes

improve maternal and/or neonatal outcomes. The review also suggested teaching breech skills as part of an obstetric emergencies training programme may reduce the likelihood of actually attending a breech birth in practice. The aim of this study was to explore how professionals acquire physiological breech experience and skill over the courses of their careers, in order to develop an empirical model which might explain and/or predict how clinicians move towards physiological breech birth competence.

2. Participants, Ethics and Methods

2.1 Research design

This study followed a constructivist grounded theory methodology (Charmaz, 2006). Grounded theory is ideally suited to exploring processes and new understandings of social interaction, grounded in empirical data, and expressed in the form of a theory which can be tested further (Glaser and Strauss, 1967). A constructivist approach acknowledges the inevitable influence of personal experience and social network activity in the co-construction of shared realities, and provides a reflexive framework to maintain awareness of these influences throughout the research process (Steier, 1991). The research team included a clinically active midwife, a Senior Lecturer in midwifery, and a Professor of Educational Development who is a nurse. The first author had qualitative research experience and breech experience at a level similar to the participants. The second and third authors, who had previously conducted grounded theory studies, provided methodological familiarity and professional distance from breech practice, which balanced reflexive discussions. Ethical approval was obtained (City University London, SHSREC Ref: PhD/15-16/06), and all participants gave consent to participate via an on-line form.

2.2 Sampling and Participants

This research sought to conduct in-depth interviews with midwives and obstetricians who had attended between 3-20 upright breech births. This range was chosen to

capture the experiences of professionals who are still in the process of acquiring competence and proficiency (Walker et al., 2016a). According to Benner (2001), professionals in earlier stages of developing competence and proficiency can be expected to engage in more conscious and deliberate planning and reflection, potentially revealing more data about the learning process, than professionals who have reached the level of expertise, wherein analytic processes have been incorporated into more intuitive grasp of complex situations.

Recruitment involved purposive, network, and social media sampling (Walker et al., 2016a). Although ability to participate in an interview in English was required, recruitment was international. Information about the research and the researcher (first author) was sent via e-mail to practitioners whose involvement with breech birth was publicly known, e.g. through publications or conference activities. Those responding to an expression of interest were also invited to nominate experienced colleagues, who were each sent information about the research. A call for expressions of interest was also posted on social media sites related to breech birth, with permission of the moderators. This process resulted in 52 expressions of interest from professionals who indicated they had the desired range of experience for this study, and 32 were invited to participate [Figure 6]. If a potential participant did not respond to a request to schedule an interview, the next suitable participant was approached, until saturation was achieved (Hennink et al., 2017). Participants were selected to represent a heterogeneous range of experience levels, geographical areas and both the midwifery and obstetric professions, in order to distil common elements resonant across diversity through the constant comparative method used in grounded theory research. All participants gave consent via an on-line form. Recruitment stopped when saturation was reached, as described below (Hennink et al., 2017).

A total of 14 professionals were interviewed, including nine midwives and five obstetricians, working in Australia, Brazil, Canada, the Netherlands, New Zealand,

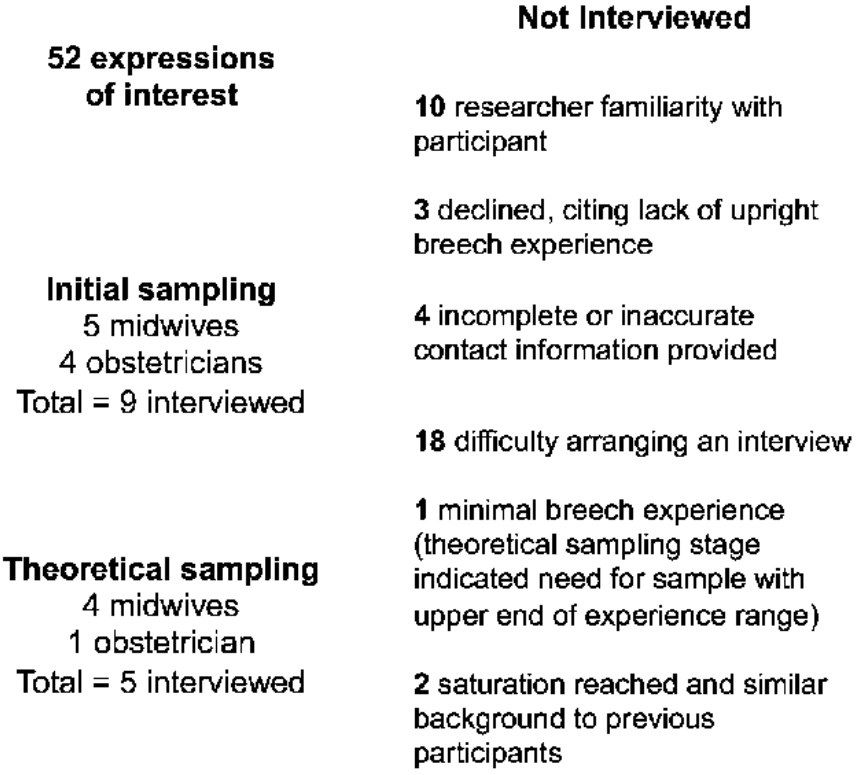

Figure 6. Sampling: Expressions of interest, inclusions and exclusions

the Philippines, the United Kingdom, and the United States. All but one of the midwives described attending breech births in both home and hospital settings. Five midwives and three obstetricians had worked in multiple geographical locations, including the developing world. Some of the participants, especially obstetricians, had significantly more experience with vaginal breech births where the woman births in a supine or lithotomy position but were beginning to change their practice to include upright positions. Three participants had attended over 20 upright breech births by the time the interview took place. The experience level among those interviewed ultimately ranged from five breech births to approximately 30 upright breech births, and this range of experience provided sufficient comparative insight to meet the objectives of this study.

Eleven of the professionals who expressed an interest in participating were professionally acquainted with the researcher conducting the interviews, through conferences and other networking activities. The potential for bias in sampling was recognised, and the first nine interviews were conducted with participants with whom the researcher had little or no previous contact. However, in the final interviews, participants were theoretically sampled in order to achieve saturation of the emerging categories; this included one participant whose background experience was known to the researcher and particularly relevant to areas requiring deeper exploration at this stage.

2.3 Data collection

Individual in-depth interviews were conducted by the first author with all 14 participants, using a semi-structured interview schedule, below.

Semi-structured interview schedule(s): * = *added/modified in second round of interviews*

How did you gain experience with upright breech birth?

Please describe some/one* of your significant learning experiences.

* Have you had any difficult breech births? Please describe what happened.

* Have you ever experienced a head entrapment?

* Do you consider yourself skilled and experienced in breech birth? Why?

What does 'upright breech expertise' mean to you?

The first nine interviews took place between June and September 2014, and the final five took place between December 2015 and February 2016. Interviews ranged in length from twenty to ninety minutes; one interview was cut short due to clinical activity, with some follow-up exchange via e-mail. Five interviews were done via telephone (audio recording), eight via Skype (audio-visual), and one in person (audio). Consent was verbally confirmed prior to the start of the interview. Notes were made during the interviews. All were recorded and transcribed by the first author, and a transcript was returned to the participant as a courtesy where requested. Only one participant came back with a clarification, correcting the initials of a colleague mentioned in a narrative. Anonymity was maintained with

pseudonyms, and data were stored on a password-protected, encrypted laptop and networked university drive, in line with the ethics approvals obtained.

2.4 Data analysis

Data analysis was facilitated by QSR International's NVivo 11 for Mac software, which provided flexibility to sort, consider, rearrange, and recode as required throughout the analytic process (Bazeley and Jackson, 2013). Analysis began following transcription of the first interview and continued in an iterative fashion throughout the conduct of the research (Bryant and Charmaz, 2007). Interviews were first coded line-by-line by the first author, using action-oriented descriptors (Charmaz, 2015), and over 300 initial codes were identified. As connections and resonances between the codes became apparent, related codes were grouped and arranged into a coding tree in order to focus the analysis. Memos were created and linked to significant codes, chronicling the abductive reasoning behind the groupings (Charmaz, 2015), and identifying gaps in the data. Tentative analytic categories were built up through this process, and earlier interviews were continually revisited to interrogate the emerging categories further. Following the first nine interviews, an initial framework was developed, which organised the emerging categories into stages. The interview schedule was revised, driven by the emerging theory, and a further five interviews were then conducted using a modified interview schedule, above. At this point, theoretical sampling of participants with minimal and maximal experience levels within the identified range allowed for testing and saturation of the categories, particularly relating to the trajectory of competence development through stages as experience increased.

Saturation was judged to have occurred when theoretical categories were sufficiently dense and fully resonant across the diverse sample of participants, with no further insights or dimensions emerging through further analysis (Hennink et al., 2017). Saturation was also observed objectively, by recording the diminishing number coding and category changes during analysis of the later interviews, as they

gradually ceased to reveal new properties within the categories under consideration (Mason, 2010).

2.5 Trustworthiness

We employed a number of verification strategies throughout the research, including an audit trail, reflexive discussions, member checking, and network testing. Throughout the research, the team met monthly to review coding activity, discuss the emerging analysis, and resolve inconsistencies. The audit of the iterative decision-making process was maintained through memos, including snapshots of coding trees as emerging categories were built up into theoretical categories, and changes to the tentative theoretical framework. Reflexive awareness of network influences and personal experience was facilitated through memo writing and team discussion (Bryant and Charmaz, 2007).

In order to check for resonance and recognisability, each of the later five interviews ended by sharing a brief summary of the emerging theoretical framework with the participant at the conclusion of the interview. This activity functioned as a form of member checking (Morse, 2015) and enabled reciprocal shaping of the theoretical framework in line with constructivist methodology (Mills et al., 2006). Throughout the analytic process, the emerging theory was also shared informally with other professionals in the first author's international network, and formally at the 11th Normal Labour and Birth Conference in Sydney, Australia, in October 2016. Peer scrutiny and feedback in the early stages of analysis helped shed light on nuances which had not previously been noticed within the data, and later reassured us of the credibility of the results (Lincoln and Guba, 1985), as fewer nuances emerged within and outside of the interviews. Public engagement also prompted consideration of the practical implications and transferability of the model (Kennedy et al., 2015).

3. Results

Analysis of participants' narratives indicated that these professionals engaged in a process of deliberate acquisition of competence in physiological breech birth, involving five iterative stages: 1) affinity with physiological birth, 2) critical awareness, 3) intention, 4) identity and 5) responsibility. Figure 7 depicts these stages as spheres which grow as experience increases, and overlap to illustrate the recursive nature of the trajectory. **Key elements** of each stage are listed in a box alongside each stage, and highlighted in bold in the text below. *Participant quotes* are in italics. Any names used are pseudonyms.

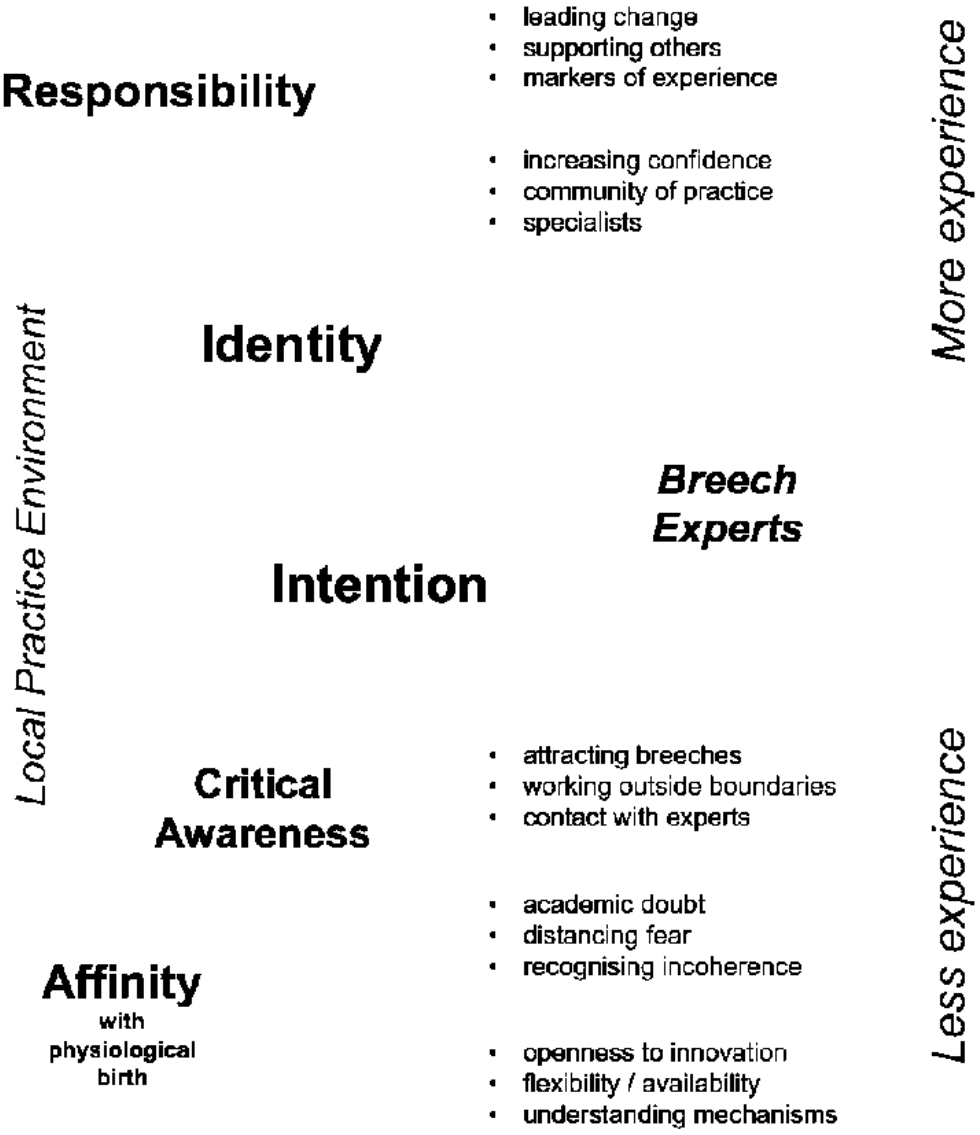

Figure 7. Deliberate acquisition of competence in physiological breech birth

3.1: Affinity with physiological birth

The midwives and obstetricians who participated in this research shared an affinity with physiological birth. This stemmed in some cases from personal predispositions, in others from early exposure to mentors and practice settings oriented towards physiological birth, although both influences appeared to enhance the other. *My own philosophy has always been very pro normal birth. Even in cephalic births, I don't do a lot of interventions.* (OB4) The obstetricians particularly reported training in settings where vaginal breech births were perceived as *a normal thing* (OB3).

Their perceptions of breech birth as a physiological process were enhanced by **understanding the mechanisms** of normal breech birth.

> *I went to the pre-conference workshop that [Midwife and Obstetrician Breech Experts] taught together … and I really understood the mechanisms of normal breech birth, and I really understood how to identify when there was a problem and what to do about it.* (MW5)

They contrasted physiological breech strategies to training in their local practice settings which focused on performing interventions.

> *They only explain what to do, like how to remove the arms. But you need to understand the mechanism, otherwise you don't recognise anything.* (MW3)

Several participants described repeatedly watching and simulating breech birth videos in order to familiarise themselves with the normal mechanisms.

These midwives and obstetricians demonstrated **flexibility** in their practice that enabled them to work to the rhythm of physiological births, particularly by *being available*.

> *Our section rate was down towards 10%. So we did everything vaginally, and it was just a matter of being available and being there to do 'em.* (OB2)

This type of flexibility was a matter of both character and circumstance, which participants identified as unique in their settings.

> *The reason that myself and my colleagues are able to do it is because we have family set-ups that allow us to drop everything at a moment's notice and come.* (MW8)

Participants in all settings described diverse ways they created **availability** for breech births which occurred unpredictably, and were continually trying to increase this availability. These included: on-call working; offering to come if available; responding to colleagues' requests for help, even when not on duty; setting up innovative continuity-based teams within maternity care systems where the majority of care was provided by professionals working shifts; and negotiating the ability to work across employment borders in collaboration with other breech colleagues.

Personal flexibility was also evident in participants' **openness to innovation** based on physiological principles, often before such practices had gained acceptance in their local practice settings. For example, several participants discussed initiating resuscitation with the umbilical cord intact. *Leave the cord attached and they do so much better … But our big universities haven't quite caught onto that.* (OB2) Despite participants' personal openness, cultural resistance around breech created barriers to innovation. One participant contrasted the ease with which other specialists were able to introduce new surgical techniques which had not yet been rigorously tested, based on experienced professional judgement, with the resistance faced when trying to introduce upright maternal position for breech births.

> *I think when you find a new operating way, or a new technique, you do it also. And my colleague who is very good in laparoscopy, does not ask, "Hey, Lilith, can I try this on Monday? Shall I call you?" You have some experience and you want to advance techniques. And [upright breech birth] is a good technique in which I really believe, and I cannot make it from a randomised controlled trial clear to my colleagues, but I want to try it, yes.* (OB5)

3.2: Critical Awareness

For these participants, **critical awareness** initiated a turn away from local practice settings to explore different understandings about breech birth. This turn often involved witnessing less-than-optimal breech practice. Several participants expressed criticism of the actions and responses of professionals they observed managing breech births, but also felt keenly aware of the inadequacy of their own preparation.

> *No one in the entire hospital knew what to do. A very old guy … attended the birth in a very awful, awful, awful way. And the baby was completely with bruises on the entire body. And I felt that something was wrong about that.* (MW9)

Early formative events involved **recognising incoherence** in behaviour which undermined the successful physiology they observed.

> *It was obvious she was cracking on, she was kneeling up, she was beginning to feel pressure … And the consultant just came in and was like, "Right I need an epidural put in …" She started pushing as the epidural went in, and then she was numb … they struggled with the head, and the consultant pulled and pulled and pulled ….* (MW1)

Recognising the negative effects of fear on professional decision-making, these participants began consciously **distancing fear**.

> *It was my first breech, I was alone. My colleague, the [senior] midwife, she told me, "I won't do it because I'm too scared. You need to do it because you are the brave one."* (MW3)

Participants were aware of how communicating about breech as an emergency impacted the behaviour of their colleagues, and consciously chose to communicate about breech as normal, a choice some had also observed in their mentors.

> *I was like, "Oooh, what do I do? It's coming, but chaos will ensue if I pull that [emergency] bell … so I just pulled the bell as in I was just calling somebody" (MW1)*

They also reflected on the effect of fear on their own actions.

> *In that birth, the baby was fine, the baby was coming along … I think I did something, I did an episiotomy and I did the manoeuvre because I was scared.* (MW3)

Participants expressed **academic doubt** about the research and education underpinning mainstream practice for breech presentation.

> *While I was compiling this data [from a local audit], the Term Breech Trial was published suggesting we were killing or maiming 1:20 babies, and I had in my hands data from 400 [breech births] that showed that was nonsense. That piqued my critical interest, so it became an academic interest as well.* (OB1)

They began to read more widely around the research base concerning breech presentation, and questioned the legitimacy of mainstream training methods.

> *It feels like there's a whole generation of obstetrics that has taken us back to the dark ages in terms of breech. We've now got this cookie-cutter recipe for how to do vaginal breech, which sounds like it's just recited out of textbooks rather than emerging out of the depths of lots of personal experience of people.* (OB4)

3.3: Intention

Participants' critical awareness catalysed an **intention** to develop personal skill with breech birth. *So I decided to go search for courses and things like that.* (MW9) Only one participant described having received support from their employers to undertake additional learning in this area, but some participants' efforts to gain experience were supported by individual, like-minded colleagues. *What we do is we call each other. We do these births together.* (MW2) Some viewed their self-determined intention as similar to other areas of advanced practice within their professions, but were aware that colleagues did not share this view.

> *That word, "brave," I hear that said to me all the time, and I find that quite insulting. It's nothing to do with being brave. I mean, I wouldn't be able to go and look after somebody on HDU [High Dependency Unit]. I would need to have extra training. And if for some reason or other, I suddenly woke up tomorrow and thought, "All I ever wanted was to be is an HDU obstetric nurse," then I would seek that training. If you want to do something and you want to be something, the buck stops with you.* (MW8)

Participants specifically sought out **contact with experts**, professionals regarded as having genuine expertise in both breech practice and teaching skills to others.

> *During the conference, people would come up to him over and over again and say, "Can you show me again?" And I kinda stalked him a little bit and watched him doing it again and again 'cause I really wanted to get it down.* (MW5)

In Figure 7, Breech Experts are depicted independently due to their important and on-going role in guiding participants' deliberate acquisition of competence and the trajectories of their careers: *So I would say that he changed my life in my career, something like this.* (OB3) The influence of Breech Experts operated across multiple practice settings, and a few were mentioned by multiple participants working in different geographic areas, sometimes with reverent language, eg. *guru of breech birth* (OB4). Simulations performed with Breech Experts appeared particularly meaningful.

> *She put her hands on my hands. And it was minute, minute traction. But it was there, and that's what I needed. In a way, that single act taught me absolutely the most of what I understand. (MW8)*

At this stage, participants were **working outside boundaries** of geography, practice and standard training, in various ways. All participants in this study described travelling beyond their local practice settings, sometimes internationally, to attend breech workshops and conferences. Some travelled to work with Breech Experts, or

to settings where breech births were common. *I was at a conference and saw his name there so tracked him down and asked if I could come and work at his unit.* (OB1) Some remained within the same local geographical area but worked outside normative boundaries in other ways. One midwife and one doctor reported significant early learning experiences while caring for women whose babies had died in utero. For the midwife, attending stillbirths meant practising autonomously within an environment where midwives usually did not attend unsupervised breech births. For the obstetrician, it meant freedom to be slow and careful when applying forceps to an aftercoming head for the first time, knowing the baby could not end up, as she described, *deader than dead* (OB4). For another midwife, gaining breech experience involved working outside local regulation boundaries.

> *So I asked this OB-GYN to be with me, and here … the medical board is very against home births, so we were illegal midwife and also our illegal OB-GYN attending breech home birth.* (MW9)

Having set their intention and broadcast it in various ways, participants began **attracting breeches**. Combinations of accident, attention, receptiveness and word of mouth meant they found themselves attending more breech births than they previously expected or thought possible. *So one woman told the other one, and suddenly a lot of breech births were appearing from everywhere! … I think we attracted the breech births.* (MW9) Some participants attributed clusters of early experiences to chance; others actively created conditions that made it more likely that they would be involved in breech births, particularly by discussing their interest and extra training with their colleagues. *That basically came about from talking to the staff of my interest and pure luck that I was on shift when the women came in.* (MW1)

3.4: Identity

As colleagues in their local practice settings became aware of the participants' interest, association with breech birth became part of these participants' professional **identity**, even before the participants owned such an association as part of their

personal identity. *I had a phone call in the middle of the night when I wasn't on call … someone had decided I was the breech expert that night [laughing].* (OB4) Despite some having attended a relatively modest number of births, participants were already beginning to operate recognisably as **specialists**. This term was used by some participants when referring to experienced mentors who were known for their skill with breech within the participants' local practice settings.

> *I had the luck to be resident where breech positions were accepted and especially because two gynaecologists were specialised in it because they had a lot of experience.* (OB5)

But awareness of this special association with breech was not always positive. *Lots of people think we're mavericks.* (MW8) While all participants in this research demonstrated an affinity for physiological birth, critical awareness and intention to develop breech skills, these later stages in the deliberate acquisition of competence featured more frequently in the narratives of more experienced participants. In data from less experienced participants, the same stages were recognisable, but in the form of shadow data (Morse, 2000), where participants speak about others, rather than themselves, eg. *[She] is well-known for her breech.* (MW6)

A core feature of sustaining breech identity and practice was establishment of a **community of practice** with other supportive breech-experienced professionals.

> *By e-mail or occasionally by phone and sometimes just serendipitously when we catch up with one another … we review cases, more out of interest than … some critical appraisal format.* (OB1)

They forged relationships with like-minded colleagues within their practice settings.

> *Then another consultant came along [here], who was really open to midwifery as a skill, and we'd just naturally found each other, like you do.* (MW8)

These collaborative professional associations enabled them to grow and change, acquiring additional clinical flexibility.

> *Especially one [colleague] … she is really progressing and pushing me in a new way to see things from another point of view. And she supports me and I her to do things differently. Because you need support.* (OB5)

However, sometimes cultural resistance meant they could not access support locally.

> *I think the last 20 years, if you've been prepared to stand up and be counted as an obstetrician who does vaginal breech births, you were painted as a bit of a feral risk taker … It wasn't the sort of thing that you walked into the tea room and said, "Ahh, I just did a fabulous breech!"* (OB4)

Therefore, they also maintained connections with the Breech Experts and peers they had encountered outside their local practice environment. *Some of the other midwives were really scathing … I ended up ringing up [a Midwife Breech Expert] and talking through to her.* (MW6)

As their experience and understanding grew, the participants found **increasing confidence**. Unexpectedly, this seemed to occur along with, or as a consequence, of the establishment of breech identity, rather than preceding it. Participants were often receiving referrals from other professionals before feeling fully confident as specialists themselves. Self-confidence increased following successfully resolving complications.

> *I did the [manoeuvre] for the very first time, and it worked like a charm and this 10 1/2 pound baby just popped right out. It was very affirming that what I had learned actually worked in practice.* (MW5)

Confidence to trust their own experience, intuition and problem-solving ability also grew as they learned in practice that the rules they had been taught to follow do not always work.

> *It gives you a new perspective when you realise it isn't quite the way that you were taught and that the sky won't fall in if the woman isn't flat on her back with her legs in stirrups. It's okay if you don't cut an episiotomy, and it's okay if you don't put forceps on and … you know, all that high intervention stuff we were taught as trainees.* (OB4)

Confidence also grew as they successfully applied transferable knowledge of physiological cephalic birth to their breech practice.

> *My colleague wanted at first to do it the way she learned it, so asked the woman to lie down on the bed, and then after two times pushes, she said, "Well, no, this is not going to work," and asked her to sit on the birthing chair.* (MW2)

3.5: Responsibility

Increased **responsibility**, and awareness of that responsibility, characterised the final stage in the deliberate acquisition of competence.

> *When you learn breech skills and you get to the point where others consider you experienced … with that, for me and my colleague, has come a massive sense of responsibility.* (MW8)

Participants sensed others' increased expectations of their abilities, and their colleagues' doubts.

> *Well, it's complicated because everybody thinks it's complicated, so you get real sore on your shoulders doing the birth. So everyone is a little bit shaky, and everybody says, "She's doing it." So that makes me sometimes a little bit more nervous than it should be.* (OB5)

Participants at this stage exhibited noticeable **markers of experience**, which distinguished them as the most breech experienced practitioners in their local settings, even amongst professionals with comparatively more years of experience. They were able to make comparisons between experiences: *What I had found to work with larger babies [at home] did not work for that one.* (MW5) Their familiarity with the mechanisms and patterns of breech labours underpinned an ability to anticipate complications occurring. *I've seen so many normal breeches as well … so I know when I need to intervene now.* (MW7) These more experienced practitioners also described being able to improvise solutions in particularly complex situations, where simpler methods proved inadequate.

> *I did what felt instinctively right to me, and I … turned it posteriorly. It wasn't a conscious decision to do that … just felt which way it felt like it would go … and then as I turned it the other way, it was already delivering its own arm.* (MW8)

Participants exhibiting markers of experience had all attended at least 10 breech births and had managed multiple complications successfully.

Participants became increasingly involved in **supporting others** to develop breech knowledge and skills within their local services. *I've also been at [other births], trying to encourage other midwives, just by being in the room.* (MW4) Their capacity to describe physiological patterns, problems and solutions enabled them to teach others, which they did both formally and informally. *Then afterwards, I'm like, "I'm really not an expert in this, but I know the theory, so let's do it all together."* (MW7) Supporting colleagues' up-skilling involved continued flexibility and availability to support breech births clinically to ensure the safety of the service. *And then I have to be there because I think a lot of trouble comes from people who don't know how to do breeches and they want to pull.* (OB2)

Some participants also became involved in **leading change** at local levels and beyond. They organised conferences and training days similar to those they had attended when they first set their intention to develop breech competence. Leading change often required them to become aware of institutional politics.

> *It was about teaching the managers. I actually think that trying to start from the bottom up in this particular instance, with lost skills, is not helpful. You have got to engage the consultants and the senior management.* (MW8)

Critical awareness also expanded with experience, and some discussed access to skilled support for a vaginal birth as a human right. *We understand breech birth as a reproductive right. So the women have the right to have a vaginal birth if they have a bottom-first breech.* (MW9) They also understood the need to think strategically

beyond their local situation, although this sometimes attracted additional cultural resistance.

> *I can't get enough volume for other people to learn at my private hospital. So I went to the university, thinking people could just refer 'em there. The problem is that their paediatricians, they're all hyperventilating when the baby comes out.* (OB2)

Finally, the evidence indicated that some participants were beginning to be regarded as specialists with expertise valued beyond their local practice settings. *On the back of [the conference], we've had so many requests, "Will you come and talk to us about what you've done, how you've done it?"* (MW9) This suggests that, for some practitioners, iterative engagement in this model develops into the deliberate acquisition of expertise, and an expanded professional identity as a Breech Expert.

Discussion

In this study, the deliberate acquisition of competence in physiological breech birth involved five iterative stages: affinity with physiological birth, critical awareness, intention, identity and responsibility. The findings lend further support for the development of specialist breech teams within each maternity care setting, as suggested by the consensus of experienced breech professionals in previous research (Walker et al., 2016a).

Unique to this research is the finding that specialist identity association with physiological breech practice does not appear to be a linear progression following achievement of a certain number of births, a prescribed training programme, or formal recognition. All but one of the participants, the least experienced, received referrals and requests to assist other professionals with aspects of breech care. This suggests the demand for breech specialists exists across very disparate maternity care environments, and is felt by professionals as well as service users. The participants' regard as somewhat specialised among their peers was evident, despite in most cases a modest amount of actual breech experience. In this model, the

notion of specialist practice is reconceptualised, from an association with lengthy clinical experience, to one of engagement within a community of practice. This model resonates with Ericsson's (2008) theories of expert performance. According to Ericsson (2008), observed expert performance correlates with active engagement in deliberate practice, including feedback and guidance from teachers, time for problem-solving and evaluation, and opportunities for repeated performance to refine behaviour, rather than greater professional experience. The deliberate acquisition of competence model presented in this paper also has the potential to be refined and tested in other areas where specialist skill and greater continuity might enhance safety and service provision, such as home birth, physiological twin birth and vaginal birth after caesarean section.

Lave and Wenger (1991; Wenger, 1999) describe how members of a community of practice acquire an identity association by virtue of successfully navigating and negotiating participation in that community, within which learning and development continually occurs. Through their engagement with a breech community of practice, participants in this research acquired a professional identity association with breech specialist practice, often through the eyes of their non-participating or more peripheral colleagues in the first instance. The model suggests that formal identification of a multi-disciplinary breech team may be sufficient within many contexts to initiate the attraction of enough breech births to develop and maintain the team's expertise, although the practicalities of how this occurs will inevitably vary between settings. If implementing a breech team model, services should be aware of a window of vulnerability. Despite early professional identity association, in this research only participants who had attended approximately 10 or more births exhibited the markers of experience associated with taking on increased responsibility, due to having successfully encountered and resolved multiple complications. This corresponds to consensus research indicating that professionals gain competence to practice autonomously after attending approximately 10-13 breech births (Walker et al., 2016a), and appropriate support mechanisms should be in place as individuals within the team approach this level of experience.

With time and flexibility, the presence of a clearly identified group of experienced practitioners may enable further members of the local maternity care team to engage in situated learning with internal specialists or external breech experts. Such models of training and care should be rigorously monitored and evaluated if implemented. Many of the participants felt a heavy burden of responsibility, which in several cases was made heavier by feelings of professional isolation and cultural resistance to vaginal breech births in general. Team and workplace conflict has been shown to have a detrimental effect on safety (West and Lyubovnikova, 2013), and may furthermore reduce professional resilience (Howe et al., 2012), leading to a reduction in the necessary flexibility and affinity required to facilitate physiological breech births.

This study has a few limitations. The in-depth interviews with a broad international sample of fourteen midwives and obstetricians practicing in a variety of settings enabled the discernment of similar stages across settings, but the heterogeneous nature of the participants' practice settings may have obscured other important aspects because they were not able to be expressed in certain contexts; this may affect transferability of the model. The results describe general principles of breech specialist skill development, but lacks specific practical detail necessary for implementation in individual organisations. While the results suggest deliberately organising breech training and services to involve flexible specialist teams may be fruitful, they do not present evidence that such a strategy will be effective, nor do they provide safety data concerning the impact of any changes on outcomes for mothers and babies. These questions should be explored in future research.

Conclusion

The results of this research suggest that institutions wishing to implement the option of physiological breech birth may begin by identifying a multi-professional team of individuals with aptitude and flexibility, who may be supported to develop into breech

specialists within a local community of practice, with guidance from internal and/or external breech experts. The five stages of deliberate competence acquisition identified were distinct enough across a variety of contexts to inform training and organisational development programmes based on this empirical model. Institutions may also consider implementing policies which reduce the burdens of isolation and disproportionate responsibility on those who attend breech births. Training models based the stages described in this research may enable more sustainable provision of vaginal breech birth support within contemporary maternity services. The impact and safety of such models should be explored in further research and evaluation.

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5.2 Critical Analysis

This critical analysis explores the usefulness of generating a theory of learning specific to breech practice using constructivist grounded theory methodology, reflections on how the results *fit* and *work* (Glaser and Strauss, 1967) in the context of contemporary maternity care, strengths and weaknesses of the methodological approach, and implications for future research. Contributions to this work are as follows: I designed the research in consultation with my doctoral supervisors. I was responsible for recruitment and every aspect of liaising with participants, including creation of the on-line expression of interest instrument and consent form. I conducted and transcribed each of the interviews. I performed the analysis, and this was supported by monthly reflexive discussions with my supervisors, Dr Mandie Scamell and Professor Pam Parker. Theory development was an iterative process following on from this analysis and reflexive supervision. I wrote the initial draft of the paper and revised it after feedback from the co-authors and peer review.

When Glaser and Strauss (1967, sec. 99/4686) outlined their approach to generating theory in *The Discovery of Grounded Theory*, they contrasted theory derived from systematic comparative analysis of data with "theory generated by logical deduction from *a prior* assumptions." They challenged what they perceived as the current emphasis on verification of inherited theories by outlining a way to produce new theory more "suited to its supposed uses" (1967, sec. 99/4686). They described the inherited theories as "great man" (1967, sec. 177/4686) theories because they were developed by authoritative thinkers, and transmitted with such charismatic conviction that successive generations of scholars could only work in relation to these theories. The *great man* theories could be verified and modified, but not

matched by the generation of new theories; and so the emphasis on verification strategies, most often using quantitative methods, proliferated.

This situation bears relation to the dynamics apparent in research about breech. For example, our systematic review suggested that evaluated breech training methods consist mostly of formal teaching strategies and simulation exercises (Walker et al., 2017a), reflecting a behaviourist approach to learning and a focus on procedural knowledge (Michels et al., 2012). Although the results of the review indicated a lack of evidence to recommend these strategies as a sole or primary mechanism of breech skill development, they continue to be recommended in guidelines (Impey et al., 2017). This is reasonable so long as no more effective alternative is apparent. The discovery of a potentially more effective alternative is a fundamentally different project than comparisons of effectiveness of current methods, and requires a different methodology.

Grounded theory methodology has been developed for the purpose of developing theory *suited to its supposed uses*, which can be tested in further research designed for evaluation and/or verification. This focus on usefulness resonates with the pragmatic tradition, in which knowledge is seen as a tool or instrument, and judged in terms of how useful it is for knowing subjects (Bryant, 2009). A constructivist grounded theory approach adopts a position of mutuality and partnership between the researcher and the researched, which aligns with the intention to avoid the limiting and sometimes subjugating tendencies recognised in other approaches. This constructivist view of knowledge as provisional, consensual and dependent on the researcher's perspective also fits with the aim of this research to strengthen minority voices while maintaining awareness of the power dynamics which may obscure

them. Charmaz's (2000, p. 523) description of constructivist grounded theory also indicates close alignment with critical realism:

> *A constructivist grounded theory distinguishes between the real and the true. The constructivist approach does not seek truth – single, universal and lasting. Still, it remains realist because it addresses human realities and assumes the existence of real worlds.*

In this research, I aimed to develop a theory of competence development that acknowledged the continually socially negotiated aspects of human life and learning, as well as the clinical realities it is intended to influence.

Fit and Work

In their original description of grounded theory methodology, Glaser and Strauss introduced the concepts of *fit*, *work*, *relevance* and *modifiability* as criteria for quality judgement of grounded theory work (Glaser and Strauss, 1967). They emphasised the concepts of *fit* and *work* to describe how grounded theory is *suited to its supposed uses* (1967):

> *By "fit" we mean that the categories must be readily (not forcibly) applicable to and indicated by the data under study; by "work" we mean that they must be meaningfully relevant to and be able to explain the behaviour under study (1967, sec. 104/4686).*

Fit and *work* are related to the jobs of theory: prediction, explanation and relevance. According to Glaser and Strauss, theory should enable prediction and explanation of behaviour, be useful in practical applications by providing understanding and some control, and guide future research on the areas of behaviour covered by the theory (1967).

The theory described in *The deliberate acquisition of physiological breech competence* (Walker et al., 2017c) is explanatory, in the sense that it describes the common elements of a trajectory in which skill, knowledge and experience are developed, shared by a multi-national and multi-setting sample of participants. The analytical categories used to develop this theory were built around words and expressions used by participants to ensure *fit* with the data. For example, we identified the phenomenon of "attracting breeches" early in the data analysis process, but the name for this category was finalised when a participant described the unusually high number of breeches observed in her practice by saying, *I think we attracted the breech births* (MW9). The theory also considers influences such as resistance in local settings and external availability of expertise to explain why the trajectory takes the form that it does, and thus identifies some potentially modifiable factors of setting and context. Bryant (2009, p. 15) writes of the pragmatic tradition in grounded theory, "[K]knowledge is a web or a network of statements rather than an edifice, and the value of any form of knowledge is its usefulness and applicability which may be constrained in terms of time and place and user." The theory seems *suited to its supposed uses*, particularly increasing understanding of how practitioners develop breech competence when they deliberately set out to do so, but it may not be universally applicable in all settings, or may require modification.

The theory outlined in the paper suggests that identifying professionals with affinity and flexibility, enabling them to attend breech births when they occur, and catalysing local communities of practice, may enable settings to develop local expertise in physiological breech birth. Some confirmation that the theory proposed was recognisable by participants came during the later interviews, in which I shared the developing model with participants by describing the iterative stages as I understood them after the conclusion of their interview.

This prompted participants to provide more examples corresponding with the recognisable stages, and in one case it prompted a participant to describe the final stage before I had reached that stage of the description. This is one way the developing model was checked for *fit* with participants' experience, which conformed with the relational ethics central to the constructivist process (Tracy, 2010).

But as Charmaz (2006, p. 149) notes, a theory cannot be verified internally with more data: "Rather than contributing verified knowledge, I see grounded theorists as offering plausible accounts." While I took measures to ascertain whether our account appeared plausible, both with participants and audiences of clinical and research professionals, this does not equate to verification of the theory's predictability. Although Glaser and Strauss felt that grounded theory should be able to predict social behaviour, I feel it is more accurate to say that its predictability is plausible. For example, if individuals who set an intention to develop breech competence begin *attracting breeches*, and at least some of this is due to a gradual accumulation of professional identity association with breech practice, it is plausible that by formally identifying a team of individuals who will be supported to develop a credible level of breech expertise, opportunities to do this will become available: other colleagues will begin making referrals rather than discouraging the option of vaginal breech birth, women will refer other women, diagnosis of breech presentation in labour will more often result in a vaginal birth. I will return to this idea of breech teams below and in the discussion, but this theory can potentially be verified by developing models of continuing professional development based around this organising principle and evaluating their implementation.

Glaser and Strauss (1967, sec. 78/4686) wrote of grounded theory, "Most importantly it works – provides us with relevant predictions, explanations,

interpretations and applications." The question of relevance links grounded theory to our pragmatic aims: Is this theory clearly applicable in contemporary maternity care contexts? Does it *work*? Can it be implemented? A brief literature review suggests that the development of local breech teams is occurring in some diverse international settings, including the UK (Dresner-Barnes and Bodle, 2014), the USA (Marko et al., 2015), Austria (Maier et al., 2011) and Spain (García Adánez et al., 2013). Although the theory of *deliberate development of competence in physiological breech birth* inferred from the data may appear plausible to the participants who took part in this research, and may accord with models implemented in a minority of settings, application of the theory will be complicated by various actualities of context. For example, the model described in our grounded theory paper has not appeared plausible and applicable to everyone. One journal peer reviewer asked: "[H]ow will this service be achieved in a system of protocols and guidelines where breech is perceived as an obstetric emergency and hence training in obstetric emergency training is relied on?" This doubt aligns with the hegemonic position we have argued the dominance of a medicalised model of care currently holds: the symbolic authority of guidelines, the perception of breech birth as abnormal, and the reliance on procedure-driven models of skills transmission. Such a criticism is valid as long as it is assumed the *status quo* will be maintained; the expectation is *fit* to the system, rather than the individual. The potentiality of the theory is plausible but not inevitable given the power dynamics involved.

The theory of deliberate competence development described appears relevant and resonant, but mainly with individuals and systems that value a relational model of care and a more open and flexible learning culture than is prevalent in guideline-driven, medicalised maternity care cultures. The uncomfortable fit between our theory and such settings returns us to our initial

critique: These clinical cultures are not suited to enabling a multiplicity of voices to thrive. Enforcement of acceptable behaviours and procedures stifles innovation and can lead to the subjugation of some of the women it is set up to serve (Kotaska, 2007). Adopting a constructivist approach to grounded theory enabled the development of a theory that *fits* the experience of our participants, resonates with others who share a commitment to a relational model of care and strengthens advocacy for minority voices through representation and understanding. But it will not necessarily *work* within maternity care cultures dominated by a medicalised model of care, just as we described how some of the participants needed to find ways to work outside the boundaries of such systems in order to develop their skills. The pragmatic consequences of adopting our relational model of competence development within a heavily medicalised care culture characterised by fragmented relationships is likely to be either: 1) resistance, conflict and difficulty akin to that described by our participants and women seeking care for vaginal breech births; or 2) an unsettling of the dominant culture such that other social and relational models of care become more able to also gain ground within that setting. Only further implementation research can shed light on how to increase the likelihood of the latter and minimise the former.

The limits of pure constructivism

I have argued above for the potential benefits of a constructivist approach to grounded theory, particularly its ability to amplify minority voices by unsettling hegemonic claims to universal truths through what Star (2007, p. 21) describes as "[d]elicately dissecting, situating and making the world ontologically and epistemologically open to revision." In this section, I would like to explore some of the limitations of a purely constructivist approach and

how I see my constructivist and pragmatic leanings combining within a critical realist perspective.

Constructivist methods of doing grounded theory arose in response to Glaser and Strauss' preoccupation with data driven meaning, and their ontological position that this would result in a theory which *fit* external reality (Lomborg and Kirkevold, 2003). In contrast, constructivist grounded theorist Charmaz (2000, p. 523) asserts that, "a grounded theorist constructs an image of *a* reality, not *the* reality – that is, objective, true, and external." Constructivists see realities as continually mutually constructed and reconstructed (MacDonald and Schreiber, 2001). Some critics, such as Lomborg and Kirkevold (2003, p. 197), have labelled this relativist epistemological stance as *antirealist*:

> *Social constructivism denies that our knowledge is a direct perception of reality and offers a view of sociological research that maintains that truth is constructed, both individually and collectively, is multiple and shifting, and that there are no such things as objective facts.*

Bury (1986, p. 166) acknowledges the ability of constructionism to make social inequities visible, but questions whether it is able to address real human suffering:

> *Tendencies towards the medicalization and rationalisation of society are, indeed, serious issues, but resistances and limits to this process should be recognised. So, too, should the needs and sufferings which human experience entails, and with which all forms of society must deal. Constructionism too readily conveys the*

> *impression that care and welfare are mere facades for the interests of powerful groups. In its preoccupation with medicine's supposed role in social surveillance and control it frequently exaggerates the processes at work.*

Criticism of the relativism in constructivist ontology and epistemology is concerned with its "opening up the possibility of 'anything goes' attitudes in research and solipsistic confirmations of the world view of researchers with little or misleading practical impact" (Lomborg and Kirkevold, 2003, p. 189).

Critical realism's layered ontology offers a way to incorporate constructivist ways of knowing without losing sight of non-negotiable human suffering, which health care and health care research seek to minimise. Morbidity and mortality in women and breech babies can be observed and measured empirically, as can numbers of breech births occurring, and the opinions of women regarding whether or not they felt able to choose their preferred mode of childbirth. The actual circumstances of breech learning and service delivery can also be observed, for example the structure of a local breech care pathway, whether professionals are able to work flexibly and provide continuity to women planning breech births, positions in which women birth. But the complex web of substructures and relationships that influence surface phenomena but do not completely determine them, what Bhaskar refers to as the real generative mechanisms (Bhaskar, 1997), are not amenable to quantification or even simple description; these include care cultures based on a relational model of care, birth environment and societal perceptions of breech presentation. Understanding them, and the constantly shifting and multiple nature of these realities requires different ways of knowing. Constructivist ways of co-creating knowledge can enable understanding of

macro- and middle-level phenomena that influence the micro-level phenomena it remains important to scrutinise empirically.

As Star describes(2007, p. 90), "The object of analysis in grounded theory and Pragmatism is nearly always a form of action … Actions traverse the skin. They do not originate in individuals, but as a result of relations, the 'between-ness' of the world." This *between-ness* remains relative and must be constantly negotiated, even while surface-level micro-phenomena, results, can be measured. Constructivism acknowledges the meaning making activities of the researcher, mediated by her own perspectives and experiences, and committed as an ethical imperative to the mutual production of knowledge between the researcher and researched (Charmaz, 2000). The focus on action and embrace of multiplicity enabled us to provide an answer to the question of *how* competence is developed by some professionals who have intended to develop it, even within systems which do not support this intention. We do not claim that this is the *only*, or the *best* answer to breech competence development. For reasons we have described, it is by no means inevitable that it will enable more women to access support for a physiological breech birth, and provide more skill to prevent suffering in terms of morbidity and mortality. But understanding how a relational approach to skill development has enabled these professionals to gain competence and confidence in physiological breech birth provides an alternative to the dominant approach of teaching breech birth as an obstetric emergency within a procedure-driven birth culture. Such a theory can be tested empirically by modifying the actual circumstances of local breech care delivery and observing the results for women and babies.

Implications for future research

A common explanation for lack of availability of breech services is lack of opportunity for professionals to gain breech experience:

> *[T]here has been a continued decline in vaginal delivery of breech fetuses, despite lack of compelling evidence to support this. This is most likely motivated by medicolegal implications of poor obstetric outcomes and declining opportunities for training in residency programmes* (Yamamura et al., 2007, p. 527)

This research challenges the prevailing explanation by describing some similarities in the actual circumstances in which professionals have gained breech experience, despite the apparent lack of opportunity, and some of the generative mechanisms that may have underpinned their success. It suggests that the problem may not be lack of opportunity so much as lack of flexibility and continuity, lack of recognition of the influence of experienced breech mentors, and the increasing dominance of fragmented care within procedure-driven medicalised care cultures, which inhibits relational care and learning.

The theory outlined in this research can be implemented by changing the actual circumstances in which breech care is delivered within organisations. The change would involve developing visible teams and care pathways, in which relationships with women and each other as a community of practice can develop; suggestions for practice will be described further in the discussion section below. Any such changes should be rigorously evaluated. Such evaluations must include empirical measurements of outcomes, including perinatal morbidity and mortality for mothers and babies, as well as rates of vaginal breech births and caesarean sections. They should also develop ways to capture women's perception of agency and support in decision-making regarding mode of birth and in labour. Finally, they would

benefit from continued collection of qualitative data from health professionals. Developing care and learning systems based on this model would mean implementing what has been a counter-cultural model within mainstream practice. This will inevitably result in different dynamics of *between-ness* and action among health professionals and the women they service, requiring on-going commitment to the mutual construction of meaning and understanding.

Chapter 6: Mixed methods integrative analysis

6.1 Expertise in physiological breech birth

Reference

Walker S, Parker P and Scamell M. Expertise in physiological breech birth: A mixed-methods study. *In Review.*

Abstract

Background: The safety of vaginal breech birth depends on the expertise of birth attendants, yet the meaning of 'expertise' remains unclear and subjectively defined. The objective of this study was to define expertise, in order to understand how it can be developed in contemporary maternity services.

Methods: We performed an integrative analysis of two strands of data concerning expertise in physiological breech birth, including: survey data from a Delphi study involving very experienced clinicians (mean experience = 135 breech births), and interviews from a grounded theory study of more moderately experienced clinicians (5-30 upright breech births). Data were pooled and analyzed using constant comparative methods.

Results: Expertise is defined by its on-going function, the generation of comparatively good outcomes, and confidence and competence among colleagues. Although clinical experience is important, expertise is developed and expressed in social clinical roles, which expand as experience grows: clinician, mentor, specialist, expert. To develop expertise within a service, clinicians who have an interest in breech birth should be supported to perform these roles within specialist teams.

Conclusions: In settings where it is considered desirable to increase the availability and safety of vaginal breech birth, specialist teams may facilitate the development of expertise within maternity care settings. Evaluation of expertise based on enablement of women and colleagues, as well as outcomes, will potentially avoid the pitfalls of alienation produced by some forms of specialist authority.

Keywords: Breech presentation; expertise; specialist; mixed methods; relational care

Introduction

Breech expertise can be understood as skill or knowledge concerning breech birth, acquired through training, study and experience. The recent Royal College of Obstetricians and Gynaecologists (RCOG) guideline on Management of Breech Presentation refers to "clinical expertise" as an essential safety factor in vaginal breech birth, similarly to other guidelines globally (Impey et al., 2017, p. 4). When breech expertise is unavailable, the safety and availability of vaginal breech birth decline. Breech presentation occurs in approximately 3-4% of all pregnancies at term (Impey et al., 2017), but only a small portion are born vaginally (NHS Digital, 2016), attributed to a global decline in expertise (van Roosmalen and Meguid, 2014). Women's autonomy to choose a vaginal breech birth is limited by lack of skill and experience (Catling et al., 2015; Petrovska et al., 2016a, 2017), so the development of expertise addresses the need to provide humane and dignified care to all women (Kotaska, 2017; Lokugamage and Pathberiya, 2017).

Minimal empirical evidence exists to guide identification and evaluation of expertise. The Term Breech Trial (Hannah et al., 2000b) associated attendance by a clinician "who judged him or herself to be skilled and experienced at vaginal breech delivery, confirmed by the Head of Department" with a reduction in adverse outcomes when compared with the categories of licensed obstetrician or clinician with over 10 or 20 years experience (Su et al., 2003, p. 742). But reliance on self-assessment of skill in the trial has been criticized (Glezerman, 2006). The objective of this mixed methods study was to explore the meaning of expertise in physiological breech birth, in order to understand how it can be developed within contemporary maternity services.

Methods

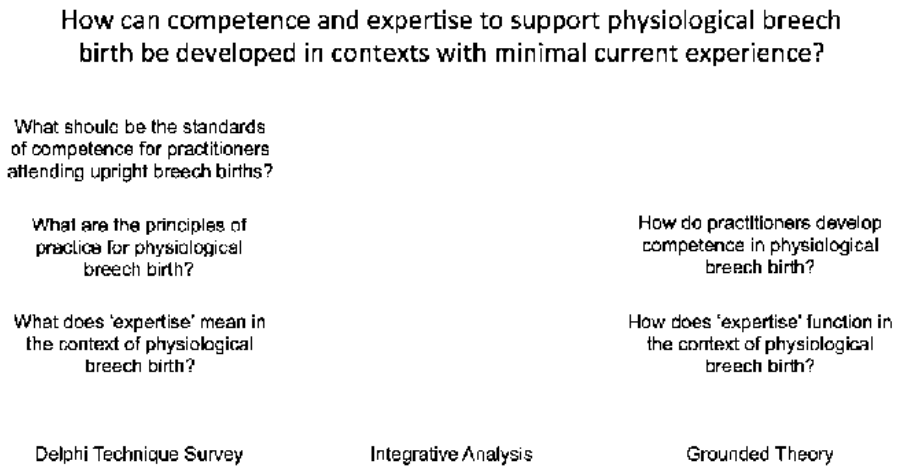

Figure 8. Design of mixed methods expertise study

This study employed a convergent parallel mixed methods design (Creswell and Plano Clark, 2011) [*Figure 8*]. Data from two methodologically distinct studies were pooled to perform an integrated analysis, which synthesised and extended the findings of each (Heyvaert et al., 2013). Data came from a Delphi survey (Walker et al., 2016a) involving comparatively experienced practitioners and a grounded theory interview study (Walker et al., 2017c) involving practitioners moderately experienced with upright physiological breech birth [*Table 10*]. The data analyzed included free text answers to open-ended survey questions from the Delphi survey; a collection of statements which reached consensus agreement among at least 70% of the Delphi panel members, rated on a Likert scale [*Table 11*]; and transcriptions of in-depth interviews from the grounded theory study. Detailed descriptions of recruitment, methodologies and results of the contributing studies have been published separately (Walker et al., 2016a, 2017c).

Table 10: Backgrounds of participants in mixed methods expertise study

Delphi consensus technique study	13 obstetricians, 13 midwives, 2 service user representatives
Settings	Australia, Austria, Brazil, Canada, Germany, Mozambique, New Zealand, United Kingdom, United States of America
Experience level	20-400 total breech births (mean = 135; median = 100)
Grounded theory interview study	9 midwives, 5 obstetricians
Settings	Australia, Brazil, Canada, the Netherlands, New Zealand, the Philippines, the United Kingdom, and the United States
Experience level	5-30 upright breech births

We began our analysis by descriptively coding references to more experienced clinicians, and comparing the patterns we observed to the consensus statements in *Table 11*. These initial codes were then organized into categories reflecting social clinical roles and increasing layers of responsibility associated with some experienced clinicians. This iterative process included highlighting counter-examples and exploring tensions in the data, particularly the doubt multiple participants expressed about the concept of "breech expertise." Theoretical categories were settled by relating the expansive progression of roles to a central concept of *generative expertise*, and comparing this to *alienating authority*.

The multiple data sets contributed diverse views (Bryman, 2006) of professionals with varying experience levels [*Table 10*]. Integration of this data during analysis enabled a more thorough exploration of processes (Bryman, 2006), particularly the social functions of expertise, than would have been possible considering the concept from a single viewpoint. Detailed memo writing throughout the constant comparative analysis maintained an audit trail of key decisions, and reflexive awareness of various sources of influence, in line with constructivist grounded theory methods (Charmaz, 2006; Steier, 1991). Ethics approval was obtained by the City, University of

London, School of Health Sciences Research Ethics Committee. All participants consented to participate and transcripts were anonymised prior to analysis. Clinicians who participated in the Delphi panel are identified by a three-digit code, eg. OB104. Clinicians who participated in interviews are identified with a single-digit code, eg. MW1. All data were stored and analyzed on a password-protected, encrypted laptop or central shared university drive, in line with ethics approval. Each of the three authors contributed to the original studies, design of this analysis and the writing up of the results. The first author performed the integrative analysis, in consultation with the other two authors who provided reflexive supervision at monthly meetings.

Results

1.0 The Generative Function of Expertise

Expertise can be identified by its on-going function, rather than the achievement of objective, static criteria. Expertise generates comparatively good outcomes for mothers and babies, and confidence and competence among other professionals, so can be called *generative*. Clinical experience is essential, but expertise develops in social clinical roles: clinician, mentor, specialist and expert. Formally developing these social clinical roles within a breech team has the potential to improve access and safety of breech birth. Below we will discuss volume standards, numbers of births associated with expertise, and the social roles through which expertise develops.

2.0 Volume Standards

As expected, participants viewed expertise as dependent on ample clinical experience. The Delphi survey results identified 20 births as an approximate number reasonably associated with acquiring expertise [*Table 11*]. During this period, professionals encounter most significant complications for the first

time (Walker et al., 2017c). The first 20 births should be considered a consolidation period during which clinicians should be supported by mentors or breech experienced peers wherever possible.

Table 11. Qualities associated with expertise in physiological breech birth

Percentage of panel in agreement, Likert mean and standard deviation (SD)
Likert scale: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

Qualities associated with expertise	*%*	*Mean*	*SD*
Ability to anticipate the need to intervene based on careful observation of the birth and progress	100%	4.68	0.48
Keeps current and continues to attend breech births	95%	4.59	0.59
Having encountered and resolved complications successfully	95%	4.52	0.81
Openness to new research	95%	4.50	0.60
Experience with many births both breech and cephalic	91%	4.45	0.67
A special interest in breech birth	86%	4.36	0.73
Known for their empathy, knowledge and compassion	86%	4.23	0.68
Affinity – joy and happiness in the job	86%	4.23	0.69
One who has explored and evaluated a variety of different techniques and approaches to vaginal breech birth	86%	4.23	0.81
Ability to teach others the skills of breech birth	77%	4.18	0.80
Evidence of good outcomes over a significant number of births	77%	4.14	0.89
Attendance at a certain number of breech births	73%	4.14	0.83
Someone who knows how to create the conditions for a real fetus ejection reflex	73%	3.91	1.06
Leadership skills	71%	4.05	0.59
While numbers are helpful as a guideline, expertise is context-dependent. Expertise is more accurately understood through the demonstration of qualities such as those outlined above than by achieving any particular number.	95%	4.59	0.59
Number of births associated with consolidating expertise: **20** (mode and median of all responses)			

But the actual amount of experience required to function as generative expertise is context-dependent [*Table 11*]; the skill and knowledge of these clinicians is *comparatively* higher than that of their colleagues. Experience matters, but experience alone will not necessarily achieve comparatively good maternal and neonatal outcomes, nor nurture competence and inspire confidence in others. In some contexts, the most experienced clinician had attended less than 10 breech births: *And then I found myself in the position of being the most experienced breech catcher present* (MW5). Their support of other clinicians at births may still function as expertise when it increases the likelihood of a good outcome and the confidence of colleagues. Similarly, a clinician who has attended over 20 breech births or practiced for many years may not have developed skills to generate more confidence and better outcomes.

3.0 The Social Expressions of Expertise

The generative nature of expertise is expressed in social clinical roles: clinician, mentor, specialist, expert. Practitioners take on increased responsibility and expanded social roles as their experience grows, and each successive role incorporates the one before. Fulfilling these roles also contributes to the continued development of the practitioner's expertise, creating a positive feedback cycle. Expertise results from cumulative and continual learning and practice.

3.1 Clinician

The data indicated that generative expertise originates in reciprocal relationships with birthing women, *being willing and teachable from the woman and breech baby* (MW103).

> *The stuff that I've learnt since [training] as an obstetrician has probably been more instructive because I've learnt just through the process of observation and working with women, rather than being taught actively by someone else and being told, "This is the way you have to do it"* (OB4).

Clinicians with generative expertise increase the likelihood of both planned and successful breech births because their confidence and comfort instills the same in birthing women.

> *I found that my experience was influencing them in the decision because all of my women were thinking about vaginal birth* (MW3).

Comfort and familiarity with the process of breech birth brings increased flexibility and openness to follow the woman.

> *As providers gain experience, for sure in my experience, I've gotten more comfortable with the mother being in her chosen position* (MW105).

Enablement of women results in further opportunities to attend breech births through referrals:

> *So one woman told the other one, and suddenly a lot of breech births were appearing from everywhere. I think we attracted the breech births* (MW9).

Successful breech births initiate a self-replicating cycle, attracting further opportunities. These clinicians have the potential to develop into mentors.

3.2 Mentor

Comparatively experienced clinicians begin to mentor others at births. The presence of a mentor with generative expertise increases the likelihood that breech births will occur.

> *We had a Dutch registrar who was very comfortable with breech birth, and I had the opportunity to do a few, instead of the usual scenario where the registrar's trying to race women to the operating theatre as fast as possible. She used to come into the room and just stand there. And she used to say, "I'll help if you need me, but just press on"* (MW4).

They are able to *step back and watch it unfold* (MW113), and this enables developing clinicians' skills to come forward.

> *We'd call one of the specialists and they would stand there beside you, either be hands over yours or at least within arms reach, and usually actively talk you through* (OB4).

Some participants described intentionally developing the skill of stepping back, promoting shared responsibility for breech births, and resisting attempts of less experienced colleagues to step aside.

> *I could stand back because I wanted them to be able to do it when there was nobody else. So it was important that I could do it myself. But then I was like, "I'm here so that you can do it"* (MW7).

When mentors with generative expertise support other clinicians at breech births, their presence brings into the birth space an increased flexibility and openness to follow the woman. They increase the likelihood and safety of breech births among the colleagues they work alongside, and maintain their own proficiency in the process. Mentors functioning with generative expertise have the potential to develop into specialists.

3.3 Specialists

Breech specialists are experienced clinicians who have an extended formal role working with breech presentation in a local setting. They provide theoretical teaching in addition to attendance and mentorship at breech births.

> *In retrospect if somebody had given me a workshop that I now give to people who might find themselves in that situation, I would have left her [kneeling] and had her just push the baby out spontaneously, which she would have done beautifully* (OB1).

In the interview data, skilled teaching had the effect of increasing developing clinicians' confidence to attend breech births, by increasing their conceptual understanding.

> *[The workshop] left me with the feeling that I really understood normal breech birth and how to identify when there was a problem and what to do about it* (MW5).

The interview data indicated specialists were sought out for reflective supervision activities such as *preparing* for births, *talking through* births and birth videos, and *picking up tips*, each of which were mentioned by multiple participants. Specialists also undertake service activities such as auditing outcomes of breech births. These activities enabled them to identify patterns in both their own experience and the experiences of other clinicians. Non-hierarchical dialogues facilitated developing clinicians' learning, and supported specialists' continued development, *serendipitously* (OB1).

> *I have some wonderful colleagues, especially one. She is really progressing and pushing me to see things from other point of view. She supports me and I her to do things differently* (OB5).

The skilled teaching and supervision provided by specialists with generative expertise function to increase the likelihood and safety of vaginal breech birth by increasing confidence, skill and understanding among colleagues throughout the local maternity care context. Some specialists take on additional leadership and advocacy activities outside their local settings, in the role of a breech expert.

3.4 Experts

A breech expert is a specialist who has an expanded role mobilizing knowledge across multiple settings: *Understanding and teaching. Research and mentorship. Good outcomes over a high volume (MW105)*. Each of these activities potentially generates an increase in the availability and safety of vaginal breech birth. When operating in an expert role, clinicians maintain the openness and flexibility which characterizes their work with women and developing clinicians. This involves conducting their own research and being open to the work of others, flexible enough to try new methods [*Table 11*]. Although breech experts are heavily involved in teaching, the data were thick with references to the need to continue learning, from women, other clinicians and new research:

> *We always learn. I think loving it and doing it often make you the right person but once you stop being humble in the presence of breech birth you will probably become dangerous* (MW110).

The role of a breech expert is primarily in the synthesis and dissemination of knowledge about breech birth, in addition to their own experience, highly relevant to the expert's credibility.

4.0 Alienating Authority

Some more experienced clinicians, particularly midwives, expressed doubt about the concept of "breech expertise," and concern about the effect of *segregating breech into a specialty* (MW102).

> *I am not a fan of the "expert" model. I am into competence for all as a basic skill* (MW101).

Analysis of the data revealed an antithetical expression of breech expertise, *alienating authority*, which may help explain this resistance.

Alienating authority claims a mandate through experience or professional hierarchy, but fails to generate consistent availability and safety of breech births. This may involve over-estimation of one's own skill, disregard of the skills and experience of others, or misrepresentation of skill and its ability to mitigate risks: *Claiming to be an 'expert' could mislead* (MW102). Alienating authority is characterized by inflexibility and close-mindedness, which limits continued learning: *They like to do it like they did it all the time.* (OB104). In this data, individuals exhibiting alienating authority were described as exercising more control, over birthing women and developing clinicians: *And then the consultant just came in and basically was just like, "Right I need an epidural put in …* (MW1). This type of authority prioritizes the clinician's preferences, which may be asserted without relation to the needs and wishes of the birthing woman or developing clinicians due to the implicit hierarchical nature of their relationship.

Clinicians exercising alienating authority made care decisions based on limiting and inaccurate predictions, undermining trust.

> *A woman who had been told that she wouldn't actually go into labor so that's why she had to have a caesarean section, she came into hospital in advanced labor so was very shocked about it all* (MW1).

This also applied to alienating teaching and organizational practices:

> *"You've gotta have the woman flat on her back in lithotomy, and she's gotta have an epidural in, and she's gotta have an episiotomy, and you have to do this, this and this in this order. You can't do anything other than that, otherwise it's all gonna go pear shaped"* (OB4).

Alienating authority diminished, rather than enabled, shared responsibility and experience throughout the team. This sometimes involved professionals in senior roles assuming authority: *Because there was that superior obstetric view, I felt like I needed to defer to him* (MW6). But the evidence also indicated some clinicians eagerly deferred to others during breech births, relinquishing the opportunity to acquire hands-on clinical practice, along with their own clinical responsibility for the births. Alienating authority undermines relational aspects of care. This potentially leads to fewer breech births, less flexibility for women and less confidence among colleagues, contributing to *the dying process* (OB104) for breech birth.

5.0 Mechanisms of sustainability

In this data, three mechanisms supported the gradual role expansion associated with the development of generative expertise: affinity, visibility and relationship. Individuals functioning with generative expertise were repeatedly described as experiencing *joy*, *love* and *beauty* in their work with breech births, which contributed to sustaining their interest. The identification of specialists who taught breech skills within and outside of their local contexts created visibility with two important results: increased volume and learning. Because of their association with breech, they were called by colleagues to more births and were sought out by more women desiring vaginal breech births. They were also consulted to *talk through* more births, enabling them to recognize patterns beyond their own personal experience. Finally, their

practice was based on relationship and response. This required for each participant some degree of flexibility to follow the woman and the rhythms of physiological birth, involving being on-call wherever possible, even within systems where this was not the norm. The self-replicating, generative cycle of expertise is only possible in systems which enable some model of continuity of carer. Three mechanisms of limitation promoted alienating authority: fear, under-utilized experience, and professional hierarchy.

Discussion

Expertise is defined by its on-going function: the generation of comparatively good outcomes, and confidence and competence among colleagues. Although clinical experience is necessary, it does not guarantee expertise, so a simple definition based on volume of experience or completion of a training programme is not practically useful. Generative expertise is developed and expressed in social clinical roles, which expand as experience grows: clinician, mentor, specialist, expert. In most contemporary maternity services, these social clinical roles are either not present, or filled on an *ad hoc* basis by practitioners with an interest, resulting in missed opportunities. The data indicate that to develop expertise within a service, clinicians who have an interest in breech birth should be supported to perform these roles more regularly. Even within services hosting a small number of breech births annually, this will enable a core group to attend the 3-6 births per year recommended for the maintenance of breech skills (Walker et al., 2016a).

Formally dedicating a specialist team has the potential to increase levels of expertise, and consequently safety and access to vaginal breech birth. Primarily this will require enabling the team to work flexibly to be present at as many breech births as possible, in order acquire a significant level of

experience and continuity of relationships within the team, and to devote time to the additional activities of reflection, audit, teaching and research. Care should be taken not to segregate into a specialist team with an exclusive skill set, which replicates the problematic model of alienating authority. Evaluation of a breech team's performance should include feedback from women and colleagues as well as perinatal outcomes, to ensure that the developing expertise is generating comparatively better outcomes, competence and confidence throughout the entire team.

These recommendations resonate with the current RCOG breech guideline (Impey et al., 2017, p. 7), which states, "Guidance for the … management of vaginal breech birth should be developed in each department by the healthcare professionals who supervise such births." Some obstetricians and midwives will have more interest and affinity with breech birth, and attend more breech births than their colleagues. This affinity can be developed formally to support a more open, flexible and successful service, in contexts where revitalization of breech birth skill is desirable. A recent systematic review also suggested that experienced mentorship in clinical practice is an important corollary to breech training, associated with higher rates of attendance vaginal breech birth (Walker et al., 2017a). Models of specialist care provision have been explored with good results in areas such as twin pregnancy and birth (Henry et al., 2015) and birth after caesarean section (Gardner et al., 2014; Lundgren et al., 2015). While much work has been done on the benefits of models of continuity of carer provided by midwives (Allen et al., 2017; Sandall et al., 2016b), less research has addressed the impact of continuity of obstetric carer. Continuity has been identified in qualitative research as a significant factor influencing the success of complex physiological birth (Foureur et al., 2017), and the organization of obstetric and specialist midwifery services to provide greater levels of continuity deserves

further research.

The strength of this research is that it integrates data from participants who are perceived as experts, and participants who are at an earlier stage of developing breech skills. The participants worked in various international maternity care settings. This variety may increase the translatability of the findings across settings, but the heterogeneity of the sample means that the findings are not oriented toward implementation in any specific setting, and may therefore require further local work to implement successfully. Additionally, the methods used in this study do not enable us to verify our findings by demonstrating an association with improvement in outcomes. The implementation and effect of breech roles and teams remains to be tested predictively in practice. The opposing belief among a portion of participants that identification of specialists would limit, rather than expand, availability of breech births requires careful consideration in any setting intending to trial a breech team. A further limitation is that the participants in the research were all oriented to physiological breech birth (Walker et al., 2016b), involving upright maternal positioning (Bogner et al., 2015; Louwen et al., 2017). Although many of the participants developed experience within settings where this practice was not normative, the model may not function in the same way in maternity care contexts where women and/or their providers are not able to utilize upright birthing positions.

In conclusion, in settings where it is considered desirable to increase the availability and safety of vaginal breech birth, specialist teams may facilitate the development of generative expertise within maternity care settings. Once a team of individuals is identified, organizational systems should be put in place for flexible working, enabling specialists to support women and colleagues at breech births wherever possible, and continued learning, to

exchange lessons learned with other breech specialists. Any implementation of breech teams must be fully evaluated. Such evaluation should include the views of service users and managers regarding the usefulness the care model, opportunities and barriers to implementing it, and perinatal outcomes.

6.2 Critical analysis

This critical analysis considers the contribution undertaking a mixed methods integrative analysis of multiple data sets may make to exploring the meaning and function of breech expertise. The strengths and weaknesses of this work will also be considered with implications for future research. Contributions to this work are as follows: I designed the research in consultation with my doctoral supervisors. I performed the analysis, which evolved in an iterative fashion and in consultation with my doctoral supervisors during monthly reflexive discussions. I wrote the initial draft of the paper and revised it after feedback from the co-authors and peer review.

The importance placed on the attendance of a professional with clinical expertise in breech guidelines internationally was outlined previously in this thesis. Absence of clinical expertise is considered an exclusion criteria for vaginal breech birth, but within the international sample of breech guidelines quoted in Section 1.5 of this thesis, the meaning of expertise remained undefined and is sometimes subject to the personal judgement of professionals (Kotaska et al., 2009). In the Delphi results, the experienced panel reached 100% consensus on the statement, *Ensuring skilled and experienced professionals attend the birth has a significant impact on the safety of breech birth* (Walker et al., 2016b, p. 3). In contrast, only 69% of the panel, below consensus level, agreed with the statement, *Antenatal screening of candidates has a significant impact on the safety of breech birth*, and only 57% agreed with the statement, *Where the availability of skilled and experienced attendance is minimal, screening criteria will need to be stricter* (Walker et al., 2016b, p. 4). This contrast suggests that the panel generally viewed skill and experience as more influential than screening criteria on the outcomes of vaginal breech birth. Investigation of whether expertise has a

greater effect on safety than current screening criteria (fetal weight, type of breech presentation, head flexion or extension, etc.) is a potentially useful line of future research. The meaning and function of expertise needs to be defined so that research can begin to evaluate its effect, and this is the significant contribution of this research.

Several of the consensus statements in the *Standards* paper pertained to mentorship, apprenticeship or specialist practitioners whose role is to support breech skill development throughout the entire maternity care team (Walker et al., 2016a, p. 11). The centrality of relationship-based practice reflected in these statements meant exploration of the social as well as clinical aspects of expertise was important. Capturing these relational elements required the perspectives of both experienced practitioners and professionals who were developing breech skills, or learning new skills associated with upright techniques. The Delphi dataset brought qualitative survey data and a set of consensus statements concerning expertise, representing the views of a panel members who were comparatively highly experienced and in many cases internationally regarded as experts. The grounded theory interviews brought rich narrative-based data from professionals who were more moderately experienced either in breech birth in general, or new upright techniques. Combining these two data sets enabled these multiple perspectives to be included through an integrated analysis. Bryman (2006) explains how mixed methods approaches can be used to incorporate a diversity of views, and to further explore the processes of social phenomena. They complemented each other to achieve results that would not have been possible with only one set of data.

Although it was important to understand how experienced professionals perceived expertise, not privileging this perspective was also in line with the

axiological orientation in this research of amplifying less powerful voices, such as those who seek to learn and enter into established communities of practice. For example, while some of the more experienced panellists eschewed the notion of *breech experts*, the interview data made it clear that less experienced learners valued the leadership of certain experienced practitioners and depended on them to enter into a community of practice. Understanding the needs and concerns of both sides of this relationship helped to elucidate the difference between expertise that functions generatively and expertise that alienates. Given the emphasis on relational aspects of care and amplifying less powerful voices, it could be argued that the analysis would have further benefited from the inclusion of interview data from women who had received care from professionals perceived as experts. This is an area for future research that would provide the additional perspective of service users.

The paper also outlined an antithetical concept of alienating authority, which explains some potential pitfalls in developing a team of specialists with generative expertise. When specialists are perceived as having exclusive and elusive skills, it actually diminishes the confidence of colleagues and undermines the goal of developing specialists in order to develop skills across the maternity care team.

The significant contribution of this paper is the insight that expertise cannot exist outside of the network of social relationships through which it is expressed and developed. The quality of expertise functions as what Bhaskar (1997) would describe as a generative mechanism, characterised by a tendency to increase availability, safety and colleagues' confidence to attend breech births. But these tendencies are mediated by various social clinical roles through which expertise may function, e.g. clinician, mentor, specialist

and expert. These roles are based in social relationships and not limited to manual clinical skill. Because exercise of expertise is influenced by context, a reductionist definition based on numbers of births or years of experience alone cannot be fully explanatory. Specific professional roles can be observed. The description of these roles in this paper enables future research to consider explanations for empirical phenomena rooted in the relational aspects of breech care, rather than remaining focused on superficial phenomena such as fetal weight and maternal parity.

Chapter 7: Discussion and Conclusion

This chapter will contain a discussion around the implications for practice and research arising out of the work in this thesis. This is followed by a section reflecting on the influence of doing the research on myself as a clinician, teacher and researcher. The chapter finishes with a conclusion to the thesis.

7.1 Implications for practice and research

This discussion will explore implications for practice and research following on from the work contained in this thesis, considered as a whole. These implications will be discussed as part of the layered reality of breech services, in line with Bhaskar's critical realism (1997), including the domains of the empirical, the actual, and the real. The domain of the empirical includes experiences which can be observed and measured. Increasing women's autonomy with regard to choice of mode of breech childbirth remains the primary axiological basis of this research. Improving perinatal morbidity and mortality associated with vaginal breech birth is important to women and contributes to that goal. The logical progression of this research is that both of these conditions should be observed in any future applications of our models. This thesis provides a theoretical framework for how these objectives might be achieved. Within domain of empirical, observable experiences, the research offers volume standards, or guideline numbers of vaginal breech births, to contextualise the meaning of *experienced* and *expertise*. Within the domain of actual events, the research supports the development of organised breech teams and breech care pathways within current maternity services. I will argue that the actual structure of breech services should be based on awareness of the generative mechanisms which underpin them, within the

domain of the real. This includes training within communities of practice, which may be consciously created, and care provision within a relationship-based model. The three following sections will explore volume standards, breech teams as consciously created communities of practice, and breech care pathways based on the principle of relational continuity, and how these suggestions are driven by the data in this project.

7.1.1 Volume standards

The introduction to this thesis described how national-level breech guidelines advise that the attendance of a skilled and experienced professional is considered fundamental to the safety of breech birth, and consequently its availability. But the lack of definition regarding what constitutes experience and expertise is problematic. Because experience can be quantified, one simple way of setting minimal standards is through the use of guideline numbers of breech births associated with certain levels of skill, also known as volume standards (Wheeler et al., 2001). Volume standards at institutional level, e.g. recommended numbers of procedures per year per institution, have been demonstrated to improve safety in some areas of healthcare, such as complex surgical interventions (Wheeler et al., 2001). But meeting national guidance regarding volume standards has also proven difficult to achieve simultaneously with equity of care access (Luft et al., 2003). This same tension applies to volume standards for vaginal breech birth practice: Higher levels of experience may have a tendency to be associated with higher levels of safety, but requiring certain levels of experience in order to provide the service is likely to reduce access to vaginal breech birth as an option for many women.

Studies of the effect of volume standards in maternity services have returned inconsistent results, with some studies suggesting local care cultures influence safety as much or more than simply numbers of births required to practice with skill (Kozhimannil et al., 2014). This resonates with the results of this research, indicating that significant experience is regarded as a generative mechanism for safety, but due to the complex web of influencing factors the connection is not directly causal. Better results for vaginal breech births have been associated with institutions facilitating >1500 total births per year (Azria et al., 2012), and lower caesarean section rates have also been associated with centralisation of breech services in larger institutions (Albrechtsen et al., 1998). But Vlemmix et al (2014b) recently looked specifically at volume of breech deliveries within institutions and found no association between volume and safety outcomes. Volume standards for breech births have not been evaluated at the level of individual practitioner, but in a separate area of breech practice, two studies have indicated that practitioners performing a higher individual volume of external cephalic version have greater success rates (Andrews et al., 2017; Bogner et al., 2012). Volume of personal experience appears a potentially relevant factor influencing the safety of vaginal breech birth, but empirical evidence is inconsistent. Consensus-based methods can offer a useful way of synthesising individual opinion where other evidence is lacking (van Teijlingen et al., 2006).

As a result of the Delphi research outlined in this thesis, the following experience ranges have been proposed as useful guidance, with a caution to consider the overall context when applying them: competence in approximately 10-13 breech births, maintenance of proficiency by attending approximately 3-6 breech births per year, and expertise after approximately 20 breech births. *Experience* of births is observable and quantifiable, but it

does not necessarily correlate with competence or *expertise*. The grounded theory research on competence development and integrative mixed methods analysis of the expertise data indicated that the development of competence and expertise is influenced by many more intrinsic and environmental factors, in addition to quantifiable experience. Acknowledging the layered reality of expertise development and the panel's resistance to assigning specific boundaries, the guideline numbers were reported as an approximate range, represented by the mode (the most common answer) and the median (the average of all answers received), rather than a consensus result. Guideline numbers were published alongside consensus statements reflecting the importance of accounting for individual practitioners' ability to adapt and acquire the necessary skills, and the context-dependent nature of expertise.

The only other consensus-based study to date that offers a tangible numeric framework for maintaining breech birth competence involved a similar Delphi method and used a sample of practitioners from Africa and South Asia (Scotland and Bullough, 2004). They asked doctors working in Africa and South Asia what they thought were the minimum, maximum and optimal annual caseload numbers for maintaining skill in assisted breech delivery and other obstetric complications. That paper reported the minimum annual number of breech births as 10, and the optimal number as 25, both higher than the 3-6 per year range reported in the *Standards* paper (Walker et al., 2016a). This difference in results may reflect the differing professional contexts of our participants. Scotland and Bullough (2004, p. 306) reflected, "The usefulness of the results is also dependent to some extent on whether the responses given on numbers required to achieve skills are actually achievable in practice." Most of our sample for each arm of the research were working in countries with lower annual rates of vaginal breech birth than one would expect to see in Africa and South Asia in 2004. The results reported in

the *Standards* paper represent more feasible targets in contemporary settings.

Numbers were a contentious issue among participants in our research (Walker et al., 2016a). In the design of the Delphi study, I did not assume that numbers were essential to a definition of competence, proficiency or expertise. Rather, the survey asked open-ended questions about how these concepts should be defined, and gaining the experience of a certain number of breech births was offered by multiple participants as one aspect of a definition. But the panel was polarised on this topic, and resistance to associating specific numbers with certain levels of skill was discussed in the two papers reporting guideline numbers (Walker et al., 2016a).

The multi-method, mutli-perspective approach to exploring how competence can be acquired helped to build a fuller picture than numbers alone can provide, but the numbers themselves retain some utility. For example, guideline numbers for acquisition of competence were reported as attendance at 10-13 breech births, and the qualitative findings of the grounded theory study help to explain why this range is significant. In that paper, the development of competence to facilitate physiological breech birth is described as a series of stages. The final stage is described as *Responsibility*, in which practitioners began to exhibit *markers of experience*, such as the ability to make comparisons between experiences. These markers emerged following having encountered and successfully resolved complications, resulted in those practitioners receiving additional referrals from other practitioners due to their professional identity association with breech birth, and were most apparent in the interviews with participants who had attended 10 or more breech births. A significant percentage (56-70%) of upright breech births unfold completely spontaneously (Bogner et al., 2015; Louwen et al.,

2017); therefore attendance at 10 or more births would make it more likely for a professional to encounter, resolve and compare multiple complications, though the actual numbers of complications encountered and the ability to learn from them will vary between individuals. The results of the Delphi and grounded theory studies considered together suggest 10-13 breech births is a reasonable range to recommend as a guideline for acquisition of competence to support planned physiological breech births autonomously. While I am not claiming to have verified these numbers, when considering them from the multiple perspectives adopted in this thesis they appear a *plausible account* (Charmaz, 2006) of a useful pattern.

The effect on clinical practice of recommending such a guideline range is a separate consideration from whether such a range is, in some sense, accurate or truthful. The integrative analysis of data concerning expertise provides some context for the pitfalls experienced practitioners perceived in volume standards. This analysis reported a facilitative concept of breech expertise, which we called *generative expertise*, and the antithetical concept of *alienating authority*, which may constitute a barrier to safe breech births. Both the Delphi and grounded theory research emphasised the importance of adaptability, flexibility and affinity as foundational qualities enabling practitioners to acquire and use necessary skills to facilitate physiological breech birth, and the relative, context-dependent nature of expertise. Generative expertise cannot be measured in the same way as experience, e.g. numbers of births. Practitioners who have actively sought out opportunities to acquire breech skills and knowledge but have only attended three breech births may bring as much or more expertise to a planned breech birth as a practitioner who has attended 20 births rigidly performing a prescribed set of manoeuvres, with comparatively little reflection on the process. There is no one ultimate truth about when and how competence is

acquired. Unobservable influences such as intention, reflection and relationships with skilful mentors also have mediating effects.

At a practical level, imposing volume standards as a requirement for any professional to support a planned breech birth would preclude the possibility of vaginal breech births occurring with professional support in many areas. This was a major concern to some participants, also acknowledged in the Scotland and Bullough (2004) study. Prescriptive guidance on numbers of births professionals must have attended to facilitate breech births autonomously has the potential to become a form of alienating authority and effectively limit, rather than enable, women's access to the option of physiological breech birth. Focusing on individuals rather than institutions, the Society of Obstetricians Gynaecologists of Canada (2002, p. 359) have explicitly rejected the idea of setting a minimum number of births to maintain competence and credentialing, instead placing emphasis on "locally determined quality assurance programmes and on individual participation in self-directed maintenance of competence programs." In rural contexts where opportunities for experience in a range of clinical skills are minimal, such an approach is essential to maintaining equity of access to services.

The participants in our research also pointed out the potential danger of reducing breech expertise down to a definite set of numbers. They perceived that guideline numbers and the label of *breech expert* may have the potential to mislead by providing an illusion of safety. Attendance at 20 breech births, the number we reported as associated with acquisition of expertise, does not guarantee a good outcome for a vaginal breech birth. The predictive value of guideline numbers in this context has not be verified in this research, and their use as a form of individual professional regulation would be inappropriate. At best, they provide an opinion which may help raise awareness of the volume

of experience needed to develop clinical skill, and an argument for the development of specialist teams and pathways.

In future research, transparent reporting of definitions of *experience* used, when reporting outcomes for planned breech birth would help to contribute to a systematic review and analysis of outcomes associated with various definitions of *experience* and *expertise*. In many papers, the system of ensuring experienced attendance is unclear. For example, Louwen et al (2017, p. 153) reported comparatively good outcomes for upright breech births. Their paper states, "In the few cases where no obstetrician experienced in vaginal breech birth was available, the option was no longer offered." Although attendance of an *experienced* professional was important in this setting, the meaning of *experienced*, how many senior professionals were considered to be *experienced* and the plan for providing *experienced* attendance are not made explicit.

As institution-facing, rather than individual professional-facing guidance, the number ranges we have reported present a practical challenge to the way maternity services and training programmes are currently structured. Thornton and Hayman (2002) have pointed out that the ratio of volume of breech births to numbers of midwives in the UK would mean the average midwife would attend only one breech birth every nine years. Dhingra and Raffi's (2010) paper on the breech experience of obstetric speciality trainees in the UK reported that, among trainees who had trained exclusively in the UK, only 40% of them had attended 10 or more vaginal breech births. This suggests that most obstetric trainees in the UK do not obtain a level of experience in line with the 10-13 births for competence development reported in the *Standards* paper (Walker et al., 2016a). In the UK, regardless of actual experience levels, consultant obstetricians would normally be expected to

oversee vaginal breech births as the most senior professional. This may explain why research and anecdotal literature suggests that obstetric trainees are not always supported by their consultant colleagues (BBC, 2015; Dhingra and Raffi, 2010). If experience does matter to safety, the fact that few midwives will ever attend a significant volume of breech births in their career, and 40% of UK-trained obstetric consultants do not finish training having attended more than 10 breech births, is of concern. In settings with minimum numbers of breech births, an entirely different strategy is called for where services are committed to having breech births attended by professionals with skill and experience wherever possible, rather than whoever happens to be on shift at the time. The following two sections will discuss some strategies suggested by this research.

This thesis began with the intention to increase women's access to physiological breech birth, recognising that safety is a multi-faceted and relative concept influenced by each individual's unique values. In the context of the overall intention of this research project, perhaps the most relevant use of the guideline numbers we have reported is in evidence-based counselling about mode of childbirth. Relevant to this purpose is the consensus statement: *Health professionals should share their training background openly with women who seek care and support for a breech birth, with reference to standards set out by their professional certifying body (Walker et al., 2016a, p. 11)*. Discussion about the meaning of numbers displaces professionals' exclusive responsibility and right to self-evaluation of their own competence, and provides a framework for self-disclosure which is amenable to professional scrutiny, governance, and accountability. Open discussion around guideline numbers also shifts some of the power to judge towards women. For example, if the most experienced practitioner available has only attended 5 breech births, explaining that evidence suggests competence is

acquired through experience of around 10-13 breech births may enable women and families to contextualise the support being offered in a shared decision-making context. This approach is more nuanced than simply stating that expertise is available, which may produce unrealistic safety assumptions, or that expertise is not available, which may withhold some level of available experience the woman may choose to use. It demystifies the concept of *skilled and experienced practitioner* by offering a reference to empirical evidence, while acknowledging that other less quantifiable factors may influence safety and decision-making in the current context. In doing so, it extends the availability of vaginal breech birth by increasing a woman's ability and autonomy to judge whether or not the choice will fit her needs.

7.1.2 Breech teams: Intentional communities of practice

The previous section discussed clinical experience guidelines, numbers of births associated with competence, proficiency and expertise, and the practical implications of such numbers. Rather than an instrument of professional credentialing and regulation, I suggested these numbers may be more useful as a component of relational woman-centred counselling. They may also be a guide for institutions seeking to structure breech services in a logical way, enabling breech expertise to develop. The results of the three strands of research contained in this thesis suggest that one way of doing this is to catalyse a local community of practice, one of the key elements of the model of *deliberate development of physiological breech competence* reported in the grounded theory paper (Walker et al., 2017c). A community of breech practice that has been intentionally created, institutionally recognised and assigned roles and responsibilities supporting breech care may be called a *breech team*, although the actual language used to describe it is less

important than its function. This section will explore what breech teams may look like, how they may function within contemporary maternity services and why.

The idea of breech teams, or squads as they are sometimes called, is not necessarily new. Kotaska reflected (2009, p. 553), in his article "Breech Birth Can Be Safe, But Is It Worth the Effort?":

> *For almost a decade, the pool of expertise in breech birth has been shrinking, and it will take effort and flexibility to re-expand it. Offering breech birth again will require systems of on-call coverage that pair more experienced practitioners with various learners, including practising obstetricians.*

The research contained in this thesis confirms that this is not just the considered view of one experienced health professional; it is shared by a significant number of professionals at various stages of experience in disparate settings around the world. But as Kotaska asks and our research suggests, effort and flexibility are key to developing breech competence. These may be institutionally expressed by the creation of breech teams and care pathways. A survey into the attitudes of Canadian hospitals conducted in 2006 indicated that only 1/20 centres responding considered establishing a breech clinic possible, feasible and desirable, and only 2/20 felt similarly about establishing a breech squad (Daviss et al., 2010). This research attempts to help overcome such resistance by contributing understanding of how and why such models may improve provision and outcomes associated with vaginal breech birth, and strengthening the minority voice calling for this approach to care and learning.

Communities of practice were first described by Lave and Wenger (1991; Wenger, 1999). They used the expression to identify a group who share a common interest and motivation to learn from and contribute to the community by sharing experiences, emphasising the social and relational nature of knowledge development. Lave and Wenger, and much of the work within which the concepts of community of practice and situated learning arose, share a constructivist epistemology (Cox, 2005), so the resonance of our results with these earlier theories is not surprising. In their work on "Organizational Learning and Communities-of-Practice: Toward a Unified View of Working, Learning and Innovation," Brown and Duguid (1991) describe how informal communities-of-practice, in which new knowledge is generated and transmitted, are often obscured within institutions by a cultural focus on formal training programmes and job descriptions. Dominant mainstream practices become codified, while minority voices remain active on the fringes. They argue for making apparent the "actual communities and actual practices" thriving in interstitial, often counter-cultural groups as a way of fostering innovation within organisations (Brown and Duguid, 1991, p. 40).

This echoes Bhaskar's (1997) layered representation of reality, in which the actual events which influence observable results are less obvious, and the underlying generative mechanisms even more difficult to observe due to their complexity and lack of constant conjunction with events. In our grounded theory-based model of competence development, communities of practice were identified as a core feature of sustaining breech practice and identity; they were an actual, observable but not necessarily quantifiable, factor in participants' professional development. Some participants were able to establish relationships with like-minded colleagues within their institutions, but most sought professional relationships that could help them learn and reflect outside their local maternity care settings, due to both lack of local expertise

and active resistance to supporting breech birth; this is a potentially modifiable actuality. The logical inference is that intentional cultivation of a community of practice, or breech team, within an institution may provide one way of replicating the actual practices of professionals who have been able to gain breech competence within maternity systems where this is usually not achieved.

The Delphi results reported in this thesis suggest some specific ways of organising breech teams; these include apprenticeships and/or on-call 'specialist' teams (Walker et al., 2016a). The most immediate practical effect of having a small group of professionals attend most of the breech births in a given setting is the higher level of individual experience each of these professionals acquire. This pragmatic arrangement addresses the challenge of achieving and maintaining the volume standards recommended. The research does not provide specific guidance on the organisational structure of a breech team, who should be members (other than a breech team should be multi-disciplinary wherever possible), or how to organise on-call arrangements. These details will vary between settings and should be centred around the needs and interests of team members, and women who use the service.

Our integrative analysis of data from the Delphi and grounded theory studies concerning expertise indicated that the mechanisms of sustainability for generative expertise are *affinity*, *visibility* and *relationship*. Identifying individuals who enjoy attending breech births (affinity) and are able to work collaboratively as part of a multi-disciplinary breech team (relationship) creates visibility within an institutional setting. Visibility results in increased opportunities to attend breech births and engage in breech practice-based discussion, based on the resulting professional identity association. But an

identity association that remains informal remains vulnerable to resistance and missed opportunity. Our theory suggests that formal identification within an institution or collective is a potentially effective first step in catalysing a local community of practice, providing enough legitimacy for the membership of a breech team to begin to organise itself in the most effective manner.

Attendance at births by breech team members does not necessarily mean that they will be the only professionals providing breech care, as one Delphi result made clear: *The role of 'specialists' is to mentor and support breech skill development throughout the entire maternity care team* (Walker et al., 2016a, p. 14). Among the more experienced participants who participated in the Delphi study, several eschewed the notion of *experts* and *expertise*. They saw themselves as part of a community of learners, rather than possessing an exclusive set of knowledge and skills, consistent with other community of practice models (Cox, 2005). Yet as outlined in the *Expertise* paper, some professionals took on recognisable, expanded roles within this community, related to their experience, such as mentorship, teaching and dissemination. These roles are more amenable to definition and observation than the concept of expertise itself. Official recognition and protection of these roles is one way of modifying actual circumstances in a way which may strengthen the challenge to dominant mainstream practices of codified knowledge and hegemonic control which are currently limiting breech practice.

The danger in formalising breech teams is the potential for creating further insider/outsider boundaries which ultimately alienate and stifle those who have not received official recognition. The *Expertise* paper also offers a caution against viewing breech teams as a group of professionals with an exclusive skill set. As reflected in the Delphi consensus statements, professionals with *generative expertise* facilitate woman-centred care and skill

development among the entire maternity care team. The role of mentors and specialists is to bring experience into the birthing space an extra layer of safety and confidence, rather than to take over care of every breech birth. A breech team is an institutionally recognised internal community of practice, but identifying a breech team with specific roles also provides a mechanism by which locally gained knowledge and experience may be shared with the wider communities of breech practice already operating across settings. Dissemination across local, national and international communities of practice is part of what defines the role of *breech expert*. The protected and legitimised roles of local breech team members in mentorship, teaching and dissemination potentially promote sustainability of the model. But formalisation will inevitably alter the context in ways which cannot be predicted, creating new obstacles as well as opportunities. Any implementation should be rigorously evaluated using quantitative and qualitative methods.

Attending breech births with other like-minded professionals was also meaningful to the participants in this research, enabling them to have immediate access to a second opinion during the birth, and an opportunity to reflect afterwards. *Regular opportunities to discuss experiences with peers and mentors* was considered an important aspect of breech education in the Delphi research (Walker et al., 2016a, p. 14). But this support was not necessarily available to all of the participants in this research, who often had to seek outside their own institutions to find other individuals supportive of and experienced in vaginal breech birth, among an international community of practice. All of the participants in the research reported resistance to breech births or physiological methods in their local practice environments; formation of an institutionally recognised local community of practice may provide some protection from this resistance. An expectation of attending breech births

together may also lift some of the disproportionate responsibility which participants described was placed upon professionals willing to support breech birth in the *development of competence* study (Walker et al., 2017c). And it may help to bridge the window of vulnerability identified in that study, in which maternity care professionals willing to attend breech births were seen as *specialists* before they felt fully confident to resolve the range of complications they may encounter, even before they had attended the approximately 10-13 breech births associated with the development of competence in the Delphi research.

In future research, transparent reporting of the model of breech mentorship provided, in addition to definitions of *experienced*, would help to contribute to a systematic review and analysis of outcomes associated with various definitions of training and organisational delivery models. Another useful direction for future research would be a prospective evaluation of implementation of a breech team, and breech training packages based upon respect for autonomy, building confidence and practice communities.

For example, Maier et al (2011) and García Adánez et al (2013) reported comparatively good neonatal outcomes, and each associated their success with the on-call system of senior mentors they use to deliver their services. This differs from most observational studies of breech outcomes, which focus on maternal and fetal qualities such as parity, type of breech presentation, or fetal weight, or institutional setting, such as annual birth rate or status as a tertiary referral centre, as predictive factors for perinatal outcomes. Empirical research has had little success associating these types of characteristics with improved perinatal outcomes. Stricter selection criteria for vaginal breech births has resulted in few vaginal breech births, but with no change in outcomes for the remaining vaginal breech births (Vlemmix et al., 2013). It is

plausible that characteristics of the service organisation or individual attendants are more significant safety factors, but this would need to be confirmed with research specifically designed to measure their impact. Implementation of innovative models of care delivery or training should include audit data to assess whether or how any perinatal outcomes have changed, including rates of vaginal breech birth and variety of maternal positioning at birth. It would also benefit from simultaneous qualitative research with maternity care professionals and managers involved in the implementation process, to identify barriers and facilitators.

This section has discussed breech teams as intentionally created communities of practice. As such, they foster continuity in relationships between professionals, and facilitate practice-based learning with colleagues who share a common interest. The purpose of this is to generate professional competence and confidence, which function to increase the availability and safety of physiological breech birth. The next section will continue to explore the importance of relational continuity as the underlying principle of organised breech care pathways.

7.1.3 Breech care pathways: affinity, visibility and relationship

The first section in this discussion explored how clinical experience guidelines could be used to guide the organisation of services and for counselling women within a relational model of care. The next section explored breech teams as intentionally catalysed and institutionally recognised local communities of practice, one of the key concepts in the *deliberate acquisition of physiological breech competence*, in order to foster learning and innovation in breech practice. This final section on practical applications will explore

recognisable breech care pathways as way of delivering services in a way that fosters affinity, visibility and relationship, the mechanisms associated with development and maintenance of skill and expertise in the *Expertise* paper.

Bhaskar writes (1997, p. 14), "In science there is a kind of dialectic in which a regularity is identified, a plausible explanation for it is invented, and the reality of the entities and processes postulated in the explanation is then checked." Thus he describes movement from classical empiricism, through model building into the imagined/imaginary, and then through empirical testing to the real. The imagined/imaginary are the plausible accounts which are constructed in research, which then go on to underpin further verification research. Bhaskar continues (1997, p. 18), "Moving towards a conception of science as concerned essentially with possibilities, and only derivatively with actualities, much attention is given to the analysis of such concepts as tendencies and powers." The *Expertise* paper postulated that affinity, visibility and relationship are mechanisms that develop and sustain breech skill and expertise. While plausible, this model must be verified by a transformation in the realm of the actual that activates these mechanisms. One way this may be achieved is through the development of a recognised breech care pathway.

A breech care pathway is an organised and institutionally recognised way of delivering breech services. Although individual features will vary between contexts, in institutional settings it generally involves: a specialist clinic, where antenatal counselling is provided to women with breech-presenting babies; a standard referral mechanism by which other maternity care providers refer to the service; and a pathway for providing the options of external cephalic version, vaginal breech birth and/or caesarean section delivery. In a specialist clinic, care is delivered by a small number of professionals who have acquired increased skill through exposure to increased volume. They also operate on a

model of relational continuity. Due to repeated interaction at the point of diagnosis, initial counselling, performance of external cephalic version if chosen, birth planning and attendance at vaginal breech births if chosen, women and their breech care providers have the opportunity to develop a trusting relationship. Due to consistent working relationships within a small team of specialists, professionals also have opportunities to develop trusting and familiar relationships with each other.

Specialist clinics have been associated with improved health outcomes, more efficient and consistent care, and less use of inpatient services (Gruen et al., 2003). The development of specialist clinics is also aligned with the development of specialist midwife roles, such as work with twins (Henry et al., 2015), diabetes (NHS Diabetes, 2010), mental health (RCM, 2015) and perineal care (Priddis et al., 2014; Shore, 2015). Mounting evidence supports the use of specialist clinics in obstetrics (Angood et al., 2010). A few locations have begun to explore their use in breech services (Hickland et al., 2017; Kidd et al., 2014; Marko et al., 2015; Pradhan et al., 2005). But research around expanded midwifery roles in these clinics has largely centred on the use of ultrasound and performance of external cephalic version (Taylor and Robson, 2003). Some research suggests one pitfall of limiting the scope of midwifery skill development to external cephalic version only is the potential that counselling emphasises the choice of external cephalic version (Say et al., 2013; Watts et al., 2016), and vaginal breech birth continues to be presented as a minority option.

Affinity

If affinity is a mechanism that tends to encourage the development of competence and expertise in physiological breech birth, one of two changes

need to take place in order to activate this mechanism. Either all maternity care professionals need to develop greater comfort and affinity for breech birth, or the delivery of breech care should be organised in such a way that it is provided by professionals who experience *love, joy and beauty* in their work with breech presentation wherever possible. In many maternity care systems without a specialist service, vaginal breech birth is viewed as an obstetric emergency, an accident to be avoided. Breech births are attended by the senior professional on duty, or whoever is present at the time in the case of a precipitous birth. When breech presentation is diagnosed antenatally, counselling is done by the woman's main care provider, or in a general obstetric antenatal clinic by whoever is on duty. Given the resistance reported in this thesis, as well as other qualitative research around breech (Catling et al., 2015), the systems described above do not consistently match affinity, a *liking*, for breech birth with counselling about birth options or breech births themselves. In a specialist breech clinic, care is provided by designated maternity care professionals who have chosen that role. Ensuring that these roles are filled by people who are comfortable with breech birth potentially increases women's access to balanced counselling and decision-making, recommended in guidelines and research (Catling et al., 2016; Impey et al., 2017), which in turn creates further opportunities to attend breech births and develop further competence and expertise within the maternity care team. When institutionalising specific roles supporting a breech care pathway, relational aspects with women and the wider maternity care team must be foregrounded to avoid the potential for developing expertise to function in an alienating manner.

Visibility

The previous section in this discussion explored how a breech team creates internal visibility within a maternity care system. A breech care pathway, with a clearly disseminated referral mechanism, does this as well. But it also creates external visibility, enabling referral and self-referral from outside the maternity system. Evidence indicates that many women transfer care in order to access the option of vaginal breech birth (Homer et al., 2015; Petrovska et al., 2016a), so external visibility of organised care pathways and breech clinics increases access for women. Their external visibility also provides a counter-point to the dominant tendency to promote caesarean section, including through the publication of audits and research. The *Expertise* paper reported that undertaking reflective activities such as service audit is one of the defining characteristics of specialist practice. It enables the service to learn about itself, and when disseminated enables learning throughout the professions.

Relationship

Throughout this thesis, I have used the expression *relational model of care* to emphasise the central importance of healthy, respectful and known relationships between professionals and between professionals. The terms *relational care* and *relational continuity* are also used in the literature (Noseworthy et al., 2013; Sandall et al., 2016a). The centrality of relationships is an important value within a *social model of care*, which is often contrasted with a *medical model of care* (Walsh and Newburn, 2002). Ample high-quality evidence exists to support midwifery continuity of carer for women at all risk levels (Sandall et al., 2016b). Results include reductions in preterm birth, stillbirth, epidural use and interventions during birth (Sandall et al., 2016b). Policy drivers such as the World Health Organisation (Requejo et al., 2012), the Quality Maternity and Newborn Care Framework (Renfrew et al., 2014)

and NHS England (King's Fund, 2017) increasingly emphasise the importance of midwifery continuity of carer in safe, effective maternity services. Less work has been done to explore issues of continuity in obstetric care. In another area of complex physiological birth, the critical importance of continuity of carer and high quality relationships has been highlighted in research about midwives' and obstetricians' experiences of supporting women planning a vaginal birth after caesarean section (Foureur et al., 2017). The research in this thesis suggests that enabling relational continuity in the design of breech services would potentially improve levels of skill and expertise, and enable greater access to the option of vaginal breech birth.

Midwifery-led continuity entails a consistent relationship between the woman and her midwife or small team of midwives, who also have relational continuity with each other. But describing what continuity in obstetric care means is challenging. At a basic level it is similar, entailing a relationship between the woman and her named obstetrician. But co-ordinating complex care necessarily involves multiple health professionals. Obstetricians often create plans for care which will be provided by or with others, for example midwives, obstetric nurses, anaesthetists and theatre practitioners, or other obstetricians. The ability to deliver individualised care inevitably depends on the quality and consistency of obstetricians' relationships with professional colleagues as well.

While antenatal continuity and consistency of care is important, intrapartum continuity is also important. Participants in the Delphi study reached a consensus that, "The introduction of strangers in the birth environment interferes with a woman's ability to give birth" (Walker et al., 2016b, p. 3). Known relationships also minimise the need to discuss risk in the birthing room, which is important because another of the consensus-based principles

of optimal physiological practice was to eliminate fear-based language in the birthing room. Flexibility, including some amount of on-call working, featured in the results of the *Deliberate development of competence* and *Expertise* studies. Strict continuity of carer and on-call working were not identified as essential features in either study, but relational continuity consistently appeared to underpin other features, such as confidence in thorough counselling, women's confidence to choose vaginal breech birth, and mentorship relationships.

Further research should explore women's experiences of care designed to promote physiological processes in breech birth, including aspects of physiology which can be maintained in caesarean deliveries, and the outcomes associated with innovative models of care provision. The role of continuity and of specialists, both midwifery and obstetric, should also be evaluated in the context of dedicated breech care pathways. Relationships and continuity within small specialist teams should be considered a relevant factor in the provision of high-quality care, and its effect on maternal/neonatal outcomes, professional resilience and the ability to innovate should be studied further.

Implementation of specialist and breech team member roles must always foreground the intention to develop *generative expertise*, that is, the kind of expertise that generates confidence and opportunity throughout the entire maternity care team. Any implementation should take steps to minimise the development of *alienating authority* by emphasising the role of specialists to support and involve others in the care they provide. Evaluations of breech services commonly focus on perinatal morbidity and mortality, and look to fetal and maternal characteristics for possible associations with increased or decreased risk. This research suggests that evaluations of breech services

should include relational aspects of care provision and ask questions that make these aspects visible. For example, women using the services could be asked if they felt pressured to choose one option over another. Colleagues who work in intrapartum care could be asked if they feel supported by specialists to acquire counselling and hands-on experience when the opportunity presents. Specialists could be asked if they feel the plans they put in place are supported by the wider maternity care team.

7.2 Gnōthi seuton

The name Delphi is derived from the Greek word *delphys*, meaning *uterus* or *womb*. In ancient Greece, the city was home to the Temple of Apollo, as well as the *Omphalos*, meaning *navel*, a religious artefact that symbolised their regard of Delphi as the centre, or navel, of the world. Within the temple sat the Oracle, revered for her ability to forecast the future, delivering ambiguous-at-best answers to the day's most vexing questions. As if to explain, the phrase *gnōthi seuton* was engraved within the temple's forecourt. Translation: *Know thyself*. The symbolism surrounding the oracle reminded truth-seekers that the birth of knowledge is the result of labour, beginning with self-reflection and reflexivity, deep navel-gazing. In that spirit, the overall project contained in this thesis could be understood as my best answers to the questions: *What am I? What am I doing? And what should I be doing?*

In 2012, when I began working with the Maternity Services Liaison Committee to establish a breech care pathway, I could find no suitable models to work from. I found external cephalic version clinics (Collins et al., 2007; Taylor and Robson, 2003), but no integrated clinics that also offered the option of vaginal breech birth. I had midwifery role models such as independent midwives Mary Cronk (Cronk, 1998a) and Jane Evans (Evans, 2007), who were attending vaginal breech births and sharing the skills through teaching (Abbott, 2005). But Cronk and Evans were working independently, and forging a pathway for breech care within the NHS system felt important to me and the women whose access I was seeking to facilitate. Within mainstream practice, midwives were expected to be able to attend breech births in an emergency, when care could not be handed over to an obstetrician, but a midwifery role in planned breech birth was controversial. I found no models to work from that included midwives in a dedicated breech care pathway incorporating all three

care options of external cephalic version, planned breech birth and planned caesarean section.

During that period, I had supportive managers who gave me protected time to work on the innovation I was proposing, but a job needed to be created, and that job needed a name. Within the hospital, we had specialist midwives working in areas such as mental health, diabetes and vulnerable women. This seemed a starting point, and my managers and I agreed on: *Breech Specialist Midwife*. This was a practical measure that fitted the culture we were working in, but it almost immediately proved controversial, for many of the same reasons that participants have raised in the research included in this thesis. I also wrote a job description along the lines of the innovation I had envisioned with feedback from the user representatives, but I could find no research or even professional literature to guide what we were creating. The need for such guidance shaped my research, which began with *Standards for competence for midwife practitioners of external cephalic version* (Walker et al., 2015a), and carried on with this doctoral thesis, which also began in 2012.

But in the beginning was the name that had not existed before: *Breech Specialist Midwife*. Philosopher Rorty (1990, p. 4) writes in his lecture on "Feminism and Pragmatism" of the way "new language" alters the logical space, revealing and disrupting otherwise invisible assumptions: "[A]ssumptions become visible as assumptions only if we can make the contradictories of those assumptions sound plausible. So injustices may not be perceived as injustices, even by those who suffer them, until somebody invents a previously unplayed role." The juxtaposition of *breech*, widely perceived as an abnormality, and *midwife*, the expert in normality, challenged both the assumption of abnormality and the boundaries of midwifery practice (Walker, 2012). Rorty continues: "One way to change instinctive emotional

reactions is to provide new language which will facilitate new reactions. By 'new language' I mean not just new words but also creative misuses of language – familiar words used in ways which initially sound crazy" (Rorty, 1990, p. 6). Feedback I received from sources as diverse as the Nursing and Midwifery Council, other midwives and a peer reviewer responding to a title page on a research paper, indicated that the invention of this previously unplayed role did provoke reactions, perhaps sounding crazy and presumptuous. But the questions remained: *What do you call a midwife who does what I am doing? And is this what a midwife who is called that should be doing?*

Identifying specific points where my understanding shifted as a result of the research is difficult. In retrospect, it feels like one big iterative process of gradual change. If I could go back and change one thing from my initial innovation, it would be to identify a breech team to work within, and to insist on an obstetric lead to work alongside. But it is in the nature of new innovations to make mistakes from which others may learn, and I did not know then what I know now that the research has been completed. My clinical understandings have also changed. For example, one of the consensus statements in the *Principles* paper has gradually accumulated increased importance in my practice and teaching: *In a physiological breech birth, a healthy, uncompromised baby moves in ways which assist his/her own birth* (Walker et al., 2016b, p. 3). Prior to undertaking this research, I would have said of course the baby participates in his/her own birth, but I did not understand what that meant and the implications of this participation in the way I do now. This statement has affected the way I view videos and listen to stories. It has directed my attention to patterns in breech births where complications have occurred, and the frequent association with fetal compromise, which appears to function as both a contributing cause and an

effect of complications. This in turn has changed the way I teach other health professionals to anticipate and respond to complications, taking fetal condition into account.

Undertaking this research has also helped me to understand and feel more confident in my own role, even though I am currently in academia and no longer have a specialist clinical position. For a long time, I felt considerable angst over the difficulty of combining academic and clinical roles, and worry that time spent teaching and writing meant less hands-on clinical opportunities. This worry came primarily from the fact that the role models I was following were all highly experienced clinical experts, having attended 100 or more breech births. My own experience of 15 births seemed paltry, and I cringed when someone described me as a *breech expert* on social media, even while intellectually I understood this as further evidence that professionals looked to individuals regarded as breech experts for leadership. After completing the mixed methods analysis of expertise, I now see how my additional research, evaluation and teaching skills contribute to my role as a *breech expert*, enabling me to help disseminate breech knowledge across various settings in the UK and internationally. The experience possessed by clinical experts is extremely valuable, but it comes from the perspective of one individual practitioner, which is subject to the limitations of that perspective. As physiological breech birth practice gains voice and momentum, ways of knowing which incorporate multiple perspectives are needed to synthesise, critique and explain the tacit and explicit knowledge of expert practitioners. And for the practice to grow and become safer, it must be theorised, researched and taught by professionals who have also developed advanced skills in these areas. Expertise is context dependent.

As I draw this reflective section to a close, I have to admit I am not certain that Breech Specialist Midwife is the right language to use. The language had a role in that moment, and it may be useful in some maternity care systems that already recognise other specialist midwifery roles. It may not work as well among, for example, networks of midwifery practitioners, who may also benefit from organised systems of mentorship structured differently from those used within institutions, or in practice environments that do not recognise a midwifery role in physiological breech birth. The crucial shift in thinking is less around a specific description of a role and more around the idea that recognising a protected role or roles for some professionals who support breech care across the rest of their maternity care team has the potential to increase access to and safety of vaginal breech birth. There is still so much more to learn about how this might look in various contexts. I know at least part of my role going forward is to look and listen for these variations.

7.3 Conclusion

With this thesis, I set out to understand how competence and expertise in physiological breech birth develop, in order to improve women's ability to access skilled support for this option. In this enquiry, physiological breech birth is viewed as an uncommon variation of normal birth (Cronk, 1998a; Walker, 2012), rather than an abnormality or emergency. Current evidence indicates skilled support for physiological breech birth is lacking in many areas, leaving many women feeling coerced into accepting a caesarean section delivery for their breech babies. Suppression of minority voices and systems designed around powerful and majority interests were identified as contributing factors. Being in a minority group renders the individual vulnerable to the oppression and cruelty of having their autonomy denied. No woman should ever be denied the human right to physical autonomy regardless of whether she is pregnant or positioned as a minority (Lokugamage and Pathberiya, 2017). To deny a woman her right to autonomy is a form of political violence, disempowerment and subjugation. The work in this thesis operates to expose the political nature of breech care by seeking to provide practice and research recommendations that can disturb the suspicious *status quo* of most contemporary breech care.

I set out to explore the problem with the specific intention of using multiple methods, enabling multiple voices, in order to understand the problem and potential solutions from the viewpoints of various stakeholders. My approach was underpinned by pragmatic aims and constructivist ways of knowing. But I also acknowledged that the things we know, while complex, shifting and continually negotiated, do have real effects on real outcomes for mothers and babies. A pervasive theme throughout each strand of the research was the fundamental importance of relationships – to learning, to access, and

ultimately to safety. This emphasis on relational continuity is in line with the Quality Maternity and Newborn Care Framework proposed in the Lancet Series on Midwifery, which also links midwife-led continuity models to safer care (Renfrew et al. 2014). Relationships humanise both care and learning.

The research presented in this thesis began with an integrative review of evaluated breech training strategies. The review reported no evidence linking any currently available breech training programme with improvements in perinatal outcomes for mothers or babies. While the available evidence was of poor quality and inconclusive, qualitative feedback indicated that the support of a mentor in practice may increase attendance at vaginal breech births following training, while teaching breech as part of an obstetric emergencies training course may reduce attendance at actual vaginal breech births. Very few studies considered the effect of mentorship in practice, and those including it did not evaluate its effect quantitatively. The other strands of this research emphasised the influence of supportive relationships on learning and practice changes. Together with the results of the review, this suggests that prospective evaluation of a specific plan for breech mentorship from experienced practitioners would be a useful direction for future research.

The next strand of research involved comparatively experienced obstetricians and midwives (>20 breech births and teaching experience), and two service user representatives in a Delphi panel survey designed to explore the meaning of competence and expertise from their perspective. The paper on *Standards* (Walker et al., 2016a) resulting from the Delphi process reported a number of consensus-based recommendations that have already proven useful in the development of a physiological breech birth training course (Walker et al., 2017b). But many of the consensus statements pertain again to relationships such as mentorship, apprenticeship, reflective opportunities, and

breech teams. The *Principles* paper (Walker et al., 2016b) complements this focus by reporting additional ways in which relationship-based principles facilitate or inhibit breech births. These include familiar faces in the birthing room, a calm presence, and ability to follow the mother's instinctive positioning, or alternatively, resistance to vaginal breech birth, affecting a mother's ability to birth and providers' ability to access hospital-based services. Each of these has as much potential to influence safety as estimated fetal weight. Unlike fetal weight, they are potentially modifiable through re-organisation of services to promote continuity of relationship, and education rooted in principles of maternal autonomy.

The third strand of research involved midwives and obstetricians who were more moderately experienced attending vaginal breech birth, or comparatively new to upright breech birth. This paper reported a model of how professionals deliberately developed competence to facilitate physiological breech births, often despite resistance in their local settings. Certain intrinsic characteristics were important, such as affinity for breech birth, openness and flexibility, and ability to develop critical awareness. But again, crucial to the success of their efforts were the relationships they developed with professionals regarded as breech experts, and communities of practice with other like-minded practitioners. These relationships helped them to acquire new skills and reflect on their own experiences, and in some cases led to the participants feeling ready to lead change in order to transform their local services. The paper demonstrates a need for services to support communities of practice in order to develop local breech skills.

The final strand of research pooled data sets from the Delphi and grounded theory studies to explore the nature of physiological breech expertise, blending the viewpoints of comparatively experienced practitioners and those

gaining experience or new skills. The interactive, comparative analysis helped to explain why a reductionist definition of expertise is difficult to achieve and not practically useful. Expertise is a complex combination of skill and knowledge, acquired through training, study and experience. But it is expressed through social roles and relationships, and cannot exist independently of these relationships. Expertise can potentially be developed, increased and more effectively utilised by focusing on the organisation and protection of these roles. The institution and development of breech specialists, working within a team, with a remit for increasing competence and confidence throughout the entire maternity care team, has potential to improve access and safety of breech services. Focusing on the quality of relationships in role definition and evaluation may help avoid the potential for specialists to be perceived as having alienating authority.

The discussion integrated the findings of these papers to make three recommendations for practice and research, concerning volume standards, breech teams and breech care pathways. Guideline numbers of births to achieve competence and expertise have been reported, but the research suggests that they have limited use for regulatory purposes. Volume standards are likely to be more useful to guide discussion and relationships, for example to contextualise the expertise available in woman-centred counselling, or to guide the length of supportive mentorship relationships, so that no practitioner is expected to take on sole responsibility before having acquired significant practical experience with supportive back-up. Breech teams were presented as one way of instituting a local community of practice to promote volume of experience, consistent relationships among breech practitioners, social learning, and a greater likelihood of vaginal breech births being attended by practitioners with expertise. Recognised breech care pathways were presented as another way to encourage affinity, visibility and

relationship, so that women with breech presenting babies are cared for more consistently by professionals who have a liking for breech birth, are identifiable and accessible, and are able to foster trusting relationships with women and colleagues.

Limited lifetime opportunities to attend breech births mean that social sharing and learning is all the more important to the development of breech skills. Professional relationships can be enabling or disabling, encouraging or blocking the development of breech skill. Rigid hierarchical structures and politics within contemporary maternity care influence these relationships, and these will need to be addressed in order to enable breech skills to thrive. The conclusion that good relationships are fundamental to learning and practice, and therefore the access and safety of breech birth, may seem like common sense when presented in this way. But many breech services are not designed in ways that promote trusting and familiar relationships between women and health professionals, nor between different professionals within maternity care teams. And most research focuses on easily measured, superficial characteristics of mothers and babies, rather than the complex web of relationships within which expertise to flexibly respond to these characteristics develops. Expertise is mediated by social relationships, and it is time to look more closely at the association between the quality of these relationships and the quality of health care.

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Appendices

Appendix 1: Related publications authored by the candidate

Walker S, Reading C, Silverwood-Cope O, Cochrane V (2017) Physiological breech birth: Evaluation of a training programme for birth professionals. *The Practising Midwife*. 20(2): 25-8. (Included in Appendix 2)

Fineberg A, Maher B, Walker S (2016) *Upright vaginal breech birth*, film presented at the *Annual Clinical and Scientific Meeting of the American Congress of Obstetricians and Gynaecologists*, Washington DC, 14 May 2016.

Walker S, Cochrane V (2015) Unexpected breech: what can midwives do? *The Practising Midwife*, 18(10): 26-29.

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Walker S (2012) Breech birth: an unusual normal. *The Practising Midwife* 15(3):18,20–1.

Appendix 2: Physiological breech birth training programme evaluation

This appendix contains the author version of a published evaluation of physiological breech birth training, based on the results of the research contained in this thesis. The evaluation was designed based upon the methods used in the studies included in the integrative review of breech training methods, reported above, to enable comparison with a similar level of evidence.

Reference

Walker S, Reading C, Siverwood-Cope O, Cochrane V (2017) Physiological breech birth: Evaluation of a training programme for birth professionals. *The Practising Midwife* 20(2):25–28.

Abstract

Objective: To evaluate an evidence-based training package for teaching physiological breech birth skills to health care professionals.

Design: Mixed methods before-and-after survey-based evaluation.

Setting: Four National Health Service hospitals, in the north and south of England.

Sample: 106 participants, mostly midwives, attended the training and completed a pre-training evaluation survey. 80 completed the post-training evaluation surveys.

Methods: All those attending training were asked to complete either an on-line or paper-based survey prior to training, containing a mixture of open-ended and multiple-choice questions, and ratings scales. Following the training, participants were invited to repeat the survey. Answer data was analysed descriptively.

Results: The training addressed the concerns of the participants, and rated highly (6.69/7) in expected usefulness for practice. Significant improvements in self-reported confidence and objectively assessed knowledge were observed. Participants found discussions and hands-on practice accompanying videos helpful, and reported concerns about lack of support and involvement of obstetric colleagues both before and after training.

Conclusion: The Breech Birth Network Physiological Breech Birth training package is an effectively designed programme for introducing physiological breech practice to health care professionals in a way which can be replicated.

Background

This paper reports evaluation results for Physiological Breech Birth (PBB) study days, provided by Breech Birth Network (BBN). A physiological breech birth is one which occurs entirely spontaneously, due to the efforts of the mother and baby, and the effects of gravity. The focus of professional care is on supporting optimal physiology, recognising deviation from normal requiring assistance and intervening only when such deviation occurs. No routine interventions are used, although assisting in a timely manner when required is a key skill, which the training seeks to develop. Physiological breech births also often involve upright maternal positioning. Therefore the methods taught in BBN PBB study days differ significantly from those taught in training programmes based on the use of supine maternal birth position.

Physiological breech birth strategies have been advocated for some time by both midwives and obstetricians (Banks, 1998; Cronk, 1998a; Dresner-Barnes and Bodle, 2014; Evans, 2012; Krause, 2007), and women still desire the option of birthing their breech babies vaginally (Homer et al., 2015; Powell et al., 2015; Sanders and Lamb, 2015). However, until recently, evidence to support the safety of such methods was lacking. Bogner et al's (2015) study first suggested that use of hand-knees position had no clinical consequences for neonates, and may be associated with a significant reduction in perineal trauma for mothers, as well as a high (>60%) spontaneous birth rate. And Louwen et al's (2017) study our of Frankfurt has also confirmed in much larger numbers that the practice is safe and offers some advantages.

Structure of the training

The BBN PBB study days have been provided in a similar format for health professionals since March 2013 (Davis, 2013; Plested, 2013). The delivery of the training has been refined through evaluation feedback in previous iterations, introduction of new learning technologies, and the involvement of local teams to ensure the study days meet local needs. The facilitators for these days were all practising midwives with significant breech experience and/or experience of teaching breech skills within their National Health Services organisations, with the exception of one midwife who took an administrative role. The content and structure have been increasingly driven by the first author's concurrent research into how professionals understand and learn breech skills (Walker et al., 2016a, 2016b). Although this evaluation focuses on the one-day, face-to-face training day, participants also had access to an on-line learning platform providing secure access to the videos and materials, to enable continued learning and dissemination to other colleagues following the training. Table 12 summarises the structure of BBN PBB study days.

Evaluation methods

Evaluation data was collected from four study days occurring within United Kingdom (UK) National Health Service (NHS) Trust Hospitals, from March – July, 2016, in the following locations: Canterbury, London, Portsmouth and Preston. The study days were evaluated using pre- and post-training surveys, containing a variety of questions. The questions were of mixed types, including open-ended, multiple choice and ratings scales, as described below.

Table 12: *Learning activities based on consensus research*

Learning activity in Breech Birth Network Physiological Breech Birth training	***Associated consensus statement / recommendation in Walker et al 2016a or 2016b***
Introduction to principles of physiological breech practice	The primary purpose of upright breech birth is to optimise physiology, e.g. facilitate the mother's ability to birth her baby with maximum efficiency. A healthy, uncompromised baby moves in ways which assist his/her own birth. A calm, quiet, warm environment enhances a woman's ability to give birth.
Research update	*Key skill*: Facilitating an informed consent discussion that demonstrates respect for maternal intelligence and autonomy, while being realistic about the inability to guarantee a perfect outcome.
Lectures on 'Normal for Breech' and 'Complicated Breech Birth,' including photographic and video examples	Breech training should include theoretical instruction on anatomy, physiology, mechanisms and manoeuvres.
Individual / small group recreation of mechanisms and manoeuvres with doll & pelvis during theoretical presentations	Breech training should include hands-on simulation and watching breech videos.
"Save the baby" – simulating resolution of a complicated breech birth alongside a real-life video of that complication occurring	*Assessment skills*: optimal and delayed progress specific to breech labours; determine whether infant is coming freely or is stuck by the signs of the infant part that is visible; identification of the level of pelvis where head entrapment has occurred. *Performance of manoeuvres*: rotational manoeuvres for the arms; moving infant's body to mum's body; sweeping down the arms; assisting rotation of the fetal back to anterior; manual flexing of the head; sub-clavicular pressure to flex the head
Presentation of Models of Care, providing examples of successful implementation, and including opportunity for discussion with colleagues and facilitators	A 'specialist' vaginal breech team in every labour setting. The role of 'specialists' is to mentor and support breech skill development throughout the entire maternity care team.

Two sets of pre- and post-training surveys were administered on paper, immediately before and immediately after the training. The other two sets of surveys were administered using the Feedback Tool in the Moodle-based on-line learning platform associated with the training, known as the Virtual On-line Community of Practice (VCOP). These participants had access to the Moodle space from two weeks ahead of training. Although they were encouraged to complete the surveys during the final training activity, surveys were completed throughout the two weeks following training.

Overall, 106 participants completed the pre-training survey and 80 completed the post-training survey (75%). Almost all of the attrition came from the locations where on-line surveys were used. However, the written surveys contained a few instances where a question was left blank, or two numbers on the rating scale were circled instead of one; this was not possible on the on-line survey. On the few occasions where this occurred, the average of the two numbers was used, and means were calculated with a denominator reflecting the total number of answers received.

Surveys were anonymous. Each co-author helped to administer and collect the surveys. Following completion, hand-filled surveys were entered into an Microsoft® Excel programme spreadsheet. Answers obtained through the VCOP were exported into an Excel spreadsheet, and the results from the four study days were amalgamated. Quantitative data was analysed within the spreadsheet using sum and average functions. Qualitative data was analysed by identifying the most recurrent themes among the answers for each question. Completely anonymised spreadsheet files were stored within a shared Dropbox folder, to enable each co-author to verify the data. Paper versions of the surveys were stored in a locked filing cabinet within the first author's home, registered with the UK Information Commissioner's Office for

the purposes of Data Protection. As this was a training evaluation and not research, NHS ethics committee approval was required.

Results

Participants' background and motivations

Participants' professional roles were: midwife (97), obstetric registrar (1), senior house officer (1), student midwife (6), doula (1). The professionals' years in practice ranged from 1-36, with a median of 9. The doula was employed by the NHS Trust hosting the training. Although not asked about their specific roles within midwifery, 11 participants indicated in their reasons for attending that they worked in community settings where they would be required to be the lead professional in an undiagnosed breech birth, and 4 indicated that they held a role as a clinical educator. The participants had previously attended a variety of training programmes either focusing on or including vaginal breech birth, as reflected in Figure 9.

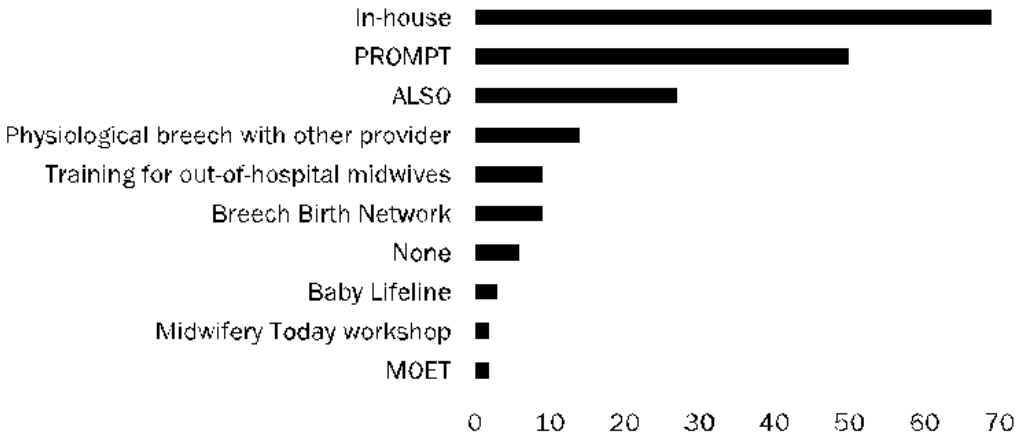

Figure 9: *Previous training experience of participants in physiological breech training*

When asked the total number of breech births attended in their careers, participants stated a range of 0-75, with a median of 3. The median number of breech births attended as the lead professional was 0, with a range of 0-10. Collectively, the participants had attended 50 breech births in the previous year (range 0-3). Although their overall experience was low, responses suggested that 21 (20%) of those attending the training had been the lead professional at a vaginal breech birth within the previous year.

Participants identified four main reasons for attending the BBN PBB study day, in an open-answer question. These were: extending current knowledge and skills (55), increasing confidence (48), general professional development/updating (25) and the desire to better support women's informed decision-making and the option of vaginal breech birth within their local practice setting (20). When asked in another open-ended question to identify their biggest concerns prior to the study days, participants identified the following four main concerns: delay in delivery of the head / head entrapment (44), lack of experience / confidence in themselves and among the wider maternity care team (18), adverse outcome for baby and/or mother (16), and lack of collaboration and support from obstetric colleagues (12).

Value of the training

Participants were asked if the BBN PBB study day addressed the concerns they had prior to the training, with the option of answering Yes or No. Seventy-seven (77) participants answered Yes (96%), and 3 participants answered No (4%). They were also asked to rate how useful they felt the training would be in their practice, using a 7-point rating scale, ranging from 1=not at all useful to 7=very useful. The mean response was 6.69, with a range from 4-7.

Change in confidence

Confidence was measured on a 7-point rating scale, ranging from 1=not at all confident to 7=very confident. Participants were asked to rate their confidence to manage a supine breech delivery, and their confidence to facilitate an upright breech birth, before and after training. Confidence increased significantly in both areas. Confidence to manage a supine delivery changed from a mean of 2.99 before training to 4.51 following training. Confidence to facilitate an upright breech birth changed from a mean of 3.16 before training to 5.31 following training.

Change in knowledge

Change in knowledge was evaluated with two questions. The first, a multiple choice question (MCQ), asked participants to identify the direction of the fetal sacrum as the breech descends through the maternal pelvis: anterior (to the maternal front), transverse (to the maternal side), or posterior (to the maternal back). In BBN PPB training, knowledge of the optimal mechanisms of breech birth (Frye, 2013) underpins clinical decision-making around whether the birth is unfolding normally, or intervention is required. The fetal sacrum is normally (>50% of the time) in a transverse position during engagement and descent of the breech through the maternal pelvis, much like the occiput in an optimal cephalic birth. Rotation to a sacral-anterior position normally occurs with engagement of the fetal shoulders, and failure to completely rotate signals the need for intervention to deliver the fetal arms. Therefore, this question addresses knowledge of the breech mechanisms as a dynamic and clinically significant process, which is one of the unique features of this training.

Prior to training, a majority of participants felt that the fetal sacrum was normally in an anterior position during descent through the maternal pelvis, followed by transverse, and posterior. Following training, the majority identified the correct answer as transverse, followed by anterior, and no participants thought the fetal sacrum was normally posterior during descent. This change is represented in Figure 10.

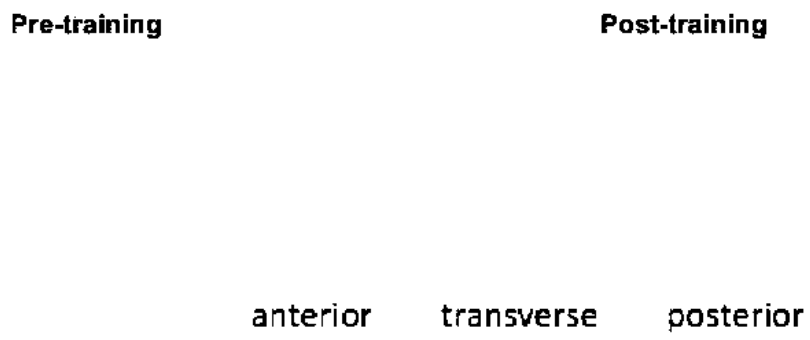

Figure 10: *Change in understanding of the normal mechanisms of breech*

The survey also evaluated change in knowledge about assisting delayed engagement of the aftercoming fetal head, where the fetal head is in an extended position at the inlet to the maternal pelvis, in order to demonstrated knowledge of the different levels of the pelvis at which head entrapment can occur (Walker et al., 2016b). In the pre- and post-training surveys, participants were asked how they would manage this complication in an open-ended question. Correct answers followed the current Royal College of Obstetricians Guideline (RCOG, 2006) and demonstrated knowledge that the head would need to be manually flexed, and if necessary elevated off the pelvic inlet and rotated to assist engagement in the maternal pelvis. In the analysis process, answers were awarded 1 point if the answer included head flexion, and 1

point if the answer demonstrated knowledge of the possibility that the fetal head may need to be elevated and rotated in order to assist entry into the maternal pelvis. If this question was left blank, or the answer included something which would introduce additional danger to the fetus, 1 point was deducted.

In the pre-survey, the total score for the 106 participants was 31 (mean 0.29), including 60 points for identifying the need for manual flexion of the head, and 6 points for identifying the possible need to elevate and/or rotate. However, 35 points were deducted, due to answering unsure / no answer, suggesting that the woman assume a knees-chest position (which would further extend a head impacted at the inlet), or suggesting that the baby be left to 'hang' while awaiting maternal effort. In the post-training survey, the total score for 80 respondents was 95 (mean 1.19). This included 44 points for describing manual head flexion manoeuvres, and 61 points for identifying the possible need to elevate and/or rotate. 10 points were deducted for answers suggesting changing the woman's position to hands/knees from supine was an appropriate management strategy at this time: "Put the woman into all fours to extend the pelvic outlet." While the BBN PBB training package does emphasise the utility of spontaneous and judiciously guided maternal position changes at the early signs of slow progress, a change from supine to upright with the fetal head extended and possibly impacted at the pelvic inlet could expose the infant to cervical spine or nerve damage. This result has prompted greater clarity around the use of maternal position changes within the training. However, results for this aspect of the evaluation indicate a significant improvement in knowledge of head entrapment at the inlet to the pelvis, and understanding of safe and effective manoeuvres to resolve this complication, with a change in mean score from 0.29 to 1.19 before and after training.

Feedback

Participants were asked what they liked the most about the study days in an open-ended question. The most common reported answers were: Videos (27), storytelling and reflective discussions (27), hands-on activities and scenarios (25), the practical and realistic approach (13), the description of the mechanism and physiology (13), new manoeuvres (8) and the mix of teaching styles (6). Included in the hands-on scenarios, several commented on a unique activity used in this training programme. In the 'Save the baby!' activity, participants watch a video of a complicated breech birth and simultaneously identify and resolve the specific complication on a mannequin or doll and pelvis set, with the suggestions and assistance of their colleagues where appropriate. Commenting generally, a few participants liked about the approach, "that it taught mechanisms and principles and promoted understanding in order to work out appropriate solutions where required rather than teaching set methods."

Participants were asked what could be improved in future study days, in an open-ended question. The most common reported answers were: More organised group work (12), involvement of obstetric colleagues (6), information to share with women / counselling scenario (4), more about breech clinics / pathways / implementation (3), and longer / more time (3). Feedback on the group work has prompted the initiation of an 'away day' for those involved in training to better prepare for both the programme delivery and management of the day's movements.

Discussion

This is the first published evaluation of a training programme designed to increase competence and confidence in the facilitation of physiological breech birth. The results indicate the programme addressed the concerns participants, mostly midwives, had prior to the training. Participants generally felt the training would be highly useful to their clinical practice. The evaluation survey results also indicated the training achieved an observable change in knowledge in two key areas, identified by previous consensus research (Walker et al., 2016a): the normal mechanisms of breech birth, and the ability to choose an appropriate intervention based upon understanding the level of the pelvis at which head entrapment has occurred.

The evaluation results indicate a clear change in confidence following the BBN PBB training, which is reassuring given that increased confidence was one of the most frequently cited reasons for attending the training. Moreover, the results indicate an increase in confidence to both manage a lithotomy delivery, as well as facilitate an upright breech birth. Critics of introducing physiological approaches have expressed wariness of deviating from methods with which most practitioners are familiar (RCOG, 2006). However, the clear explanations of anatomy, physiology, mechanisms and manoeuvres which underpin the BBN PBB approach to training appear to increase participants' confidence to assist women in both upright and lithotomy positions. This balance allows for choice of maternal position as the evidence-based standard of care for all physiological births (NICE, 2014), and the possibility that in some breech births use of lithotomy positioning may be clinically indicated. Although a minority of participants in this series of training days were medical professionals, such a results suggests that the training would be useful and acceptable to obstetricians as well as midwives.

This evaluation, demonstrating changes in confidence and knowledge around physiological breech birth in the BBN training programme, reflects similar or better outcomes than evaluation studies conducted for other breech training programmes. In Crofts et al's evaluation of multi-professional emergency training, based on the PROMPT programme (Crofts et al., 2007; Winter et al., 2012), breech was the only portion of the programme evaluation in which a significant change in knowledge was not demonstrated. This was also true for one evaluation of the MOET course (R. B. Johanson et al., 2002), although others reflected improvement in knowledge (R. Johanson et al., 2002). An evaluation of the ALSO programme in Australia found sustained increases in self-assessed knowledge and confidence 6 weeks after the training (Walker et al., 2013), among midwives and doctors. Some programmes have reported increases in knowledge without concurrent increases in confidence (Jordan et al., 2015), while others have reported increases in confidence without concurrent increases in objectively measured knowledge (Thornburg et al., 2014).

However, the gold standard for evaluating a training programme designed to improve the safety of breech birth is one which includes neonatal and maternal outcome measures. No breech training programme known to the authors has associated improved outcomes with breech training (systematic review currently in peer review). PROMPT training, the most popular external training programme reported by participants, is used widely throughout the United Kingdom (Winter et al., 2012). This is in part because it is one of the few training programmes to demonstrate a change in outcomes, particularly a reduction in neonatal seizures, following training (Draycott et al., 2006). However, their outcome study excluded non-cephalic births, so does not provide evidence relevant to the breech segment of PROMPT training.

Thorough evaluation of outcomes following training is the next stage in this programme evaluation.

One of the weaknesses in this evaluation is that the participants were predominantly midwives, which does not reflect the balance of multi-professional team working within global maternity care. The hosts for each of the training days made concerted efforts to engage obstetric colleagues to achieve team training, but they were unsuccessful securing their involvement. This lack of collaboration was identified as a concern among participants, both before and after the study day. Effective and genuine teamwork, understanding and communication have significant impacts on safety outcomes in health care (West and Lyubovnikova, 2013). Training almost exclusively midwives may have some impact on safety on the rare occasions that a midwife needs to facilitate an unanticipated breech birth in a community setting. But without collaboration, support and common technical language between the multi-professional team, no training, no matter the quality, will improve the overall safety of vaginal breech birth for women and professionals. The evidence now exists that physiological breech birth is at least as safe as supine breech birth, and that at least one training programme can effectively teach the skills required to support it. Midwives now need their obstetric colleagues to come to the table and enter the conversation about the way forward.

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Appendix 3: Anonymised peer review

Because this is a doctorate by publication, peer review has had substantial influence on processes of reflection and revision during the writing of these papers. Below is a sample of peer review received from the initial two journals to which the *Standards of Competence* paper was submitted.

Journal #1

Editor 1: Study of breech standards for delivery with Delphi survey of experts. 2/3 positive but unenthusiastic reviews; nothing special nor major potential for citations so I am leaning towards rejection.

Editor 2: I would favour rejection. The panel is underpowered - "A panel of thirteen obstetricians, thirteen midwives and two user".
HTA Consensus development methods review indicate while the exact number of participants are not known approximately 28-32 are required for each participant group (plus 20% to account for attrition).
They also have not included two important groups - neonatologists and anaesthetists.
Patients are hugely under-represented within the sample.

Editor 3: Breech vaginal delivery--alone gives me angina
Breech vaginal delivery in standing position--give MI.

Unless there is RCT on benefits of delivering in standing position, would not even read the results of Delphi in [this journal]!

Please reject.

Editor 4: I do not know of many Obstetricians/midwives who will support vaginal breech delivery in upright position. Consequently, interest is pretty limited amongst our readership. I wiuld also support rejection.

Editor 5: I enjoy arguing about breech births - we offer them as an option in well selected and counseled cases. However, this paper is non-informative, contains no evidence, promotes a technique with almost no data to support it and is poorly executed with regard to the Delphi. Reject for me.

Editor 6: The group of experts selected were made up of those who perform and teach VBB so not a representative sample of clinicians performing breech delivery. The group did not include clinicians who are experts in all the relevant outcomes eg. neonatologists, lawyers, health economists. The study is underpowered. I suggest we reject.

Referee/Statistician #1 (Originality - Required):

Most of the literature on breech delivery is focused on responding to the question about which is the most appropriate delivery route.

While the approach is original, the theme focuses on a survey of opnion about managing breech, widely reported in the literature.

Referee/Statistician #1 (Scientific Merit - Required):

The work is a survey of experts in the breech to give his opinion on the management of breech. Scientific merit is scarce.

Referee/Statistician #1 (Clinical Importance - Required):

The study has little clinical application.

Referee/Statistician #1 (Title and Keywords - Required):

The manuscript is well written

Referee/Statistician #2 (Originality - Required):

This paper covers an interesting topic of vaginal breech birth utilising the experience of a range of practitioners through the Delphi process to guide future training in the skills required for this delivery.

Some interesting consensus statements on skills were reported (eg. "sub-clavicular pressure and bringing the shoulders forward to flex an extended head") which many current practitioners may not be aware of. Although the vast majority are already employed on obstetric skills training courses or accepted in routine practice, there is some value in bringing them together to promote discussion/raise awareness and direct further training.

Referee/Statistician #2 (Scientific Merit - Required):

The manuscript provides a good description of the Delphi process utilised. However, it would benefit form a flow diagram detailing the stages involved including the number of participants and questions/statements at each stage.

There is a reasonable number of practitioners included in the panel from the obstetric and midwifery groups as well as user representatives. The experience of the panel members appears to be high although it should be noted that this is self-declared and not necessarily externally confirmed.

The methods used to recruit the participants use a good range of techniques to ensure wide sampling. However, there appears to be only one UK Obstetrician on the panel and as many of the recommendations have been made for the UK practice this needs to be reflected upon in the limitations.

More detail is required regarding the process and stages of thematic analysis employed. In particular, there is currently little reference to the coding process, the development of themes, the qualitative researchers involved (and their experience) and degree of agreement between them. This needs expanding upon in the methodology section.

A reasonable attempt to discuss the study's findings with the existing published literature has been made.

Referee/Statistician #2 (Clinical Importance - Required):

Vaginal breech birth and the training of this technique is an important clinical area within the speciality. This paper details an interesting consensus technique to raise awareness of the skills required for vaginal breech birth which could form the basis of training courses/programmes.

Referee/Statistician #2 (Title and Keywords - Required):

Keywords
? include 'vaginal breech birth', 'training'
? relevance of 'head entrapment'as there is minimal reference to this in the paper

Referee/Statistician #2 (Remarks for the Author):

There is a tendency to a commentary regarding the area around the research and the benefits/use of methods employed in the methods section rather than a clear description of what the authors did in this study (eg lines 135-142 and lines 149-152). Much of this would be better included in the discussion section to explore and justify the Delphi methods used.

The statement at the end of the discussion is rather strongly worded and inflammatory. In the current NHS climate with financial, workload and staffing pressures, it may not be possible for all maternity units to provide dedicated skilled vaginal birth teams providing 24 hour cover however much they wish this to be the case. To suggest that the inability to provide this is coercive towards a caesarean policy or clinically negligent is unfair and likely to alienate many readers and detract from an otherwise reasonable recommendation regarding increased training.

Referee/Statistician #3 (Originality - Required):

This paper addresses the issue of appropriate standards in training and competence that obstetricians and midwives should have for conducting a vaginal breech delivery. Score = α

Referee/Statistician #3 (Scientific Merit - Required):

The main methodological approach used by the authors was a Delphi process of 28 participants comprising 13 obstetricians, 13 midwives and 2 lay

members.
The Delphi approach used was appropriate and correctly undertaken as far as I could tell.

However:
1. There was no discussion of the representative nature of the two groups of health professionals. 135 were initially approached before the final group of 26 (plus the two lay members) were chosen. Could they have been a biased sample? There was no discussion of this.

2. For some reason after the first round of the Delphi process, the participants were informed of who the other participants were. I am not sure why that was done. Whilst it is unlikely that communication took place between what I assume were busy health professionals, nevertheless, there was a chance of this happening and a potential for discussion of responses before they were formally made. There was no discussion of this possibility.

3. My main criticism of the paper is that the authors have introduced the issue of management of a vaginal breech delivery in the upright position as the basis of their research. However, the great majority of the conclusions they reach in terms of standards of training and competence for health professionals conducting a vaginal breech delivery could apply to a delivery conducted in the lithotomy OR the upright position.

4. There is no discussion of the evidence of the benefits and risks of breech delivery in the lithotomy or upright positions which I was expecting. Though given than the issue of position for delivery is largely irrelevant to the paper about appropriate competencies maybe that is not surprising.

5. There is no discussion of the evidence for individual competencies. For example, skill at performing certain manoevres is recommended but what is the evidence that these are appropriate? In other words we end up with a list of opinions which are shared by 26 health care professionals. In obstetrics we are aware how strongly held views about management have been shown to be wrong when subjected to critical scientific examination.

6. A relatively minor editorial point is that Tables 2 & 3 need to have some entry to indicate that t3rd he 2nd and columns indicate Likert Scores.

In summary, more work is needed to focus on the competencies for vaginal birth delivery (irrespective of method).
Score = γ

Referee/Statistician #3 (Clinical Importance - Required):

A paper reporting the opinions about the standards requred for training and competence in conducting a vaginal breech delivery is of modest interest.
Score = β

Referee/Statistician #3 (Title and Keywords - Required):

Ironically, the keywords correctly reflect the content of the paper. However, the title incorrectly implies that the aim is to report standards for the conduct of vaginal breech birth in the upright position. Whereas the paper could equally apply to the conduct of all vaginal breech births. Score = β

Journal #2

REVIEWER COMMENTS:

Reviewer #1: This is a study from the UK in which the authors attempted to develop guidelines on vaginal breech delivery using the Delphi survey technique, by circulating a series of questions / statements to a large number of experienced clinicians, and then re-circulating the document on two further occasions to come to final consensus.

I have the following observations on this study:
1) What is an upright breech delivery? I doubt very much whether most readers of [this journal] would be familiar with this term. Perhaps this is something unique to the UK?

2) The authors make the strange conclusion / statement that all health professionals should maintain basic competence to assist in unanticipated vaginal breech births. Yet they do not back-up this statement with any evidence as to why clinicians "should" do this? In most developed countries, where >95% CS rates for singleton breeches are common, there will be far too few vaginal breech opportunities for any significant training of obstetricians / midwives. This strikes me as a somewhat academic "ivory tower" statement, which will not reflect the reality on the ground with contemporary obstetrics.

3) Given that recruitment of professionals to participate in the survey technique was actively recruited and required individuals to volunteer or want to submit to this process, it is highly likely that bias would be possible. For clinicians who do not believe in the safety of vaginal breech, it is likely that they would not agree to participate. While others who would voluntarily participate may in fact have an agenda?

Reviewer #2: The present article deals with an already well-studied issue. Breech vaginal delivery has been extensively demonstrated as disadvantageous to the fetus, compared to elective cesarean.

It is commendable that authors tried to achieve a wide consensus on the best modality of assistance for breech vaginal delivery, through a panel of experts in this field.

However, the level of recommendation provided does not seem to be evidence-based, and some of the advice provided (e.g. avoidance of cardiotochographic monitoring during labor) appear more opinions rather than

scientific evidence.

Reviewer #3:
1. This paper attempts to achieve a consensus around VBB using the Delphi method. This methodology may be unfamiliar to many readers and should be described better in the introduction. Importantly, what advantage does this method have over other methods currently in use by ACOG, SMFM, NICE etc. when developing guidelines for the practitioner.

2. An important element to the Delphi appraoach is the expertise of the participants. The process of choosing the participants is poorly described and it is unclear what expertise they bring to the project beyond their experience. What is the quality of the literature reviewed or what level of "conference participation" was needed to qualify as an expert?.

3. Is this paper about VBB or championing the physiological birth movement? One of the weaknesses of the Delphi technique is the lack of focus on the topic under consideration. Concentrating on VBB would be welcome.

4. I'm not sure upright maternal positioning, electronic fetal heart rate monitoring or delayed cord clamping are specific to this topic. They really don't add much to this paper(see point#3). It is hard to tell if the authors are more interested in establishing guidelines for non intervention in normal labor or giving us specific guidelines for breech delivery.

5. Nothing is said about the location of birth, hospital versus home. Certainly this impacts outcome. The experienced practioner is humble enough to know that although rare, when things go bad in a breech delivery, help is needed, and fast!!

Reviewer #4: This article concerns the development of standards for those who will attend a breech birth, based on expert consensus. A major criterion for selection of experts was their experience with breech birth in the upright position. I am not sure how this affected the selection of experts from other countries, but the effect in the US was that all but one of the US experts were, apparently, practicing home births. The conclusion is that the methods used by these persons are not likely applicable to any MD training program of which I am aware. Similarly, although the authors recommend an institutional "breech squad", their US contributors are explicitly non-institutional, making this recommendation moot.

Finally, although these persons are self-described experts, there is no discussion about whether their expertise increases the safety of breech delivery in (specifically) their hands. I would value more the expert advice of those performing breech delivery more
safely than others, not just more frequently, and I am not completely reassured by the statement that self-designated experts are better breech practitioners.