Exploring the effects of second stage management from the maternal and midwifery perspectives: are there any benefits to directing women?

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ORIGINAL

Background: The management of second stage varies considerably, with directed pushing, by recourse to the Valsalva technique or a variation of this, being frequently utilised as a replacement for progression through spontaneous maternal effort. The evidence for directed management versus spontaneous is unclear.

Objectives: This review aims to consider the effects of directed pushing on maternal perspectives of second stage management and to assess midwives' attitudes in relation to this in direct comparison to how spontaneous pushing affects the above measures. The effects on maternal and fetal outcomes of such practice are also evaluated.

Search methods: The electronic databases MIDIRS Research Database, CINAHL, Wiley Online, Cochrane Library, PubMed, NHS Evidence and Google Scholar were searched. Additionally a reference list and author and hand searches were completed. No restrictions were placed on parity, age or gestation of the women although all selected studies comprised women of 37–42 weeks' gestation. English language studies only were accessed. Epidural usage was excluded.

Selection criteria and data collection: Randomised controlled trials (RCTs) and non-randomised qualitative literature were accessed to gain statistically comparative data and understanding of maternal perspectives and midwifery practice and attitudes. Outcome measures relating to maternal perspectives, midwives' behaviours, length of second stage, mode of delivery, APGAR score, cord blood pH and base excess and perineal trauma were assessed.

Main results: Eleven studies were included. One study observed a statistically significant increase in length of second stage with spontaneous pushing ($t = 3.455$, $p < 0.002$), another study contradicted this finding it to be shorter with spontaneous effort ($t = 2.028$, $p < 0.05$). Two studies demonstrated a reduction in instrumental deliveries with spontaneous pushing. No other statistically significant differences were discovered in maternal outcomes. One study found a statistically significant increased risk of fetal acidosis related to Valsalva pushing ($r = 0.040$, $p = 0.020$). Maternal satisfaction was demonstrated to be increased by midwifery support of spontaneous effort; disempowerment was observed when unsolicited direction was given. Midwives felt they provided such support (82.4%); observation of practice supported this in one study but contradicted this in two studies.

Conclusion: The evidence of this review does not support the practice of directed pushing, as it does not appear to confer any tangible benefits to mother or infant and has a negative effect on the autonomy of women. The evidence is limited and recommendations are made for further research. At present, the practice should be discouraged and women should be supported to choose their own method.

The care givers involved include midwives and nurse-midwives dependent on geographical location of the study; for the purposes of clarity in this review they are categorised as midwives.

Background

Directed pushing is defined as the care provider instructing the woman on how and when to push, usually by recourse to the 'Valsalva manoeuvre' using breath-holding and pushing against a closed glottis in order to forcefully expel the fetus, customarily pushing for the full duration of the contraction (Fraser & Cooper 2009, Vanderlaan 2015). Spontaneous pushing involves the woman instinctively bearing down when she feels the physiological urge and breathing as she needs, typically encompassing several small pushes, for part of the contraction and not necessarily with every contraction (Fraser & Cooper 2009, Vanderlaan 2015). Direction usually occurs during the second stage of labour (from full dilatation to birth), however may occur during the first stage in certain circumstances for example with an early pushing urge (Downe *et al* 2008).

Historical research (Rushmer 1947) recognised the detrimental effects of the Valsalva technique and countless studies have since provided further data to this effect. Despite decades passing since this research, and both the World Health Organization and the National Institute for Health and Care Excellence outlawing directed pushing (WHO 1996, NICE 2014), Peterson & Besuner (1997) found 45.5% of midwives still directed women, largely relating to ever increasing medical interventions following the *Peel report* (Department of Health and Social Security Office, Central Health Services Council, Standing Maternity and Midwifery Advisory Committee 1970). Growing pressure from feminist writers (Byrom & Downe 2005, Perez-Botella & Downe 2006, Reed 2015) and groups such as the National Childbirth Trust (Dodwell & Newburn 2010) prompted more women to question the practice, but anecdotal evidence suggests it still remains in popular use today (StudentMidwife.NET 2015), with Reed (2015) citing it as the '*cultural norm*' within maternity units.

Numerous reasons are given for this intervention including, but not limited to, concern for fetal or maternal well-being, poor maternal effort, perceived lack of maternal knowledge and shortening of the second stage (Lemos *et al* 2015, Reed 2015).

This review will assess the evidence to determine the impact of directed pushing on women's and midwives' experiences, seeking to inform evidence-based second-stage management to the benefit of mother and baby. The impact on maternal and fetal outcomes is also incorporated and evaluated as a secondary analysis due to the fundamental importance of maintaining safety (Nursing & Midwifery Council 2015).

Methodology

A comprehensive literature review was undertaken of the available evidence using systematic methods (Figure 1).

The Hierarchy of Evidence (Guyatt *et al* 1995) considers RCTs to be 'gold-standard' evidence; it is however important to recognise the limitations of quantitative data when examining the 'lived-experience'. The Evidence Triad (Sackett *et al* 1996, Sackett *et al* 2000) recognised and addressed this discrepancy by integrating clinical expertise and patient experience in conjunction with the assessment of evidence, thus providing a justification for the inclusion of qualitative research within literature reviews. In recognition of such rationalisations, both qualitative and quantitative data were accessed to encompass as comprehensive a body of literature as possible.

Studies were located globally, with priority being given to those from westernised societies to ensure maximum applicability of results to the UK, whilst recognising some of these countries have a more medicalised view of childbirth than the UK.

Thematic analysis (Aveyard 2014) identified three recurrent themes relevant to this review within the selected literature (Figure 2).

Maternal satisfaction was noted to be increased when spontaneous effort was promoted (Sampselle *et al* 2005, Yildirim & Kizilkaya Beji 2008, Phipps *et al* 2009, Co Lam & McDonald 2010); this was inversely related to increased midwife intervention (Bergstom *et al* 1997, Sampselle *et al* 2005, Borrelli *et al* 2015). Greater encouragement from midwives facilitated increased spontaneous pushing (Sampselle *et al* 2005).

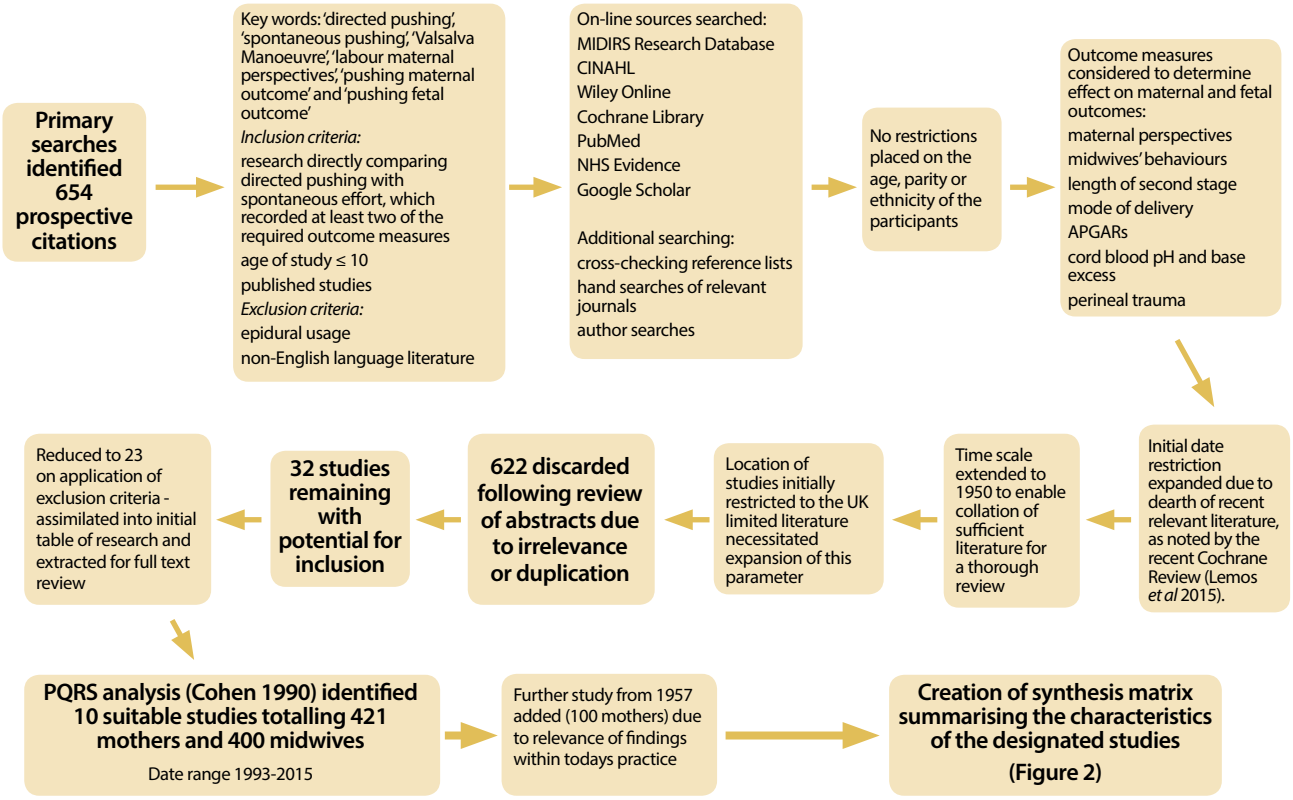
Midwives believed they were encouraging of spontaneous effort (Sampselle *et al* 2005), and were more likely to be responsive to women's urges in direct correlation to the parity of the women (Borrelli *et al* 2015). However, midwives were observed to be acting in a paternalistic manner, actively discouraging women from pushing even when strong expulsive urges were present (Bergstrom *et al* 1997) leading to maternal disempowerment, subsequent loss of autonomy and increased control assumed by the midwife (Sampselle *et al* 2005).

No statistically significant differences were observed overall in respect of maternal or fetal outcomes, although individual studies noted variations in mode of delivery (Beynon 1957, Co Lam & McDonald 2010), APGAR scores (Yildirim & Kizilkaya Beji 2008) and fetal venous pH ($r = 0.40$, $p = 0.020$) (Lemos *et al* 2011). One study noted a statistically significant lengthening of second stage when spontaneous pushing was used over directed ($t = 3.455$, $p < 0.002$) (Thomson 1993), one study observed a statistically significant lengthening of second stage when using the Valsalva technique ($t = 2.028$, $p < 0.05$) (Yildirim & Kizilkaya Beji 2008).

Discussion

Aveyard (2014) considers each study should be critiqued individually; however, in order to maximise

Figure 1: Literature review summary of the available evidence using systematic methods



clarity and avoid repetition, the evidence relating to each theme has been reviewed and discussed jointly; following which the research will be collectively reviewed for quality.

Maternal perspectives

Four studies considered the maternal perspective in relation to second stage management. Phipps *et al* (2009) found women's satisfaction was improved, against that of the control group, when antenatal teaching was provided relating to second stage management. They cite this as a clear indicator of the need for improved antenatal classes. However the paternalistic implication that arises from their data is that women are incapable of successfully bearing down without instruction. When women are coached antenatally, it could be argued that the directed pushing is simply inculcated prior to labour but to the same effect. Whilst 62% reported finding the intervention useful, there was no comparable situation for them as they were all primiparous.

Yildirim & Kizilkaya Beji (2008) reported greater levels of satisfaction in those women who had delivered using spontaneous effort rather than Valsalva. Women reported fewer problems and had higher satisfaction with their birth experience overall. Since both groups of women were instructed in their technique it could be argued that they were all effectively 'coached', which may have influenced their behaviour and expectations in second stage with positive or negative effect, thus creating an unintentional participant bias.

Co Lam & McDonald (2010) primarily reported on maternal postpartum fatigue levels, which were then found to impact on women's satisfaction levels. The women allocated to the experimental (spontaneous) group reported both lower levels of fatigue and higher levels of satisfaction following delivery, with a statistically significant difference apparent. There were a reduced number of instrumental deliveries in the experimental group, which may have positively impacted on decreasing fatigue levels and increased satisfaction with their birth experience.

Figure 2: Identified themes within second stage management

Theme	Studies
Maternal perspectives	Thomson (1993), Downe *et al* (2008), Yildirim & Kizilkaya Beji (2008), Phipps *et al* (2009), Co Lam & McDonald (2010)
Midwives' behaviour and perspectives	Bergstrom *et al* (1997), Sampselle *et al* (2005), Osborne & Hanson (2012), Borrelli *et al* (2015)
Maternal and fetal outcomes	Beynon (1957), Thomson (1993), Yildirim & Kizilkaya Beji (2008), Phipps *et al* (2009), Co Lam & McDonald (2010), Lemos *et al* (2011)

Thomson (1993) found no statistically significant difference in women's satisfaction levels relating to the method of pushing they were allocated to; however, the women were unaware of the method of management; the midwives were informed of allocation on diagnosis of second stage. This blind intervention allows for minimal development of participant bias, therefore potentiating a more objective reflection on their birth experience rather than their preconceived expectations.

The studies show a general consensus, demonstrating increased maternal satisfaction when permitted to attend to their spontaneous urges, although the validity of the data could be questioned due to the potential for both participant and researcher bias. The methods by which the pushing techniques were communicated may have had an influence on the women, causing them to respond more positively when allocated to the spontaneous group; it could be argued that this view is vindicated by Thomson (1993) since that study blinded the women to their allocation and reported no significant difference in satisfaction.

Midwives' behaviour and perspectives

Five studies considered the impact of the midwife's behaviour and perspectives on the second stage. Osborne & Hanson (2012) found 82.4% of respondents reported supporting spontaneous maternal effort '*often or almost always*', with just 11.9% reporting feeling women usually needed some direction. The level of support for spontaneous maternal behaviour appears considerable, but is untested as it results from self-reporting not observed footage.

Sampselle *et al* (2005) conducted a secondary analysis of video footage relating to a previous study of 20 women on perineal trauma, primarily transcribing the audio soundtrack. Since the footage was secondary analysis, the study did not impact on the spontaneous behaviour of the participants but focused on the midwifery management of the situations. They found the majority of women (65%) were spontaneously expulsive and identified a positive correlation between the amount of support in favour of spontaneous effort proffered by the midwife and the empowerment demonstrated by the woman; a negative correlation was observed if the midwife failed to provide that support. They did, however, witness instances of directed pushing, passing comment on the tone in which women were spoken to and querying the impact such direction may have on the labouring woman.

Bergstrom *et al* (1997) found a clear disparity between reported practice and actual behaviours in their secondary analysis of videotapes of three women, all of whom were experiencing spontaneous expulsive urges. While focusing on the medical management, they observed the women being actively discouraged from engaging in their spontaneous urges until they were 'diagnosed' in second stage by medical staff. The study reports a clear display of disempowerment directly relating to the midwives' paternalistic behaviours, in contrast to the supportive behaviour reported by Osborne & Hanson's findings (2012).

Borrelli *et al* (2015) specifically consider midwives' behaviour relating to the early pushing urge and found 87% of midwives report telling women to stop pushing, using management strategies such as epidurals and position changes to facilitate this. Although this study relates to one specific phenomenon within labour care, it highlights the paternalistic approach which prevails within some settings and which has been apparent in other studies.

Downe *et al* (2008) document similar findings, with 79% of midwives stating that they would tell a woman to stop pushing if they felt it was too soon. These studies appear to show a clear discrepancy between desirable practice as reported by Osborne & Hanson (2012) and the reality which Bergstrom *et al* (1997), Sampselle *et al* (2005) and Borrelli *et al* (2015) have documented. Of particular note is the inequality relating to the women's parity, with Downe *et al* (2008) and Borrelli *et al* (2015) reporting that the higher the parity, the greater the likelihood of midwives trusting the women's behaviour — Borrelli *et al* (2015) found parity to be one of the main determinants in establishing a management plan.

Another determining factor appears to be the level of the midwives' experience, with those with greater experience appearing more comfortable allowing the woman to act instinctively, while those with lesser experience feeling the requirement to adhere to a pre-ordained plan (Downe *et al* 2008, Osbourne & Hanson 2012, Borrelli *et al* 2015). Downe *et al (*2008) specifically asked midwives if they felt their practice had changed in relation to length of experience, to which 57% responded in the affirmative stating they felt their practice has become more physiological with experience. This questions the experiences the midwives are exposed to in their training and early years of practice which may predispose them to following such a path — many less experienced midwives now find their training consists primarily of obstetric-based experiences, depriving them of the opportunity to witness physiological births in more natural environments (Lange & Powell-Kennedy 2006, Smith *et al* 2008).

Maternal and fetal outcomes

Six studies detailed the effects of directed versus spontaneous pushing on the maternal and fetal condition at birth. Lemos *et al* (2011) considered six variables relating to labour and delivery including length of labour, umbilical pH, perineal trauma and

APGAR score. No statistically significant differences were found except relating to venous umbilical pH, demonstrating a slightly increased risk of fetal acidosis when adopting the Valsalva technique. The researchers related this to an increased maternal acidosis, due to maternal apnoea. These results broadly echoed those of earlier studies by Yildirim & Kizilkaya Beji (2008) and Phipps *et al* (2009). These studies also assessed similar outcome measures, including mean length of labour. Neither study noted any significant difference in physical outcome measures, but Yildirim & Kizilkaya Beji (2008) did find the overall length of second stage to be shorter in those exhibiting spontaneous urges. This finding contradicts an earlier study by Thomson (1993) who observed a statistically significant difference in second stage to the opposite effect, with spontaneous second stages lasting twice as long as those using the directed technique. However, the majority of women in the spontaneous group had also experienced a longer first stage of labour; this correlated directly with an increased requirement for analgesia which may have negatively impacted on the length of second stage and their ability to spontaneously push.

The other main physical outcome measure related to instrumental deliveries, which was assessed by Co Lam & McDonald (2010) who found a statistically significant increase in instrumental deliveries in the control (directed) group; this corroborated Beynon's 1957 study, which found the instrumental delivery rate in the spontaneous group to be half that of the directed group. An increased suturing requirement of 39% more than the spontaneous group was also noted in the control group, although this may have been as a direct consequence of the increase in instrumental deliveries. Phipps *et al* (2009) found no significant differences in mode of delivery.

Overall, the evidence reviewed here seems to suggest no significantly better outcomes when using directed pushing, and some detrimental outcomes.

Review of quality of included studies

Whilst the findings from these studies are clearly thought provoking, some major limitations exist within the research. Self-reporting has been used in four studies (Thomson 1993, Downe *et al* 2008, Phipps *et al* 2009, Osbourne & Hanson 2012) through questionnaires. Questionnaires are cheap, wide reaching, easily quantifiable and can garner useful information (Hoskin 2012), but self-reporting of behaviours has been found to produce bias (Viswanathan *et al* 2012), as participants may lack the introspective skills to objectively assess their own behaviour causing them to view their actions in a more preferential way than outside observers. Additionally they may selectively report information which portrays them favourably and elect to dismiss that which is less complimentary (Evans *et al* 2002).

Both Downe *et al* (2008) and Borrelli *et al* (2015) use fictional vignettes which may cause potentially idealised, therefore inaccurate, reporting (Brett-Davies 2007).

Questionnaires may be of poor quality, creating poor quality data (Greenhalgh 2010). With the exception of Downe *et al* (2008) it is unclear if those used here have been piloted to check understanding of the questions; questionnaires can also lack complexity particularly in the case of Osbourne & Hanson (2012) who wholly utilised closed questions, meaning the responses may have lacked depth (Brett-Davies 2007). Downe *et al*'s (2008) study is a continuation of research from 1994 and many of that study's weaknesses relating to data collection have been corrected in the 2001 version, therefore increasing the quality of the information collected.

Interviews as used by Yildirim & Kizilkaya Beji (2008) and Borrelli *et al* (2015) provide a more expansive result, with the interviewer able to probe issues raised within the initial questioning (Steen & Roberts 2011), but, in common with questionnaires, interviews are open to interviewer bias dependent on the phrasing of the questions (Steen & Roberts 2011).

Yildirim & Kizilkaya Beji (2008) and Co Lam & McDonald (2010) both use Visual Analogue Scales (VAS) for subjective data collection of fatigue and pain scores respectively. Although these tools have been validated, such tools are subjective in their nature and potentially lack sensitivity (Niven 1985); the strength of the results is dependent on the objectivity of the participant (Lee *et al* 1991), as such variables as pain and fatigue are so subjective.

Bergstrom *et al* (1997) and Sampselle *et al* (2005) use secondary analysis of video data. This can be a valid method of research, removing the potential for researcher bias which can occur in interviews and questionnaires (Clough & Nutbrown 2012); but it is limiting in these cases due to the researcher being unable to directly communicate with the participants from the original research. This elicits a researcher interpretation of events which cannot be verified by the participants, thus leading to a stronger likelihood of researcher bias (Steen & Roberts 2011). Sampselle *et al* (2005) have recognised and attempted to increase inter-rater reliability with the data being blind reviewed by numerous researchers; Bergstrom *et al* (1997) do not document any such measures.

Sampling methods utilised were mainly appropriate to the research designs chosen (Steen & Roberts 2011). The use of a control group within some studies (Beynon 1957, Thomson 1993, Yildirim & Kizilkaya Beji 2008, Phipps *et al* 2009, Co Lam & McDonald 2010) strengthens the validity of the findings and could be seen to weaken those which do not.

Acceptably smaller samples were obtained for qualitative research. However Bergstrom *et al*'s (1997) sample (3) was exceptionally small, even allowing for the constraints of qualitative research, which fundamentally weakens the findings of the study. Appropriate use was mainly made of both qualitative and quantitative methodology dependent on the specific area studied; mixed methods were adopted where both statistical and phenomenological data were sought. Purposive sampling was frequently adopted, which could be recognised as an appropriate technique due to the specific section of the population whose views were sought (mothers and midwives); however secondary randomised sampling could have occurred within the aforementioned groups. This would have improved the reliability of much of the data, specifically the quantitative data collected by Beynon (1957) and Lemos *et al* (2011) which, with appropriately increased sample sizes, could have improved the validity of results. It is widely recognised that qualitative research contains inequalities apparent from the outset when applied to the broader population, due to the requirement of the participant to have undergone the 'lived experience' making it difficult to assess the impact of the intervention in such cases (Aveyard 2014).

The subjectivity of the qualitative studies included is acknowledged as both a strength and a weakness. Qualitative data must be subjective in order to gain full insight from the participants (Downe *et al* 2008), detachment should be neither sought nor desired. Attention is given to the capacity of the researchers to incorporate reflexivity into their work, thus allowing objective consideration and negating any potential bias from the subjective approach; three studies (Sampselle *et al* 2005, Downe *et al* 2008, Borrelli *et al* 2015) clearly demonstrate evidence of this capability. Bergstrom *et al* (1997) and Beynon (1957) fail to demonstrate any evidence of this. Beynon specifically refers to attempting to prove the 'correct' techniques in the original aims of the study; this consequently undermines its findings.

All of the included studies were undertaken within a medical setting, primarily obstetric-led units, or with participating staff who worked within such institutions. This may have adversely impacted on all aspects of the researched data (Downe *et al* 2008) due to the influencing factors of the medical model of childbirth.

The majority of maternal participants within the studies are primiparous — only two studies made no distinction (Lemos *et al* 2011, Borrelli 2015). Whilst this may to some extent limit the findings, it may also validate them since the women had no preconceptions related to previous births which may have influenced their judgements and responses. Interestingly, of the midwives surveyed by Downe *et al* (2008), personal experience of childbirth was a reason cited for evolution of practice to become more physiological (30%).

All studies included in the review have been published in reputable national/international journals, whose articles are subjected to peer review. However Osbourne & Hanson's (2012) study depicting a favourable perception of midwives, all of whom were members of the American College of Nurse Midwives (ACNM), was published in the ACNM journal potentially compromising its objectivity.

Limitations of the review

There are several recognised limitations of this review. The settings of the research all being within medical institutions is noted; however, despite extensive searching it was not possible to find appropriate literature outside of these settings. The age of some of the studies pre-dates the intended search parameters of ≤10 years old; however, it is felt this is mitigated to some degree due to the paucity of relevant research within the original parameters. Additionally it may be argued that, discerning a particular year when research fails to be relevant is not possible (Cutcliffe & Ward 2003), particularly owing to the findings of the older research being broadly similar to the current despite the wide age range. The use of non-randomised trials may weaken the reliability of data, but the inclusion of this has been previously justified. The use of international studies may reduce the applicability of findings in relation to UK practice, although justification for this is also sought due to the dearth of relevant UK data, a recognised limitation of other recent systematic reviews (Prins *et al* 2011, Lemos *et al* 2015).

Conclusion

Directed pushing, originally introduced as an altruistic measure to minimise maternal distress in childbirth, is now widespread practice, despite guidelines worldwide (WHO 1996, NICE 2014) advising against its implementation. Maternal preferences anecdotally appear to favour the following of spontaneous impulses (Byrom & Downe 2005, Perez-Botella & Downe 2006, Reed 2015). Notwithstanding the limitations of the research included in this review, synthesis of the evidence appears to detect no benefits, therefore suggesting a suspension of the use of the practice in favour of adopting a more physiological approach.

The reviewed evidence demonstrates increased maternal satisfaction and empowerment resulting from supportive midwifery care, but opinions of practising midwives appear to be divided between the desire to provide holistic care and the concern of causing harm. This is an understandable dichotomy, but one which appears to lessen with experience,

inferring the possibility of midwives providing increased physiological support if exposed to more experiences of such throughout pre-registration and the early years of practice. Physiologically, the evidence overwhelmingly suggests no reason for continuing to advocate directed pushing, since all measured outcomes within this review demonstrate no tangible benefit to either mother or baby.

Chalmers *et al* (1989) suggest intervention only if it produces a more effective result than nature; Walsh (2015) states that optimisation of birth physiology is not possible if caregivers attempt to override the woman's natural instincts. The evidence in this review corroborates both of these opinions and that of the recent Cochrane Review (Lemos *et al* 2015).

The recommendations of this review are therefore cessation of the use of directed pushing within practice. Clear local guidelines should be developed, reflecting both national and international guidance (WHO 1996, NICE 2014), within medical settings and the rationale for this elucidated by evidence-based teaching for midwives. In order to facilitate improved care for women, the author recommends increased exposure of normal physiological care for student and junior midwives, mentored by those who have both experience and confidence in such areas. Additionally, increased evidence-based information for women delivered antenatally, not teaching them *how* to push, but instead advocating the importance of awareness of their body's natural impulses and the benefits to be achieved by following them.

There is a clear requirement for engagement of future UK-based studies investigating in greater detail women's experiences and perceptions of second stage management within both obstetric- and community/midwife-led settings in order to continue the development of this theme to provide the optimum, evidence-based safe birth experience for women.

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