Is the evidence on waterbirth watertight?

Abstract

Waterbirth has been promoted as an effective means to control pain and improve comfort in labour (Royal College of Midwives/Royal College of Obstetricians and Gynaecologists (RCM/RCOG), 2006). Proponents for waterbirth show boundless enthusiasm for the practice, citing the benefits in terms of good clinical outcomes and increased levels of women's satisfaction. Its opponents, however, demonstrate the same level of fervour, portraying waterbirth as a folly with grave potential for both mother and baby. Interestingly, the quality of literature that supports the incongruent sides of the waterbirth debate varies greatly. This article reviews the existing body of literature on waterbirth.

Keywords: Waterbirth, Evidence-based practice, Safety

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Waterbirth has been recognised as a clinically effective means to reduce the intensity of pain during normal physiological labour and increase women's satisfaction with their birth experiences (National Institute for Health and Care Excellence (NICE), 2007; Jones et al, 2012; Lui et al, 2014; Henderson et al, 2014). A joint statement from the Royal College of Midwives (RCM) and the Royal College of Obstetricians and Gynaecologists (RCOG) 2006 extolled the benefits of waterbirth, but noted that (RCM/RCOG, 2006: 2):

> ***'The evidence to support underwater birth is less clear but complications are seemingly rare.'***

The Nursing and Midwifery Council urges every registrant to ensure that any advice that they give is evidence-based (NMC, 2008) but in light of the joint RCM/RCOG statement, the question must be asked as to whether waterbirth and, or the care of women who choose to labour in water, creates a paradox for midwives and midwifery practice. This article explores this issue further by analysing the contemporary evidence that pertains to waterbirth.

Fuzzy logic

When reviewing the waterbirth literature, most recount stories of man's connection to water (Kitzinger, 2000; Garland, 2002a; Sprague, 2011). Examples of indigenous populations who lived and thrived beside rivers and coasts are commonly cited by authors who have explored this subject. These narratives are often embellished by anthropological examples of indigenous women birthing in organic water sources such as rivers, streams and mountain pools. The veracity of these stories could be questioned, as they are commonly cited but rarely have discernible origin. Their bearing on best-practice can be debated as; in a hierarchy of evidence anecdotes carry little weight (Aslam, 2000). That is not to say however, that we cannot learn from the experiences of others. Cluett and Bluff (2006) note that practice should be made up of both propositional knowledge such as research and non-propositional knowledge such as that gained through observing and reflecting critically on our own practice and that of others.

Waterbirth champions

In 1963, Igor Tjarkovsky began experimenting with birth in water. Tjarkovsky believed that if a baby was born into ice-cold water, the lower gradient pressure on its head would prevent damage to the immature brain cells and thereby enhance their psychic abilities and physiological potential (Richmond, 2003). He also promoted births in the Baltic Sea and the presence of dolphins during birth to support labouring women. Despite his zeal for waterbirth, Tjarkovsky applied no distinct methodology to his studies and produced little evidence to support the validity or reliability of his outlandish theories, so intuitively practitioners recognise his ideas as flawed. This relegated his work to a footnote within the development and history of waterbirth. However, despite the distinct lack of a systematic approach to his work, Tjarkovsky was a pioneer and protagonist within the waterbirth movement and continues to influence the less mainstream proponents of waterbirth.

Modern waterbirth began with real fervour through the works of Michel Odent in the 1970s. He observed that women in labour often wanted to lie in a bath or stand under a shower to ease their contractions. He found that if his staff timed the woman's entry into water, the women not only felt comfortable and less anxious but also gave birth soon after (Odent, 2000). Thus began the phenomena of waterbirths within a

clinical setting. Odent (2000: 69) attributes the success of this intervention to our mammalian ancestry, stating:

> ***'First, the primitive brain developed mostly inside the uterus—that is to say in water. Second the neocortex might have reached its huge development during an aquatic phase of our evolution.'***

This hypothesis complements the 'Aquatic Ape Theory' popularised by Elaine Morgan. Morgan (1999) attributes our *Homo sapiens* characteristics such as bipedalism, head hair, paranasal sinuses, subcutaneous body fat, and ability to swim at birth, dive reflex and apparent love of water as proof of our aquatic past. This is despite the fact that there is no fossil evidence to substantiate the theory (Bergman, 2007).

Although Odent's advocacy of waterbirth, like that of Tjarkovsky's, was not based on research with a discernible methodology, his findings do have validity because of the clinical reasoning that he has used (Munro and Spiby, 2010). Consciously or unconsciously, Odent recognised patterns in women's labour. He saw that women savoured the comfort and tranquillity of water and as a consequence birthed quickly soon after they were submersed. He hypothesised that women experienced a reduction in the secretion of noradrenalin and other catecholamines, which in turn aided the normal adaptive process of labour (Garland, 2002a). Odent's observations in practice led him to offer waterbirth to more women, who in turn also birthed well. Analytical processes such as these have been criticised for their lack of subjectivity but are recognised as an essential component in perceptive, woman-centred practice and the development of new knowledge and ways of seeing and/or doing.

In 2002, Garland published audit findings from nine UK maternity services that offered waterbirth; these appeared to suggest that waterbirth decreased the length of a woman's labour (Garland et al, 2002b). Six hundred and eighty waterbirths were reviewed against a comparison group of women who birthed normally, out of water. The audit had good intent as part of the wider clinical governance agenda; it enabled the researchers to contribute to a relatively small body of work, monitor service provision, midwives' practice and women's needs (Brayford et al, 2008). Within a hierarchy of evidence, audit data holds less weight than that generated through research. This can create doubt in regard to findings, although researchers such as Geissbuehler et al (2004) and Zanetti-Dällenbach et al (2006) have undertaken observational studies which have produced similar results.

The findings such as these were endorsed further when Cluett and Burns (2009) undertook a systematic review of trials on waterbirth. This was undertaken under the patronage of the Cochrane Library. Most of the trials had limitations in terms of validity and reliability; although they were able to confidently state that waterbirth does significantly reduce the rate of epidural in labour. They found no evidence that this was associated with poorer outcomes for neonates, longer labours or more complex births.

Although this systematic review did not offer startling findings, it now contributes to the body of literature which legitimises waterbirth as a safe and effective means by which women are cared for during labour. It also recognises that current evidence is based on studies with a degree of heterogeneity and makes the recommendation that further research should be performed. This is particularly pressing in regard to infection and neonatal outcomes as these remain largely unaddressed. Cluett and Burns (2009) complete their review by recommending that large collaborative trials are needed to contend with this issue.

Waterbirth opponents

Despite its benefits, waterbirth has also been associated by some with adverse outcomes. These include: risk of premature gasping and water inhalation by the neonate, fetal hyperthermia, maternal water embolism, maternal and neonatal sepsis, snapped umbilical cord, subsequent haemorrhage and primary dystocia (Chapman and Charles, 2009). As with the research that supports waterbirth, these studies vary in their rigour. Nguyen et al (2002) published a commonly cited study—sensationally titled: 'Water Birth—A Near-Drowning Experience.' This piece of work is based on four neonatal adverse outcomes following waterbirths, where presumably, the physiological process that inhibits neonatal breathing and closure of the larynx to prevent inhalation of water during birth, did not occur. The study reviews each of the cases in depth with a qualitative approach. Case studies are a valuable means by which clinicians can explore incidents and make recommendation for current practice and ensuing research.

By conducting this work, Nguyen et al (2002) demonstrated concern in regard to the observed phenomenon. Publishing their findings could be

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Waterbirth is acknowledged as an efficacious means of supporting women to cope in labour

viewed as an endeavour in professional integrity, as they wished to prevent further adverse neonatal outcomes. However it is important that clinicians are mindful that owing to the size and contextual nature of a case study, these findings cannot be generalised to the whole population. It is imperative that all research is viewed objectively.

In the case study supplied by Nyugen et al (2002), variables such as the knowledge, skills and competence of the midwives conducting the waterbirths were not examined. It did not address whether fetal hypoxia was present before birth or note pool temperature—both of which have been proposed as factors which induce gasping in the newborn (Johnson, 1996). Nor do they acknowledge that it is normal for the neonate to be in an aqueous environment and that it is only when they are brought out of the water, that they progress their adaption to extrauterine life by aeration of the lungs (Resuscitation Council, 2011). Other stimulus for neonatal breathing includes chest compression during descent through the vagina, modification in gaseous exchange following the umbilical cord being cut and the impact of external stimuli such as temperature, noise, light and handling of the neonate following birth (Lumsden and Holmes, 2010).

Sadly, some opponents to waterbirth will use dissonance to justify their own beliefs rather than improve care and enhance women's birth experience (Lavender, 2010). Nyugen et al's (2002) article is eight years old, yet it is continues to be referenced by other authors (Byard and Zuccollo, 2010). Most recently, the American Congress of Obstetricians and Gynecologists (ACOG) (2014) referenced Nyugen et al's (2002) article in a paper which alleged that waterbirth was an experimental practice that had no benefits for mother and baby; directing practioners to only facilitate the practice within the confines of a clinical trial with allied ethical permissions. This was publicly countermanded by the RCM (2014) who critiqued the ACOG paper and found it to be biased and partly incorrect.

There are examples, however, where adverse outcomes and cautionary tales have improved waterbirth processes. Notable, are those which report neonatal sepsis. Research by Rawal et al (1994), Franzin et al (2001) and Vochem et al (2001) are a few examples of small scale studies whereby neonates have contracted bacterial infections during the course of their birth in water. It is hypothesised that water piping, maternal body fluids and the warm water temperature all contribute to increased bacterial growth (Zanetti-

Dällenbach et al, 2006). Although each strain of bacteria in these cases vary from *Legionella* to *Pseudomonas*, they have encouraged waterbirth providers to design infection control procedures and guidelines to ensure that the water used in pools is of optimum quality and that meticulous cleansing of equipment takes place on a regular basis (RCM, 2012) in order to protect both baby and mother from potential sepsis.

Similarly, individual cases of where the umbilical cord has snapped during a waterbirth have been published (Shafer, 2014). Although there is no formalised study that has examined this phenomenon, midwives have made recommendations that care is taken during birth and no undue traction is placed on the cord when bringing the newborn baby to the surface of the water. Though it may be good practice for the midwife to reflect on such an occurrence, modifying her technique as necessary and/or seeking opportunity to increase her knowledge, skills or competence if this is thought to be lacking in any way (Cro and Preston, 2002).

Analysis

On review of the evidence it is apparent that waterbirth is an evolving phenomenon. Waterbirth proponents have maintained their enthusiasm for the practise and have amassed a wealth of experience in regard to its execution. A growing confidence in regard to waterbirth is encouraging midwives to examine how the practice can safely be extended to offer 'high-risk' women the opportunity to labour and/or birth in water (Benko, 2009). This is particularly apparent in women who wish to use water in their endeavours to achieve a vaginal birth after caesarean section (Jackson, 2013; McKenna and Symon, 2014). There still does, however, continue to be a considerable gap in the evidence-base surrounding waterbirth. Filling this is essential if waterbirth opponents are to be silenced and the requirements of clinical governance frameworks are met.

Increasing the body of evidence around this practise may also offer reassurance to those midwives who fear litigation and organisational backlash, should an adverse outcome occur. However, midwives should be reassured that in the right circumstances with due regard to guidelines, they will be supported by collegiate endorsement of waterbirth (RCOG/RCM, 2006; RCM, 2012). The Bolitho Principle (1998) can also be referenced to support midwives in practice, i.e. (Bolitho v City & Hackney Health Authority 1998: 588):

> ***'[where] the court has to be satisfied that the exponents of the body of opinion relied upon can demonstrate that such opinion has a logical basis. In particular in cases involving, as they so often do the weighing of risks against benefits.'***

Partnership with women is pivotal to the continuation and development of waterbirth. Any decisions that the woman makes in regard to mode of birth needs to be based on clear, unbiased information and a reciprocal dialogue between woman and midwife. She should understand both the advantages, disadvantages and the indeterminate aspects of waterbirth. This is in keeping with the terms of *The Code* (NMC, 2008). McFarlin (2004) asks us to consider the ethics involved in the pursuit of informed choice, reminding us that midwives have a duty to uphold the ethical principles of justice, beneficence, autonomy and non-maleficence. This should be irrespective of whether the midwife is definite or doubtful of the evidence surrounding waterbirth.

Conclusion

Midwives, as a group, are committed to waterbirth and the use of water in labour and are supported in this by the issue of best-practice documentation such as NICE (2007) guidance and professional papers from bodies such as the RCM and RCOG. Despite the high degree of satisfaction that it brings women, the waterbirth evidence can be viewed as lacking in both quantity and quality. There is not a vast breadth of evidence to draw from and that which has been published commonly has issues in regard to generalisability, bias and reliability. This is recognised by the clinical community and almost every publication or published piece of research ends with a recommendation that further studies are undertaken. Those embarking on such

Key points

- Waterbirth is acknowledged as an efficacious means of supporting women to cope in labour
- However, waterbirth remains a controversial practice as the evidence surrounding this varies in quantity and quality
- Midwives are compelled through their professional code of conduct to provide care that is evidence-based but also meets the needs of women
- Future studies in regard to waterbirth should ensure that they employ robust methods, paying particular attention to research design which sets out to overcome issues of bias and reliability

endeavours need to analyse their methodologies and ensure that these are apt as otherwise their efforts may be in vain. BJM

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