

Normal Birth 9. Optimising Physiology: Labouring in Water and Waterbirth

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All4Maternity

1st May 2021



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Published in The Practising Midwife Volume 24 Issue 5 May 2021

Summary

As the ninth article in our normal birth series, we highlight the key evidence around birthing pool use: a tool for optimising labour and birth physiology. Drawing upon our collective clinical and research-based experience, we provide practice tips for intrapartum care in water.

Introduction

So far in this normal birth series, the articles have combined revisiting the basics of normal physiological labour and birth processes, alongside new research findings, insights and updates. International research tells us that most women value and expect to have a normal labour and birth with midwives who are knowledgeable and competent in facilitating physiological births.¹ While the research also found that women understood that events may change, which may require ‘going with the flow’, their expectations of midwives capable of supporting normal labour and birth is a vital point to press.¹ We know that increasing constraints on midwifery practice risks the key components that define midwifery practice as per the Lancet² and International Confederation of Midwives (ICM),³ negatively impacting women’s capacity to labour and give birth naturally.⁴ Therefore, it is vital that midwives continue to revisit the basic anatomy and physiological process of childbearing as core midwifery skills and that researchers continue to advance that knowledge. Accordingly, in this article we advocate that water immersion during

labour and waterbirth offers a valuable tool to optimise women and birthing people's innate capacity to labour and birth, and midwives a unique opportunity to really 'be with woman'.

Birthing pool use is an independent factor that improves birth experiences, some maternal outcomes with no risk to the neonate, other factors influence the degree of benefit that water immersion can offer

Water immersion: a low-tech, complex intervention

Water immersion appears to be a straightforward intervention that offers women the comfort of buoyancy, space and freedom of movement.⁵ It is a low-tech intervention, and the key requirements include:

- A birthing pool big enough to enable full mobility.
- A birthing pool that is firm and stable to support women leaning/hanging against the sides.
- A water supply (clean and hot running water).
- Enough warm water filled to submerge the person's bottom/abdomen.

However, when we unpack the evidence in favour of positive biological and psychological maternal outcomes (with no adverse effects on the neonate),⁶ we can see several things. First, the range of benefits across the birth continuum:

- Buoyancy enhances mobility, freedom of movement and positional changes that facilitate physiological labour and birth outcomes.^{5,6}
- Pain perception: release of endogenous endorphins/analgesic properties,⁷ enhances ability to cope with labour.⁵
- Reduces epidural use⁶ (and therefore, subsequent risks associated with epidurals).⁸
- Labour augmentation/reduction in the duration of labour.⁹
- Increased number of spontaneous vaginal birth (particularly in midwifery-led settings).¹⁰
- Reduces transfer likelihood from home/freestanding birth centres.¹¹
- No impact on perineal trauma/obstetric anal sphincter injury (OASI).⁶
- Improves satisfaction.⁶
- Enhanced feelings of safety, protection and privacy.⁵
- Facilitates (for some) a positive state of altered consciousness during labour.⁵
- Facilitates easier pushing (as reported by women).⁵
- Enables positive birth experiences with positive implications for postnatal mental-emotional health and wellbeing.⁵

Second, the level of benefit differs between care settings and models of care. For example, birthing pools are used most in midwifery-led settings (home/alongside midwifery unit (AMU)/ freestanding midwifery unit (FMU))¹² and birth pool use increases the rates of spontaneous vaginal birth at home or in a midwifery-led setting,¹⁰ but not necessarily in hospital.⁶ Third, the care culture as displayed by maternity professional behaviours can influence the access to and use of birthing pools.¹³ Therefore, with so

many variables, water immersion can be viewed as a 'complex intervention'¹⁴ defined as: '... in the number of interacting components; the number and difficulty of behaviours required by those delivering or receiving the intervention; the number of groups or organisational levels targeted by the intervention; the number and variability of outcomes; and the degree of flexibility or tailoring of the intervention permitted.'^{15 p.397}

The warmth of the pool, maintaining ambient lighting and minimising distractions and stimulation will reduce the release of catecholamines and facilitate safe physiological placental birth in the pool

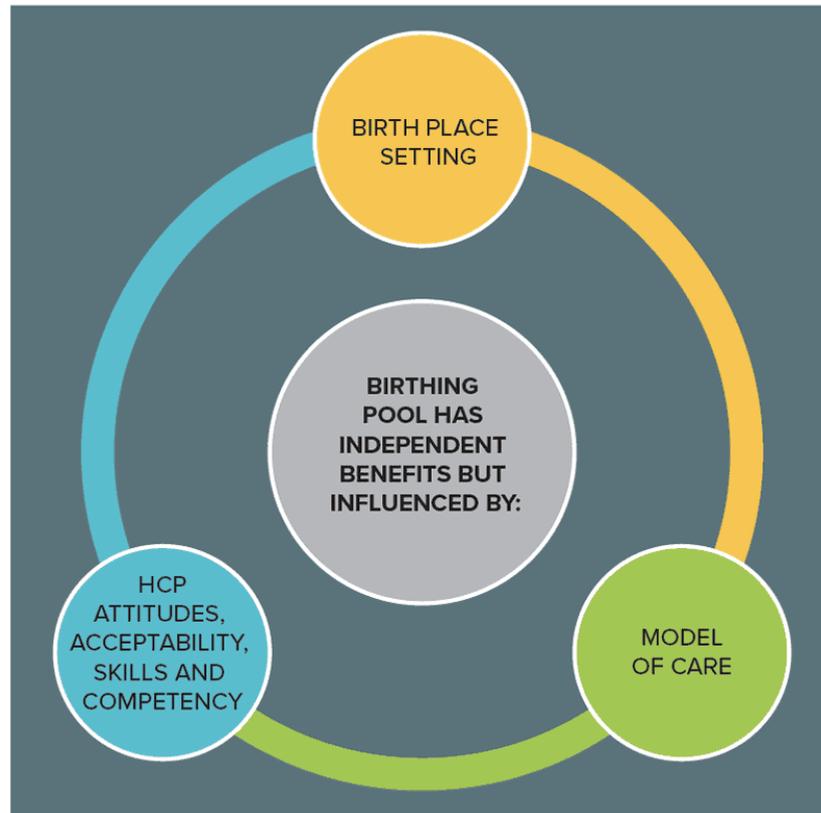
While we can see that birthing pool use is an independent factor that improves birth experiences, some maternal outcomes with no risk to the neonate, we also know that other factors influence the degree of benefit that water immersion can offer. Therefore, contextual information is required when assessing the maternal outcome data and applying it to clinical practice (see Figure 1). For example, the Birthplace study examined the relationship between birth setting and outcomes of 67,000 women. It found that comparable women (of low-risk status) were significantly less likely to use water immersion in an obstetric unit compared with women who birth in alternative settings.¹⁶ Only 13.3% of first-time mothers used water immersion in an obstetric unit versus 53.7% in a freestanding birth centre, and there was similar disparity among multiparous mothers.¹⁶ Additionally, Burns et al¹⁰ found marked differences in interventions and outcomes between midwifery-led settings in one large prospective observational water birth study (N=8,924 women).¹⁰ It found that women who used a birth pool in an AMU were more likely to be transferred to the obstetric unit and less likely to have a waterbirth when compared with similar women who laboured in water in the community (FMU/home).¹⁰ In fact, the interventions and outcomes for the women who immersed in water in the AMU setting were similar to those reported in the obstetric unit, highlighting the influence of care models and care settings, and reiterating birthing pools as a low tech but complex intervention.

PRACTICE POINT 1

Considering the strong evidence in favour of midwifery led place of birth and birth pool use, what initiatives are available in your area that facilitate these choices?

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Figure 1 Understanding context for water immersion as a complex intervention



Women's voices

Our recent work was a qualitative systematic review examining the views and experiences of women who had used water immersion during labour and/or birth.⁵ The seven studies we included provided rich insights into the value and biopsychosocial-spiritual benefits of water immersion. Our review, supported by numerous survey studies, highlighted the important contribution of water immersion to women's experiences of childbirth. Physical benefits related to the buoyancy the water provided, enabling free and unrestricted movement, particularly profound for women who reported to be self-conscious about their weight.⁵ The warm water was reported to be analgesic, relieving labour pains, soothing and comforting.⁵ The properties of water, 'cushioned the intensity', enhancing women's sense of control and ability to cope.⁵ Moreover, the physical separation that the pool afforded was also valued, where feelings of safety and protection were enhanced and likened to a 'cocoon' or 'safe haven'.⁵ Many women reported blissful states of altered consciousness as the combined properties of the warm water and physical boundaries of



the pool facilitated letting go into a liminal space of birth, for example: 'Another world...it was like by the ocean, and then you come back to land and you are in another country... They call it 'labourland'... It really was another world, and you think about the journey that you make from being pregnant to becoming a mother... An incredible journey.' Rosa¹⁷ (Sprague, 2004).

Many women reported blissful states of altered consciousness as the combined properties of the warm water and physical boundaries of the pool facilitated letting go into a liminal space of birth

Supporting labour in the pool

Concerns around supporting labour in water can result in midwives being expected to gain specific 'competencies' to facilitate water immersion.¹⁸ In our experience, this may indicate a broader cultural fear and suspicion of water immersion and is not necessary. Of course, it is beneficial for those who have not witnessed a water labour/birth to observe someone competent and confident,¹⁹ and is essential for midwives to feel supported in their practice. However, as the overall physiological processes of labour and birth do not alter in a pool, other than to enhance the neuroendocrinology,⁷ we advocate that midwives equipped with the knowledge and skills of physiological land births can apply this readily to a water situation. This includes ambient lighting, soft sounds, low voices and supportive one-to-one care. Moreover, there is no reason to alter the frequency of routine intrapartum observations for women in a birth pool from those labouring on land. It is sensible, however, that birth pool water is not greater than body temperature (37°C) because labour contractions generate heat and the fetus is hotter than his/her mother. For example, we know that epidural analgesia increases maternal core temperature, which can adversely affect mother and fetus, therefore two-to-four-hourly water temperature checks are advisable.^{20,21}



Clinical guidance can influence when women access a birthing pool. For example, some maternity units advocate that a woman's cervix be at least 4cm dilated before she can enter a birth pool. However, there is no evidence to support this recommendation. Furthermore, cervical dilatation in itself, is a subjective, limited measurement and does not account for effacement, cervical application to the presenting part of the fetus, its position or descent in the women's pelvis. A woman's cervix might be one to two centimetres dilated, but fully effaced, well applied to the presenting part and the uterine contractions good while, conversely, the cervix could be ≥ 5 cm dilated, uneffaced and a woman is not in established labour. Women should be supported to use the pool as and when they prefer and should not be contingent on cervical dilatation. It is not unusual for

contractions to slow down shortly after entering a birth pool. This is a transient physiological response to the relaxation of water immersion.⁷ The pelvic biomechanics involved with getting into and exiting the pool may also facilitate optimising fetal position by creating more space.²² Conversely, birthing pools can take 20-30 minutes to fill, and sometimes women labour too quickly to access, therefore it is helpful to start running the pool sooner rather than later.

Key points for labour care

- Pool has enough water to submerge the woman's abdomen and bottom.
- Pool is big enough to enable a woman to flip over and adopt different positions with ease.
- Usual observations apply, plus two-to-four-hourly water temperature checks.
- Usual advice to maintain good hydration.
- Intermittent auscultation with a waterproof sonic aid avoids disturbing the mother.
- Vaginal examinations, if required, can be carried out in the pool.
- If concerned by labour dystocia, exiting the pool temporarily may help. The exiting/entering will support pelvic biomechanics, and mobilising to empty the bladder will support both pelvic biomechanics and fetal descent. Also just walking around for a while, or resting on her side on bed/floor cushions may also assist.

Supporting waterbirth

We advocate responding to the woman's instinctive urge to push through gentle support and encouragement, rather than coached or Valsalva pushing. Those in water for the second stage follow the same patterns of land physiological births, whereby involuntary pushing (often) begins at the height of a contraction, gradually building towards greater expulsive pushing over time. Like on land, depending on maternal position, external signs (anal



pouting, rhombus of Michaelis and/or the purple line) may be observed indicating the progression of fetal descent. Some midwives prefer to use a torch and mirror to observe progress, others find it unnecessary. While waterbirths should be hands off by the midwife, some women will reach down to touch the baby's head, which should be unhindered. Depending on the woman's position and preferences she may wish to 'catch' the baby, and this should be supported where possible. Of importance, once the fetal head is born, it remains under water. Should a woman raise her bottom out of the water at this point, the rest of the birth should be facilitated out of the water and must not be resubmerged to avoid any risk of water inhalation. Additionally, traction must not be applied to the cord to avoid cord avulsion²³ (see practice point below).

Retrospective research expressed concern that waterbirth may predispose women to sustaining an extensive perineal tear to involve the anal sphincter (OASI).²⁴ However, prospectively collected data analysis found no such association.²⁵ When a midwife assists a woman to give birth in water, typically she adopts a hands off approach – a practice that is currently not recommended for women giving birth on land. The advent of the OASI ‘bundle’ has exerted a drive to encourage midwives to routinely adopt a hands-on approach to birth.²⁹ However, the evidence supporting this intervention is less than robust and being challenged.²⁶ Unfortunately, some maternity units have set the OASI bundle as a mandate, which may present a confidence and skills issue for midwives regarding water and land birth.

Cervical dilatation in itself, is a subjective, limited measurement and does not account for effacement, cervical application to the presenting part of the fetus, its position or descent in the women’s pelvis

PRACTICE POINT 2

One note of caution with waterbirth

There have been reports of cord avulsion during waterbirth. Most of the babies were fine and did not require a blood transfusion or admission to neonatal intensive care unit (NICU).²³ However, it is important not to exert traction on the umbilical cord as baby is brought to cuddle with mother. It is sufficient to just have baby’s head out of the water. Should a cord avulsion occur, clamp the cord immediately, assess baby’s condition, and act accordingly.

Key points for waterbirth

- Follow the woman’s instinctive pushing cues.
- Continue with usual observations and signs of progression.
- Adopt a hands-off approach.
- Support the woman to remain submerged during the birth, otherwise avoid re-submersion of baby’s head.
- Avoid traction on the cord as baby is lifted gently out of the water.

Third-stage care

Various hospital guidelines recommend leaving the pool for placental birth (whether active or physiologically managed), however, this is not necessary and may interfere with the high release of oxytocin that occurs following birth.²⁷ This release of oxytocin facilitates the detachment and expulsion of the placenta. Therefore, interfering – for example, turning lights on, talking loudly, moving the mother out of the pool – may increase bleeding and/or haemorrhage.²⁸ In addition, the warmth of the pool, maintaining ambient lighting and minimising distractions and stimulation will reduce the release of catecholamines and facilitate safe physiological placental birth in the pool.⁷ Furthermore, the vast neonatal benefits from delayed cord clamping, which means enabling the woman to remain in the pool to birth her placenta followed by cord clamping, should not present a problem. It is easy to revert to active management in the event of concern. The purported

risk of incurring a water embolism by birthing the placenta in water, is purely hypothetical and were it a problem, it would have manifested itself before now given the thousands of waterbirths that have happened across several countries.



Estimating blood loss

Visual blood loss estimates are only ever an educated guess during spontaneous or operative vaginal birth. Aids in the form of photographs of different blood volumes in a standard-size, plumbed-in birth pool with reference points to rose/red wine have been developed to guide midwives in their estimation. However, regarding waterbirth, anxiety lingers in this area even though the blood loss one sees is married to the women's condition and factors such as the length of her labour and past history. Worry around possibly not identifying excessive blood loss in a timely manner may be making some midwives ask that women leave the pool for the third stage of labour, disrupting the crucial mother-baby skin-to-skin contact. estiMATE is an online tool developed to improve visual blood loss estimations during waterbirth, which showed promise in estimates and midwives' confidence.²⁹ A large-scale evaluation conducted during 2019 will soon be ready to submit for publication. This tool involves simulations using live models and involving a range of different blood volumes using expired blood filmed in real time will hopefully assist in resolving this worry and result in less third-stage disturbance in the absence of a problem.

Pain management is a key element of respectful and dignified maternity care, in which we advocate birthing pools should be as available as pharmacological options

PRACTICE POINT 3

Most of the research regarding water immersion outcomes has involved healthy women and been undertaken in the obstetric unit setting. Further research has been upcoming or ongoing for those who may have a risk factor, for example, a previous caesarean section, or a BMI >30. Across the UK, many women deemed 'out of guidelines'³⁰ have experienced successful waterbirths. While the physiology of birth does not change(!), our empirical knowledge of specific conditions during pregnancy and whether they affect water immersion outcomes, remain a work in progress. Another point that research has raised about women who use a birth pool is that the majority are white and high socio-

economic.³¹ This raises the question: could and should we be doing more to inform all pregnant women about birth pool use, given our remit is to provide equitable care to all women?

Key points for placental birth

- Keep an ambient environment avoiding disturbing the mother-baby dyad.
- Support/encourage uninterrupted skin-to-skin contact and/or initiating breastfeeding.
- Observe for signs of placental detachment (cord lengthening, small acute blood loss, cramping), gently encourage woman to work with those cramps to expel the placenta.
- Observe for excessive blood loss in the pool and, if required, support the woman to exit the pool and revert to active management (if consented).

Organisational practice points

- Keep the birthing pool room free and available for those wishing to labour/birth in water wherever possible.
- Have a strict cleaning protocol in place, as per local infection control guidance.
- Organise regular multidisciplinary team (MDT) study days to raise awareness and knowledge of physiological labour and birth in water, and to troubleshoot concerns.
- Consider water immersion champions who can support inexperienced staff.
- Where possible, appropriate and with consent, encourage obstetricians and neonatologists to quietly observe a waterbirth.
- Invite women to speak about their waterbirths.
- Invite midwives to speak about the waterbirths they assist.
- Use online videos for educational purposes for those inexperienced with water labour/birth.
- Ensure all staff are competent with intermittent auscultation and usual labour care.
- Practice supporting women out of the pool, should it be required.

Conclusion

Water immersion during labour and waterbirth is a low-tech but complex intervention that optimises the normal physiological processes of labour and birth. We call for midwives and maternity professionals to familiarise themselves with labour and birth care in a birthing pool to ensure more women have access to its benefits. Pain management is a key element of respectful and dignified maternity care, in which we advocate birthing pools should be as available as pharmacological options. **TPM**

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Upcoming research

At Oxford Brookes University, we are working to advance the evidence base for labouring and giving birth in water. Claire led on the recently published systematic review of women's experiences highlighted in this introduction.⁵ This offers a rich insight to inform women and midwives in their discussion about this care option. A write-up of another systematic review is nearing completion on interventions and outcomes following water immersion for labour and waterbirth. It is a large review that includes more than 30 studies, comprising different designs undertaken by an international team led by Ethel. A scoping review of health professionals, organisational and policy barriers and facilitators for waterbirth is being led by Dr Megan Cooper, supported by Claire and Ethel. Ethel has run workshops and presented estiMATE at conferences. It is attracting significant interest

in the UK and beyond from maternity personnel and it is planned to release it as a continuing professional development (CPD) tool this summer. Colleague Dr Jane Carpenter is completing a paper reporting on a secondary analysis of prospectively collected data to examine factors associated with normal birth (as defined by the Maternity Care Working Party) for women who labour in water. She is also co-supervising (with Dr Louise Hunter and Associate Professor Rachel Rowe from the National Perinatal Epidemiology Unit (NPEU)) a PhD undertaken by student Claire Litchfield investigating the outcomes and experiences of women with obesity who use water immersion in labour.

We thank our extended research group, OxMater, an international collaborative network, for contributing to our research programmes. For more information, see <https://www.brookes.ac.uk/osnm/research/centre-for-nursing-health-and-social-care/oxmater/members/>.

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