Review article

How valid are the common concerns raised against water birth? A focused review of the literature

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Abstract

Background: Women have birthed in water for many years, with researchers finding a number of benefits for mother and baby. Despite these benefits, many health institutions and clinicians are hesitant to support women’s access to water immersion in birth for a number of reasons. As such, this paper aimed to (1) select five common concerns raised against water birth and (2) examine whether research supports these concerns as being evidence-based.

Method: A literature review was conducted to (1) select the concerns for review and to (2) review each selected concern as to whether they were supported by the current evidence. A recent review of women’s access to, and uptake of, water immersion in Queensland, Australia, was also used to determine the concerns for review in order to better capture concerns relevant to Australian practice.

Findings: Three clinical concerns were selected for review: water aspiration, neonatal and maternal infection, and neonatal and maternal thermo-regulation; and two concerns around the practice of water birth were selected: skills and education of workforce, and emergency procedures in case of maternal collapse. The three clinical concerns were not found to be supported by the available evidence and the two practice concerns can be addressed by appropriate policy, guidelines and practice.

Conclusion: The reviewed common concerns against water birth are not evidence-based nor are they sufficient to prevent women from accessing the use of water in labour and birth. Health institutions and clinicians should ensure they take adequate precautions to enable women access to this valued and effective method of birth.

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Water has been used for pain relief in labour and birth for centuries in both clinical and non-clinical settings, and is becoming increasingly popular around the world. Water birth is associated with a number of benefits for the mother including that it aids relaxation, facilitates position change, and increases satisfaction with birth experience. Benefits for the baby have also been suggested including that water birth allows for an easier transition to extra uterine life and reduces the need and therefore side effects of pharmaceutical analgesia as water immersion is associated with a reduced use of epidural analgesia. A recent survey of women in Queensland, Australia, in 2009 found that approximately 20% of women wanted to birth in water but were unable to and that 3% of women actually birthed in water. Despite these benefits and consumer demand, many clinicians are hesitant to support the use of water in birth. This paper aims to (1) identify five common reasons used for denying women access to water birth and (2) to examine whether research supports them as being evidence-based concerns against the practice of water birth.

1. Part one: Selecting the common concerns against water birth

1.1. Method

A literature search for papers featuring discussion of concerns against water birth was conducted. The Cochrane Library, PubMed, Medline, Science Direct, and Wiley Online Library databases were searched with key terms including water birth, water immersion, concerns, barriers and risks. A review of women’s access to water immersion in Queensland, Australia, recently conducted by the Queensland Centre for Mothers and Babies at the University of Queensland was also used to obtain common concerns against water birth within the Australian maternity care system. The concerns highlighted in each of these sources were collated with the five most frequent concerns relevant to Australian maternity practice selected for review.
1.2. Findings

The literature search yielded five articles of relevance,\textsuperscript{1,9–12} which were used in conjunction with a recent review of women’s access to, and uptake of, water immersion in Queensland.\textsuperscript{5} The five most frequent concerns within these sources deemed to be relevant to Australian practice were selected for review. These included three clinical concerns about water birth (i.e., water aspiration, neonatal and maternal infection, neonatal and maternal thermo-regulation) and two concerns around the practice of water birth (i.e., skills and education of workforce, emergency procedures in case of maternal collapse).

1.2.1. Water aspiration

A number of inhibitory responses prevent an infant from inhaling water during a water birth.\textsuperscript{13} Approximately 24–48 h before birth, foetal breathing movements slow down or cease in response to increased Prostaglandin E\textsuperscript{2} levels. This allows for increased blood flow to vital organs (e.g., the brain) and enables a low breathing response at birth.\textsuperscript{13} A further response is that all babies are born with mild apnoea which causes apnoea and swallowing (i.e., not inhalation). However, a prolonged hypoxic state can cause breathing and gasping. A further inhibitory response is the ‘dive reflex’ which enables the chemoreceptors covering the larynx to initiate the closure of the glottis upon detection of foreign stimuli (e.g., water, ammonia) so that the stimuli is swallowed and not inhaled.\textsuperscript{13} Despite these inhibitory responses being well described throughout the water birth literature, many clinicians raise water aspiration as a key concern against water birth.\textsuperscript{8–11}

1.2.2. Neonatal and maternal infection

Infection of the neonate due to contamination by the water (e.g., due to faecal matter or unclean pipes) or the mother is a common concern against water birth.\textsuperscript{1,9–11} Increased risk of infection for the mother has also been raised as a concern.\textsuperscript{1,10} It has been suggested that the risk of infection for the mother is increased in a water birth due to the possibility of water entering the uterus and blood stream (e.g., water embolism\textsuperscript{14,15}); however, this has been strongly contested.\textsuperscript{16}

1.2.3. Neonatal and maternal thermo-regulation

The effect of water temperature on that of the mother and the infant has been raised as a concern against water birth.\textsuperscript{8–10} The foetus is dependent on the mother for thermo-regulation\textsuperscript{17} and its temperature is approximately 1 °C above that of the mother’s.\textsuperscript{18} This combined with the fact that the water temperature of the birth pool may at times be significantly greater or less than the mother’s temperature,\textsuperscript{19} has led many to be concerned that birthing in water may lead to hypothermia/hyperthermia and other related negative outcomes.

1.2.4. Skills and education of workforce

The skills and knowledge required by health professionals to assist women in labour and birth in water has been raised as a concern against water immersion.\textsuperscript{8–10} More specifically, the concern is around what training is actually required and how best to implement it.\textsuperscript{5} The majority of water births are attended by midwives,\textsuperscript{5,10,20}; however, obstetricians provide care to women with a range of risk profiles.\textsuperscript{21} As such, it is essential that all maternity health professionals have the necessary skills and knowledge to assist women in labour and birth in water.

1.2.5. Emergency procedure in case of maternal collapse

Finally, concern has been expressed about the implications of water birth in cases of maternal collapse where emergency procedures require the quick removal of the mother from the pool.\textsuperscript{8,9,12} Specifically, the water the woman is immersed in is seen as a physical barrier to reaching her in order to treat her and/or her baby during an emergency.

2. Part two: Literature review of each concern

2.1. Method

A literature review was conducted for the three clinical concerns (i.e., water aspiration, maternal and neonatal infection, maternal and neonatal thermo-regulation) using The Cochrane Library, PubMed, Medline, Science Direct, and Wiley Online Library. Google Scholar was used at the conclusion of the database searches as a means of determining that all relevant papers had been located. The search criteria included systematic reviews, randomised controlled trials (RCT), observational studies, case control studies, microbiological comparison studies, case audit studies, and case reports. The outcome of interest for each search was the incidence of the corresponding concern (e.g., incidence of water aspiration).

A literature review was conducted using PubMed, Medline, Science Direct, Wiley Online Library, and Google (to locate non-academic reports) for the two practice concerns (i.e., skills and education of workforce, emergency procedure in case of maternal collapse). The search criteria included clinician surveys, opinion pieces and review reports on water birth. Outcomes of interest were findings and discussion around the skills and knowledge required for health professionals to assist water births and emergency procedures during water birth.

2.2. Findings

2.2.1. Water aspiration

Randomised controlled trials examining a possible association between water birth and water aspiration have not been conducted and as such, none are included in the most recent Cochrane review on water immersion in labour and birth.\textsuperscript{1} Four large prospective observational studies comparing water birth to land birth were located.\textsuperscript{25–27,29} The period of observation ranged between 4 and 9 years across the three studies, and the sample size ranged between 513 and 9518 births (with water births ranging from 89 to 3617), with a total of 19 139 births and 6457 water births. No case of water aspiration was noted in any of these studies.

One paediatric epidemiology study surveyed 1500 paediatricians monthly over a 2 year period in the British Isles, asking them to report cases where neonatal death or admission to special care had occurred within 48 h of a water birth.\textsuperscript{26} Of the 4032 water births that occurred, two babies were reported as being admitted to special care with symptoms of water aspiration. However, no causal link with water birth could be made.

Four case reports examining the incidence of water aspiration in babies born in water were located.\textsuperscript{27–30} The sample size ranged from 1 to 4 babies across all studies, with a total of 8 babies. All babies were identified as needing treatment within 12 h of birth and made a full recovery to be discharged from hospital within approximately 8 days of birth. A causal relationship between water birth and water aspiration symptoms was unable to be established in any of these case reports.

2.2.2. Neonatal and maternal infection

The most recent Cochrane review included two RCTs examining neonatal infection rates associated with water birth.\textsuperscript{1} Trials examining maternal infection were unable to be located. Nikodem\textsuperscript{5} found no difference between water and land births
in terms of raised neonatal temperatures (>37.5 °C) at birth, and Woodward and Kelly found no difference in terms of antibiotics given to newborns or in positive swabs for infection from the ear, mouth or umbilical cord. The review concluded that water birth is not associated with increased neonatal infection rates. No further RCTs have been conducted since the Cochrane review was undertaken.

Two case control studies were found to examine the association between water birth and maternal and neonatal infection rates. Otigbah et al. compared 301 water births to 301 land births across 5 years, and found no difference in maternal infection rates and no cases of neonatal infections. Bodner et al. compared 140 water births to 140 land births across one and a half years. The rate of maternal infection was significantly lower in the water birth group, whilst there was no difference in neonatal infection rates.

Five observational studies comparing maternal and neonatal health outcomes between water birth and land birth were located. The period of observation ranged between 4 and 9 years across the six studies, and the sample size ranged between 513 and 10,775 births (with water births ranging from 89 to 5192), with a total of 30 016 births and 12 797 water births. Geissbuehler et al. found a higher rate of antibiotic use in the land birth group, whilst the remaining studies either found no difference in maternal infection rate, no case of maternal infection, or did not include it as an outcome variable. Six studies found no difference in the neonatal infection rate between groups.

Two paediatric epidemiology studies were found to have examined neonatal infection in water births. Alderdice et al. surveyed 219 heads of midwifery in England and Wales. Of the 449 women who birthed in water, there were 51 reports of morbidity in the baby including infection (exact number of babies with infection is not provided). In Gilbert and Tookey’s paediatric epidemiology study of 4032 water births, two infants were reported to have evidence of an infection. In both studies water birth could not be directly attributed as causing the infection symptoms.

Two microbiological studies were located. Fehervary et al. compared cultures from 34 water births and 62 land births, and found no difference in the rate of bacterial contamination between the two groups for both mothers and newborns. Thoeni et al. performed bacterial cultures of water samples of a birth pool before and after delivery for 250 water births. Results indicated that the water was moderately contaminated both before and after delivery; however, this did not translate to increased neonatal infection with no difference in infection rate between babies born in water and on land. Maternal infection was not examined.

Three case reports on neonatal infection after water birth were located. Parker and Boles and Rawal et al. each report a case where a newborn had been diagnosed with Pseudomonas infection at 12 h after birth and at 19 days after birth. In both cases the infant responded well to antibiotics and made a full recovery. Franzin et al. reported a case where a newborn was diagnosed with Legionella pneumophila 26 days after birth. A course of antibiotics was undergone for three weeks, with the infant making a full recovery. Of note, the hospital water used to fill the birth pool was later found to be infected with a Legionella species.

2.2.3. Maternal and foetal thermo-regulation

No systematic reviews assessing maternal and foetal thermo-regulation during and after water birth could be located, with only one RCT examining this sourced for review. Woodward and Kelly conducted an RCT comparing health outcomes associated with water birth (n = 40) versus land birth (n = 20) in 60 women. Both maternal and neonatal temperatures at birth were not found to differ between those randomised to water birth or land birth. Geissbuehler et al. examined whether guidelines for water temperature during a water birth were necessary. An observational study was conducted across 8 years comparing maternal and neonatal temperature for 10 775 births, along with a smaller study of 47 births where body temperature, water temperature, and duration of bath time were constantly recorded for water and land births. Neonatal and maternal body temperatures did not differ between those who birthed in water (n = 3162) and those on land (n = 5272), except at birth where the difference in maternal temperature was 0.6 °C higher in water. The smaller study revealed that the water temperature varied between 23.0 and 38.9 °C in the 30 water births examined with no detrimental effects for mother or child. Zanetti-Daellenbach et al. also conducted an observational study across 4 years with 513 women (83 water births) and reported that maternal temperature did not differ between water and land birth groups.

Deans and Steer audited 112 cases from the 353 women who birthed in water on a number of outcomes across a 3 year period at one hospital. Five women were noted as having foetal tachycardia, with four of these women also having a temperature of 37.5–38.4 °C. The remaining woman did not have her temperature recorded; however, the water was recorded as being greater than 38 °C. Four women left the pool to have continuous foetal monitoring where it was noted that the foetal heart rate fell to a normal range within an hour. The remaining woman who did not leave the water instead had cold water added to the bath upon which the baby’s heart rate and maternal temperature were also noted to reduce within an hour.

2.2.4. Skills and education of workforce

A recent review of water birth practice within Queensland highlighted the skills and education of the workforce as a key concern against water birth. Birthing facilities were not confident that midwives were competent in assisting women in water as per their tertiary qualification. As such, many required midwives to complete lengthy educational packages that were only recognised within that facility. Furthermore, a number of facilities reported that issues with training (e.g., development of an adequate training package) were inhibiting their ability to provide women access to water immersion in labour and birth.

One study was found to have examined clinicians’ experiences with water birth, including their associated training. Meyer et al. surveyed 53 midwives from Georgia, U.S., about their perceptions and practice of water birth. Thirty percent of midwives had received education on water birth in their tertiary training and approximately 20% had ever witnessed a ‘real-life’ water birth.

Kitzinger highlighted that women in the UK are often told that they are unable to use a birth pool due to adequately skilled midwives not being on duty. The author states that one problem contributing to this is that midwives have limited opportunities to gain the skills and knowledge required to confidently assist women with water births.

2.2.5. Emergency procedure in case of maternal collapse

Despite there being concern amongst clinicians about the emergency procedures involved in event of maternal collapse during a water birth, the review of water birth practice in Queensland found that only two of the thirteen facility water immersion policies reviewed included comprehensive information about the emergency procedure required. A further four referred to separate guidelines specifically around the manual handling of a patient in water and the remaining seven included no mention of emergency procedures.

Of note, none of the studies examined in this review contained a case of maternal collapse during water birth, nor did they make reference to a paper that included such a case. Kitzinger claims
that maternal collapse during a water birth has never been recorded. The author goes on to say that it is unlikely to occur given that women using birth pools do not use opioids or other narcotics that can cause the woman to become unconscious. 

Mills and Stirrat argued that the delay created by getting the mother out of the water creates excess difficulty in obstetric emergencies. However, many hospital policies are able to work around this and given that the buoyancy of water causes the body to lose weight, the water can be used to assist in removing the woman from the bath.

2.3. Discussion

The current paper reviewed five common concerns raised against water birth as to whether they were evidence-based. Included in this review were three clinical concerns (i.e., water aspiration, neonatal and maternal infection, neonatal and maternal thermo-regulation) and two practice concerns (i.e., skills and education of workforce, emergency procedures in case of maternal collapse). Overall, these concerns were not found to be supported by the evidence and are able to be controlled for with appropriate policies, guidelines and practice.

2.3.1. Clinical concerns

Concerns around water aspiration in newborn babies birthed in water are not supported by the available evidence. Comparison studies have found no difference between babies born in water or on land in terms of how many infants experience water aspiration symptoms. Case report studies have identified very few infants born in water with such symptoms and none were able to establish a causal link with water birth.

Current evidence does not support concerns of water birth being associated with neonatal and maternal infection. Studies comparing women who birthed in water and on land found either a lower rate of infection in those who birthed in water or no difference. The remaining studies reported few incidences of neonatal and maternal infection in women who birthed in water, and none were able to directly attribute such symptoms to having experienced a water birth. Concerns for neonatal and maternal thermo-regulation during water birth are not supported by the available evidence. Studies comparing neonatal and maternal temperature found little to no difference between those who birthed in water and on land with one study demonstrating that when women did not have strict water temperature guidelines imposed on them they are able to self-regulate their body temperature, and thus the fetus, within a normal physiological range. In addition, one case audit study found only a few women with a raised temperature which returned to a normal range upon the addition of cold water to the pool or the woman exiting the pool.

2.3.2. Practice concerns

In Australia, midwives are currently required to complete additional facility level training in order to assist women in labour and birth in water. It appears that obstetricians do not complete such training, despite a number of low-risk women seeking their care for pregnancy and birth. Less than half of all midwives report receiving training in water birth during their tertiary education and even less have witnessed a ‘real-life’ water birth. This non-standardised process of training is resource intensive, may lead to inconsistent practice, and has been reported to prevent women’s access to water immersion. These findings suggest a need for a more streamlined and standardised process of educating the maternity care workforce in the practice of water birth.

Less than half of all Queensland birthing facilities were found to include an adequate description of emergency procedures in case of maternal collapse or to refer to a document that contained such a description. There has been no case of maternal collapse during water birth recorded in the literature, suggesting that the risk of maternal collapse is minimal. Even so, it is still a very real possibility and as such it is essential that facilities and care providers have effective emergency procedures in place. Interestingly, other areas of health care that use water for pain relief (e.g., rehabilitation, spinal injuries, burns unit) with patients who have severe physical disabilities have similar emergency procedures in place; however, these are not called into question despite these patients most likely having a higher chance of physical collapse than that of a pregnant woman.

2.3.3. Implications for practice and future directions

The findings of the current paper have a number of implications for the practice of water birth. Based on these findings, it can be seen that preventing women from accessing water immersion during birth due to concerns of water aspiration, infection and thermo-regulation is not evidence-based. As such, both state health departments and birthing facilities should align their policies and guidelines, and clinicians align their practice, with the available evidence to ensure that women are not prevented from accessing this birthing option due to these concerns.

Currently, health service providers are burdened with the training of the maternity care workforce with regards to assisting women to birth in water. A standardised approach is needed to reduce this burden, to ensure consistent practice amongst health professionals, and to allow more women access to this method of birth. It has been suggested that tertiary education facilities need to provide their students with more training and experience with water birth. Given that both midwives and obstetricians assist in the births of low-risk women, it is essential that both these health professionals are trained and experienced in water birth. Should obstetricians feel that water birth is outside of their remit, it is essential that they are able to support and promote midwives to be adequately trained in caring for women who choose to birth in water.

All birthing facilities offering water immersion in labour and birth should ensure that they have adequate procedures in place in the unlikely event of maternal collapse during immersion. Every staff member assisting women to birth in water should be well acquainted with such procedures and know how to use the water to their advantage when helping to remove the woman (e.g., not removing the plug to use the buoyancy created by the water).

2.3.4. Conclusion

The current paper reviewed five common concerns against water birth; three involving clinical issues and two involving practice issues. All three clinical issues were not found to be evidence-based and the two practice issues, whilst legitimate concerns, can be addressed with appropriate policy and guidelines, and clinical practice. It is hoped that the findings of this paper will increase the range of birthing options available to women and better enable health professionals to provide evidence-based practice.

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References