

# Waterbirth: current knowledge and medico-legal issues

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**Abstract.** Water immersion during labour and birth has become increasingly popular and widespread in many countries, in particular in midwifery-led care settings. Nevertheless, there is a dearth of quality data about waterbirth, with currently available findings mostly arising from observational studies and case series. The lack of high-quality evidence and the controversial results reported by different studies determined a “behavioral gap” without clearly objective, consistent indications allowing for a sound and evidence-based decision making process. Although water immersion in the first stage of labour is generally considered a safe and cost-effective method of pain management for women in labor, concerns still linger as to the safety of immersion during the second stage of labor and delivery, particularly in terms of neonatal risks and medico-legal implications. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** delivery, waterbirth, water immersion

## Introduction

Immersion in water during labour or delivery has been gaining popularity over the past several decades, especially in midwifery-led care settings. The use of water immersion as a “therapeutic” method is not new; while its exact origins are unknown, there is evidence of immersion in water being used as a treatment for physical and psychological ill health since the time of Greeks and Romans. A perception of relaxation, pain relief, ease of movements and more holistic experience made labour in water a popular choice since 1980s. Actually, many women consider waterbirth as a positive and “more natural” experience to deliver their baby (1).

Despite women’s demand, waterbirth is controversial. In fact, if benefits for the mother are well

known, otherwise waterbirth risks and benefits for the baby are more challenging to quantify. Concerns have been raised about possible neonatal risks, such as infection, respiratory distress, tub water aspiration, hyponatremia, seizures, cord avulsion and mortality. Moreover, waterbirth may influence early bacterial colonization of the intestine, affecting the developing of gut microbiome, with its consequences on neonatal and thus adult’s life (2).

Though water immersion in the first stage of labour is generally considered a safe and low-cost method of pain management for women in labour, concerns persist regarding the safety of second stage and delivery immersion (3).

Observational studies and case reports from various settings (i.e. birth centres, hospital or home births)

are the primary source of information for the assessment of safety or possible complications, given the challenges of implementing randomized controlled trials for waterbirth and resulting bias (4).

The lack of high-quality evidence regarding possible benefits and/or risks for both mothers and newborns does not allow to issue consistent, evidence-based recommendations at this stage.

The aim of the article is to lay out an overview as to the current knowledge about immersion in water during labour and delivery, with a close focus on the medico-legal issues arising from to waterbirth.

### **Water immersion during the first stage of labour**

Most currently available evidence does not suggest an increased risk of adverse fetal or neonatal outcomes with water immersion during the first stage of labour.

The Cochrane Review published in 2009 (5) included 12 trials (3243 women) resulting in a positive physiological effects of hydrotherapy such as buoyancy, hydrostatic pressure, and associated thermal changes, are relevant to women labouring in water. The buoyancy of water enables the woman to move more easily than on land, facilitating the neurohormonal interactions of labour and alleviating pain. Moreover, water immersion may be associated with improved uterine perfusion, less painful contractions, a shorter labour with fewer interventions and hydrotherapy has marked physiological effects on the cardiovascular system: shoulder-deep warm water immersion reduces blood pressure due to vasodilation of the peripheral vessels and redistribution of blood flow. Despite limitations in the validity and reliability of the randomized controlled trial evidence due to trial design, the authors concluded that water immersion during the first stage of labour significantly reduces epidural/spinal analgesia requirements and reported maternal pain, without adversely affecting labour duration and operative delivery rates, or neonatal wellbeing.

In the Joint Statement in 2009, Royal College of Obstetricians and Gynecologists/Royal College of Midwives support labouring in water for healthy women with uncomplicated pregnancies, underlining

that it is important to separate the evidence on benefits and risks of immersion in water during the active phase of labour from those of actual birth in water (6).

The Committee Opinions n°679 from the American College of Obstetricians and Gynecologists in November 2016 indicated that water immersion during the first stage of labour is safe for women with full-term, uncomplicated pregnancies and may bring benefits in terms of pain relief, reduced analgesic need, and short labour (7).

The Cochrane review in 2018 included 15 trials conducted between 1990 and 2015 (3663 women). The authors concluded that in healthy women at low risk of complications there is moderate to low-quality evidence that water immersion during the first stage of labour probably has little effect on mode of birth or perineal trauma, but may reduce the use of regional analgesia (1).

### **Water immersion during the second stage of labour including delivery: still undetermined safety levels**

The Royal College of Obstetricians and Gynecologists and the Royal College of Midwives, in a Joint Statement issued in 2009, reported that the evidence to support underwater birth is less clear, but complications are apparently rare (6).

Committee Opinions n°679 from the American College of Obstetricians and Gynecologists of November 2016 contraindicated water immersion during the second stage of labour and delivery, because of the lack of solid evidence and several serious neonatal complications reported (7).

The 2018 Cochrane Review concluded that the evidence for immersion during the second stage of labour was limited and did not show clear differences on maternal or neonatal outcomes intensive care. Moreover, there was no evidence of increased adverse effects to the fetus/neonate or woman from labouring or giving birth in water (1).

A retrospective cohort study of 2019 by Hodgson et al. included 25798 births, 23201 conventional and 2567 waterbirths. According to the results, rates of individual components of the composite adverse neonatal score were not greater in the waterbirth cohort.

Besides outcomes included statistically shorter labours in the waterbirth cohort and no difference between the cohorts in incidence of third- and fourth degree lacerations (8).

In a retrospective study published in 2020 by Sidebottom et al. (4), 583 women with water immersion were included and compared with a matched control group. The authors found no higher risk of Neonatal Intensive Care Unit (NICU) or special care nursery admissions occurring in deliveries with first- or second-stage water immersion. Besides, there were no significant differences for other secondary outcomes and maternal infection, and they found lower risk of perineal lacerations for women with second-stage immersion.

### Neonatal risks

Concerns have been expressed that immersion in water during delivery may predispose to potentially serious neonatal complications. Data from individual case reports, observational studies and case series have reported several serious adverse outcomes among neonates intentionally delivered in water. These include respiratory problems (including the possibility of fresh water drowning), cord rupture with haemorrhage, and waterborne infections. Cases of major infection with *Pseudomonas aeruginosa* and *Legionella pneumophila* have been reported (9-11).

Neonatal water aspiration, which may be accompanied by hyponatremia, and seizures, was reported as a complication as well. The protective “diving reflex” can allegedly prevent breathing, gasping or swallowing of fluid in neonates delivered into the water. However, experimental studies on animals and literature centered around meconium aspiration syndrome demonstrate that in compromised fetuses and neonates, the diving reflex may have failed, potentially leading to gasping and aspiration of the surrounding water. Moreover, the presence of the diving reflex at birth and timing of its activation in healthy newborns have been questioned. Therefore, uncompromised fetuses may be at risk of water aspiration and its resulting sequelae (7).

Umbilical cord avulsion has been observed as the newborn is lifted or maneuvered out of the water.

Although most instances were not associated with additional neonatal morbidity, some affected newborns have required intensive care unit admission and transfusion (12, 13).

No increased frequency of adverse neonatal outcomes after second-stage immersion or delivery while submerged was found by the 2009 Cochrane synthesis of randomized trials (5), one meta-analysis in 2015 (14), or in an additional meta-analysis and systematic review (2). The already mentioned 2018 Cochrane review noted limited data regarding morbidity and mortality, concluding that “there is insufficient evidence about the use of water immersion during second stage of labour and therefore clear implications cannot be stated” (1).

According to these evidences, Committee Opinions n°679 from the American College of Obstetricians and Gynecologists of November 2016 concluded that there are insufficient data to draw conclusions regarding the relative benefits and risks of immersion in water during the second stage of labour and delivery. Therefore, until such data are available, it is the recommendation of the College that birth occur on land, not in water (7).

A 2017 review by Vanderlaan et al. (3) that included 39 studies, considering 12 different neonatal outcomes, did not find evidence of an increased likelihood of poor neonatal outcome with waterbirth compared to conventional delivery.

An observational study of 2020 by Snapp et al. found that among 26684 women, those giving birth in water had more favorable outcomes; cord avulsion occurred rarely, but it was more common among waterbirths. Newborns born in water were less likely to require transfer to a higher level of care, be admitted to a neonatal intensive care unit, or experience respiratory complication. However, these findings favoring waterbirth in this sample were likely attributable to the appropriate utilization of policies, procedures, risk screening, and expertise of the nurses and midwives. The results suggest that experienced waterbirth providers can recognize potential complications and either avoid or discontinue water immersion for those women. The lower incidence of prolonged labour, intrapartum and neonatal transfer to hospitals, shoulder dystocia, and neonatal respiratory issues in

the waterbirth group may reflect this clinical decision-making (15).

## Discussion

The increasing request of a more physiological delivery experience has led doctors and midwives to reconsider an evidence-based approach regarding waterbirth.

A 2019 review by Clews et al. (16) has found that women mostly present positive experience of waterbirth when their perspectives and opinions are sought, probably because the increasing women's knowledge of waterbirth as an element of physiological birth may increase their sense of autonomy and control. On the other hand, data on immersion during second stage of labour including delivery are controversial, with several studies based on rather small samples either supporting or opposing it. Prominent scientific societies agree that available evidence is limited by clinical variability and heterogeneity across trials; besides, data on neonatal risks arise predominantly from individual case reports, observational studies and case series, with marginal statistical significance. Nonetheless, despite the lack of quality evidence, water immersion during the first stage of labour can undoubtedly provide maternal benefits, especially in terms of pain relief, lower episiotomy (17-19) and induction rates (20), without affecting neonatal outcomes.

Informed choice on the benefits and risks of birth in water is clouded by the lack of good quality safety data, and women should be informed that there is insufficient high-quality evidence. Clinical decision-making should take into account medico-legal aspects. The lack of evidence-based guidelines and/or recommendations related to waterbirth can lead malpractice allegations for providers in case of adverse outcomes for the mother and newborn. It is essential for professionals to take into account the fact that the guidelines and recommendations issued and approved by scientific societies or local health institutions are deemed to constitute best practices. The potential risks and benefits of waterbirth should be thoroughly discussed, along the process of informed decision-making, with women interested in this option (21).

Water immersion during labour is not suitable for all pregnant women, and a thorough patient assessment needs to be carried out according to available data, however inconclusive.

From a medicolegal perspective, it is of utmost importance to clearly report clinical data and counselling in the patient records. If complications arise and lawsuits are filed, courts are likely to hold doctors and facilities liable if the decision-making pattern leading to the choice of waterbirth is flawed, not clearly defined and inadequately documented, thus failing to meet acceptable standards of care. That has long been the case with unfavorable outcomes stemming from birth-related infections (22), for instance, which have also been associated with waterbirth (23, 24), although most of the currently available waterbirth research is essentially observational, hence causal associations cannot be substantiated by reported outcomes (25). That is also the reason why many hospitals do not accommodate waterbirths: the lack of scientific evidence outlining clear indications for each individual patient and higher liability costs for facilities and professionals, mostly due to the inability to realize what complications could be developing from underwater (26). One of the most emblematic and meaningful instances of such dynamics unfolding took place in 2016 at the Legacy Emanuel Medical Center in Portland, US state of Oregon. Soon-to-be mother A. B. was advised by midwives to choose waterbirth, since she was defined "an ideal candidate" for it. She was reportedly misled by healthcare operators characterizing waterbirth as just as safe, or even safer, than traditional vaginal or C-section deliveries. That being said, the court filings showed that A. B. was not at all a good candidate for waterbirth, since her pregnancy should not have been labeled "low-risk". The fetal heart rate was in fact abnormal upon her admittance to the hospital. Despite that, the midwives outlined a birthing plan which entailed submerging the patient, yet failed to consistently monitor the fetal heart rate or consult obstetricians. The court sided with the family's argument that had the midwives regularly monitored the fetal heart rate with a waterproof device, they would have seen that the baby was in distress much sooner. At that juncture, the mother should have delivered via C-section immediately. Instead, the patient was eventually taken out of the tub and delivered vaginally. As

it turned out, it was too late: the newborn had been deprived of oxygen for about 15 minutes. The time spent under water with no vital checks caused severe brain damage and ensuing birth-induced cerebral palsy, making the child unable to walk and express himself verbally. The parents sought redress upwards of \$36 million, and were ultimately awarded very substantial compensatory damages in a settlement. As it was pointed out, the settlement was the largest in at least a decade for a medical hospital malpractice lawsuit (27).

## Conclusions

Waterbirth as a modality of delivery should not be considered as standard clinical practice, given that immersion in water during delivery may predispose the infant to potentially serious neonatal complications. As it has been highlighted in various sources cited herein, women who decide to opt for waterbirth often do so out of a desire for limited medical interventions, as well as a belief in their body's natural capabilities to give birth. Still, the decision-making process needs to take into account a key element: the legitimate wish to limit the medicalization of birth to a minimum cannot come at the expense of safety, thorough patient assessment and constant monitoring of fetal as well as maternal well-being. The Oregon court case briefly illustrated earlier unequivocally highlights the dangers of an unbalanced approach to decision-making. Just as importantly, there is no discounting the fact that currently available evidence has not been established through population-based analyses. It is therefore necessary to conduct well-designed prospective studies of the maternal and perinatal benefits and risks associated with immersion during labour and delivery.

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