# REVIEWS

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# Water Birth and Water Immersion – an Important Step Towards More Patient-Oriented Health Care or a New Way for Obstetrical Wards to Make Profits?

## Poród w wodzie – krok w kierunku odstąpienia od instrumentalnego traktowania pacjenta czy nowa forma komercjalizacji położnictwa po reformie służby zdrowia w Polsce?

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## Abstract

Many pregnant women have concerns associated with childbirth. They feel especially anxious about the health of the child, but also about their own comfort. They are concerned about the duration of labor, as well as the delivery itself. Water birth is an alternative to conventional vaginal delivery. This alternative method makes use of the benefits of heat and the underwater environment. It has an impact on the course of delivery and reduces the feeling of pain through the spasmolytic and analgesic effects of heat and the relaxing and buoyant effects of water. However, with all its advantages, water delivery also raises a number of questions. Many people wonder why the cost of water birth is high (in Poland it runs as high as several hundred PLN) or why there are so few bathtubs in hospitals. Questions are also asked about the physiology of water labor itself, e.g., what makes this method of delivery so attractive, and why the transition of the fetus is so smooth. There are several factors involved. Water, with its sound and gentle movements, has a relaxing effect on the woman and child. It also causes general muscle relaxation and makes it easier to change position during labor, which makes labor much less painful for the mother. The aim of this article is to provide a concise outline of the advantages and risks of water birth, for the mother as well as for the child, and to assess the status of this method in Polish maternity wards. Knowledge of the benefits and risks of water birth is especially important today, when women want the right to decide how to give birth. A logical consequence of agreeing that they have this right is to assume that they also have the right to be well informed. Alternative methods of delivery do not advance obstetrics, but they can render it less dehumanized, offering better opportunities for cooperation between midwives and women in childbirth, and more personal contact than in a situation where the midwife's main role is to attend to machines and graphs. In modern obstetrics natural childbirth should not be viewed as a step backward. It should entail the use of an appropriate range of medical procedures to ensure the safety of both the mother and child, while keeping the technology and pharmacology as minimal as possible. Despite the enormous progress that has been made in obstetrics since the earliest recorded water birth in 1805, the procedure is still controversial. Water births are associated with analgetic and relaxing effects, with a reduction in the duration of the second stage of labor and in the need to administer oxytocin during this stage. Post partum hemorrhages occur about twice as often as in conventional deliveries. Various authors have reported different statistical results regarding the duration of the first labor stage, the need for episiotomy and the frequency of perineal tears. Neonatal well-being, expressed as an Apgar score, doesn't differ significantly between water-born and land-born babies, but complications are not as rare as was initially thought. In Poland, the popularity of water birth and water immersion seems to be seen as an opportunity to bolster the budgets of maternity units more often than as a genuine departure from conventional obstetrics (**Adv Clin Exp Med 2011, 20, 3, 391–397**).

**Key words:** water birth, labor in water, immersion in water, alternative methods of natural labor.

## Streszczenie

Wiele kobiet ma obawy związane z porodem, zarówno o zdrowie dziecka, jak i własny komfort w czasie porodu. Boją się wielogodzinnego bólu porodowego, a także chwili samego rodzenia się dziecka. Poród w wodzie jest alternatywą dla tradycyjnego porodu drogami natury, wykorzystuje pozytywny wpływ ciepła i samo działanie wody. Ciepło ma działanie relaksacyjne dla mięśni oraz zmniejsza odczuwanie bólu, a woda działa ogólnie relaksacyjnie oraz zmniejsza odczuwanie ciężaru własnego ciała, dzięki czemu ułatwia zmianę pozycji w czasie porodu. Mimo tych korzyści pozostaje wiele nierozstrzygniętych pytań, m.in. dlaczego wanny znajdują się tylko w nielicznych szpitalach oraz dlaczego płacimy tak dużo za porody w wodzie (do kilku tysięcy złotych). Pozostają pytania dotyczące czynników i zjawisk, które powodują, że poród w warunkach wodnych przebiega łagodniej. Woda, jej szum i delikatne ruchy działają relaksacyjnie i powodują ogólne rozluźnienie, w związku z czym poród jest dużo przyjemniejszy – nie tylko dla matki, ale również dla dziecka: przechodzi ono łagodnie z jednego wodnego środowiska do drugiego. Celem pracy jest pokazanie korzyści i zagrożeń dla matki i dziecka w czasie porodu w wodzie. Ma to szczególne znaczenie w obecnym czasie, kiedy kobiety mają prawo decydować o drodze porodu i sposobach radzenia sobie z bólem. Logiczne więc jest to, aby rodzące były dobrze poinformowane o korzyściach i ryzyku takiego porodu. Alternatywne sposoby odbywania porodu drogami natury nie decydują o postępie w położnictwie, ale czynią położnictwo mniej zdehumanizowanym. Dają ponadto możliwość lepszego bezpośredniego kontaktu położnej z rodzącą kobietą, który zmniejszył się w sytuacji zastosowania wielu urządzeń monitorujących, konieczności kontroli ich wykresów, zwalniając niejako położną z obowiązku bezpośredniego kontaktu z rodzącą i niesienia jej wsparcia. We współczesnym położnictwie synonimem naturalnego porodu nie może być wstecznictwo. Pomimo postępu, jaki od 1805 r. dokonał się w położnictwie, opinie na temat porodu w wodzie są kontrowersyjne. Poród w wodzie i imersja wodna działają analgetycznie, antystresowo. Poród w wodzie skraca drugi okresu porodu oraz zmniejsza zużycie oksytocyny w tym okresie. Różne źródła podają natomiast różne wyniki dotyczące czasu trwania pierwszego okresu porodu, stosowania nacięcia krocza, liczby obrażeń krocza. Około 2-krotnie częściej po porodach w wodzie niż po konwencjonalnych porodach występują krwawienia poporodowe. Nie ma zaś wątpliwości, co do tego, że noworodki urodzone w wodzie nie odbiegają w punktacji Apgar od noworodków urodzonych tradycyjnie. Popularność porodów w wodzie i imersji wodnej jest w Polsce często wykorzystywana jako źródło reperowania budżetu oddziałów położniczych, a nie jako metoda odejścia od tradycyjnego położnictwa (**Adv Clin Exp Med 2011, 20, 3, 391–397**).


**Słowa kluczowe:** poród w wodzie, zanurzenie w wodzie, alternatywne metody naturalnego porodu.

Despite the enormous advances in knowledge that have been made in obstetrics since 1805, water births are still a controversial issue [1]. The authors' own observations and a review of the literature show that water birth is an alternative to conventional methods of childbirth that is safe for both for mother and child [1–3].

The main aim of obstetrics today is to ensure the safety of mother and child during pregnancy and labor, which should be possible due to trained staff who ensure the physical comfort of the woman giving birth, and to well-organized and well-equipped delivery rooms. A shift towards integrated medicine, using methods with scientifically proven effectiveness, as well as those that are effective although not yet fully understood, seems inevitable [4].

The first documented description of water birth dates back to 1805, in a report from southern France [1]. A woman who was exhausted from two days of ineffective labor was advised to relax and rest in water. To everyone's surprise, shortly after immersion in water, the woman bore her child without any help, and moments later a healthy baby floated to the surface. Michel Odent, MD, who has been called "the father of water birth", oversaw water births from 1978 to1985 at a hospital near Paris. In 1983, he described 100 cases of water immersion of pregnant women and only seven full deliveries in water: "The water is ordinary tap water, at a temperature of 37°C […] We tend to reserve the pool for women who are experiencing especially painful contractions (lumbar pains, in particular), and where the dilatation of the cervix is not progressing beyond about 5 cm" [1]. This was the beginning of an era of scientific research on water births.

In Poland, the first water birth took place in 1996 in Lodz; the first labor with water immersion was in Tychy. In recent years, the image of obstetrics has changed: It has become safer, more diverse, more holistic and better oriented to women's needs. For women and couples, birth is a major and special event. It is something more than the purely medical act of delivering an infant. The safety of the mother and child is not the only determinant of the quality of care. The nearly-forgotten idea of natural birth has been revived in opposition to the view that an obstetrics unit equipped with the most advanced technology is all that is necessary to guarantee good results and satisfied mothers.

Water therapy (or hydrotherapy) is treatment with water using two factors: heat and water. The heat provides analgetic, spasmolytic and relaxing effects; it also facilitates and accelerates the first stage of labor. Water's weight-bearing quality makes it easier to change position during labor [2]. Water immersion and water birth reduce

anxiety and relieve pain during childbirth [2, 5]. Water birth or water immersion lead to reductions in perineal trauma, medical interventions and the use of drugs [1, 2, 5].

In water immersion, the woman giving birth stays in the water during the first stage of labor, while the second stage is conducted out of the water. Immersion does not begin until cervical dilation has progressed to 5 cm. If the delivery is not inhibited after immersion, the doctor may encourage the patient to stay in the water during the second stage of labor as well [1, 5]. Delivery takes place in the obstetric bed after immersion. The time the patient spends in the water is limited to 30 minutes. The water temperature is around 37°C.

In water birth, the second stage of labor takes place in the water. Because sounds and lights are more subdued underwater and the transition of the child into water is gentler, it reduces the shock that the newborn endures when emerging from the intrauterine environment. In most cases the mother's first contact with the newborn takes place while the mother is kneeling in the water. After delivery the child should stay beneath the surface of the water for about 30 seconds, floating freely, supported by a midwife. When the newborn is under water, there is no danger of aspiration. Prior to birth the fetus is in an aquatic environment (amniotic fluid) and in water birth it passes from water into water. Until umbilical cord pulsation ceases, oxygen is still delivered into the body through maternal circulation. After the birth the child is taken out of the water with the occiput up, which is the best position to reduce the risk of the newborn aspirating water. The first breath is triggered by contact with the air and the difference in temperature [1, 6, 7]. The placenta should not be expelled in the water, but after the water is let out of the tub, to prevent maternal contact with the contents of the uterus [8].

Water immersion and water birth reduce the need for medication or obstetric interventions, facilitate relaxation, relieve pain and reduce discomfort during strong contractions [2, 4]. Water is an environment that naturally attracts humans and is a source of renewal and joy. During the nine months of pregnancy the fetus develops inside the uterus in the amniotic fluid. Water is also a component of the human body. It can be used therapeutically, as a medium for physical and chemical stimuli [2, 5]. Water immersion and water birth reduce anxiety and relieve pain during childbirth [1, 2, 5].

A body immersed in water during a bath is affected by many biological and physical factors – mainly heat and hydrostatic pressure. A warm bath soothes and relaxes. It helps relieve tension and pain, and has a calming effect. Scientists say that water affects the autonomic nervous system tension, which is the source of its analgesic effect [1–3]. Childbirth involves both physical and a psychological effort, which is why bathing in warm water can be very helpful in the course of that act. The bath also reduces pain and discomfort during maternal pushing, due to the decreased action of gravity, the reduced release of catecholamines and the increased release of endorphins [1–3]. It has a strengthening and stimulating effect on peripheral muscles, so that contractions are less painful and more effective, which greatly speeds up delivery and shortens its duration [1–3]. While bathing, the pelvic floor muscles relax, becoming more susceptible to stretching, which can to some extent minimize the need for episiotomy or the spontaneous rupture of the perineum [1, 3].

But statistical studies are surprising: Cortem et al. reported that water birth results in shortening the second stage of labor in comparison to land birth, but also noted that in water births there is an increase in the incidence of third-degree tears and no less overall perineal trauma. This is a result of physical limitations to the midwife's ability to prevent damage to the perineum during pushing [9]. These results differ from other authors' data, in which the proportion of perineal incisions in water deliveries amounts to only 13% of the rate in births in the obstetric bed. Also, the percentage of perineal ruptures is the lowest in the group of women who gave birth in water [10]. Other data indicate that water births increase the patients' satisfaction but do not protect against perineal tears and even may prolong first stage of labor [11].

Hydrostatic pressure – pressure exerted on the surface of the body submerged in water – increases intra-abdominal pressure, which can be very useful during pushing in the second stage of labor. This also contributes to lowering energy expenditure during the exercises associated with maternal pushing. In addition, immersion in water induces a balanced distribution of blood throughout the body and increases stroke volume.

The buoyancy of water is a highly advantageous feature. Due to displacement, a 70-kg body submerged in water (except for the head and neck) behaves as if it weighed 10 times less, which means that the mother can more easily change her position during contractions and pushing, as compared to conventional labor [12].

Water immersion and water birth are new and unfamiliar to most Polish doctors, nurses and midwives. In assessing the woman's overall state one should pay attention to blood pressure (systolic blood pressure increases by an average of 8 mm Hg, and after the bath it goes back to nor-

mal; the diastolic pressure does not change) and body temperature (which increases an average of 0.3°C) [13].

There are of course some limitations on water deliveries. Normal births that do not require intervention from a doctor or midwife can be conducted in water. Candidates for giving birth in water are women without medical or obstetric risk factors who wish to give birth that way. Women who express a wish to have a water birth are seen by a senior member of a midwifery team. Acceptance criteria are gestation of at least 39 weeks, cephalic presentation, normal fetus size, a reactive cardiotocograph (CTG) and clear amniotic fluid if the membranes were already ruptured [14]. During childbirth the woman can enter the water whenever she feels a need for it, as long as there is no need for close monitoring of the mother or child. Not every birth can be completed in the water, but it is very rare that a woman cannot enjoy the water during the first or even the second stage of labor.

Monitoring the fetus's condition is a very important part of medical care, and usually involves advanced technology, which can be difficult to use safely in water: Since water is a good conductor of electricity it can be dangerous not only for the woman giving birth and her child, but also for medical personnel. Maintaining safety precautions in this situation is a priority issue. Evaluation of the fetal heart rate may be carried out using a waterproof detector for computerized or traditional CTG, or through fetal heart auscultation above the surface of the water.

While water birth generally accelerates and shortens labor, it sometimes leads to the opposite effect: If the woman enters the water too early, labor can be slowed down or inhibited, so the woman should enter the water only when the dilation of the cervix reaches 4–5 cm [11, 14].

The temperature of the bath water should not exceed 37°C, and temperature of the delivery room should be 26–27°C. A warm bath affects peripheral vasodilatation, causing decreased blood pressure and thereby reducing placental blood flow. The temperature of the unborn child is also higher by about 0.05–0.1°C due to the temperature difference between the fetus and mother depending on fetal circulation and heat release by the fetus [15]. If the water is at 38° C, oxygen consumption increases significantly due to vasodilation [8]. Overheating the mother by immersing her in water at temperatures much higher than the temperature of her body can lead to hyperthermia of the fetus [3].

Because mucus with blood is expelled at the time of the first contraction following the release of forewaters, a properly assisted water delivery entails taking care of details such as a systematic exchange of water. The following list summarizes the principles for conducting water immersion and water birth, which have been developed over years of practice:

1. Agreement to water birth by a well-informed woman (after medical clearance).
2. A qualified midwife.
3. Water temperature around 37°C, which should be recorded in the documentation.
4. Air temperature around 26–27°C.
5. A tub suited for use in water births, equipped to enable rapid outflow and changes of water.
6. Sessions of immersion in the bath water must be limited to 30 minutes due to adverse changes in body electrolyte level after lengthy immersion.
7. To reduce the loss of electrolytes, an aqueous solution of salt (0.9 kg per 100 liters of water) can be used.
8. In various medical centers different depths of immersion are used. Many authors believe that the abdomen of the pregnant woman should be above the surface of the water to prevent respiratory difficulties, while others believe that hydrostatic pressure is one of the factors facilitating pushing and delivery (Fig. 1).
9. Immersion should be initiated when the opening of the uterine cervix is about 5 cm.
10. Monitoring the fetus by CTG is carried out above the water surface or under water using waterproof detector.
10. If necessary, episiotomy can be carried out under water. The decision rests with the midwife.
11. The time the infant spends in the water is kept to a minimum – from 30 seconds to 1 minute.
12. Taking the newborn out of the water is a crucial element of water birth. The occiput should be taken out first, preferably in an upright position.
13. Cutting and dressing the umbilical cord is performed in the same way as in land birth.
14. The newborn should have direct contact with the mother. The baby should be in a position where he/she can find the mother's breast without difficulty and where he/she is protected against heat loss (Fig. 2).
15. The discharge of the placenta should take place outside of the water.

Water immersion reduces labor pain and increases the mother's satisfaction with natural delivery [4], and also benefits the baby. Avoiding analgesic drugs during childbirth eliminates their side effects on the fetus. The reduced pressure gradient between the vagina and the external environment allows the head to pass easily through the pelvis [14]. Water birth reduces the infant's emotional and somatic stress: Since water is a fa-

**Fig. 1.** Water birth in hospital SPZOZ Nowa Ruda (author M. Wojtysiak)

**Ryc. 1.** Poród w wodzie w szpitalu SPZOZ Nowa Ruda (fot. M. Wojtysiak)

**Fig. 2.** The latch-on mother's breast (author M. Wojtysiak)

**Ryc. 2.** Po porodzie dziecko zostaje przystawione do piersi matki (fot. M. Wojtysiak)

miliar environment, it gives the baby a feeling of safety and comfort [1–3]; and water birth is usually shorter and gives the child freedom of movement. Newborns under water move their arms and legs, open their eyes and do not cry. After the birth they breathe calmly in their mothers' arms, smoothly adapting to the conditions of the external environment [1–3]. The mother's emotional state has a direct impact on the child: A quiet, relaxed mother calms a stressed child, and the woman's response to stress during childbirth may program the child to respond similarly to stress in later life [16, 17]. Children born in the water can have immediate bodily contact with their mothers: Women take their children out of the water to make close face-to-face contact with them [1].

Heat and water immersion very clearly affect respiratory depression. In a very interesting experiment conducted on lambs born under water, it was found that even when the umbilical cord was cut they did not take their first breaths; it was only when they were above the surface of the water surface and the cooler air contacted the nostrils that the newborn animals initiated their first breaths [1]. Antepartum fetal breathing is periodical, occupying about 40% of the time during active and quiet sleep; only small amounts of amniotic fluid are aspirated into the respiratory tract because the larynx acts as a valve, assisted by the blocking of the respiratory muscles [15]. The cooling of the natural environment of the fetus by 1–2°C initiates breathing movements, synchronizing the wings of the nose and the respiratory activity of the diaphragm. The temperature of the environment is thus the primary determinant of fetal respiratory efficiency and the capacity for survival after the closure of the umbilical cord [1, 15]. After water birth, once the newborn is above the surface of the water, he/she starts breathing air quietly, without crying, and gas exchange takes place gradually. The child is ready for independent breathing after an average of three minutes, and at that moment the umbilical cord is cut; there is no danger of any sudden cut-off of the baby's oxygen source under

the water [15]. Obstetricians engaged in water deliveries have observed that the newborns' Apgar scores and umbilical blood pH do not differ significantly from those of children born by conventional methods [11, 14, 15].

To reduce the stress of labor, it is important to create a pleasant atmosphere in the delivery room. The type and intensity of illumination of the room is of great importance for the well-being of women giving birth; at the time of birth the light should be subdued, contributing to an atmosphere of calm and intimacy [1, 15]. Unnecessary noises should be eliminated. Conversations should be conducted in a calm voice, and the staff should maintain a calm attitude to help eliminate anxiety. At Dr. Odent's clinic in Pithiviers, France – the "Mecca" of water birth – the delivery room is predominantly blue in color, with walls reminiscent of ocean waves. Navy blue curtains and potted plants enhance the atmosphere of calm. In the middle of the room there is a large blue pool. The pool is over two meters in diameter and seventy-five centimeters deep, in which two people can fit – the woman in childbirth and an accompanying person. The woman can be completely immersed in the water during labor [18].

The authors conclude that for low-risk women delivered by experienced professionals, water births are safe both for mothers and newborns. However, perinatal morbidity after water birth is not as rare as was originally thought [19–22]. Water aspiration and infection are the main reasons for the hospitalization of water-born newborns in intensive care units [13, 19, 23]. On the other hand, the rate of Group B Streptococcus (GBS) among water-born babies is far lower than in babies born by conventional methods [24]. Umbilical cord rupture is another rather frequent complication in water births, and also requires intensive management for the newborn [25].

In recent years, there has been a major shift in obstetric approaches to issues related to childbirth. Efforts are being made to provide an environment for childbirth that resembles domestic, natural conditions but is also safe and comfortable. Allowing women to choose where and how to give birth, as well as the use of the various achievements of modern obstetrics, is growing in importance. Water immersion during labor can be a positive experience for women, but the freedom to make decisions must of course be balanced with education [26]. Women also report that the water helps to reduce their fear of pain and to maintain their sense of control over delivery without anesthesia, and "[w]omen's knowledge contributes an important part of the evidence on which obstetricians base the practice" [17]. The increasing availability of water births in Polish hospitals often reflects a desire to bolster the maternity unit's budget rather than a belief in the advantages of natural birth. The prices charged for water birth in Polish hospitals are much higher than its actual cost, which makes water delivery prohibitively expensive for many parents. It seems that at present water birth and water immersion are steps toward commercializing obstetrical care rather than an effort to relieve the stress associated with conventional labor and delivery.

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