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Poród w immersji wodnej

Personal experiences of water birth

Streszczenie

Wstęp. Poród w immersji wodnej jest jedną z nowoczesnych metod prowadzenia porodu.

Cel. Celem pracy jest ocena wpływu immersji wodnej na przebieg porodu, stan rodzącej i noworodka oraz ocena satysfakcji pacjentek po porodzie.

Materiał i metody. W pracy przeprowadzono badania za pomocą anonimowej ankiety według własnego opracowania. Zebrany materiał poddano analizie statystycznej z użyciem programu Statistica oraz Excel. Badania były prowadzono od października 2009 roku do marca 2010 roku wśród 74 losowo wybranych pacjentek po porodzie odbytym w Wojewódzkim Szpitalu Specjalistycznym we Wrocławiu.

Wyniki. Do porodu klasycznego częściej przygotowywał lekarz prowadzący ciążę w poradni (49%), a do porodu w immersji wodnej – położna w szkole rodzenia (51%). W obu grupach wskaźnik procentowy dotyczący obecności ojca dziecka wynosił około 86%. 73% kobiet urodziło dziecko bezpośrednio do wody najczęściej w pierwszej i drugiej immersji. Żaden z porodów w immersji wodnej nie zakończył się zabiegiem, a kobiety istotnie niżej oceniły poziom bólu niż w grupie kontrolnej. Woda mogła mieć wpływ na osłabienie dynamiki skurczów i przedłużanie się porodu. 46% kobiet rodzących w immersji wodnej twierdzi, że pierwszy okres porodu trwał krótko drugi okres porodu trwał długo i bardzo długo według oceny 14% rodzących w wodzie i 5% poza wodą. W czasie porodu w immersji wodnej rzadziej zachodzi konieczność nacięcia krocza. W grupie badanej istotnie częściej nie stwierdzano obrażeń narządu rodnego (27%) w porównaniu z grupą kontrolna (8%). Stwierdzono brak różnicy w częstości powikłań w III okresie porodu w grupie badanej i kontrolnej. Nie obserwuje się zwiększonego krwawienia okołoporodowego u rodzących w grupie badanej w porównaniu z grupa kontrolną.

Wnioski. Poród w immersji wodnej przy zachowaniu odpowiednich warunków może być alternatywą dla klasycznego położnictwa.

Słowa kluczowe: immersja wodna, poród w wodzie, poród drogami natury.

Abstract

Introduction. Water birth is one of the advanced methods of labour managing.

Aim. The aim of this study is the assessment of the influence of water immersion on labour progress, condition of mother and newborn as well as the women's reported contentment with childbirth.

Material and methods. An anonymous survey of own design was used for the research. The gathered material was statistically analyzed using Satistica and Excel software. The research was conducted from October 2009 till March 2010 on 74 randomly chosen women, giving birth at The Regional Specialist Hospital in Wrocław.

Results. The preparations for a traditional birth were carried out by the attending physician at the clinic (49%), while the ones for the water birth, by a midwife at a birth center (51%). In both groups the father was present in 86% of the cases. Seventy three per cent delivered during the first or second immersion. No instrumental procedures were required during the whole process of water birth and lower pain levels in comparison to the traditional method were reported. The water could have decreased the intensity of contractions and slowed the labor. The first stage of labor was reported as short by women who chose the water method (46%), while the second stage was reported as a long one by the same group of women (14%) and as a very long by women who chose the traditional method (5%). Compared to the traditional birth, episiotomy rates for a water birth are distinctively lower, as well as sex organ injuries – 27% in the former and 8% in the latter. There is no difference in the rate of complications in the third stage of labor between the test group and the control group. Compared to the control group no increase in perinatal bleeding was observed in the test group.

Conclusions. After meeting adequate conditions water birth can serve as an alternative to traditional obstetrics.

Keywords: water immersion, water birth, vaginal birth.

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INTRODUCTION

For many women and parents the childbirth is the most important psychosocial experience of their lives. It is significantly more important than just a labor seen from a strictly medical point of view and should therefore gain "experience characteristics" rather than just secure clinical results [1]. This study shows one of the advanced methods of labor managing, involving the beneficial effect of water, for both mother and fetus. It attempts to assess maternal perception of pain and general satisfaction during the water birth.

Benefits for the mother of being immersed in warm water during childbirth include:

1. Relaxation.
   Together with proper breathing relaxation regenerates strength and provides an increase in resistance, both physical and psychic.
2. Pain relief.
   Immersion in water significantly reduces pain perception through muscle relaxation and increased tissue oxygenation. It is a simple and natural way of reducing the use of analgesics.
3. Relaxation of perineal and pelvic floor muscles.
   Warm water increases the elasticity of perineal tissues thus reducing the risk of ruptures and the use of episiotomy. Less perineal trauma is observed.
4. Relaxation of the cervix – faster dilation.
   The research studies conducted by Lenstrup et al. show a faster dilation of the cervix in women giving birth in water. Average dilation of 2.5 cm per hour was observed, where traditional birth has a dilation of 1.25 cm per hour [2-5]. Water birth also reduces the use of spasmolytics and occurrence of cervical dystocia [6].
5. Possibility of adopting a variety of different positions.
   Being immersed in water allows easier movement and different positions.
6. Emotional impact.
   Increase in overall mental comfort
7. Other benefits.

In publications on water birth authors also mention:

- increased blood plasma volume and renal blood flow,
- lower rennin, aldosterone, angiotensin and vasopressin concentration,
- buoyancy lowering uterus weight, thus leading to a decrease in the pressure on the sacrum and associated pain,
- faster descent of the fetal head,
- increased uteroplacental flow.

Benefits for the baby

Warm water is thought to resemble the pre-natal intrauterine environment- the amniotic fluid, thus allowing an easier transition from the birth canal to the outside world. It helps to eliminate the sudden onset of gravity, a rapid change in temperature as well as the blinding lights and deafening noise of the delivery room [7,8].

Risks and concerns

Risks for the mother

Any pathology not diagnosed early enough is as likely to manifest itself during a water birth as during a traditional one [9].

The possible complications include:

- inferior vena cava syndrome,
- placental abruption,
- syncope due to high temperature and humidity,
- maternal hemorrhage,
- injuries of the perineum,
- water embolism,
- increased perspiration and dehydration of the mother.

Risks for the fetus and newborn

During inappropriately managed water birth there is a risk of aspiration and drowning for the newborn. However, it is physiologically impossible for a newborn to drown during a properly managed water birth. The infant begins to breathe after its body is exposed to stress factors and not while being submerged. These factors can be divided into environmental (gravitation, cold, noise, light) and endogenous ones (pain, increase in CO2 partial pressure after closing of the umbilical vein).

Further risks for fetus and newborn include:

- tachycardia due to increased oxygen demand,
- injury of the umbilical vein due to improper delivery management,
- infection.

AIM

The aim of this study is the assessment of the influence of water immersion on labor progress, condition of mother and newborn as well as on women's reported contentment with childbirth.

MATERIAL AND METHODS

In this study an anonymous survey of own design was used. The questionnaire included 37 questions for women who gave birth being immersed in water (water birth) and 35 questions for women who gave birth in the traditional way (control group). The material also includes data from clinical documentation as well as from our own experiences from birth management. The gathered data was statistically evaluated using Statistica and Excel software. The research was conducted from October 2009 till March 2010 among 74 randomly chosen women who gave birth at The Regional Specialist Hospital in Wrocław. A BTL 3000 birthing pool was used for delivery.

Thirty seven cases of water birth were compared with 37 cases of traditional birth (control group). Cesarean sections in the control group were not taken into account. All of the surveyed women were inhabitants of Wrocław or the surrounding region. The women giving birth in water were at the age of 21-33, while the ones in the control group were at the age of 18-36. The patients' education, financial standing, abode, level of birth preparation, general satisfaction, pain levels, partner presence and duration of first and second birth stage were taken into account. Sex organ injuries were also evaluated.

RESULTS AND DISCUSSION

Statistical analysis included 37 women of regular birth progress qualified for water birth and 37 women of regular birth progress, who delivered traditionally. There were no distinct differences in the mothers' education between those two groups, but a relevantly higher proportion of fathers with university education was observed in the test group. Financial standing was approximately the same in both groups (Table 1). The test group consisted of 81% primiparas and 19% multiparas; the control group was 43% and 57% respectively. Considering the women's education and conscious decision regarding the method of labor, their choice in method of preparation for parturition was analyzed. The preparations for a traditional birth were carried out by the attending physician at the clinic (49%), while the ones for the water birth, by a midwife at a birth center (51%). Despite of the preparations at the birth center, 32% of the surveyed stated that they were not prepared for a water birth. This implies the need for the preparations to be carried out by the same midwife who will manage the birth. Her experience and practice allows the woman in labor a more informed choice as to the method. It should be noted, that most parturient women wish for their partner to be present during the childbirth. In both groups the father was present in 86% of the cases (Table 1, 2).

From among 37 surveyed patients who delivered in the water pool, 27 (73%), delivered their babies directly to the water, mostly during the first and second immersion. The remaining 10 patients (27%) left the birth tub closer to the end of the first stage or at the beginning of the second stage of labor. Labor did not progress properly in the case of two patients. For one patient the reason was cardiac disorder of the fetus. In four patients (40%), the immersion had to be stopped because cord blood samples had to be taken to the Stem Cell Bank. Three patients (30%) did not approve of water birth. Those patients delivered their children on delivery beds in a side or half-sitting position (Figure 1, 2). In each of the described cases the newborns had direct skin-to-skin contact with their mother upon delivery. According to Kornacka, thermoregulation, respiratory system adaptation and oxygenation of hemoglobin are faster in children who were laid on their mother's abdomen directly after delivery. They tend to suffer from apnea and bradycardia less frequently. They also put on weight faster [10]. Since in all these cases omphalotomy was performed after the newborns emerged, it enabled them a more gradual and gentle change to breathing with the atmospheric air.

There was no need for surgical procedures at the end of labor in any of the cases where water immersion was applied.

Our research proved that women who delivered their babies in water immersion assessed pain level as much lower than those who delivered traditionally. Contractions were felt less and were less painful in the analysis of the research mate-

TABLE 1. Statistical analysis concerning education, financial standing and place of abode in test group and control group.

Analyzed trait	Test Group N=37 (100%)	Control Group N=37 (100%)	Comparison
Mother's education:			
Primary	0 (0%)	4 (11%)	Chi-square test: $c^2_{v=2}$=4.52 p=0.105
Secondary	6 (16%)	7 (19%)	
Post-secondary	31 (84%)	26 (70%)	
Father's education:			
Primary	0 (0%)	1 (3%)	Chi-square test: $c^2_{v=3}$=10.9 p=0.012
Vocational	0 (0%)	8 (22%)	
Secondary	5 (14%)	6 (16%)	
Post-secondary	32 (86%)	22 (59%)	
Financial standing:			
Medium	5 (14%)	6 (16%)	Chi-square test: $c^2_{v=2}$=0.11 p=0.946
Good	24 (64%)	23 (62%)	
Very good	8 (22%)	8 (22%)	
Place of residence:			
Town <10,000 inhabitants	3 (8%)	0 (0%)	Chi-square test: $c^2_{v=5}$=9.95 p=0.077
10,000-25,000 inhabitants	1 (3%)	4 (11%)	
25,000-50,000 inhabitants	0 (0%)	2 (5%)	
50,000-100,000 inhabitants	0 (0%)	2 (5%)	
100,000-500,000 inhabitants	1 (3%)	0 (0%)	
>500,000 inhabitants	32 (86%)	29 (78%)	

TABLE 2. Statistical analysis of survey in both groups.

Analyzed trait	Test Group N=37 (100%)	Control Group N=37 (100%)	Comparison
Which pregnancy is this?			
First	28 (76%)	14 (38%)	Chi-square test: $c^2_{v=2}$=15.2 p=0.0005
Second	7 (19%)	23 (62%)	
Third	2 (5%)	0 (0%)	
Which delivery is this?			
First	30 (81%)	16 (43%)	Chi-square test: $c^2_{v=1}$=9.71 p=0.0018
Second	7 (19%)	21 (57%)	
Were you prepared for the delivery?			
No	14 (38%)	8 (22%)	Chi-square test: $c^2_{v=1}$=1.62 p=0.204
Yes	23 (62%)	29 (78%)	
Where and by whom were you prepared?			
Nobody	12 (32%)	8 (22%)	Chi-square test: $c^2_{v=3}$=14.6 p=0.0022
Midwife in Birthing Center	19 (51%)	15 (41%)	
Midwife in clinic	6 (16%)	0 (0%)	
Attending Physician in clinic	5 (14%)	18 (49%)	
How do you rate your preparations for delivery?			
I wasn't prepared	12 (32%)	7 (19%)	Chi-square test: $c^2_{v=3}$=5.63 p=0.131
Poor	1 (3%)	3 (8%)	
Good	12 (32%)	20 (54%)	
Very good	12 (32%)	7 (19%)	
Did you have a companion present during delivery?			
No	2 (5%)	6 (16%)	Chi-square test: $c^2_{v=2}$=5.02 p=0.081
Yes, a close person	3 (8%)	0 (0%)	
Yes, the child's father	32 (86%)	31 (84%)	

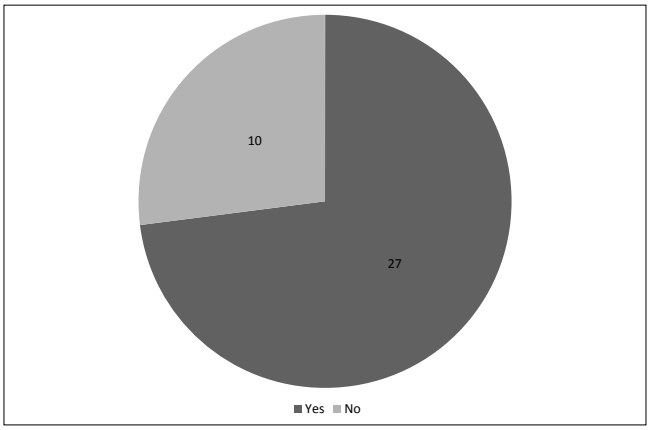

FIGURE 1. Method of water birth completion.

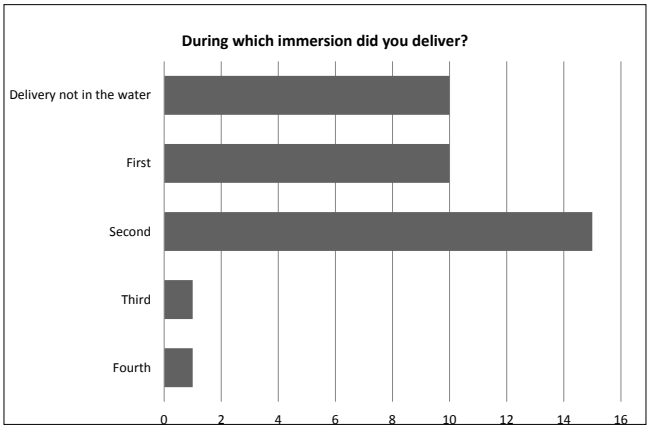

FIGURE 2. Immersion delivery.

rial for 22 parturient women (59%). According to the same number of patients, the contractions were described as intense but water relieved the pain. (Figure 3) (There was a possibility of giving more than one answer.) Similar observations were made by Michael Odent, who in 1962, was the first to recognize the benefits of warm water for relieving pain during labor.

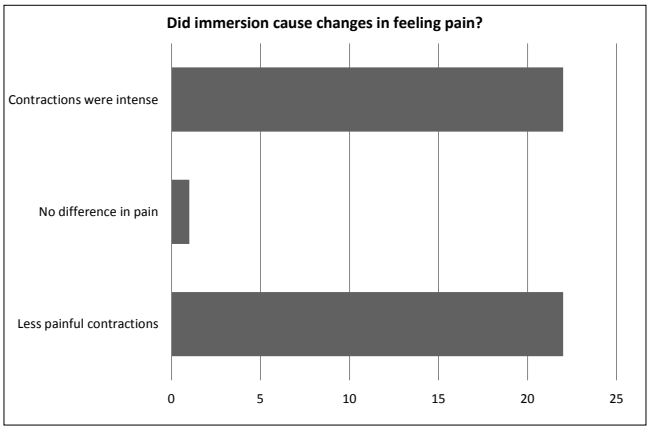

FIGURE 3. Influence of immersion on pain perception.

Only one patient from among those surveyed did not perceive any difference during contractions. It should be noted that there was a possibility of providing more than one answer in the survey to the question concerning pain sensations during water birth.

Noting the beneficial influence of water on parturient women, one must also consider if it can weaken uterine contractions and in consequence delay labor. In this respect the application of oxytocin was analyzed in the first and second stage of labor. The analyses revealed that oxytocin in the form of an infusion drip was applied in 19% of the parturient women delivering during water birth in the first labor stage and in 13% in the second labor stage, which confirmed the assumption that water might have influenced labor progress, weakening contraction dynamics and prolonging labor. Although considering 68% of parturient women in whom oxytocin was not administered, it cannot be claimed that application of water immersion considerably weakens the labor progress.

The carried out research shows that following the recommendations as to the time of one immersion, its application during labor does not have a considerable weakening effect on uterine contractions and delay in labor. This was also confirmed by Thoni and Sioma-Markowska's research [11].

The time of the first and second labor stage in the research group and control group is comparable (Table 3). Moneta at al., claim that there was no statistically relevant difference between control group and parturient women delivering during water birth as to the time of second labor stage. Church, however, observed a delay in labor in many cases [4]. According to Sipiński et al. premature water immersion with little gaping of the uterine cervix and weak uterine contractions may lead to further weakening of contractions [11].

The subjective assessment of parturient women as to the time of labor was also analyzed (Table 4). Forty six per cent of parturient women who delivered in water claimed that the

TABLE 3. Statistical analysis of pain-relief methods, level of pain perception and time of the first stage of birth.

Analyzed trait	Test Group N=37 (100%)	Control Group N=37 (100%)	Comparison
Did you use ways of pain-relief during delivery?			
Yes, natural	33 (89%)	33 (89%)	Chi-square test: $c^2_{v=2}$=0.63 p=0.731
Yes, pharmacological	7 (19%)	10 (27%)	
No	4 (11%)	3 (8%)	
Pain level from 1 to 10:			
Average $\bar{x}$	7.9	8.6	Mann-Whitney U test: Z=-2.200 p=0.0278
Standard deviation s	1.5	1.7	
Minimal value x_{min}	4	4	
First quartile Q_1	7	8	
Median Me	8	9	
Third quartile Q_3	9	10	
Maximal value x_{max}	10	10	
Time of first stage of birth [hours]:			
Average $\bar{x}$	7.3	6.1	Mann-Whitney U test: Z=1.249 p=0.212
Standard deviation s	4	3.3	
Minimal value x_{min}	3	1	
First quartile Q_1	4.8	4	
Median Me	6	6	
Third quartile Q_3	9	8	
Maximal value x_{max}	24	14	
How long did the first stage of birth last, according to you?			
Very long	4 (11%)	2 (5%)	Chi-square test: $c^2_{v=3}$=1.59 p=0.661
Long	2 (5%)	4 (11%)	
Average	14 (38%)	16 (43%)	
Short	17 (46%)	15 (41%)	

first labor stage was quick, as did 41% of parturient women from the control group; the second labor stage was perceived as long and very long according to 14% of parturient women delivering in water and 5% traditionally. Such assessment is a result of neglecting controlled straining during labor which becomes slower and regulated only by natural reactions of the parturient. Controlled straining applies the Valsavy Maneuver, which involves deep inspiration, closing of the epiglottis, holding of breath at the top of the contraction for at least of ten seconds and expiration. The research of Roberts [12] and Thomson [13] showed harmful effect of longer controlled straining. The research confirmed that the use of that method during labor leads to more frequent cardiac disorders of the fetus. Furthermore, newborn babies have lower blood pH and worse assessment in the Apgar scale [12,13]. The presented research showed that spontaneous straining has a positive effect on the general condition of the newborn. The analysis of the research allows for drawing the conclusion that 99% of the newborns delivered during water birth with the help of spontaneous straining scored 8-10 points in the Apgar scale. This is connected to a decrease in postpartum shock and lower decompensation of the child's head (Table 4).

TABLE 4. Statistical analysis of survey in both groups – continued.

Analyzed trait	Test Group N=37 (100%)	Control Group N=37 (100%)	Comparison
Time of second stage of birth [hours]:			
Average $\bar{x}$	0.74	0.88	Mann-Whitney U test: Z=-1.292 p=0.196
Standard deviation s	0.47	0.52	
Minimal value x_{min}	0.2	0.1	
First quartile Q_1	0.4	0.5	
Median Me	0.5	1	
Third quartile Q_3	1	1	
Maximal value x_{max}	2	2	
How long did the second stage of birth last, according to you?			
Very long	1 (3%)	0 (0%)	Chi-square test: $c^2_{v=3}$=1.84 p=0.606
Long	4 (11%)	2 (5%)	
Average	8 (22%)	8 (22%)	
Short	24 (65%)	27 (73%)	

The severity of injuries of the reproductive organs during labor was also assessed (Table 5). During water birth the necessity of perineotomy is less frequent. The procedure was applied in 30% of parturient women delivering in water as compared to 46% from the control group. According to Sipiński research who analyzed 135 labors in water, perineotomy was less frequent as compared to the control group.

In 27% parturient women from the research group, no reproductive organs injuries were diagnosed as compared to 8% of the controlled group. Although in the course of water birth the percentage of spontaneous rupture of the perineum of the III degree slightly increased, the percentage of spontaneous rupture of I and II degree was lower as compared to the controlled group. A different assessment can be found in Moneta et al. They claimed that in patients delivering in water, spontaneous perineum injuries of I egree were more frequent but they were not considered as serious complications [4].

Considering the relaxing influence of water without delaying the first labor stage, and sometimes even accelerating it, it can be assumed that water has a positive impact on the speed of the opening of the exterior orifice of the uterine cervix.

This article is also trying to assess the influence of water immersion on labor complications in the third labor stage (Table 6). Most authors suggest that the placental stage should be carried out outside the birth pool due to the potential danger of embolism caused by water aspiration to the open vascular spaces at the site of placental separation [11]. In the course of analysis of this author's own research material, there was no difference found in the complications frequency in the 3rd labor stage both in the research and in the controlled group. Similar results were obtained in the analysis of disorders of placenta separation and frequency of the curettage of the uterus. It was observed that the afterbirth was delivered incomplete in about 5% of deliveries in water. There was one case of postpartum hemorrhage which resulted from vaginal rupture and not the disorders of the uterine muscle involution. The analysis of the author's research materials of the labor course in water immersion revealed the absence of perinatal bleeding in the

TABLE 5. Statistical analysis of survey in both groups – continued.

Did perineal injuries occur during delivery?			
No	10 (27%)	3 (8%)	Chi-square test: $c^2_{v=5}$ = 9.38 p = 0.095
Yes, episiotomy	11 (30%)	17 (46%)	
Yes, grade IV° perineal tear	0 (0%)	0 (0%)	
Yes, grade III° perineal tear	3 (8%)	0 (0%)	
Yes, grade II° perineal tear	0 (0%)	1 (3%)	
Yes, grade I° perineal tear	6 (16%)	7 (19%)	
Yes, abrasion of mucous membrane	7 (19%)	9 (24%)	

TABLE 6. Statistical analysis of survey in both groups – continued.

Analyzed trait	Test Group N=37 (100%)	Control Group N=37 (100%)	Comparison
Did any complications occur during the third stage of birth?			
No	30 (81%)	31 (84%)	Chi-square test: $c^2_{v=3}$=3.42 p=0.332
Yes	4 (11%)	6 (16%)	
Yes, incomplete placenta	2 (5%)	0 (0%)	
Yes, hemorrhage	1 (3%)	0 (0%)	
Treatment due to complications during the third stage of birth:			
Pharmacological	3	0	Chi-square test: $c^2_{v=2}$=2.97 p=0.227
Dilation and curettage	6	6	
No complications	30	31	
Did other complications occur during the third stage of birth?			Chi-square test: $c^2_{v=1}$=0.00 p=1.000
No	36	37	
Yes	1	0	

parturients from the research group compared to the control group. Similar statements can be found in Sipiński et al. who analyzed 135 labors in water. According to their research, the average blood loss was 181 ml in the research group and 164 ml in the control group. The further analysis reveals very good mental condition in the test group in comparison to the control group. The analysis of the author's research materials of the labor course in water immersion also revealed a sensation of weakness in the first two hours after water birth. This is possibly due to prolonged exposure of the woman's body to warm water [11].

More parturient women in the test group chose to have their second delivery the same way than did those in the control group. The majority of those surveyed would recommend water birth to future mothers. The crucial factors of their positive evaluation are the freedom of movement under lower gravity and lower intensity of pain. The research of Cammu et al. did not show objective differences in birth parameters, but noted a distinctly higher level of satisfaction in the test group compared with the control group [14]. Ninety one per cent of patients analyzed by Lenstrup also showed their contentment. According to their own research, experiences and observations, the authors consider satisfaction and positive evaluation to be of the same importance as proper labor course. This opinion results from the feeling of security and understanding due to professional obstetric care and presence of a companion.

According to the conducted research, the authors consider water birth to be safe and constantly gaining popularity among parturient women (Table 7).

TABLE 7. Statistical analysis of survey in both groups – continued.

Analyzed trait	Test Group N=37 (100%)	Control Group N=37 (100%)	Comparison
How do you rate your mental state during delivery?			
Poor	4	2	Chi-square test: $c^2_{v=3}$=3.23 p=0.358
Average	8	12	
Good	14	17	
Very good	11	6	
How do you rate your mental state in the first two hours after delivery?			
I felt weak	7	1	Chi-square test: $c^2_{v=2}$=10.65 p=0.0049
I felt well	13	26	
I felt very well	17	10	
Did you feel sympathy and safety during delivery?			
I felt secure because of company of close person	26	24	Chi-square test: $c^2_{v=1}$=0.003 p=0.958
I felt secure because of professional care	34	33	
Your choice as to your next delivery would be?			
Traditional Birth	1	30	Chi-square test: $c^2_{v=2}$=49.96 p<0.0001
Water birth	35	5	
Cesarean section	1	2	
Would you recommend your choice to future mothers?			
Yes	35	37	Chi-square test: $c^2_{v=1}$=0.51 p=0.474
No	2	0	

CONCLUSIONS

1. The safety of parturient and newborn during delivery is always the supreme goal of water birth and requires as such absolute consideration and enforcement of proper birth management.
2. Recurrent immersions during intense uterine contractions cause them to be less perceptible, increase flexibility of the perineum during second stage of birth and relaxation of the patient.
3. Application of immersion during second stage of birth does not prolong the whole process.
4. Water birth contributes to greater satisfaction, relief, relaxation and improves the parturient women's mental state. Presence of a companion also intensifies their feeling of security and comfort.
5. Water births remain controversial despite considerable scientific progress and contentment of patients.

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