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Comparison of waterbirth with conventional vaginal delivery: A non-randomized controlled trial from Iran

Background

Giving birth is a natural physiological process. However, labor pain is one of the most severe pains women experience through their lives. Many strategies have been introduced in order to ease its pain. Waterbirth is a gentle management of child-bearing without invasive interventions. Despite the fact that waterbirth is performed globally, conclusive evidence approving the safety and efficacy of this approach to birth is missing in Iran.

Objective

The purpose of the current study is to compare the different features of landbirth and waterbirth, by reviewing maternal and neonatal outcomes.

Study design

Singleton term pregnant women attended to the labor center, were offered two options for childbirth: conventional and water-immersion (non-conventional) method. Fifty-three cases in the non-conventional group were matched to 53 controls in the conventional group regarding maternal age, number of gravidity and parity, and the history of abortion. Then, our water-immersed cases were divided into two separate subgroups according to the stages of labor spent in water. So, some of our results were analyzed among three groups, while others were compared between our two main groups.

Results

The cesarean section rate (Pv = 0.001), the need for episiotomy (Pv = 0.02), and the frequency of maternal complaint from lower abdominal pain (Pv = 0.001) were significantly lower in the non-conventional group. Mean duration of the first stage of labor was shorter in water-immersed parturients (Pv = 0.003). Subdividing the water-immersion group into waterlabor and waterbirth groups, mean duration of the second stage of labor showed a statistical difference among these groups (Pv = 0.01), but the third stage, did not. Mean of the first minute Apgar score was also higher in the neonates of water-immersed mothers (Pv = 0.037). Serious maternal and neonatal complications were not encountered in our study population. The majority of our cases (about 90%) were quite content with their experience of waterbirth.

Conclusion

We found waterbirth a safe and efficient method for childbearing and there was no apparent additional risk in this method.

Key words

Waterbirth, Waterlabor, Landbirth, Vaginal delivery

Introduction

The pain of childbirth is likely to be the most severe pain that a woman experiences during her lifetime. Many women, especially nulliparas, rate the pain of labor as very severe or intolerable. The pain of labor and delivery varies among women, and each labor of an individual woman may be quite different. As an example, an abnormal fetal presentation (eg, occiput posterior) is associated with more severe pain and may be present in one pregnancy, but not the next. The way pain is experienced is a reflection of the individual's emotional, motivational, cognitive, social, and cultural circumstances [1]. Interestingly, when interviewed after delivery, mothers tend to downplay the intensity of their labor pain [2] and it is not the most important factor influencing satisfaction with the childbirth experience [3].

Waterbirth has become widespread in the late 1990's as an alternative birth method. This new birth concept provides a natural and gentle birth process with less invasive birth management. The method is available in several birth centers in European countries, North America and New Zealand. It is believed that progression of labor in warm water would be more rapid and the need for medical and surgical interventions would decrease. According to a report from "Iran Ministry of Health", the rate of cesarean section in Iran is three times higher compared with acceptable standards. This may be caused by maternal concern of painful labor and false beliefs about the advantages of section. Waterbirth which is a simple and less aggressive method might encourage pregnant women to experience a new approach to labor. Several trials have showed benefits and also some adverse effects of waterbirth. Beneficial effects may include maternal relaxation, less painful contractions, shorter labors, less need for augmentation, less need for pharmacological analgesics, and fewer episiotomies [4, 5]. Among the adverse effects discussed are unrealistic labor expectations, restricted mobility, infection, and the potential problem of the neonate inhaling water [6, 7]. The systematic review produced by the Cochrane Library highlights that "although no significant adverse effects have been reported, the possibility of adverse outcome for the neonate should not be ignored" [8]. Data supporting the use of water for labor and birth is lacking in Iran. The aim of the present study was to investigate the effect of waterbirth on interventions and maternal/neonatal complications during labor, delivery, and within 28 days postpartum.

Materials and Methods

This non-randomized clinical trial was carried out between January and May 2005 in Akbar-abadi hospital in Tehran. All term pregnant women (gestational age between 37-42 weeks), presented with labor pain_ without the following criteria: multiple gestation, non-cephalic presentation, history of previous cesarean section, rupture of membrane for more than 24 hours, meconium-stained liquor, and maternal temperature > 38.3 °C _ had the option to choose one of the two different birth facilities: conventional vaginal delivery or waterbirth. Fifty-three pregnant women who accepted giving birth in water and signed an informed consent were enrolled as the case group. From those who chose conventional vaginal delivery, 53 subjects _matched to the cases respecting maternal age, number of gravidity and parity, and the history of abortion_ were placed in the control group.

Prior to immersion in water, maternal vital signs, pattern of contractions, and fetal heart rate were checked for any abnormality. Once the active phase began (defined as cervical dilation ≥4-5cm), cases were entered to the birth pool. Physical examinations were performed in both groups at similar intervals. Case group was hydrated orally, whereas subjects in control group were hydrated intravenously. No medication was applied in our cases, while oxytocin, analgesics, and antispasmodics were used in controls. These differences between two groups were due to the routine care and management of controls that we had a limited authority to change or interfere with it. Other aspects of labor management were the same in both groups.

All women in the case group passed their active phase of labor in water. Infant delivery (Stage 2) of the cases with acceptable perineal length and vaginal consistency was also accomplished in the water (waterbirth group); the remaining cases spent this stage out of water as the same as the conventional method (waterlabor group). The main cause made us expel subjects from the birth pool was the need for episiotomy. Considering the probable risk of amniotic fluid embolism, delivery of the placenta (stage 3) for all cases was done after rapid evacuating of the pool from water.

The child birth process, strategies, and equipment of this study were based on guidelines of waterbirth from Cheshire Medical Center (2004 edition) [9] and the Royal College of Midwives [10].

Statistical Analysis

Statistical analysis was performed using t-test, ANOVA, Chi-square, and Fisher's exact test as appropriate with significance considered at $Pv < 0.05$.

Results

Fifty-three women were found to be eligible and were placed in the case group (non-conventional delivery). Other 53 subjects were matched to these cases as the control group (conventional delivery). The mean age of women in the conventional and non-conventional groups was 27 (Standard Deviation=5.9) and 26.6 (Standard Deviation =5.8) years, respectively. About 26% (n=14) of cases and 30% (n=16) of controls were nulliparous, so the remainders were multiparous. In both case and control groups (35.8%, n=19 and 34%, n=18), women giving birth for the second time were in the majority.

More than 95% of the control group received medication such as oxytocin, antispasmodics, or analgesics, while none of our cases received these drugs. But as mentioned before, it is not a scientifically reliable difference, because of our limitations. Operative vaginal delivery did not exist in our study, but the cesarean section rate was significantly different between conventional and non-conventional groups (20.8% vs. 0% in the named order, $Pv = 0.001$). Comparing the different stages of labor, mean duration of stage 1 was shorter in water-immersed women than conventional group (114.4 min vs. 186.5 min, $Pv = 0.003$). As mentioned before, stage 2 and 3 were studied in three groups (conventional, waterlabor, and waterbirth). Mean duration of stage 2 was statistically different in these groups (respectively 20.2, 29.6, and 12.5 min; $Pv = 0.01$), but stage 3 was similar (7.3, 6, and 6 min in the same order; $Pv > 0.05$). Table 1 shows these findings in detail.

Mean Apgar score in the 1st min of birth, an indicator of the neonatal cardiopulmonary condition, revealed a significant difference among the three groups (Pv = 0.037). Means of Apgar scores _1st and 5th minute of birth_ are presented in table 2. NICU admission due to low Apgar score was observed in none of the groups.

The need for episiotomy was lower in the non-conventional group (34% vs. 57%, Pv = 0.02). First and second degree perineal lacerations were not statistically different (26.4% in cases vs. 14.3% in controls, Pv= 0.1) and the third and fourth degree lacerations were not encountered at all. However, these findings might need further investigations to be approved. While the prevalence of low back pain didn't show statistical difference (11% in waterbirth cases vs 24.5% in conventional controls; Pv = 0.08), maternal complaint of lower abdominal pain within 48 hours of delivery was less frequent in the case group (17% vs. 66%, Pv = 0.001) and it may be explained by the lower rate of episiotomy in this group.

Among all the study population, there was no need for prolonged hospitalization or antibiotic therapy in mothers without operative interventions within 48 hours postpartum. Neither excessive vaginal bleeding nor feeding problems were observed. Furthermore, NICU admission and maternal readmission besides the aforementioned complications were not encountered in 10th and 28th day follow-ups.

Asking from water-immersed mothers, 87% of the multiparous cases advocated waterbirth as a better experience compared with conventional delivery, and all the nulliparous ones had a positive attitude toward this method. Ninety-two percent of the entire case group expressed their preference to waterbirth as their favorite option for the next childbirth.

Discussion

Waterbirth is one of the non-pharmacologic methods supposed to reduce the pain of child bearing. This is the first study conducted in Iran to evaluate the impact of water in different aspects of labor and childbirth.

Many studies have shown the efficacy of water in reducing labor pain and, in turn, decrease in analgesic consumption [11, 12, 13, 14, and 15]. However, Eckert et al [16] and Nikodem et al [8] believe that water immersion does not offer an alternative pain management strategy. In this study, the intensity of pain was not assessed by any scoring scale, but we reviewed the psychological outcomes, such as satisfaction with care or postnatal distress through attitudes of our cases. None of the cases received analgesics or antispasmodics, but a great majority of them mentioned they would choose waterbirth in subsequent labors.

Although lower levels of labor pain have been correlated with higher levels of childbirth satisfaction, higher levels of labor pain do not preclude an overall satisfying experience. However, a sense of personal control over decision-making processes in labor has consistently been shown to correlate with overall maternal satisfaction with childbirth. As an example, in a study of 60 women who delivered vaginally, personal control predicted greater maternal satisfaction [17]. Another study of 100 women undergoing vaginal delivery found that satisfaction with pain relief was associated with a feeling of being in control and having input in the decision-making process [18]. Thus, these results suggest that to increase maternal satisfaction, women should be involved in the decision-making process regarding all aspects of childbirth, including pain relief. This can be accomplished by educating women about pain relief techniques during pregnancy, prior to the onset of labor, so that women can carefully

contemplate their options before labor commences, as rational decision-making is difficult during times of emotional stress and physical anguish.

Current study revealed that different stages of labor were affected by the use of water without adverse outcomes on maternal/neonatal morbidity and mortality. Similar to reports from Cluett et al[19], we found that the mean duration of the first stage of labor in water-immersed women and also second stage in ones who accomplished delivery in water, were significantly shorter. The fact that oxytocin to hasten the course of labor was not used in non-conventional group, made this finding astonishing. There are also studies documenting that water has no effect on duration of labor or may prolong stage 2, because of hydroanalgetic effect of water on inhibition of contractions [16, 20]. The increase in the second stage of labor in women who were expelled from the pool for delivery (waterlabor group) might be explained by the change of delivery context and the stress caused by the alteration of environmental factors.

One of the major concerns of immersion in water discussed by specialists or midwives is the neonatal outcome of underwater birth compared with landbirth. This is not evaluated in large, well-designed studies if this approach to birth is safe or not. The only randomized trial was too small to draw conclusion about the outcomes of this method [21]. There have been a few case reports of neonatal complications, such as drowning, wet lung, cord avulsion, hyponatremia, and water-born infection when birth occurs in the water bath [22]. We assessed the neonatal outcomes through Apgar scores in the first and fifth minutes of birth. Since the cut-off used for a low Apgar score is less than seven at the first minute, none of the neonates required further evaluation, resuscitation, or NICU admission. This study showed that the mean Apgar score in waterbirth group was even significantly higher than conventional group. In the waterbirth group, we never had a case of aspiration under water. None of the neonates drowned or died. These data agree with the idea saying that the first air inhalation takes place only after the face contacts with air. However, the number of mothers gave birth in water was not large enough to refute concerns based on some case reports of respiratory distress which was thought to be water-related [23].

Contrary to reports from Nikodem et al [8], Cluett et al [15] we found a significant lower rate of cesarean section in waterbirth group. Surprisingly, it occurred despite the fact that none of the cases received oxytocin for augmentation of labor.

The episiotomy is the most common operation performed on women in the United States (1050 procedures per 100000 population) [24]. The rate of episiotomy performance varies widely from 1% (Sweden) to 80% (Argentina) [25, 26], but the ideal rate of episiotomy is not known. "It is still a widespread belief that with episiotomies, third and fourth degree lacerations are avoided" [27]. In our study, the rate of episiotomy was higher in the conventional group. On the other hand, first and second degree perineal lacerations were more frequent in non-conventionals. This may be explained by the different rate of episiotomy between two groups. The third or fourth degree laceration occurred in neither of the groups. Since there is an anxiety of deep lacerations and owing to different trends in obstetric practice, it is really hard to analyze the need for episiotomy in an unbiased way.

"Waterbirth may be associated with potential complications which are not seen with land-based birth" [22]. Nevertheless, promising results have been obtained through this study. Maternal and neonatal outcomes in both groups were reviewed within 48 hours postpartum. Also, ten and twenty-eight days after delivery, Mothers and their infants were re-evaluated. We were not faced with the need for antibiotic therapy, prolonged hospitalization, or NICU admission as neonatal outcomes within

48 hours, 10, and 28 days postpartum. Additionally, maternal complications such as infection, prolonged hospitalization, excessive vaginal bleeding, feeding problems, and readmission were not seen in women gave birth in or out of water.

Comments

Although these findings support waterbirth as a safe method for delivery, other studies particularly randomized clinical trails (RCTs) with larger sample sizes should be designed to approve its safety and efficacy.

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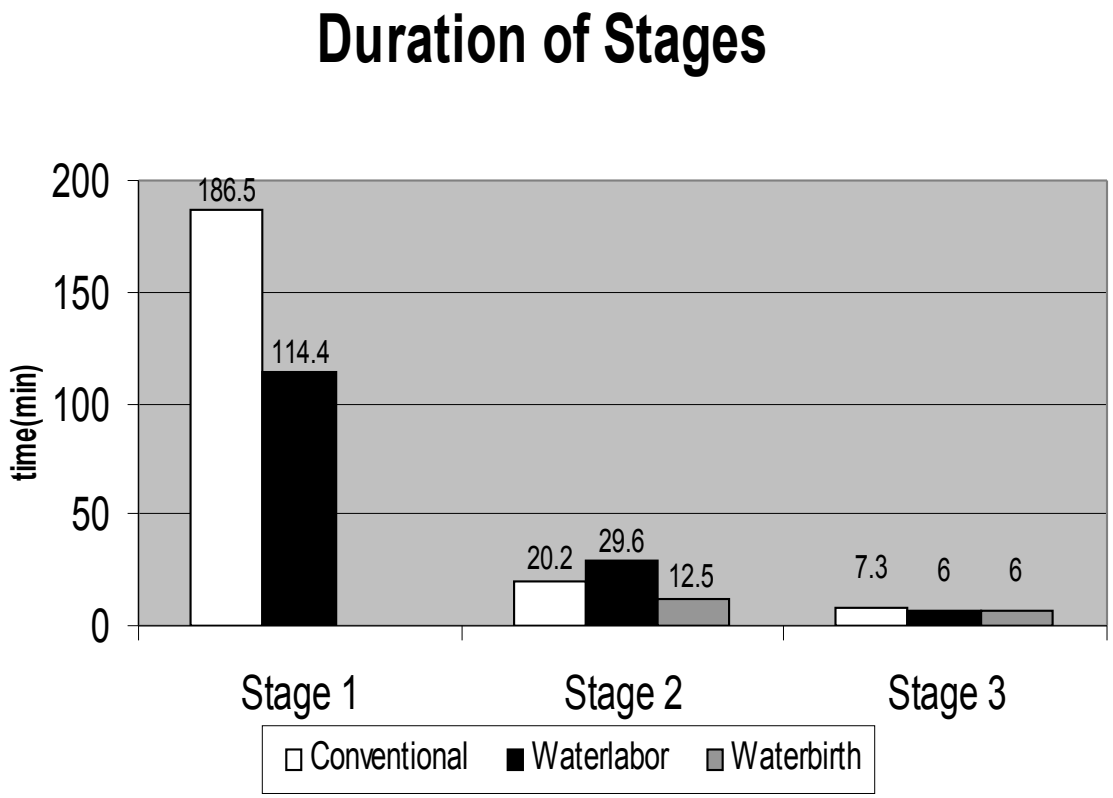

Table 1 – Duration of different stages of delivery in three groups (conventional- waterlabor- waterbirth). Consider that stage 1 is compared in two groups .((conventional and non-conventional

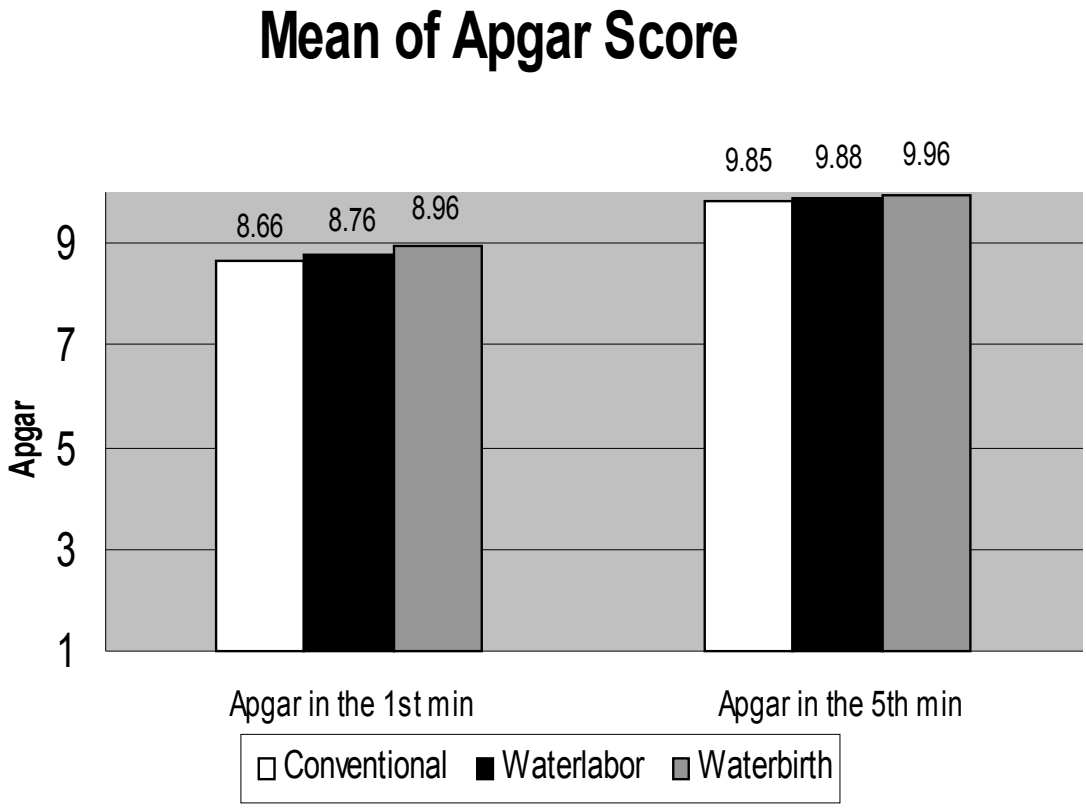

Table 2 – Mean of Apgar score in the 1st and 5th minute of birth in three groups ((conventional, waterlabor, and waterbirth

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