

THE EFFECTS OF DELIVERY IN WATER ON DURATION OF DELIVERY AND PAIN COMPARED WITH NORMAL DELIVERY

Soheila Akbari Torkamani¹, Farahnaz Kangani², Fatemeh Janani³

ABSTRACT

Objective: To assess the effects of delivery in water, as a normal way of delivery without intervention, in reducing the pain and duration of delivery.

Methodology: This is a clinical trial studying a community of Gravida one and two pregnant women at the gestational age of 38-42 weeks, referred to Asalian hospital. The sample volume was 100 cases, equally divided in two groups of routine delivery and delivery in water. The pain and duration of delivery were analyzed using K-square, Kruskal-wiallis, and mann whitney, with $p < 0.05$ considered significant.

Results: The findings show that the average duration of active delivery was 3.1 hrs \pm 0.8 in the delivery in water group, significantly lower than that of the other group, that is, 4.7 hrs \pm 0.8 ($p < 0.05$). Also the average of the second phase of delivery was 0.53 hrs \pm 0.22 in the delivery in water group, significantly lower than that of the routine group, that is, 0.88 hrs \pm 0.43 ($p < 0.05$). The amount of pain was measured in both groups using the visual analog score, yielding 3.53 \pm 0.79 in delivery in water, and 6.9 \pm 1.7 in the other group, which indicates a significant decrease in pain in delivery in water ($p < 0.05$).

Conclusion: This study indicates that delivery in water may be a suitable, nonmedical, and non invasive alternative, because it reduces the pain and duration of delivery.

KEY WORDS: Delivery in water, Normal delivery, Pain; Duration of delivery.

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1. Soheila Akbari Torkamani, MD.
2. Farahnaz Kangani, MSc
3. Fatemeh Janani, MSc
- 1: Obstetrics and Gynecology Department, Lorestan University of Medical Sciences, Lorestan, Iran
- 2-3: Dep. of Midwifery, Lorestan University of Medical Sciences, Lorestan, Iran .

Correspondence:

Soheila Akbari Torkamani
P.O. Box: 13185-1678,
Tehran - Iran.
Email: swt_f@yahoo.com

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INTRODUCTION

The science of medicine endeavors to reduce pain in patients, thus using pain killer and sedatives in many medical procedures. However, these methods are not routinely accepted in delivery which involves one of the most demanding forms of pain. Fear of delivery pain is the most important reason why many women are reluctant to undergo normal delivery and choose caesarian as the alternative, although the indications for cesarean section are many more. The American association of gynecologists has set the goal of reducing the rate of caesarian from 25.5% to 15.5% during the 2000-2010 decade.¹ In Iran, caesarian is still becoming more

frequent; the figures of the Ministry of Health report the rate of caesarian to be 3 times higher than world estimates. The common methods of reducing pain in delivery include epidural or spinal anesthesia; nitrous oxide (N₂O) in entonox capsules; and other pain killers.² Many countries use the noninvasive, non medical method of delivery in water which increases the threshold of pain in pregnant women and produces effective uterine contractions, resulting in a more easily tolerated process of delivery.

A 9-year prospective study on 9518 deliveries, comprising 3617 deliveries in water and 5901 routine deliveries, indicated that delivery in water has better outcomes for the mother and the child.³ Another comparison performed on 220 deliveries concluded that delivery in water is beneficial for difficult and long pregnancies, and reduces the need for medical interventions.⁴

A study in Tehran on one hundred nulliparous women divided in two control and case groups, indicated that the need for medical intervention, using oxytocin, analgesic, and episiotomy was lower in the case group.⁵ We conducted this study to compare the duration and pain of delivery between delivery in water and routine delivery in Asalian Hospital, Khorram Abad, Iran.

METHODOLOGY

This is a clinical trial conducted in Asalian Gynecological Hospital, Khorram Abad, from February 19, 2006 to February 19, 2007. The total number of cases was one hundred pregnant women, equally divided in two groups of delivery in water and normal delivery. Both groups were almost similar in terms of parity, age, and gestational age. The inclusion criteria were pregnant women 16-28 years old, 1-2 gravid, and gestational age of 38-42 weeks.

The study protocol was approved in ethic committee of Lorestan University of Medical Sciences, Iran and the study was conducted according Declaration of Helsinki.

For all patients a questionnaire was filled out by colleagues of the project, including the following questions:

Age; gestational age; gravidity; the duration of one and two delivery phases; score of pain; amount of analgesics and oxytocin used; need for episiotomy; neonate's Apgar score; and patient's satisfaction with the delivery mode.

If women declared their written consent to undergo delivery in water; they would enter the warm pool during the active phase of delivery; and throughout the process, the fetal heart rate, pain score, and amount of analgesics and oxytocin used would be recorded. In case of need for caesarian, the patient would be excluded from the study. If dilatation did not develop in two hours, or if the contractions were ineffective, oxytocin would be used. If the pregnant woman needed analgesics, she would be administered promethazine and the number of usages would be recorded precisely. The pain score would be estimated using visual analog score; scoring from 0 to 10.

All the quantitative variables were shown as average and standard deviation, and then they were analyzed using SPSS software and tests of variation analysis, Chi-square, Kruskal-Wallis, and Mann Whitney were conducted. P values of lower than 0.05 were considered significant.

RESULTS

The total number of cases was one hundred divided equally in two groups of delivery in water and normal delivery. Each group was further divided in two subgroups of nulliparous and second gravid women.

The mean age of patients was 20 ± 2.1 years in the nulliparous subgroup of delivery in water group, 25 ± 2.1 years in the second gravid subgroup of delivery in water group, with the grand average of 21 ± 2.5 years for all the women in the delivery in water group.

The mean age of patients was 19.8 ± 2.4 years in the nulliparous subgroup of normal delivery group, 21 ± 2.3 years in the second gravid subgroup of normal delivery group, with the grand average of 20 ± 2.5 years for all the women in the normal delivery group.

The distribution of gestational age in the community in study was shown to have 36% of cases at 38-39 weeks, 33% at 39-40 weeks, 26%

Table-I: Distribution of relative frequency of pregnant women on the basis of delivery mode and need for oxytocin

Groups	Oxytocin		Total
	Yes	No	
W (%)	16.3	83.7	100.0
L (%)	56.9	43.1	100.0
Total (%)	37.0	63.0	100.0

P<0.001

W: delivery in Water L: delivery in Land

at 40-41 weeks, and 5% at 41-42 weeks of gestational age (Table 1).

The mean duration of the active phase was 3.6 ± 0.82 hrs for the nulliparous subgroup of delivery in water group, and 2.8 ± 0.8 hrs in the second gravid subgroup of delivery in water group. The total average of the active phase was 3.1 ± 0.8 hrs for the delivery in water group.

The mean duration of the active phase was 5.2 ± 0.5 hrs for the nulliparous subgroup of normal delivery group, and 4.32 ± 0.8 hrs in the second gravid subgroup of normal delivery group. The total average of the active phase was 4.7 ± 0.8 hrs for the normal delivery group.

The mean duration of the second phase of delivery was 0.62 ± 0.21 hours for the nulliparous subgroup of delivery in water group, and 0.34 ± 0.8 hours for the second gravid subgroup of delivery in water group. The total average of the second phase of delivery was 0.53 ± 0.22 hours for delivery in water group.

The mean of the second phase of delivery was 0.88 ± 0.43 hours for normal delivery group; therefore, the reduction in the active and second phases of delivery in water was statistically significant in comparison with the normal delivery group ($p < 0.05$).

The patients were administered oxytocin, if their delivery did not develop in the active phase. The amount of oxytocin used for both groups was studied. The results show that 83.7% of patients in the delivery in water group, and 43.1% of patients in the normal delivery group did not need oxytocin. The reduction in need for oxytocin with delivery in water is significant in comparison with normal delivery group ($p < 0.05$) (Table-I).

Table-II: Distribution of relative frequency of pregnant women on the basis of delivery mode and need for painkillers

Groups	Analgesic		Total
	Yes	No	
W (%)	14.3	85.7	100.0
L (%)	58.8	41.2	100.0
Total (%)	37.0	63.0	100.0

P<0.001

W: delivery in Water L: delivery in Land

The amount of analgesics (promethazine in this study) used for both groups was studied. The results show that 85.7% of patients in the delivery in water group, and 41.2% of patients in the normal delivery group did not need analgesics. The reduction in need for analgesics with delivery in water is significant in comparison with normal delivery group ($p < 0.05$) (Table-II).

The pain score was assessed for both groups using the visual analog score. In this method, the severity of pain is scored based on the patient's perception of pain from 0-10. The results indicate that the average pain score was 3.53 ± 0.79 for the delivery in water group, and 6.96 ± 1.7 for the normal delivery group. The reduction in pain score with the delivery in water group is significant in comparison with the normal delivery ($p < 0.05$) (Table-III).

Sixty one percent of patients in the delivery in water group did not need episiotomy, whereas 35.6% of patients with normal delivery needed episiotomy. The reduction in need for episiotomy in the delivery in water group is significant in comparison with the normal delivery group ($p < 0.05$) (Table-IV).

The newborns of women giving birth in water never had five minutes Apgars of lower than 8; 85.7% of these patients had Apgar 10, and 14.3% had Apgar 8-10. 54.1% of patients in the normal delivery group had Apgar 10, 31.3% had Apgar 8-10, and 14.6% had Apgar 6-8, and one neonate needed NICU

After the delivery, the patients were asked about their satisfaction with the delivery mode. About 72.3% of patients declared that they will certainly choose this mode for their next

Table-III: Average pain score in pregnant women considering delivery mode

Groups	Pain		
	N	Mean	Standard deviation
W	50	3.53	0.79
L	50	6.96	1.7
Total	100	5.28	2.17

P<0.001

W: delivery in Water L: delivery in Land

pregnancy, 21.3% mentioned that they may choose it for the next pregnancy, and 6.4% announced that they will certainly not choose it for their next pregnancy and will choose caesarian. In the normal delivery group, 8.7% of patients said that they will certainly choose this mode for their next pregnancy, 39.1% declared that they may choose it for their next pregnancy, and 52.2% said that they will not become pregnant again, or will choose caesarian as the alternative mode. Four patients in the delivery in water group and nine patients in the normal delivery group needed caesarian and were excluded from the study.

DISCUSSION

The results of the study in Asalian Hospital depict that the durations of the 1st and 2nd phases of delivery are much shorter in the delivery in water group than those of the normal delivery group, probably because of warm water touching the nipples and stimulation oxytocin secretion, leading to effective contractions. Also, the sitting position in water and the hydrostatic effect of water increase the force of contraction in pelvis and ameliorate the descent of the presenting part.

Therefore, Cluette et al. proposed delivery in water as an alternative in cases of non developing deliveries and dystocia, with the purpose of reducing medical interventions like administering oxytocin.⁶

One study comparing 70 women undergoing delivery in water and 70 undergoing normal delivery did not show any change in the duration of the active phase of delivery. On the other hand, the duration of the second phase of

Table-IV: Distribution of frequency of pregnant women on the basis of delivery mode and need for episiotomy

Groups	Episiotomy		Total
	Yes	No	
W (%)	38.8	61.2	100.0
L (%)	64.4	35.6	100.0
Total (%)	51.1	48.9	100.0

P=0.010

W: delivery in Water L: delivery in Land

delivery was reported to have taken nine minutes longer in water than in normal delivery, a feature attributed to the hydroanalgesic properties of water that relaxes the contractions to some extent but does not interfere with the delivery process. Also the pain score and the need for episiotomy were reported to be smaller with delivery in water; and the conditions of the newborn with respect to respiration and Apgar were reported equal in both groups.⁷

One study on 220 deliveries in water in 2005 concluded that delivery in water is helpful for cases of difficult delivery and facilitates the process.⁴ Our study indicates that the pain score and the amount of analgesic needed are significantly lower with delivery in water than normal delivery: 85.7% of those delivering in water and 41.2% of those undergoing normal delivery did not need analgesics). Geissbuehler et al. 2004 reported that 69.7% of deliveries in water and 58% of normal deliveries did not need analgesics.⁸

Our study in Asalian Hospital indicates that 83.7% of deliveries in water and 43.1% of normal deliveries did not need oxytocin. Bourke et al. reported that no delivery in water required oxytocin administration and 98% of multiparous women mentioned that delivery in water is easier than normal delivery.⁹

In our study, 61% of deliveries in water and 35.6% of normal deliveries did not need episiotomy which shows a significant difference. Comparing with other studies, our study involves more cases of episiotomy, apparently due to our caution to prevent 3rd and 4th grade laceration.

One study on 2000 deliveries reports a significant reduction in episiotomy, blood loss and also pain with delivery in water. Also in this study mothers' satisfaction and 5th and 10th minute apgars of newborn were significantly higher.¹⁰

Our study showed no case of Apgar lower than 8 or NICU requirement with delivery in water. Whereas with normal delivery, 14.6% of newborns had Apgar 6-8, one case needed NICU, and one neonatal death. Also in one study in October 2000, no case of aspiration or perinatal complications was observed with delivery in water and they proposed this mode of delivery with close monitoring of mother and newborn to be the safest for mother and neonate.¹⁰

Grunebaum et al. reported that 6.49% of neonates born in water and 0.5% of neonates born normally needed NICU.¹¹ On the other hand, Joanne et al. concluded that with delivery in water, the neonatal acidosis decreases and the PCO₂ of umbilical artery is significantly lower than normal delivery.¹² Kwee et al. reported that the hydrostatic effect of water increases central blood volume and enhances placental uterine circulation, leading to ameliorating fetal conditions and preventing fetal distress.¹³

Johnson et al. concluded that with delivery in water, owing to the appropriate water temperature, lack of voice, touch, etc. stimuli, smaller effect of gravity on the newborn, and intactness of umbilical cord the neonate will not start breathing and thus will not aspirate water before emerging from the pool.¹⁴ A BMG report indicates that delivery in water is 95% safe and beneficial, with only a small risk of water aspiration, the reason of which is intactness of umbilical cord before taking the neonate out of water.¹⁵

CONCLUSION

Delivery in water may be an appropriate alternative for normal delivery due to reduction the duration of delivery, pain, medical intervention such as administering analgesics, oxytocin and episiotomy, and also lack of adverse effects on the neonate. Delivery in water, if performed

with close monitoring of mother and newborn, is totally safe for both.

Considering the patients' satisfaction with this mode of delivery and their desire to experience it again for their subsequent pregnancies, it may be a proper way to prevent elective caesarians, a measure in line with maternal health which promotes natural delivery.

Finally, we propose encouraging pregnant women to select this mode of delivery through providing health centers with the necessary equipment, educating health personnel, and also increasing the knowledge of pregnant women about the advantages of this mode of natural delivery.

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REFERENCES

1. Cuninghohm FG, Leveno J, Bloom SL, Hault JC, Gilstrap LC, Wenstrom KD, editors. Williams obstetrics. 22nd edition. New York: McGraw-Hill; 2005.
2. Miller RD, Flisher LA, Johans RA, Savarese JJ, Wiener-Kronish JP, Young WL, editors. Miller's Anesthesia. 6th edition. Philadelphia: Elsevier, Churchill, Livingstone; 2005.
3. Geissbuehler V, Ebebard J. Experience with water births: a prospective longitudinal study of 9 years with almost 4000 water births. *Gynakol Geburtshilfliche Rundsch* 2003;43(1):12-8
4. Barclay L. Laboring in Water Helpful for Dystocia. *Medscape Medical News* 2004; June 26
5. Chaichian Sh, Akhlaghi A, Rousta F, Safavi M. Experience of Water Birth Delivery in Iran. *Arch Iranian Med* 2009; 12(5): 468- 71.
6. Cluett ER, Pickering RM, Getliffe K, St George Saunders NJ. Randomised controlled trial of labouring in water compared with standard of augmentation for management of dystocia in first stage of labour. *BMJ* 2004; 328 (7435): 314.
7. Pellantova S, Vebera Z, Pucek P. Water delivery. A 5-year retrospective study. *Ceska Gynekol* 2003; 68 (3): 175-9
8. Geissbuehler V, Stein S, Eberhard J. Waterbirths compared with landbirths: an observational study of nine years. *J Perinat Med* 2004; 32 (4): 308-14
9. Bourke E, Kilfolye A. Retrospective comparative study of waterbirth and bedbirth. *Midwives J* 1995; 108: 3-7.
10. Geissbuehler V, Eberhardt J. Waterbirths: A comparative study: A prospective study on more than 2,000 Waterbirths. *Fetal Diag Ther* 2000; 15 (5): 291-300
11. Grunebaum A, Chervenak FA. The baby or the bathwater: which one should be discarded? *J Perinat Med* 2004;32 (6): 306-7
12. Woodward J, Kelly SM. A pilot study for a randomised controlled trial of. waterbirth versus land birth. *BJOG* 2004; 111 (6):537-45
13. Kwee A, Graziosi GCM, van Leeuwen JH Schagen., van Venrooy FV, Bennink D. The effect of immersion on haemodynamic and fetal measures in uncomplicated pregnancies of nulliparous women. *Br J Obstet Gynaecol* 2000; 107 (5):663-8
14. Johnson P. Birth under water – to breathe or not to breathe. *Br J Obstet Gynaecol* 1996;103 (3): 202-8
15. Gilbert RE, Tookey PA. Perinatal mortality and morbidity among babies delivered in water: surveillance study and postal survey. *BMJ* 1999; 319 (7208): 483-7