

# Association of Using Oxytocin during Labor and Breastfeeding Behaviors of Infants within Two Hours after Birth

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## ABSTRACT

**Background:** Opioids are used to relieve pain during labor and may affect the neurobehavioral conditions of infants. However, effects of using drugs, such as oxytocin, as a routine component of pre- and post-delivery care on the breastfeeding behaviors of newborns remain unclear. The present study aimed to investigate the association between the maternal use of oxytocin during labor and breastfeeding behaviors of neonates within two hours after birth.

**Methods:** This descriptive-analytical study was conducted on 160 women selected via convenience sampling. The participants were assigned to two groups of oxytocin administration (n=70) and physiologic delivery (n=90). Data were collected using demographic questionnaires and infant breastfeeding assessment tool (IBFAT). IBFAT was completed by the researcher through observing the behaviors of infants during breastfeeding after birth. Data analysis was performed in SPSS version 20, using descriptive and analytical statistics, including independent t-test, correlation-coefficients, and analysis of variance.

**Results:** Mean age of the mothers in the oxytocin administration and physiologic delivery groups was 26.9±5.9 and 27.8±5.5 years, respectively. Breastfeeding was significantly stronger in the infants whose mothers had physiologic delivery compared to the group administered with oxytocin during labor.

**Conclusion:** According to the results, use of oxytocin during labor directly weakens the breastfeeding of neonates. Therefore, it seems necessary to inform and prepare women for physiologic delivery during pregnancy.

**Keywords:** Breastfeeding behaviors in infants, Labor, Oxytocin, Physiologic delivery

## Introduction

Breast milk is a great blessing and an example of the Lord's generosity that has a special composition to precisely meet the needs of infants (1). This elixir of life is preferred for all newborns, and breastfeeding should start immediately after birth since it remarkably contributes to maternal and neonatal health (2). Some of the major benefits of breastfeeding include boosting the immune system, establishing an emotional relationship between the mother and infant, providing proteins, other key nutrients and necessary minerals for the infant, supplying adequate amounts of fats and liquids, and lack of

contamination in the breast milk (3). Disturbance in this natural process has been reported to cause maternal and neonatal mortality in developing and developed countries (4).

A study in this regard indicated low rates of gastrointestinal and respiratory diseases, urinary tract and middle-ear infections, Crohn's disease, ulcerative colitis, lymphoma, leukemia, and diabetes mellitus in breastfed newborns (5). Furthermore, the "UNICEF Declaration on World Breastfeeding Week" states that breastfeeding can prevent 1.3 million neonatal deaths per year, and in developing countries, breastfed infants are

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three times more likely to survive than other infants (6).

Meanwhile, many factors have been shown to disrupt the natural process of breastfeeding, such as maternal medication (7). Use of analgesics during labor has been reported to affect the neurobehavioral and breastfeeding conditions of infants, so that parents may occasionally have to feed the infant with powdered milk (8, 9). Analgesics used in labor rapidly reach the fetus by crossing the placenta, thereby affecting the breastfeeding behaviors of the neonates by crossing the blood-brain barrier (4).

Some studies have reported dose-related adverse effect of systemic opioid analgesia on breast-feeding (10, 11).

Moreover, a retrospective study demonstrated that use of opioids during labor is significantly associated with declined tendency to breastfeed in neonates for four hours after birth (4). However, some studies have reported no association between the use of pain-relieving drugs and breastfeeding behaviors of infants (12, 13).

To date, research has only focused on the effects of opioid use during labor on the breastfeeding status of neonates, and evidence is scant on the effects of other drugs, such as oxytocin, which is routinely administered to stimulate uterine contractions and decrease postpartum hemorrhage in labor (9).

The present study aimed to investigate the association between oxytocin use during labor and breastfeeding behaviors of infants within two hours after birth.

## Methods

This descriptive-analytical study was conducted on all the women undergoing natural vaginal delivery in the gynecology and obstetrics wards of Alzahra and Shahid Beheshti hospitals in Isfahan, Iran during 2014-2016. Among the subjects, 160 women were selected and divided into two groups of oxytocin administration (n=70) and physiologic delivery (n=90). Mothers were selected via convenience sampling, so that the first referring individual who met the inclusion criteria would be assigned to the oxytocin group, and the second individual would be assigned to the physiologic delivery group. Sampling continued until achieving the desired sample size.

Initially, the researcher referred to the hospitals and explained the objectives of the study to the authorities in order to collect the required data and complete the checklists. Written

informed permit was obtained from the Research and Technology Deputy of Isfahan University of Medical Sciences for conducting this study. For ethical considerations, an approval was issued by the Research and Technology Deputy of Isfahan University of Medical Sciences (No. 293258) and other related authorities.

Inclusion criteria of the study were as follows: 1) nulliparity; 2) single gestation; 3) gestational age of 37-42 weeks; 4) low-risk pregnancy; 4) natural vaginal delivery; 5) neonatal weight of more than 2500 grams; 6) no congenital anomalies; 7) no admission in the neonatal intensive care unit (NICU) and 8) five-minute Apgar score of  $\geq 7$ . Exclusion criteria were as follows: 1) maternal medical disease and medication use; 2) use of herbal drugs to relieve the labor pain; 3) exacerbated uterine contractions and 4) use of sugar water or sugar serum to feed the infant.

Given the importance of the dosage of the drugs used during labor and interval between drug administration and childbirth in the present study, and since the data were likely to have been recorded incompletely in the maternal medical records, two midwives in the studied hospitals were asked to record the data during labor accurately. The researcher investigated the breastfeeding behaviors of infants within two hours after birth, and written informed consent was obtained from the mothers to pursue the study.

Data were collected using demographic questionnaires and infant breastfeeding assessment tool (IBAFT). IBAFT is used to evaluate breastfeeding in newborns in four domains of preparing for breastfeeding, searching for the mother's nipple, sucking, and putting the nipple in the mouth. Items in the IBAFT are scored based on a four-point scale (range: 0-3). Maximum and minimum attainable scores in this scale are 12 and zero, respectively, with scores of  $\geq 8$  representing successful breastfeeding, and score of  $< 8$  indicating unsuccessful breastfeeding. IBAFT was first used by Matthews in 1988 and translated into Persian by Farahani et al. in 2009. Validity and reliability of IBAFT have been reported to be 95% for a randomly enrolled 20-individual sample (14).

Data analysis was performed in SPSS version 20 using descriptive and analytical statistics, including independent t-test, correlation-coefficient and analysis of variance. P-value of less than 0.05 was considered significant in all the statistical analyses.

## Results

Mean age of the mothers in the oxytocin

**Table 1.** Demographic Characteristics of Study Groups

variables	Oxytocin Administration	Physiologic Delivery	P value
Maternal Age (year) (M±SD)	26.9±5.9	27.8±5.5	0.34
Infant's Gender N (%)			
Male	25 (35.7)	38 (42.2)	0.4
Female	45 (64.3)	52 (57.8)	
Maternal Education level N (%)			
Illiterate	4 (5.7)	9 (10)	0.23
Elementary	6 (8.6)	15 (16.7)	
Secondary	36 (51.4)	47 (52.2)	
High School Diploma	22 (31.4)	18 (20)	
Academic Degree	2 (2.9)	1 (1.1)	
Mother Employment status N (%)			
Housewife	54 (77.1)	74 (82.2)	0.43
Employee	16 (22.9)	16 (17.8)	
Attending Training Sessions on Preparation for Labor and Breastfeeding during Pregnancy N (%)			
Yes	58 (82.9)	70 (77.8)	0.5
No	12 (17.1)	20 (22.2)	

administration and physiologic delivery groups was 26.9±5.9 and 27.8±5.5 years, respectively. In terms of gender distribution, 64.3% and 57.8% of the infants in the oxytocin administration and physiologic delivery groups were female, respectively, with no significant difference in this regard (P=0.4). With respect to the education level of the mothers, 51.4% and 52.2% in the oxytocin administration and physiologic delivery groups had high school diploma, respectively, with no significant difference in this regard based on the Chi-square test (P=0.2).

In terms of the occupation status, 77.1% and 82.2% of the mothers in the oxytocin administration and physiologic delivery groups were housewives, respectively, with no significant difference in this regard (P=0.4). Additionally, 82.9% and 77.8% of the mothers in the oxytocin administration and physiologic delivery groups attended the training sessions on the preparation for childbirth and breastfeeding during pregnancy,

respectively, with no significant difference in this regard (P=0.5) (Table 1).

Spearman's, Pearson's, and Kendall correlation-coefficients indicated no significant associations between the breastfeeding behaviors of infants and the education level and age of the mothers, Maternal Education Level and infant's gender (Table 2). Moreover, 51.4% of the infants in the oxytocin administration group had unsuccessful breastfeeding, whereas 82.2% of the infants in the physiologic delivery group had successful breastfeeding, with a statistically significant difference in this regard based on the independent t-test (P<0.001) (Table 3).

**Table 2.** Correlation-Coefficients of Breastfeeding Behaviors and Demographic Characteristics

Variables	P-value	r
Maternal Age	0.1	0.11
Maternal Education Level	0.1	0.13
Maternal Employment Status	0.5	0.04
Infants' Gender	0.3	0.06

**Table 3.** Comparison of Breastfeeding Behaviors of Infants in Study Groups

Dimension	Group				P-value
	Oxytocin Administration		Physiologic Delivery		
	N	%	N	%	
Successful Breastfeeding	34	48.6	74	82.2	<0.001
Unsuccessful Breastfeeding	36	51.4	16	17.8	
Mean±SD	7.8±2.07		9.8±1.6		

## Discussion

The present study aimed to investigate the association of oxytocin use during labor and breastfeeding behaviors of neonates within two hours after birth. According to the findings, breastfeeding was significantly stronger in the infants of the mothers who had physiologic delivery with no drug administration during labor compared to the neonates in the oxytocin

administration group. Consistently, Akbas et al. (2011) demonstrated that use of drugs during labor had a significant association with breastfeeding (15). In another study conducted by Brimdyr et al. on the association between the use of analgesics during labor and breastfeeding rate of infants, it was reported that these drugs reduced the rate of breastfeeding (16). Moreover,

Jordan et al. claimed that using drugs to relieve labor pain could reduce the rate of breastfeeding after birth (17). Similarly, findings of Fernandez et al. (2012) indicated that use of oxytocin during labor led to increased lactate levels and acidosis, followed by the declined ability of the neonates to suck (18).

To date, few studies have focused on the effect of oxytocin use during labor on the rate of breastfeeding after birth. Studies regarding the effects of using certain drugs (e.g., hyoscine and pethidine) during labor on the breastfeeding of infants have reported that these drugs cross the placenta and affect the fetus, thereby leading to the decreased ability of the infant to suck after birth, which could cause the delayed secretion of milk from the breast, weight gain, and supplementation with formula (19, 20).

In another research in this regard, epidural administration of pain-relieving drugs during labor was shown to have a more significant effect on the breastfeeding of neonates after birth compared to oxytocin (21). On the other hand, results of a retrospective study indicated that using oxytocin during labor could delay the onset of breastfeeding and increase the tendency for formula feeding (4).

A retrospective, cohort study in this regard suggested that using pain-relieving drugs could affect breastfeeding until 48 hours after birth (22). Therefore, it is expected that this category of drugs might influence the exclusive breastfeeding of neonates for a few months after birth and decline their growth and development (23). According to the findings of another study, using drugs during labor may decrease the ability of infants to suck, delay the ejection of breast milk, and block the milk duct (24).

Breastfeeding of infants after birth may be affected by various other factors, including the maternal age, education level, information on breastfeeding, and underlying diseases (19). However, since the inclusion and exclusion criteria were strictly observed in the present study, and the effect of confounders (e.g., training on childbirth and breastfeeding) was controlled, the findings indicated the direct effect of oxytocin use on weakening the breastfeeding behaviors of infants after birth. Furthermore, physiologic delivery was considered a safe approach for reducing postpartum complications in the mother and newborn.

According to the current research, the breastfeeding behaviors of neonates were not significantly associated with the infants' gender

and maternal age and education level, which is consistent with the findings of Brimdyr et al., who investigated the association between the use of routine drugs during labor and infants' ability to suck after birth (15).

The most important limitation of the present study was the small number of the women undergoing physiologic delivery and elongated completion of the checklists for the infants of these women. In addition, the study was conducted on a small sample size, which necessitates further investigations on larger sample sizes.

## Conclusion

According to the results, breastfeeding of infants whose mothers undergo physiologic delivery with no drug administration during labor was significantly stronger compared to the neonates whose mothers were administered with oxytocin during labor. Therefore, it is recommended that gynecologists and midwives enhance the breastfeeding of neonates after birth by training women during pregnancy and preparing them for a safe childbirth without drug use.

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## Conflicts of interests

None declared.

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