

Original Article



Maternal-Neonatal Attachment in Intended and Unintended Pregnancies during the First 24 Hours after Childbirth

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Abstract**Introduction:** Women's physical and mental health and their mortality at reproductive age depend on fertility behaviors, delivery, and its complications. Unintended pregnancy is a risk to the life of women at reproductive age. The present study aimed to compare maternal and neonatal attachment in intended and unintended pregnancies after the mother and baby skin-to-skin contact immediately after delivery (first hour) and 24 hours after that.**Methods:** This analytical case-control study was performed on 140 women who gave birth in the hospitals affiliated to Shiraz University of Medical Sciences, Iran. The subjects were categorized into groups of intended and unintended pregnancy. Skin-to-skin contact of the mother and baby was done for 15 minutes in the recovery room at the first hour and 24 hours after birth. Then, the Avant's questionnaire of mother-infant attachment behaviors was completed. Data were analyzed using SPSS ver.13.**Results:** The mean (SD) attachment score in the first hours in intended pregnancy was 84.22 (12.59), which was higher than that in unintended pregnancy 74.28 (15.81), indicating a significant difference. However, after 24 hours of delivery, there was no significant difference between the two groups. During the first hours after delivery, there was a significant difference in the total score of the emotional behaviors and care between the two groups.**Conclusion:** Maternal and infant skin contact during lactation increased attachment after 24 hours in unintended pregnancy, while in the first hours after delivery, attachment decreased in these pregnancies.**Introduction**

Pregnant women come up with events that are likely to be pleasant or unpleasant and cause tension for them. Some of these pressures are natural, but others put long-term stress on the mother and cause a stressful period with physiological changes. One of the interventions that helps the mother find ways to cope with this stress is increasing the attachment behaviors.¹ Attachment is a warm and intimate relationship between the mother and baby, which facilitates the mother and baby relationships; this emotional relationship develops during pregnancy.² Maternal attachment to the embryo is an expression of the emotional relationship between the mother and fetus and a predictor of their health. It indicates the mother's efficacy in the postpartum period.³ Maternal attachment to the fetus is affected by issues such as family relationship, pregnancy acceptance and support, the mother's mental picture of herself, previous pregnancy history, and obstetric and gestational problems.⁴

van Rosmalen et al in their review state that John Balby

is generally regarded as the founder of the theory of attachment with the help of Mary Ainsworth. Besides, John Bowlby, an attachment theorist about, initial connection between the child and parents. describes attachment as "a lasting psychological relationship between two human beings".⁵ In a study writes about attachment: "our personal identity, or the center of our love and humanity, is obtained thorough the initial connection between the child and parents".⁶ The relationship between the mother and baby is one of the factors influencing the psychosocial development of the baby.⁷ In children with behavioral and emotional problems, urinary incontinence, and educational failure, there is usually no attachment and warm relationship between mothers and them during pregnancy and after birth.⁸ Research has shown that attachment behaviors play an important role in accepting parental identity, the future relationship between the infant and parents, and growth and development of the newborn.⁹ The first hour after the baby's birth is a critical period in the formation of attachment between the mother

and baby. The skin-to-skin contact of the mother and baby (Kangaroo mother care), in which the baby has contact to the mother's skin in the middle of her chest immediately after birth or during the first 24 hours after birth, was first introduced in 1978 by Dr. Edgar Ray and Dr Hector Martinez at the Mother and Child's Institute in Bogotá, Colombia.¹⁰ During the skin contact, verbal and contact interaction between the mother and baby is increased and the nutritional behavior induced by the smell is initiated in the baby, which results in taking the mother's breast by the baby and starting eating.^{11,12} According to Jefferies, skin contact increases attachment behaviors and the sense of self-confidence of the mother in her role.¹³ Mori also states that skin contact has a positive verbal and behavioral effect on the mothers and infants.¹⁴ One possible contributing factor in parenting attachment to a child is the pregnancy being intended or unintended, so that the mother-child interaction scale score in unintended pregnancies is lower than that in intended pregnancy.¹⁵

Unintended or unintended pregnancy involves mistimed pregnancy and unintended pregnancy. Unintended pregnancy includes those occurring earlier than the time a woman desires, mistimed pregnancies, and pregnancies in which a person does not essentially decide to have a child in future.¹⁶ According to the reports, 40% of pregnancies worldwide were unintended in 2012. The highest number of unintended pregnancies were in the Latin American countries and Caribbean region (56%) and the lowest (35%) in Africa.¹⁷ In 2013, in Iran, the prevalence of unintended pregnancy was reported to be about 35-42%, of which 16% were unintended and 19% mistimed.¹⁸ Unintended pregnancy affects the parents' attitudes and behaviors and disturbs the relationship between the mother and baby.¹⁹ Singh et al demonstrated that unintended pregnancies have adverse effects on childhood vaccination and cause growth retardation in children.²⁰ Stillbirth and infant mortality in unintended pregnancies are two times higher than intended pregnancies.²¹ Neonates born of unintended pregnancies have problems, such as cognitive impairment at age 3 and behavioral problems at ages 5 and 7 as compared to their same age children.¹⁹ Therefore, supporting the infants' health is one of the best ways to invest in economic and social development in any country. In order to achieve this goal, the newborns' physical health should be prioritized.²²

The significance of this research was due to the importance of the issue of unintended pregnancy. Unintended pregnancy, as a high-risk pregnancy, can lead to depression, suicide, and maternal and fetal mortality.²³⁻²⁵ While, the mother's inappropriate behavior towards the baby, the mother's carelessness and negligence in caring for the child increase. Also, unsanitary behavior (e.g., delay in the beginning of prenatal care and inappropriate nutrition, etc) and medical problems (infection, drug use, etc.) are more prevalent in unintended cases.^{26,27} Therefore, unintended pregnancies may make the baby

unbearable for the mother resulting in a less emotional connection between them.¹⁵ In addition, experienced mothers with unintended pregnancies may have the most parental stress and depression.²⁸ The existence of cultural background and economic problems may also result in discontinuation of pregnancy and affect the baby.

Given the above reasons and due to high mental and psychological disturbance in the mother, close contact between the mother and baby may increase their attachment and willingness to exercise health behaviors and promote mother's health. Therefore, this study aimed to compare maternal and neonatal attachment intended and unintended pregnancies in the early hours and early 24 hours after delivery.

Materials and Methods

This analytical case-control study was conducted in 2017. The research population consisted of women who gave birth in recovery and postpartum care wards of Hafez, Shooshtari, and Hazrat Zeinab hospitals in Shiraz.

According to a pilot sample, for comparing maternal attachment scores in intended and unintended pregnancies at the first hours after delivery, the mean (SD) and standard deviation of these two groups were 82.25 (12.72) and 73.96 (16.09), respectively. The sample size was 130 individuals which was considered as 140 cases due to the possible attrition. Test power was considered 0.8.

Using convenience sampling, the samples were divided into two equal groups (n=70 in each) of unintended pregnancy and intended pregnancy (control). The inclusion criteria were individuals with unintended and intended pregnancy, no history of drug abuse, gestational age of 37-42 weeks, lack of high-risk pregnancy (abortion, dead children, and infertility history), absence of surgical and internal diseases in the mother and newborn, absence of symptoms of postpartum fetal distress, absence of severe pelvic stenosis, absence of psychological illness or use of psychotherapeutic drugs (imipramine, etc.), vaginal delivery, no postpartum hemorrhage, uncomplicated delivery (difficult delivery, delivery with vacuum, etc.), and lack of participation in physiological delivery classes. The exclusion criteria were lack of willingness to cooperate and inability to breastfeed the baby.

The data collection tool was a demographic questionnaire and Avant's checklist of attachment behaviors that included three types of emotional, proximity and caring behaviors. This checklist was created by Cranley and then localized in Iran. Emotional behaviors that show the mother's emotional feelings toward the baby, including kissing, looking, talking, checking the baby, smiling, and shaking cradles, the proximity of behaviors that lead the mother closer to the baby, (including hugging without contact with the mother's body, hugging close to the mother's body with the baby, hugging in the form of arms wrapped around the baby) and caring behaviors that lead the mother closer to the baby include breastfeeding,

changing the baby’s diapers, tapping the baby on the back to ventilate the baby’s stomach, and tidying the baby’s clothes.²⁹

The Avant’s checklist has a total of 11 behaviors that the researcher must observe for 15 minutes. The validity of this study was approved by the research carried out by Khoramrody. To determine its reliability, two researchers observed the maternal behaviors with the baby at the same time in 10 cases of the research community and registered them in the checklist. The reliability coefficient was 0.85, showing a significant correlation.³⁰

The procedure was performed in two groups in which skin-to-skin contact was done in the recovery room in the same way and the naked baby wearing a cap was placed in the vertical position in the middle of the mother’s breasts; the baby’s head was close to the mother’s breasts. To prevent hypothermia, we covered the baby with a blanket in the back. Behaviors were observed for 15 minutes for each mother. In the first 30 seconds, the mother’s behaviors were observed by the researcher and each behavior was recorded in the second 30 seconds; thus, the maximum observed behavior was 15 in 15 minutes, and the maximum score for each research unit was 165. Again, for both groups, in the first 24 hours of the postpartum period, in the postpartum care unit, skin-to-skin contact between mother and baby was performed for 15 minutes. The mother’s behaviors were observed and recorded in the questionnaire. Therefore, for both groups, the questionnaire was completed twice, once in the initial first hour after delivery, and the second time in the first 24 hours after delivery. This checklist was also cited by

Setoudeh and Ghodrati as well as by other researchers.³¹⁻³⁵ All data were also collected by the researcher. In order to express the characteristics of the research units, descriptive statistics including frequency table, mean (SD) were used. Moreover, SPSS software version 13 and independent, paired t-test and Chi-square test were used for data analysis. The significance was determined with a confidence interval of 95% and considered at the level of <0.05.

Results

The results of the study showed that the mean (SD) age of the women in the intended pregnancy group was 28 (6.00) and in the unintended group was 31(6.00) years, which showed a significant difference. The husband’s age in the group of intended pregnancy was 33(4.70) and in the unintended group was 35 (6.50) years, indicating a significant difference. Regarding the level of education and occupation, the highest rates were related to the group of under diploma and housewives in both groups, respectively; in addition, the two groups were homogeneous (Table 1).

The results of paired t test showed that the mean (SD) of attachment score in the intended pregnancy group was 84.22(12.59) in the first hour after delivery and 90.07(15.24) in the first 24 hours after it; the difference was significant. The mean (SD) of attachment score in the unintended pregnancy group was 74.28 (15.81) in the first hour and 86.01 (15.60) in the first 24 hours after delivery, which was significant (Table 2). The results of independent t test showed that the mean (SD) attachment

Table 1. Distribution of relative frequency of individuals and social characteristics

	Intended pregnancy (n=70)	Unintended pregnancy (n=70)	P value ^a
Mother profile, Mean (SD)			
Mother's age	28 (6.00)	31 (6.00)	<0.004*
Husband's age	33 (4.70)	35 (6.50)	<0.03*
Mother's education, No. (%)			0.29
Primary school	27 (39.7)	40 (60.6)	
Diploma	24 (35.3)	15 (22.7)	
Associate's degree	7 (10.3)	3 (4.5)	
Bachelor's degree	10 (14.7)	8 (12.1)	
Mother's occupation, No. (%)			0.22
Housewife	65 (95.58)	68 (97.14)	
Teacher	1 (1.47)	2 (2.85)	
Employee	2 (2.94)	0 (0)	

^a Chi-square test; *Statistically significant $P \leq 0.05$.

Table 2. Comparison of the mean (SD) of maternal attachment scores in intended and unintended pregnancy groups at the first and 24 hours after delivery (intra-group comparison)

Group	Mean (SD)		P value ^a
	The first hour after delivery (n=70)	24 hours after delivery (n=70)	
Intended pregnancy	84.22 (12.59)	90.07 (15.24)	<0.001*
Unintended pregnancy	74.28 (15.81)	86.01 (15.60)	<0.001*

^a Paired t test; *Statistically significant $P \leq 0.05$.

score in the first hour in the intended group was 84.22 (12.59) and in the unintended group was 74.28 (15.81), which showed a significant difference. Compared with the mean (SD) attachment score in the first 24 hours before discharge between the two groups included, the intended group was 90.07 (15.24) and the unintended group was 86.01 (15.60); there was no significant difference between the two groups (Table 3).

The results of independent t-test showed that the mean (SD) score of total emotional behavior during the first hour in the intended pregnancy group was higher 32 (8.89) than that of the unintended pregnancy group 25.85 (11.56), which was significant. However, the mean (SD) of the total score of adjacency behaviors in the first hour was 37.11(5.12) and 36.85 (3.22) in intended and unintended pregnancy groups, respectively; the difference was not statistically significant. The mean (SD) of the total score of care behavior in the first hour in intended pregnancy group was higher 16.99 (3.12) than that of unintended pregnancy 15.5 (3.25), indicating a significant difference. However, the results of independent t-test 24 hours after delivery showed that none of the three observed behaviors between the two groups was significant (Table 4).

Discussion

The present study aimed to compare the maternal and neonatal attachment in intended and unintended pregnancies at early hours and 24 hours after childbirth. The results showed that skin-to-skin contact increased the mean (SD) score of attachment in the first 24 hours after delivery compared to the first hour in the intended and unintended pregnancy groups. It seems that skin-to-skin contact between the mother and baby and smelling the

mother's natural breast scent act as a stimulant for the baby, and causes him/her to be absorbed into the scent source which is the mother's breast; this leads to identification of the mother as a caregiver, resulting in enhancement of the mother-baby attachment process.³⁶ On the other hand, the cholecystokinin and prolactin hormones, which are released to the mother's intestine during the lactation period, promote the maternal behavior.³⁷ Muller also stated that the first hours after birth is a critical time for the development of attachment behavior in infants.³⁸

These results are consistent with those of Moore et al in which skin-to-skin contact increased the mothers' attachment behaviors in the skin contact group.¹⁰ In a study Bigelow et al concluded that skin contact reduces the symptoms of depression and maternal stress and increases the attachment behaviors³⁹; which is consistent with our results. In a study conducted by Adeli and Aradmehr skin contact increased the mother's ability and self-confidence, and the attachment was increased.² The results of the study by Adeli and Aradmehr and other studies are consistent with those of the present study; however, the number of studied subjects and the duration of studies were more than those of the present study.

The mean (SD) scores of attachment in the first hour and 24 hours after delivery between the two groups of the intended and unintended pregnancies indicated an increase in the attachment score of the first hour in the intended group compared to the unintended one. Moreover, 24 hours after delivery, the attachment between the two groups was the same, indicating an increase in attachment after 24 hours in unintended pregnancies. Unintended pregnancies seem to be worrisome in terms of psychological, physical, and financial concomitance¹⁹

Table 3. Comparison of the mean (SD) of maternal attachment scores between intended and unintended pregnancy groups at the first and 24 hours after delivery (inter-group comparison)

Time	Mean (SD)		P value ^a
	Intended pregnancy group (n=70)	Unintended pregnancy group (n=70)	
First hour after delivery	84.22 (12.59)	74.28 (15.81)	<0.001*
First 24 hours after delivery	90.07 (15.24)	86.01 (15.60)	0.12

^a Paired t test; * Statistically significant $P \leq 0.05$.

Table 4. Comparison of the Mean (SD) of different aspects of attachment behaviors during the first hours and 24 hours after delivery in intended and unintended pregnancy groups

Attachment behaviors	Mean (SD)		P value ^a
	Intended pregnancy	Unintended pregnancy	
First hour after delivery			
Mother's emotional behavior	32(8.89)	25.85 (11.56)	0.001*
Maternal-infant proximity	37.11 (5.12)	36.85 (3.22)	0.72
Maternal-infant caring behavior	16.99 (3.123)	15.50(3.25)	0.007*
First 24 hours after delivery			
Mother's emotional behavior	33.86 (9.81)	31.27 (9.12)	0.10
Maternal-infant proximity	37.11 (5.12)	36.86(3.23)	0.72
Maternal-infant caring behavior	19.10 (4.04)	17.89 (4.29)	0.08

^a Independent t test; * Statistically significant $P \leq 0.05$.

since they are accompanied with many risk factors like low social support and maternal mortality.⁴⁰ Interactions and association in unintended pregnancies are fewer and these mothers are stressed.²⁸ Unwanted pregnancy helps increase the risk of maternal depression and parental stress. Efforts to increase fathers' involvement in child care and reduce marital conflicts may be helpful in reducing the adverse effects of unwanted pregnancies on maternal mental health during pregnancy.^{41,42} Stressful events are applied through processes that have a causative background, including individual and environmental factors, as well as their intermediaries and effects. Therefore, individual and interpersonal coping strategies, resources, and social support have an impact on the experience of pregnancy in circumstances in which people do not intend to get pregnant.⁴³ The results of this study are consistent with those of the research performed by Boden et al which indicated a decrease in the attachment scores in unintended pregnancies.⁴⁴ Similarly, Kavanaugh et al showed a decreased interest and weakening of relationships in unintended pregnancies.⁴³ Also, Bigelow et al showed that kangaroo care, if performed early in the first 24 hours after delivery, would increase attachment.⁴⁵ These results are consistent with those of the present study with the difference of the sample size and duration of the study.

The analysis of attachment behaviors in the first hour and the first 24 hours after delivery indicated that the mean (SD) score of attachment behaviors in the intended pregnancy group in the first hour of delivery was significantly different from that of the unintended pregnancy group; however, the difference was not significant after 24 hours of delivery. This may indicate an increase in attachment due to skin contact in unintended pregnancies. In this regard, the attachment made in the beginning of pregnancy is gradually peaked in the third trimester and continues after delivery by eye contact, smell, and touch between the mother and baby.⁴ Also, maternal and neonatal attachment behaviors, such as face-to-face contact, looking, and skin-to-skin contact during the early hours postpartum enhance the interactive pattern between the mother and baby.² In this regard, research showed that skin contact increases the parents' awareness about the baby, as the result of which they respond to the baby's needs leading to improvement of attachment behaviors.⁴⁶ Postpartum attachment begins with behaviors, such as touching the baby with fingertips, kissing, hugging, talking to the baby, eye contact, and smelling from the mother.⁴⁷ These results are similar to those of the study carried out by Piadeh Zavardehi et al which showed that physiological delivery was more than non-physiological one in all three dimensions of attachment (emotional, caring, and adjacent behavior).⁴⁸ In the study by Adeli and Aradmehr looking at the baby's face followed by shaking the cradle were reported as the most common emotional behaviors.² This result is similar

to that of the present study.

In the present study, there was no significant difference between the mother's education and occupation in the two groups, but there was a significant difference between the mother's and husband's age. It seems that as the age of women increases, the probability of unintended pregnancy increases because women at higher ages have their desirable and appropriate number of children. In addition, along with the increase in women's age in unintended pregnancies, the spouses' age is also increased.⁴⁹

One of the limitations of this research was the lack of cooperation of some of the mothers, which shows the importance of this issue and the need to motivate them. One of the strengths of this study was the novelty of studying the effect of skin-to-skin contact on attachment in unintended pregnancies. Therefore, due to the importance of the first mother-infant's encounter immediately after delivery in this study; as a result, it is recommended that this communication be made as early as possible and the mother be informed about benefits, especially during the first hours after delivery. On the other hand, the spouses' awareness and empathy in the process of their wives' pregnancy play an important role in promoting the mental health of mothers and newborns, as well as establishing better communication. Besides, Self-compassion has the potential to enhance skills necessary for healthy adjustment (such as emotional regulation, greater couple flexibility, and greater awareness of your own and your partner's needs).^{50,51}

So, transmission to parents is an important transfer in life that can increase vulnerability to parental mood disorders, and even paternal depression.⁵² It has been suggested that the quality of father-to-child attachment during pregnancy and paternal involvement are important to prevent postpartum attachment problems in fathers.⁵³ Further research should be conducted on the unintended pregnancies and father's role in maternal and neonatal attachment process.

Conclusion

The results of this study showed that skin-to-skin contact increased the attachment score in intended pregnancy cases in the first hour after delivery compared to the unintended pregnancy. This increase in attachment score was the same between the two groups after 24 hours of delivery, was the same between the two groups, which may indicate an increase in attachment as a result of skin-to-skin contact in unintended pregnancies.

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Research Highlights

What is the current knowledge?

Maternal and fetal attachment in intended pregnancies has been further investigated but limited studies have investigated unintended pregnancies.

What is new here?

Considering the importance of early maternal-neonatal attachment, skin-to-skin contact increased the attachment score in intended pregnancy cases in the first hour after delivery compared to the unintended pregnancy. This increase in attachment score was the same between the two groups after 24 hours of delivery.

Authors' Contributions

MK, MA: Contributed to the study design, definition of intellectual content, clinical studies; MA, TE: Prepared the first draft of the manuscript; MA: Manuscript editing, manuscript review, and approval of final draft and responded to the reviewers; MK: Helped the surge articles and clinical research; TE: Performed the data collection and literature search. Clinical Research Development Consultation Center of Namazi Hospital performed the data analysis and statistical analysis.

Conflict of Interests

The authors declare no conflict of interest in this study.

Data Accessibility

The datasets are available from the corresponding author on reasonable request.

Ethical Issues

This study research was approved by the Research Ethics Committee of Shiraz University of Medical Sciences and a written informed consents were obtained from all participants' ethic code: (IR.SUMS.REC.1396.S991).

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