

## Original Research



# Non-physiological and Physiological Delivery Method: Comparison of Maternal Attachment Behaviors and Anxiety

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**Corresponding Author:**Nahid bolbolhaghghi,  
Email: nbhaghghi349@yahoo.com**Abstract****Introduction:** Attachment is a stable connection or emotional knot between two individuals as one of the parties tries to maintain this connection. Delivery time as a turning point between two stages of attachment is very important.**Methods:** In a descriptive-analytical study based on specific inclusion criteria, 262 pregnant women were selected in the age range of 15-45 years old and the gestational age of 37 to 42 weeks who were candidates for physiological or non-physiological delivery. After obtaining written consent forms, the demographic information questionnaire was given to the participants. One hour after delivery, the attachment questionnaire was completed by the researcher in the postpartum ward. Also, the Spielberg anxiety inventory was completed up to 1 hour after delivery. Independent sample *t* test was used to compare the results between the two groups. Data were analyzed by SPSS software version 21.**Results:** The participants in the physiological delivery group showed more positive attachment behaviors in comparison with the other group. In all three dimensions of attachment (emotional, contiguous, and caring behavior), physiological delivery showed higher scores than the other group. Also in non-physiological delivery group, the participants had experienced higher levels of anxiety and the differences between the groups were not significant.**Conclusion:** Results of the current study indicated that mothers engaged in physiological delivery had higher scores in mother to child attachment behaviors. It means they are more successful than the non-physiological delivery group in getting attached to their babies.**Introduction**

Attachment is a stable connection or emotional knot between two individuals as one of the parties tries to maintain this connection, in such a way to ensure the relationship continues.<sup>1</sup> John Bowlby, a British psychologist explained the concept of attachment in relation to mother and child.<sup>2</sup> According to his attachment theory, the attachment behaviors were developed between the ages of 6 months and 5 years old with a pick of 3 years.<sup>3</sup> So that, attachment is a relationship and mother has an important role to play in its quality. In this way, Mulder et al., concluded that increased attachments lead to a pleasant and lasting emotional relation where the mother's mental health has a well-established role. Their results showed that mothers with higher levels of attachment are more sensitive to their children's needs, which affects the formation of curiosity, the ability to socialize, self-confidence, cooperation sense and honesty

in their children.<sup>4,5</sup> Attachment is very important because insecure attachment affects social functioning, coping, stress response, psychological well-being, health behavior, and morbidity of children. Some activities can strengthen the attachment mechanism.<sup>6</sup> In this way, some literature pointed out the positive roles of maternal relaxation, talking with and touching the embryos, and paying attention to the fetal movement by mothers.<sup>7</sup> Among the factors that destroy attachment, the role of stress in mothers is quite significant. In that order, anxiety causes an inappropriate mother to fetal responses and destroys the right attachment process.<sup>8</sup>

The attachment theorists believe that the primary experiences of life play a major role in the development of the right attachment process.<sup>9</sup> In this regard, Pillitteri remarked that attachment process begins within the first months of pregnancy and continues after delivery.<sup>8</sup> In fact, the attachment is a pattern that is always with

humans, starts from pregnancy and is completed with ocular, olfactory, and tactile contacts of mother and child after delivery. Therefore, delivery time is considered as a turning point between the two stages of attachment. Vaginal delivery is considered a regular way of birth.<sup>10-12</sup> The physiologic labor as a type of vaginal delivery is described to be safe for mother, natural, with low pain and no medical interventions in an anxiety-free atmosphere in which the mother's hormonal system modulates the main labor factors.<sup>13</sup> According to the basic study reports, some of the physiological mechanisms are responsible for attachment formation in vaginal delivery. Stimulation of the vagina and cervix during delivery,<sup>14-16</sup> high levels of oxytocin<sup>17,18</sup> and cortisol<sup>18,19</sup> are the most accepted theories in this field. On the one hand, there is a policy of encouraging pregnant women to go for the non-physiological delivery method in certain countries nowadays, and on the other hand, in some, but not most, of them, access to physiological delivery is sought. Thus, we tried to provide the comparative results on the subject of maternal anxiety and attachment in this area. This study was the first study that paid attention to the accurate details of differences between physiologic and non-physiologic birth methods. The results of such studies are very important since they encourage the participants to engage in non-interventional safe birth methods i.e. physiological delivery. Moreover, we assessed the cocktail effects of anxiety and attachment with a simple and short questionnaire that was not bothering for patients.

### Materials and Methods

This study was done in a referral hospital in Shahroud city with the ethical code of 1396.56.12. During a descriptive-analytical study in Shahroud city, we selected 262 pregnant women at the age range of 15-45 years and the gestational age of 37 to 42 weeks. Our selection criteria were based on the following characteristics: being primiparous with a normal singleton pregnancy and no history of a disease or medication consumption during pregnancy. Also in the current study, we analyzed the data of those healthy infants that were born with a non-physiological delivery and physiological childbearing methods (according to WHO definition spontaneous labor and free movement during labor, ongoing support during labor, lack of common interventions, straining spontaneous in a non-supine position, and no separation of mother and neonate at birth, someone having accompanied the patient, intermittent auscultation of fetal heart rate, minimal vaginal examinations) and their mothers.<sup>11</sup> Natural physiological birth is an involuntary process organized by chemicals and hormones that secreted by a woman's body, enabling her to give birth to a baby and make the transition to motherhood.<sup>20</sup> Non-physiological delivery includes other acts such as medical interventions, medication, and surgery.

The sampling method was purposive based on the

inclusion criteria and the participants were replaced by the next subject if they did not have the desired features.

For collecting the data, we used the demographic data form and Avant's attachment behavior checklist, and Spielberg state-trait questionnaire for anxiety. Both mentioned tools are valid and reliable measures that have been used repeatedly in Iranian studies. About Avant's attachment behavior checklist. This tool was originally developed by Norr et al, and was used in 1989<sup>21</sup> and 1991.<sup>22</sup> This tool has been used repeatedly in Iranian researches.<sup>23</sup> Avant's attachment behavior checklist include three groups of mother and infant attachment behaviors including emotional behaviors (staring, caressing, kissing, talking, laughing, and rocking a cradle), proximity/ contiguous behaviors (looping the arms firmly around the infant and sticking it to herself, and close contact with infant's body) and caring behaviors (burping the infant, and changing diaper and clothes). Maximum time of any observed behavior is 15 minutes.<sup>21</sup>

The validity of Avant's questionnaire was first determined by Avant.<sup>21</sup> This questionnaire was translated to Persian and by applying some changes (3 items were removed) in the questionnaire, its validity was confirmed. The validity of this questionnaire was also approved by Toosi et al.<sup>24</sup> The reliability of this scale was also confirmed via inter-rater reliability by Vakilian et al.<sup>23</sup> The psychometric properties of Spielberg state-trait questionnaire was evaluated by Cronbach's alpha value= 0.38 to 0.89 while the Cronbach's alpha for the total scores was 0.86. Test-retest correlation coefficients for the 40 items score were highly significant. The Intraclass correlation coefficient was high (ICC=0.39 to 0.89).<sup>24,25</sup>

The sample size was calculated based on a pilot study on 20 primiparous women, using the formula was calculated 150 women in each group (Considering CI=95%,  $\alpha=0.05$ , and power=0.8)

At first, after selecting the participants and obtaining written consent forms, the demographic information questionnaire was given to them. They answered the questionnaires in the presence of the researcher and the researcher answered possible questions. All deliveries were done by hospital midwives and the researcher was just an observer. In both groups, immediately after delivery, the babies were placed in the middle of their mother's chest so that they were in contact with their mother's skin. All the babies were in good health status and most of them were born with the 7-9 Apgar score and the weight range of 3300-4200 except for 3 Children who needed resuscitation and were thus excluded from the study because their mothers were not in a good situation to answer the questions. The time of skin contact was 20 minutes in both groups. One hour after delivery, the attachment questionnaire was completed by the researcher in the postpartum ward. When the babies were given to the mothers for feeding, the attachment behaviors were observed for 16 minutes. In the first 8 minutes of every

hour, the mothers' behaviors were observed and in the next 8 minutes, each behavior was recorded once. In this way, every observed behavior was recorded only once per minute. Counting seconds was done by stopwatch. The total number of recorded behaviors in 16 minutes was considered as the total attachment score.

Also, the Spielberger anxiety inventory for each of the subjects was completed up to 1 hour after the completion of delivery.

Descriptive and inferential statistical methods were used to analyze the data in SPSS version 21 software. For demographic characteristics, frequency tables (absolute and relative), Mean and standard deviation were used. To analyze the research hypotheses, an independent *t* test was used.  $P < 0.05$  was considered significant.

## Results

At first we included 150 women in each group, but finally analyzed the data of total 262 women. In the group of physiologic delivery a lot of women were removed because of some interventions were done for them by specialists that differed their status from complete physiologic labour. No significant difference between the two study groups in terms of basic variables (mothers age, BMI, job, education, gestational age, neonatal weight, maternal education, job and the sex of fetus) (Table 1).

The results of mother-infant attachment behaviors are showed in Table 2. According to the results of this table, the participants of the physiological delivery showed more positive attachment behaviors in most fields of attachment behaviors in comparison with the other type of delivery ( $P < 0.05$ ).

Based on the results of Table 3, in the group of non-

**Table 1.** Demographic characteristics of participants in the study

Variable	Type of delivery		P value <sup>b</sup>
	Physiological (n=118) Mean (SD)	Non-physiological (n=144) Mean (SD)	
Mothers age (y)	27.56 (0.25)	26.21 (0.12)	0.723
BMI (kg/m <sup>2</sup> )	21.32 (2.25)	19.27 (3.4)	0.643
Gestational age (wk)	38.84 (0.06)	38.34 (0.05)	0.684
Neonatal weight (kg)	2386.11 (8.64)	2089.02 (7.15)	0.734
Education <sup>a</sup>			
Illiterate	43 (36.44)	55 (38.19)	0.081 <sup>c</sup>
Literate	75 (63.56)	89 (61.81)	
Job <sup>a</sup>			
Employed	86 (72.88)	70 (48.61)	0.066 <sup>c</sup>
Housewife	32 (27.12)	74 (51.39)	
Sex of fetus <sup>a</sup>			
Male	32 (27.11)	54 (37.5)	0.643 <sup>c</sup>
Female	86 (72.89)	90 (62.5)	

<sup>a</sup> Number (percent) was reported, <sup>b</sup> *t* test, <sup>c</sup>  $\chi^2$ .

**Table 2.** Type of delivery methods and attachment behaviors

Attachment behavior		Type of delivery		P value <sup>a</sup>
		Physiological (n=118) No. (%)	Non-physiological (n=144) No. (%)	
Emotional behaviors				
Kissing	Yes	76 (64.4)	47 (32.6)	0.002*
	No	42 (35.6)	97 (67.36)	
Looking	Yes	117 (99.2)	76 (52.77)	0.03*
	No	1 (0.8)	68 (47.22)	
Caressing	Yes	93 (78.8)	17 (11.03)	<0.001*
	No	25 (21.2)	27 (18.8)	
Talking to	Yes	63 (53.4)	24 (16.66)	0.21
	No	55 (46.6)	120 (83.33)	
Smiling at	Yes	106 (89.8)	64 (44.46)	0.02*
	No	12 (10.2)	80 (55.55)	
Rocking the cradle	Yes	62 (52.5)	35 (24.30)	0.05
	No	55 (46.6)	109 (75.69)	
Contiguous behaviors				
Hugging without body contact	Yes	19 (16.1)	7 (4.86)	0.06
	No	99 (83.9)	137 (95.13)	
Hugging with the close contact	Yes	98 (83.1)	64 (44.45)	0.04*
	No	20 (16.9)	80 (55.55)	
Hugging in which hands are put around the infant's arms	Yes	62 (52.5)	24 (16.66)	0.02*
	No	56 (47.5)	120 (83.33)	
Caring behaviors				
Changing infant's diapers and clothes	Yes	17 (14.4)	8 (5.55)	0.04*
	No	101 (85.6)	136 (94.44)	
Patting the infant on the back to release gas from stomach	Yes	51 (43.2)	47 (32.63)	0.03*
	No	67 (56.8)	97 (67.37)	

<sup>a</sup>  $\chi^2$ , \*Statistically Significant.

physiological delivery, the participants had experienced higher levels of anxiety, but the differences between groups were not significant ( $P > 0.05$ ).

## Discussion

This study was done to investigate the details of mother-infant attachment behaviors in those women who experienced different vaginal delivery methods. In the field of childbearing, a baby whose mother is happy, well prepared for her labor, allows her labor to progress with confidence and courage, and gives birth spontaneously, without drugs or pain relief, ensures that her baby is biologically primed for adaptation and social responsiveness after birth.<sup>25,26</sup> This is as a result of the release of love hormones, namely oxytocin, prolactin, relaxin, endorphins, and a smattering of adrenalin for

**Table 3.** Type of delivery methods and sub types of anxiety

Types of anxiety	Type of delivery		P value <sup>a</sup>
	Physiological (n=118) No. (%)	Non-physiological (n=144) No. (%)	
State Anxiety			
Mild	18 (15.25)	22 (14.9)	0.08
Moderate	100 (84.75)	122 (82.4)	
Severe	0 (0)	0 (0)	
Trait Anxiety			
Mild	10 (8.5)	20 (13.8)	0.07
Moderate	107 (90.7)	122 (84.72)	
Severe	1 (0.8)	2 (1.38)	

<sup>a</sup>  $\chi^2$ 

alertness.<sup>27</sup> Love hormones are released during labor in ever-increasing spurts, so that immediately after birth, ‘love hormone’ concentrations in the bloodstream are at their peak and a woman is primed for attachment, as is her baby.<sup>28</sup> This period straight after birth is recognized as a biologically “sensitive period” when mother and baby are alert and awake so that they recognize and bond with each other.<sup>1-6</sup>

The study results showed that the scores of mother-infant attachment in physiological birth were higher than they were for those who underwent non-physiological birth.<sup>28-30</sup> These effects may be due to the less experienced pain and anxiety and more energy storage for baby care that literature relates to physiological delivery.<sup>26</sup> Unfortunately the data in this domain is so limited. Piadeh Zavardehi et al., showed that the quality of mother–infant attachment among women following physiological birth was higher than it was for those who underwent non-physiological birth in three dimensions of attachment: emotional, proximity/ contiguous, and caring behaviors. Their study results were in line with the present study.<sup>5</sup> In support of physiological delivery, Bergner et al., concluded that anxiety or pain that existing in non-physiological birth delivery may have an impact on the physiological and behavioral functioning of the fetus/baby, with consequences for their later development. They also have fewer facial expressions in response to happy faces, disrupted sleep patterns, increased fussiness, and non-suitability that can disrupt a good attachment formation.<sup>26</sup> Keverne et al., justified that the stimulation of the vagina and cervix during delivery is important for attachment of the mother to the child. This stimulation triggers the olfactory learning system from the mother, which is essential for the recognition of the child.<sup>19</sup> Also Takeda et al., highlighted that during and after delivery a higher level of oxytocin is present in the brain of the mother, specifically in the cerebrospinal fluid. In rodents, it was found that the oxytocin that is released during delivery triggers the start of maternal care.<sup>17</sup> Fleming et al., believed that the higher level of cortisol hormone in

vaginal delivery is responsible for more positive mother to child attachment in this delivery method.<sup>14</sup>

In this way, some studies are suggesting that there are no relations between the delivery methods and mother-infant attachment.<sup>27,31,32</sup> According to these studies, attachment is a long and deep reaction that occurs long before delivery. Therefore, it is unlikely that the mode of delivery can bring about such a profound reaction.<sup>26,30,33-35</sup> We assumed that some of the observed differences between our study results and the mentioned studies were attributed to the impact of some effecting factors (such as genetic, personality characteristics of participants, etc.), that were mentioned in the articles.<sup>27-29,31</sup>

Although this study verified the positive roles of physiologic delivery in the mother-infant attachment, no accurate knowledge about these mechanisms is available and more research should be done. A study on this subject could consider a research design in which the attachment of siblings, of whom one is born by a vaginal delivery and the other by a cesarean section, to their mother, is compared. Also, we had some limitations such as small sample size, the limitation that relates to the cross-sectional study, not measuring the hormones of the mother and child, experience during and after delivery and the differences in the release of hormones, the effect of unintended pregnancy, sex of neonates, socio-economic factors that can alter the attachment behavior by mothers.

## Conclusion

Results of the current study indicated that mothers engaged in physiological delivery had higher scores in mother to child attachment behaviors. It means they are more successful than the non-physiological delivery group in getting attached to their babies.

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## Ethical Issues

This study was accepted at ethical committee of Shahroud

## Research Highlights

### What is the current knowledge?

- Attachment process begins within the first month of pregnancy and is continues after delivery.
- Attachment is a relationship and mother has an important role to play in its quality.
- The physiologic labor as a type of vaginal delivery is described to be safe for mother, natural, with low pain and no medical interventions in an anxiety-free atmosphere in which mother’s hormonal system modulates the main labor factors. There are some advantages in this type of delivery method.

### What is new here?

- Mothers engaged in physiological delivery had higher scores in mother to child attachment behaviors.

University of Medical Sciences. all participants were free to enter or exit from the study. Written informed consent forms were given to every participant and sharing the study results were done with them.

### Conflict of Interest

The authors declare no conflict of interest in this study.

### Author's Contributions

HH: Conception of the study and design, supervision of data collection and analysis, drafted manuscript and critically revised the article; NP: Conception of the study and design, data collection and analysis, drafted manuscript; EE: Conception of the study and design, supervision of data collection and analysis; MD: Drafted manuscript and critically revised the article; NB: Conception of the study and design, data collection and analysis.

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