Relationship Between Antenatal Maternal Anxiety and Feeding Behavior and Physiological Parameters of Neonates in Cesarean Section Mothers: A Cross-sectional Study

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Abstract

Background: Anxiety is one of the most common psychological disorders in pregnancy. It seems that a pregnant mother's anxiety has adverse effects on physical growth, motor development, and breastfeeding behavior in her baby.

Objectives: This study aimed to investigate the relationship between feeding behavior and physiological parameters of neonates with antenatal maternal anxiety in cesarean section mothers.

Methods: In this cross-sectional study, with a multiple regression analysis method for each variable, 10 samples were selected based on consumptive sampling, and total 101 people were selected. Data were collected using Spielberger's questionnaire for mothers' anxiety before delivery, and Standard Infant Breastfeeding Assessment Tool for nutritional behavior, and physiological parameters of newborns was completed within 48 hours after delivery. Independent and dependent t-test and Pearson correlation coefficient tests were used to analyze the data using SPSS software version 16.

Results: The mean total anxiety (state and trait) was 90.02 ± 18.09. Pearson correlation test showed that there was no significant relationship between the two anxiety variables with the mean nutritional behavior of the neonates and the anxiety with the physiological parameters of the newborn.

Conclusions: There was no significant relationship between anxiety and physiological parameters and nutritional behavior of infants. Further studies with a larger sample size are recommended in the area of psychosocial support around delivery and the effect of mothers' anxiety on the infants' nutritional behaviors and physiological parameters.

Keywords: Anxiety, Nutritional Behavior, Physiological Parameters, Neonates

1. Background

Pregnancy is a phenomenon that changes women's physical, mental, and social life and can be the major underlying cause of disorders such as anxiety. Anxiety is one of the most common psychological disorders in the pregnancy, which will negatively influence the mother's and infant's health (1, 2). Decreasing anxiety level is associated with increased oxytocin levels and prolactin and decreased cortisol levels, which will lead to increased milk secretion and easier sucking for the baby (3). The higher nutritional behavior score of the baby, including the power of sucking milk, will lead to more comfortable breastfeeding in the first hours after birth and many short-term and long-term benefits of breastfeeding (4). Maldonado-Duran, as quoted by Dokuhaki et al., reported the mother's stress and negative experiences during pregnancy would negatively affect physical growth, motor-behavioral and psychological development of infant (5). Also, mothers who had less attachment to their fetus during their pregnancy and had gotten more depression after delivery, their infants had a more developmental delay. Moreover, Punamäki et al., as quoted by Dokuhaki et al., stated that the mother's anxiety and unpleasant mood during pregnancy directly affected the mood of the fetus (6). Therefore, this study was designed since maternal anxiety can affect the developmental, psychological, and physiological factors of the newborn (7) as well as his/her nutritional behaviors.

2. Objectives

This study aimed to investigate the relationship between feeding behavior and physiological parameters of neonates with antenatal maternal anxiety in cesarean section mothers.

3. Methods

This study is a cross-sectional study. The research units were selected according to the inclusion and exclusion criteria of the study based on the statistical consulting method in the form of multiple regression analysis. For each variable, ten samples (a total of 101 subjects) were selected based on simple purposive. The inclusion criteria were being the mother of childbearing age, being non-emergency cesarean section, with gestational age between 38 - 42 weeks, singleton pregnancy, and tendency of mothers for breastfeeding, and willingness to participate in the study. Moreover, the exclusion criteria were the infant's weight less than 2,500 and more than 4,000 grams, the Apgar score of less than 7 at 1 or 5 minutes after birth, the existence of meconium in amniotic fluid, the existence of any abnormality in the newborn, not taking anti-breastfeeding drugs in the mother during the breastfeeding, infant feeding with formula, and mother's reluctance to continue the baby's participation in the study. The study instrument consisted of maternal and neonatal demographic characteristics questionnaire, standard breastfeeding assessment tool, the form of number and duration of breastfeeding, infant physiological parameters registration form and anxiety inventory.

Standard Infant Breastfeeding Assessment Tool is a standard tool to evaluate breastfeeding. This standard tool was used in Beiranvand et al.'s study ([8]) in which its validity and reliability were calculated. This form includes four subscales of sucking, rooting, readiness, and latching. Each subscale has 0 - 3 scores and 0 - 12 scores in total. The data were recorded at the beginning of the first breastfeeding at the first hour of birth up to 48 hours (Table 1). The researcher recorded the infant physiological parameters in the registration form at the first hour of birth up to 48 hours. The Spielberger Anxiety Scale with 40 questions (80 scores) was used to assess the anxiety level of mothers. Items scored by a Likert Scale. The Spielberger anxiety test was used by Kalkhoran and Karimollahi in 2007 for 150 patients undergoing surgery in Iran in which the reliability was reported at 0.97. The present study is based on this scale ([9]).

Table 1. Standard Infant Breastfeeding Assessment Tool Based on Likert Scale

Criteria	Score
Readiness to feed	
Readiness to feed without any effort	3
Weak stimulation to start feeding	2
Need more stimulation to start feeding	1
Baby cannot wake up to feed (sleepiness)	0
Latching	
Feeding starts immediately	3
Latching starts after 3 - 10 minutes	2
Latching takes time more than 10 minutes	1
Feeding does not start	0
Sucking	
Sucking is good on both breasts	3
Sucking is medium but needs stimulation	2
Sucking is weak, and it is for a short period	1
No sucking	0
Rooting	
Effective rooting starts immediately	3
Needing stimulation and encouragement	2
Rooting is weak even with encouragement	1
No attempts for rooting	0

3.1. Performance Method

Before cesarean section, firstly, the standard breastfeeding method was trained to mothers eligible for inclusion the study by the researcher assistant and their anxiety scores were recorded. After delivery, during 48 hours of maternal hospitalization, researcher and researcher assistant recorded infants' nutritional behavior and physiological parameters (heart rate, respiratory rate, body temperature and percentage of arterial oxygen content). The researcher recorded physiological parameters by a tympanic thermometer, pulse oximetry, and a neonatal examination. Data of nutritional behavior of the infant were recorded by the researcher (nurse) and data of the number and duration of breastfeeding was recorded by the mother in the relevant form. The simultaneous examination by two nurses was conducted to confirm the reliability of Infant Breastfeeding Assessment Tool. Also, the reliability of the pulse oximeter, digital thermometer, and sphygmomanometer was measured by similar devices to ensure accuracy in calculating the physiological parameters of the infant.

3.2. Statistical Analysis Method

Statistical methods included descriptive analysis for indicators of mean, standard deviation, frequency, and percentage depending on the quantitative or qualitative variables, independent and dependent *t*-test, and Pearson correlation coefficient. Also, P-value of less than 0.05 was considered statistically significant, and the data were analyzed using SPSS software (version 16).

3.3. Ethical Considerations

This was a part of an interventional study of clinical trial type that was confirmed by the Ethics Code of Shiraz University of Medical Sciences (IR.SUMS.REC.1396.65). All participants signed written informed consent forms, and if they did not intend to continue participating in the research project, they could withdraw from the study.

4. Results

The results showed that the mean anxiety was 90.02 with a standard deviation of 18.09. The average religious health score was 45.98, with a standard deviation of 8.68. The average score of existential health was 04.04 with a standard deviation of 6.86, and the mean score of spiritual health was 89.02 with a standard deviation of 12.39 (Table 2).

Table 2. The Correlation of Mother's Anxiety and the Mean Score of Neonatal Feeding Behavior

Mother's Anxiety	Correlation	Number of Neonates	Significance Level
Readiness to feed	0.042	101	0.377
Rooting	0.095	101	0.343
Latching	0.089	101	0.376
Sucking	0.025	101	0.801
Neonatal feeding behavior	0.044	101	0.665

In 101 infants whose physiological parameters were recorded for them, the mean heart rate was 137.44 ± 10.35, the mean oxygen arterial blood pressure was 97.99 ± 1.32, the mean respiratory rate was 44.55 ± 6.38, the mean body temperature was 36.5 ± 0.49, and the mean score of nutritional behavior was 9.55 ± 1.07. Mean score of obvious anxiety in mothers was 46.63 ± 10.31, the mean of hidden anxiety was 43.69 ± 10.53, and the mean total anxiety score was 90.02 ± 18.09.

In the investigation of correlation between maternal anxiety and the mean score of nutritional behaviors, as well as physiological parameters of infants, Pearson correlation test showed no significant relationship between the two anxiety variables and the mean nutritional behavior of infants and also between the anxiety with the physiological parameters of the infant (Table 3).

Table 3. The Correlation of Mother's Anxiety and the Mean Score of Neonatal Physiologic Parameters

Mother's Anxiety	Correlation	Number of Neonates	Significance Level
Heart rate	-0/217	101	0.029
Arterial oxygen peroxidation	0/003	101	0.973
Respiratory rate	-0/187	101	0.061
Body temperature	0.05	101	0.62

5. Discussion

The total score of the mean of anxiety was 90.02 ± 18.09. The results of a study by Meades and Ayers (2011) [10] were consistent with the results of this study. They evaluated the amount of anxiety in the population of women at the time of delivery. The results of Meades and Ayers's study showed no significant relationship between the two anxiety variables and the mean nutritional behavior of the infants, and also, there was no significant relationship between anxiety and physiological parameters of the infant [10]. In a study by Johnson and Slade (2003) on the effect of anxiety on the pregnancy complications, the findings indicated no relationship between anxiety and maternal and fetal complications during perinatal period [11]. The results of Littleton et al.'s study (2007) also showed that there was no significant relationship between anxiety and perinatal complications [12]. Also, in Johnson and Slade's study (2002), there was no relationship between anxiety and the need for emergency cesarean section [13]. The results of these studies were consistent with the results of the present study.

Ding et al. (2014) concluded that maternal anxiety during pregnancy led to premature birth and low birth weight [14]. Dunkel Schetter and Tanner (2012) study also found that maternal anxiety during pregnancy and around delivery time could had a negative effect on the development of neonatal motor behaviors leading to disruption in the correct functioning of the pituitary-hypothalamus axis in the mother and the infant as well as the reduction of the gray matter of the brain of the infant [15]. The results of mentioned studies were inconsistent with the results of the present study.

Since anxiety is a mental data, it seems that the mother's understanding of anxiety is different from one person to another depending on individual, genetic, family, and cultural characteristics. Therefore, different stud-

ies have reported very different results in this regard, particularly the effect of anxiety on mother's breastfeeding and consequently the infant's nutritional behaviors. Adedinsewo et al. (2014) found a significant relationship between maternal anxiety, maternal characteristics, and continued breastfeeding. Therefore, the mother's anxiety should be monitored actively (16). On the other hand, considering the reasons given by mothers for anxiety around the time of delivery, including concerns about the health of the infant, birth weight, lack of ability for correct breastfeeding concerning nutritional behavior, it can be concluded that this wide range of reasons can affect the relationship between anxiety and other parameters in various studies in which these factors are reduced by appropriate interventions such as correct breastfeeding (17).

5.1. Conclusions

There was no significant relationship between anxiety and physiological parameters of the infant as well as nutritional behavior of infants. Given the prevalence of anxiety symptoms during pregnancy and its negative consequences on maternal and fetal health, it is recommended that further studies should be conducted in the field of psychosocial support interventions of mothers during pregnancy and around the time of delivery. In addition, according to the results of this study, it is suggested that further studies should be conducted on the effects of maternal anxiety and nutritional behaviors of the infant, as well as physiological parameters of the infant.

Footnotes

Authors' Contribution: E. K. and M. A. prepared the first draft of the manuscript and M. A. made critical revisions to the paper and responded the reviewers. M. D. and A. Z. helped the Surge Articles and clinical research.

Clinical Trial Registration Code: IRCT2017042233163N2 (link: https://en.irct.ir/trial/25664).

Conflict of Interests: The authors declare no conflict of interests.

Data Reproducibility: The data presented in this study are openly available in one of the repositories or will be available on request from the corresponding author by this journal representative at any time during submission or after publication. Otherwise, all consequences of possible withdrawal or future retraction will be with the corresponding author.

Ethical Approval: This is a part of interventional study of clinical trial type that was confirmed by the Ethics Code of Shiraz University of Medical Sciences (IR.SUMS.REC.1396.65).

Informed Consent: All participants signed written informed consent forms and if they did not intend to continue participating in the research project, they could withdraw from the study.

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