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## A Path Analysis of the Effects of Mental Health and Socio-personal Factors on Breastfeeding Problems in Infants Aged Less than Six Months

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### Abstract

**Background:** Despite the large number of studies conducted on breastfeeding, no studies have yet examined the direct and indirect effects of socio-personal factors and mental health on breastfeeding.

**Aim:** This study aimed to analyze of the effects of mental health and socio-personal factors on breastfeeding in infants aged less than six months.

**Method:** This analytical cross-sectional study was conducted on 465 eligible mothers visiting general health centers in a northern city of Iran, in 2015. Data were collected using the researcher-made scale of socio-personal factors of breastfeeding, Spielberger's State-Trait Anxiety Inventory, Beck's Depression Inventory, Cohen's Perceived Stress Scale, the Breastfeeding Difficulties Questionnaire, the Access to Healthcare Questionnaire, and the Poor Health Behaviors Questionnaire.

**Results:** The path analysis of the mental health variables showed that breastfeeding problems are associated through a direct path with depression, through an indirect path with stress, and through both paths with anxiety; a positive correlation was thus observed between these variables and breastfeeding problems. Poor health behaviors also contributed to mothers' breastfeeding problems through a direct path and indirectly by affecting their level of depression. Income had the highest positive effect ( $B=0.66$ ), while the number of children had the highest negative effect ( $B=-3.16$ ) on breastfeeding problems through a direct path. Poor health behaviors had the highest positive effect ( $B=0.75$ ) and family support had the highest negative effect ( $B=-0.11$ ) on breastfeeding.

**Implications for Practice:** The early diagnosis of poor postpartum mental health in mothers can help reduce breastfeeding problems.

**Keywords:** Breastfeeding difficulties, Mental health, Mothers, Path analysis, Socio-personal factors

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## Introduction

The Healthy People 2020 breastfeeding objectives were developed to encourage breastfeeding and promote its initiation and duration in the US (1). Breast milk satisfies all the nutritional needs of infants during the first six months of their life and contributes significantly to their health (2). Exclusive breastfeeding during the first six months is one of the most important recommendations made by the World Health Organization for improving children's health across the world. According to the International Breastfeeding Guide, breastfeeding should initiate in the baby's first hours and continue exclusively throughout the first six months (3).

This method of feeding is useful for both the mother and the infant. As shown in studies, breastfeeding strengthens the infant's immune system, reduces mortality due to infectious diseases, improves bone mass, increases intelligence quotient (IQ), and reduces adult obesity. Moreover, mothers who breastfeed return to their pre-pregnancy weight sooner and the risk of breast diseases is also diminished in them (4). Although the benefits reported for breastfeeding are persuasive, there is still no consensus on the recommended time, amount, and duration of breastfeeding (5).

According to global statistics, less than 40% of infants aged less than six months are exclusively breastfed and only 15% of mothers breastfeed their children. According to a World Health Organization (WHO) report, breastfeeding condition is worse in underdeveloped and low-income countries. According to their estimates, only two out of every ten infants aged less than six months receive exclusive breastfeeding (6). In a community-based study in Iran, only 45% of Iranian mothers were found to exclusively breastfeed; the lowest rates of exclusive breastfeeding were reported in cities such as Zahedan, Yazd, and Ghazvin (7, 8). In Shahroud, the rates of exclusive breastfeeding were reported to be 28.8%, 23%, and 11.6% two, four, and six months after birth (9). Various factors affect the initiation and continuation of breastfeeding, which include socio-personal, mental, physiological, and other intervening factors (10).

Dreesmann (2014) showed that the mother's socio-personal factors, such as educational level, race, age, weight, employment status, milk insufficiency, willingness to breastfeed, and socioeconomic status affect breastfeeding problems (11). In a systematic review, Neto et al. (2013) found that socioeconomic status is directly linked to the duration of breastfeeding (12). Other major variables affecting the initiation and duration of breastfeeding include psychosocial factors during pregnancy (13). Limited epidemiologic evidence suggests a relationship between the mother's mental health and psychosocial status with the initiation and duration of breastfeeding (14). Psychological factors need to be further studied due to their complicated and culture-based nature and their role in determining breastfeeding behaviors (3).

Just like in other countries, breastfeeding is considered essentially important in Iran. Despite the many studies conducted on breastfeeding, no studies have yet examined the direct and indirect effects of socio-personal factors and mental health on breastfeeding. Considering the importance of this issue, we aimed to carry out a path analysis of the effects of mental health and socio-personal factors on breastfeeding in infants less than six months of age.

## Methods

This analytical cross-sectional study was conducted among 465 eligible mothers presenting to general health centers affiliated to Shahroud University of Medical Sciences, Shahroud, Iran, in 2015 that were selected through quota sampling. For sampling, all the centers were first listed; then, the population of mothers with infants aged one to six months covered by each center was determined. In proportion to the number of centers and the number of mothers covered by each center and in accordance with the estimated sample size, a quota was assigned to each center and the convenience sampling from these centers was carried out on a daily basis.

Iranian mothers of one-six-month-old healthy infants without any congenital abnormalities or known diseases that could prevent breastfeeding were recruited. The inclusion criteria were having an active health record in health centers, having reading and writing literacy, and having lived in Shahroud for at least one year before the study. Women were not chosen if they or their infants had a serious medical condition that hampered breastfeeding.

The researcher used eight instruments to collect the data, including a researcher-made socio-personal factors of breastfeeding inventory, the Breastfeeding Difficulties Questionnaire developed by Wambach (15), the Access to Healthcare Questionnaire, the Poor Health Behaviors Questionnaire developed by Kiani et al. (16), Spielberger's State-Trait Anxiety Inventory (STAI), Cohen's Perceived Stress Scale

(PSS14), the Multidimensional Scale of Perceived Social Support (MSPSS), and Beck's Depression Inventory (BDI II).

The researcher-made socio-personal factors of breastfeeding inventory contained three sections, including a demographic information section, a section on the factors affecting exclusive breastfeeding in the mother, and a section on the factors influencing breastfeeding in the infant. Content validity of this scale was confirmed and its reliability was established by using the test-retest method ( $r=0.84$ ).

The Breastfeeding Difficulties Questionnaire was developed in 1990 by Wambach to ascertain mothers' breastfeeding problems (15). In 2014, Mortazavi et al. developed the Persian version of this questionnaire with 18 items about breastfeeding problems that were scored based on a five-point Likert scale (from one to five). They calculated the content validity of the scale at 0.85 and its internal consistency using Cronbach's alpha at 0.83 (9).

The Access to Healthcare Questionnaire was developed in 2014 by Kiani et al. and consists of eight items that are scored based on a four-point Likert scale from zero to three. The test-retest reliability of this questionnaire was assessed and the correlation between the scores of its items was calculated at 0.85 (16). The Poor Health Behaviors Questionnaire was also developed in 2014 by Kiani et al. in two sections discussing spouse's violence and addiction. The test-retest reliability of this questionnaire was also assessed. The correlation between the scores of its items was calculated at 0.95 (16).

First standardized by Spielberger et al. in 1970, the STAI is a 40-item self-report scale that evaluates state and trait anxiety using two 20-item subscales. Since all the items are scored on a four-point Likert scale from one to four, the scores of each subscale range between 20 and 80. Scores 20-40, 41-60, and 61-80 indicate mild, moderate, and severe anxiety, respectively. The validity and reliability of the STAI have been confirmed by several studies. In 1993, Mahram performed a study in Mashhad, Iran, and assessed the validity and reliability of the STAI among Iranians (17). The STAI's reliabilities for state and trait anxiety measurement were 0.91 and 0.90, respectively (18).

The PSS14 was developed by Cohen et al. in 1983, the PSS14 is administered to measure an individual's general level of perceived stress during the past month. Of the 14 items of the PSS14, seven items are negative and suggest the person's inability to cope with stress. The other seven items are positive and show the person's ability to cope with stressors. All the items are scored based on a five-point Likert scale (0-4). Therefore, the total scores range between 0 and 56 with higher scores indicating greater perceived stress (19). A previous study evaluated the reliability of the PSS14 in women and reported a Cronbach's alpha coefficient of 0.81 (20).

In 1988, Zimet et al. introduced the MSPSS as a 12-item tool for the measurement of perceived social support. The scale was translated into Persian in 2009 by Salimi et al. (21). The MSPSS assesses perceived support from family, significant others, and friends using three four-item subscales. Since all the items are scored on a seven-point Likert scale from one-seven, the possible total scores of the scale range between 12 and 84. Scores 12-48, 49-68, and 69-84 indicate low, moderate, and high social support, respectively. Previous studies have reported the Cronbach's alpha coefficient for the subscales and the whole scale as 0.86%-0.90% and 0.86%, respectively (21, 22).

The BDI is a 21-item self-report questionnaire designed by Beck et al. in 1961. It is widely used to evaluate people's attitudes and symptoms of depression. The items are scored on a four-point Likert scale from zero to three and the total scores range between 0 and 63. Scores 14-19, 20-28, and 29-63 respectively signify low, moderate, and high levels of depression. A large number of previous studies have confirmed the reliability and validity of the BDI (23). The Cronbach's alpha coefficient of the scale was calculated at 0.86 (24).

After obtaining permission from the Ethics Committee of Shahrood University of Medical Sciences under the code IR.SHMU.REC.1394.71, and receiving permission from the authorities for sampling, the researcher first introduced herself to the participants and briefed them on the study objectives and methods and ensured them of the confidentiality of the data, their right to discontinue cooperation at any stage of the project, and the collective interpretation of the data. The subjects were then asked to sign consent forms if they were willing to enter the study. The questionnaires were then distributed among the participating mothers to fill out in self-report form on site.

In this study, the fit of the theoretical model was determined and the simultaneous correlation of socio-demographic factors, BMI, and psychological factors was assessed with breastfeeding using a path analysis. The data obtained were analyzed in SPSS and LISREL using path analysis.

Path analysis is an extension of the regression model. In a path analysis model from the correlation

matrix, two or more casual models are compared. The path of the model is shown by a square and an arrow, which shows causation. Regression weight is predicated by the model. Then, the goodness of fit is calculated to examine the fitting of the model (25).

## Results

After examining the normal distribution of the under study variables using the Kolmogorov-Smirnov test, the mean ages of the mothers and fathers were found to not be significantly related to breastfeeding in the mothers; however, the mean score of breastfeeding difficulties and the mean scores of anxiety, depression and stress were significantly correlated with breastfeeding in the mothers ( $P < 0.001$ ; Table 1). To perform the path analysis, the correlation between the variables was examined using a bivariate analysis. As shown in Table 2, of the factors that had a direct correlation with breastfeeding difficulties, the mother's age had the highest correlation, while of the factors that had an indirect correlation with it, access to healthcare had the highest correlation.

The path analysis examined the effects of the variables of age, BMI, mother's education, scores of anxiety, depression and stress, perceived family support, poor health behaviors, access to healthcare, the number of children, income, and father's age on breastfeeding problems.

As shown by the path diagram (Figure 1), of the variables observed on the direct path, income had the highest positive effect ( $B=0.66$ ) and the number of children had the highest negative impact ( $B=-3.16$ ) on breastfeeding difficulties. According to this model, mothers with inadequate income experienced more breastfeeding difficulties, and an increased number of children reduced breastfeeding difficulties. Of the

**Table 1. The distribution of demographic, midwifery, and neonatal factors and their relationship with breastfeeding**

variable	1-6 months	
	Mean±SD	P-Value
Mother's age (years)	28.9±5.2	0.5
Father's age (years)	32.8±5.8	0.4
Infant age (months)	3.3±1.8	<0.001
Income (toomans)	1270100±871711	0.05
Weight gain in pregnancy (kg)	12.3±4.4	0.002
Breastfeeding difficulties	29.06±8.3	<0.001
Anxiety	35.8±11.5	<0.001
Depression	10.8±8.6	<0.001
Stress	20.5±8.4	<0.001

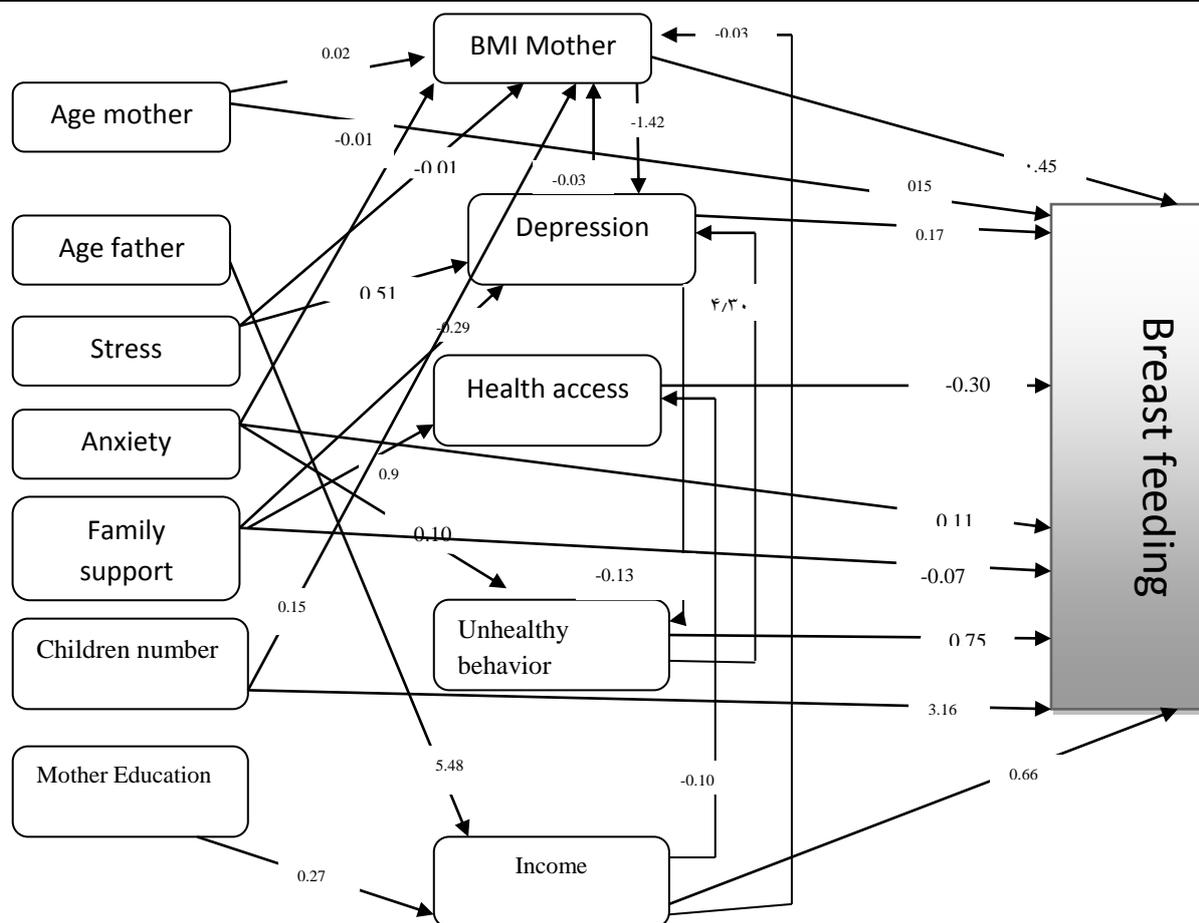
Correlation test: Pearson

**Table 2. Correlations between breastfeeding problems and mental health and social, economic, and demographic factors**

	BF	DP	A	Age F	Age M	Stress	FS	CN	BMI	EM	Income	UB	HA
BF	1	0.35	0.31	0.21*	0.096	0.28	-0.16	-0.06*	0.17*	0.15	0.10	0.20	-0.23
DP		1	0.71	0.37*	0.06*	0.68	-0.36	0.62*	-0.03*	-0.8*	-0.12	0.30	-0.10
A			1	0.05*	0.09	0.74	-0.28	0.10	-0.7*	-0.10	-0.12	0.29	-0.13
Age F				1	0.74	0.04*	-0.09	0.41	0.16	-0.10	0.17	-0.02	-0.02
Age M					1	0.04*	-0.07*	0.44	0.15	0.02*	0.17	0.03*	-0.03*
Stress						1	-0.29	0.08*	-0.08	-0.04*	-0.12	0.23	-0.18
FS							1	0.07*	0.02*	0.13	0.03*	-0.09	0.09
CN								1	0.16	-0.25	0.03*	0.00*	0.01*
BMI									1	-0.9	-0.03*	0.04*	-0.07*
EM										1	0.46	-0.1*	-0.04*
Income											1	-0.21	-0.03*
UB												1	-0.11
HA													1

Correlation is significant at the 0.01 or 0.05 level \* = Is not significant

BF= Breastfeeding difficulties, A= Anxiety, Age M= Mother's Age, Age F= father's Age, FS= Family Support, EM= education of mothers, UB= Unhealthy behavior, HA= Health accessibility, CN= Children number DP=Depression



**Figure 1. Full empirical model (Empirical Path Model for the effects of mental health and social, economic, and demographic factors on breastfeeding problems**

variables observed on the indirect path, father's age had the highest positive effect on breastfeeding difficulties (B=3.61); that is, the older was the father, the more breastfeeding difficulties the mother experienced. Of the variables observed on both paths (the direct and indirect paths), poor health behaviors had the highest positive effect (B=0.75) and family support the highest negative effect (B=-0.11) on breastfeeding difficulties. In other words, higher scores on the poor health behaviors questionnaire indicated more breastfeeding difficulties and higher scores of family support indicated less breastfeeding difficulties (Table 3).

The goodness of fit indices of the model indicated the model's good fit and the logical relationship between the variables. That is, the fitted model does not have a significant difference with the conceptual model ( $X^2=0.05$ ; GFI=0.95; CFI=0.96; NFI=0.93; RMSEA=0.00048).

**Table 3. Path coefficients for the association between breastfeeding problems and mental health and social, economic, and demographic factors**

Variable	Direct	Indirect	Total
Depression	0.17	-	0.17
Anxiety	0.11	0.14	0.25
Age Father	-	3.61	3.61
Age Mother	0.15*	-	-
Stress	-	0.08	0.08
Family Support	-0.07	-0.04	-0.11
Children number	-3.16	-	-3.16
BMI	0.45*	-	-
Mothers education	-	0.17	0.17
Income	0.66	-	0.66
Unhealthy behavior	0.07	0.68	0.75
Health accessibility	-0.30	-	-0.30

BMI: body mass index

## Discussion

The path analysis of the mental health variables showed that breastfeeding difficulties are connected through a direct path with depression, through an indirect path with stress and through both paths with anxiety; a positive correlation was thus observed between these variables and breastfeeding difficulties. The postpartum period is a transitional period in which the mother faces new roles, patterns, and relationships to which she has to adjust. As a result, she becomes more prone to emotional and mood crises such as stress, anxiety, and depression than ever. These postpartum emotional and mood crises can leave negative effects on the mother-infant bond, as well as on the infant's nutrition and development (26). The results obtained by Insaf et al. (2011) were consistent with the present findings, as they showed that the mother's mental health is one of the main factors contributing to breastfeeding success (13).

Psychiatric disorders such as depression, anxiety, and stress can cause a range of changes, from mental to physical changes, in mothers (27). The hypothalamic-pituitary-adrenal axis is more sensitive to stress in postpartum mothers compared to the rest of women (28). In the long-term, increased levels of stress, anxiety, and depression can affect the functioning of this axis and increase catecholamine levels, including cortisol levels (29), which then causes a reduction in the secretion of oxytocin and a delayed response to the baby's sucking reflex by affecting the hypothalamus. Anxiety and biological tensions can also delay the start of the second stage of lactogenesis and the early cessation of breastfeeding (30).

According to these findings, poor health behaviors and family support have the highest overall effects on breastfeeding difficulties. Poor health behaviors can contribute to breastfeeding difficulties directly and indirectly by triggering depression. In line with the present findings, Vassilaki et al. (2014) found that the amount and duration of breastfeeding were less in mothers who smoked compared to other mothers (31). Fear of being exposed and the stigmas associated with smoking cause these mothers not to refer to healthcare centers to receive services, training, and information on breastfeeding, and this fear thus exerts negative effects on their breastfeeding. Poor health behaviors such as smoking, drinking, and drug abuse can cause stress, and stress reduces lactation, and if the source of stress persists, it can even stop milk production by reducing prolactin level in the mother (32, 33).

Family support contributed the most to reducing breastfeeding difficulties directly or indirectly by affecting access to healthcare. This finding is consistent with the results obtained by Meedya et al. (2010) and Abolghasemi et al. (2012), who found that the support provided to a breastfeeding mother by her husband, family, and friends has a significant direct relationship with exclusive breastfeeding by the mother, and this factor was one of the main modifiable factors for prolonging the duration of breastfeeding (10, 34). The higher is the mother's perceived social and family support, the less are her levels of anxiety, depression, and stress. Researchers believe that physiological reactions to stress change under the influence of this factor, that is, the intensity of the individual's reaction to stress reduces in the presence of friends compared to when she has to face stress alone. To explain this finding, it can be argued that family and social support protect the individual from stressful life events through a buffering mechanism and help the mother feel better (35).

In the present study, of the variables affecting breastfeeding difficulties on one path, the husband's age had the highest indirect positive effect on breastfeeding difficulties, and income had the strongest direct effect. Husband's age affected the income level, and thus, influenced breastfeeding difficulties. In line with these findings, Brown (2014) found that as the family's economic status improves, the duration of breastfeeding increases; they also found that low socioeconomic status was a significant factor for the early cessation of exclusive breastfeeding (36). In some cases, the husband's increased age compromised the family's income (37). Families with a low socioeconomic status are faced with issues such as malnutrition, insufficient access to healthcare, addiction, tobacco and alcohol use, subsequent pregnancies, and stress (38). Income inequality can lead to health inequality, such that countries with worse income inequality have lower life expectancies. Various interpretations have been proposed for the mechanism of income and health inequality that discuss material, structural, behavioral and lifestyle factors at the individual level (35).

## Implications for Practice

This study showed that mental health and socio-personal factors are related to breastfeeding

difficulties from various paths (only the direct path, only the indirect path, or both the direct and indirect paths). The persistent cooperation of healthcare personnel during the postpartum period and providing training to fathers and close relatives to increase their support of the mother and infant and offer them proper care are essential to a successful breastfeeding experience. The early detection of mothers' poor postpartum mental health, understanding their breastfeeding difficulties, and attempting to eliminate these problems can be of significant help. Therefore, promoting the activities of child-friendly hospitals can also contribute positively to successful breastfeeding.

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### Conflicts of Interest

None declared.

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