

Assessment of Maternal General Health and Feeding Pattern of their Infants: A Cross-sectional Study in Iranian Population

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Abstract

Background

Various studies have been conducted so far regarding feeding infants exclusively with natural mother milk; various factors, which may influence feeding process, are occupation of mothers, sickness of infants or mother. This study aimed to assess the relationship between maternal general health and feeding pattern of infants.

Materials and Methods

This cross-sectional study was done in 2016. The society in this study was mothers with infants between 0-6 months referred to Imam Ali hospital (Sari, Iran). Using accessible sampling method, 250 mothers were selected. Then they were divided to two groups of dry-powder-milk (DPM, n = 125), and mother-milk (MM, n = 125). Subsequently, general health of mothers in both groups was assessed via General Health Questionnaire (GHQ). Then data were analyzed using the SPSS 16.0 (SPSS Inc., Chicago, IL, USA) by descriptive and inferential statistics tests.

Results

Mean age of mothers in dry-powder-milk (DPM) group, and mother-milk (MM) group was 28.53 ± 5.44 and 27.7 ± 5.15 years old, respectively. In overall results, general health were not significant difference between the two groups ($p = 0.34$), but only one dimension of general health (Social functioning) had significant differences between MM and DPM groups ($p = 0.02$).

Conclusion

Based on results, only one dimension of general health (Social functioning) had significant differences between two groups. So only social functioning had significant relation with feeding pattern of infants. Also, number of children had significant relationship with total score of GHQ. More studies are recommended to earn more detailed results.

Key Words: Feeding pattern, Infant, Iran, General health, Milk, Mothers.

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1- INTRODUCTION

The composition of human milk is considered as viable source of nutrition for infants and valuable feeding pattern (1). Human milk consists of antibodies that protect infants from pneumonia and diarrhea; aforementioned diseases are main cause of mortality among infants (2). Human milk would protect infants from periodic diseases such as sudden death syndrome (SDS), respiratory infectious disease (RID), and gastroenteritis and ear infection. Furthermore, it would alleviate the risk of childhood disease such as allergy, asthma and obesity and it would minimize the risk of ovarian/breast cancer (3, 4). There is no substitution for composition of human milk; there are nearly 400 vital substances within natural milk composition, which cannot be synthesized in laboratory such as white blood cells and immunoglobulin (5, 6).

Looking retrospectively at literature of 20 years, have shown the beneficial role of mother milk in social, psychological, immunological and nutrition contexts (6). Mother milk is essential nutrition source for infants more specifically in during first 6 months (7, 8). According to World Health Organization (WHO), less than 40% of infants up to 6 months are fed exclusively with natural milk composition (9); in Iran this number is around 23% (10). Although, initially feeding of infants usually starts with natural milk composition, most mothers are reluctant to continue the feeding process exclusively via their own milk (11).

Various studies have been conducted so far regarding various factors which may influence feeding process (12-15). One of the important influential factors regarding feeding pattern of infants is psychological state of mothers. Arifunhera et al. (16) showed that anxiety could endanger feeding pattern of infants during first 6 months; Li et al. (17) showed that experiencing stressful life events during

pregnancy increased the odds for the early cessation of prevalent breastfeeding. Stress events associated with separation or divorce, financial problems and residential moves in pregnancy were important predictors for a shorter duration of prevalent breastfeeding. However, Bogen et al. (18) postulated that neither MDD nor depressive symptom severity in pregnancy was related to breastfeeding intention, initiation or duration at 2 and 12 weeks. Intention to exclusively breastfeed was the most significant predictor of breastfeeding initiation and duration. One of the prospect in feeding pattern of infants in 2020 is to 60.6% of infants receive natural milk composition from their mother during first 6 months (19).

However, since most of studies conducted in Iran have not focused on current topic, we aimed to assess the relationship between general health dimensions (physical activity, anxiety, sleeping disorder, social functioning and depression) of mothers with feeding pattern of infants. With the results of this study future considerations can be made for improving the quality of feeding pattern of infants that have potential effects on health of them.

2- MATERIALS AND METHODS

2-1. Study Design and Population

This cross-sectional study was done in 2016 (March-Jun) to determine the relationship between general health of mothers and feeding pattern of infants. The society in this study was mothers with infants between 0-6 months hospitalized in Imam Ali hospital (Sari, Iran). The sample size was calculated with G-power software ($Z = 1.96$, $d = 0.05$, In-group variance = 0.135) (20). Using accessible sampling method, 250 mothers were selected. Then they were divided to two groups. At first, 250 random numbers between 0 and 1 were made by computer (Excel software), and then, numbers were printed

automatically. An envelope containing a number was given to each subject. Mothers with numbers < 0.5 were assigned into the case group and the ones with the numbers > 0.5 were assigned into the control group. One hundred and twenty-five mothers who fed their infants with dry powder milk were included as case group; and 125 mothers who fed their infants exclusively with human milk were also included in current study as control group. Subsequently, general health of mothers in both groups was assessed via General Health Questionnaire (GHQ) (21). The criteria of present study were as below:

2-1. Inclusion criteria

- Infant is born via full-term pregnancy period,
- Being Healthy by the time of birth,
- Age range between 0-6 months,
- Referring reason: Just normal health check-up.

2-2. Exclusion criteria

- Twin pregnancy,
- Contraindication regarding feeding infants,
- Mental Health of Mothers,
- Addiction of Mothers,
- Occupancy of mothers in night shift.

2-3. Study procedure

Firstly, mothers were fully informed regarding full procedure of current study; consequently after acquiring written consent forms mothers were entered the study. Accordingly, demographic data (age, education, work, number of children) was obtained. Subsequently, mothers in both groups answered to GHQ.

2-3-1. General Health Questionnaire

General Health Questionnaire (GHQ) developed by Goldberg in the 1970s as a method to quantify the risk of developing psychiatric disorders (21). This instrument

targets two areas – the inability to carry out normal functions and the appearance of distress – to assess well-being in a person (21). The test exists in several alternate forms: GHQ-30 (30 items), GHQ-28 (28-items), GHQ-12 (12 items) (23). In present study GHQ-28 was used. In this questionnaire, the items 1 to 7 were related to somatic (physical) symptoms, the items 8 to 14 were related to anxiety and insomnia, the items 15 to 21 were related to social dysfunction, and the items 22 to 28 were related to severe depression.

A somatic symptom disorder, formerly known as a somatoform disorder, is any mental disorder which manifests as physical symptoms that suggest illness or injury, but which cannot be explained fully by a general medical condition or by the direct effect of a substance, and are not attributable to another mental disorder (e.g., panic disorder) (24). Anxiety is an emotion characterized by an unpleasant state of inner turmoil, often accompanied by nervous behavior, such as pacing back and forth, somatic complaints, and rumination (25).

Social dysfunction, in the vivid sense of something deviating from the normal (c.f. Norm (social) or differing from the typical (such as an aberration), is a subjectively defined behavioral characteristic, assigned to those with rare or dysfunctional conditions. Behavior is considered abnormal when it is atypical, out of the ordinary, causes some kind of impairment, or consists of undesirable behavior (21).

Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings, and sense of well-being. A depressed mood is a normal temporary reaction to life events such as loss of a loved one (23). The answer possibilities provided for each item had a 4-point Likert scale type (i.e., ranging from not at all to much more than usual) specifying the amount of discomfort. Its scoring was from 0 to 3.

Every person's score in each of the subscales ranges from 0 to 21. Scores ranging from 0 to 7 represent an individual's terrible condition. Scores ranging from 7 to 14 shows an individual is on the eve of the disease. A score ranging from 14 to 21 is responsive of an individual's healthy condition (26). Using receiver operating curve (ROC) analysis, the optimum cutoff score for the GHQ-28 in this group was 19/20 (sensitivity 0.83, specificity 0.76). Using a loading of 0.6 or greater, a short form of the instrument (GHQ-15) ($\alpha=0.9$) was derived and correlated well with the longer form of the scale ($r=0.97$).

Using ROC analysis, the optimum cutoff score was 10/11 (sensitivity 0.83, specificity 0.69) (27). The reported Cronbach alpha coefficient for the GHQ is a range of 0.82 to 0.86 (28). The instrument is considered as reliable and has been translated into 38 different languages. Four factors were extracted using exploratory factor analysis: "depression," "psychosocial activity," "anxiety," and "somatic (physical)" (27).

2-4. Data analysis

After obtaining data, data were analyzed using the SPSS 16 (SPSS Inc., Chicago, IL, USA). Descriptive statistics was computed for all variables. The results are reported as the frequency (percent) for the demographic data. With respect to comparing two groups, independent t-test was used and regarding comparison of variables correlation coefficient was used. Also, Pearson test was used to assess possible relationship between demographic variables and general health. The significant p-value was set at a value of less than 0.05.

2-5. Ethical Considerations

Ethical approval was obtained from the research ethics committee of the Research deputy of Mazandaran University of medical sciences. All the participants received oral and written information about the aims of the study. It was made clear to them that their participation was voluntary and that all data would remain confidential. Research participants could not be personally identified and they were assured that participation would in no way affect their academic results.

3- RESULTS

Mean age of mothers in dry-powder-milk (DPM) group and mother-milk (MM) group was 28.53 ± 5.44 and 27.7 ± 5.15 years old, respectively (total mean was 28.02 ± 5.297 years old). Regarding to **Table.1**, no meaningful differences were showed between two groups ($p > 0.05$); so groups were similar to each other. Comparing results of general health in four dimensions (physical activity, anxiety and lack of sleep, social functioning and depression) were presented in **Table.2**.

In overall results, general health were not significant difference between the two groups ($p = 0.34$), but only one dimension of general health (social functioning) had significant differences between MM and DPM groups ($p = 0.02$). Therefore we can conclude that no relation was between general health of mothers and feeding pattern of infants.

Based on **Table.3**, there were no meaningful relationship between age ($r = 0.088$, $p = 0.16$), educational status ($r = 0.121$, $p = 265$), and work ($r = 0.096$, $p = 0.34$) with general health of mothers. But number of children had significant relationship with general health of mothers ($r = 0.174$, $p = 0.005$).

Table-1: Demographic characteristics of participants

Variables	Number (%), Mean (SD)		P-value
	DPM*	MM*	
Education			
Illiterate	23 (18.4)	12 (9.6)	0.193
BSc	78 (62.4)	82 (65.6)	
MSc and upper	24 (19.2)	31 (24.8)	
Work			
Yes	42 (33.6)	49 (39.2)	0.328
No	83 (66.4)	76 (60.8)	
Number of children			
1 children	71 (56.8)	63 (50.4)	0.412
2 children	31 (24.8)	40 (32)	
3 children and upper	23 (18.4)	22 (16.6)	
Age	28.53 (5.44)	27.7 (5.15)	0.23

*DPM: Dry-Powder-Milk; MM: Mother-Milk.

Table-2: Mean score of general health and its dimensions between two groups

Variables	Group	Mean (SD)	P-value
Somatic (physical) symptoms	MM	3.96 (2.73)	0.35
	DPM	4.27 (2.57)	
Anxiety	MM	4.86 (3.49)	0.76
	DPM	4.99 (3.33)	
Social Functioning	MM	6.88 (2.19)	0.02
	DPM	7.52 (2.38)	
Depression Symptoms	MM	1.91 (3.21)	0.93
	DPM	1.94 (2.94)	
Total	MM	17.61 (9.2)	0.34
	DPM	18.72 (9.17)	

*DPM: Dry-Powder-Milk; MM: Mother-Milk.

Table-3: Relationship between demographic variables and maternal general health

Variables	Pearson correlation	P-value
Education level of mother	0.121	0.265
Work status of mother	0.096	0.34
Number of children	0.174	0.005
Age of mother	0.088	0.16

4- DISCUSSION

Social functioning demonstrates routine functioning of individual in dealing with daily life incidences and how would they feel and experience daily life (29). According to results of current study, mothers in mother-milk (MM) group maintained higher level of social functioning. However, no meaningful difference was noticed with respect to

other dimension (physical symptoms, anxiety and sleeping problems, depression symptoms and total score). Other results of current study were that increasing number of children in household is correlated with elevated score in GHQ. Mothers with fewer children were at higher risk comparing to mothers with more children; this high-risk group should be noticed in time during and after pregnancy period and

this intervention may insure continuation of feeding with natural milk composition by mothers. The results of current study are consistent with the results of the study conducted by Bogen et al. (18) that studied relationship between depression and tendency toward breast-feeding among mothers. In that study 168 mothers were studied from pregnancy period and 12 weeks after delivery time with respect to nutrition and depression symptoms. They concluded that there is no meaningful difference between depression and feeding pattern from MM and duration of feeding among mothers.

In 2015, Bahadoran et al. (30) conducted cross-sectional study among three groups of mothers for assessing the relationship between psychological and physical health of mothers and feeding pattern of infants. In aforementioned study, they included statistical samples firstly via Holmes-Rahe Questionnaire (Social Readjustment Rating Scale (SRRS)) by considering mothers with lower level of stress. Subsequently, they assessed psychological/physical health of mothers via WHOQOL-BREF questionnaire. They concluded that in mothers in MM group has higher-level physical health score, but no difference was noticed between mental health of mothers between three groups. Their results were consistent with the results of current study as well.

Furthermore, Akman et al. (31) conducted a study regarding post-partum adaptation and feeding pattern. In their study, they assessed anxiety and depression symptoms among 60 mothers one month and 4 months after parturition. They concluded that there is meaningful relationship between elevated score of Early Screen for Discharge Planning (ESPD) and stopping exclusive feeding with mother milk 4 months after parturition. Since, we didn't noticed any difference between MM and DPM groups with respect to depression scale; this difference between result of our

study and Akman's study (31) may stem from two different questionnaire regarding obtaining data since GHQ is more general questionnaire comparing to ESPD. In another study conducted by Nishioka et al. (32) in Japan, he studied feeding pattern of 405 mothers one month and 5 months after childbearing. They concluded that mothers with $ESPD \geq 9$ were the mothers who stopped exclusively feeding their infants with natural milk. Difference between our study and Nishioka's study is difference between tools (ESPS and GHQ).

Advantage of Nishioka's study (32) is using ESPS questionnaire as more accurate and specific tools and advantage of our study is comparison between two groups instead of just assessment of one large sample. Arifunhera et al. (16), studied anxiety as possible cause of stopping breastfeeding among mothers; in their study they used Iowa Infant Feeding Attitude Scale (IIFAS) and Hospital Anxiety and Depression Scale (HADS) regarding assessment of depression and anxiety. They concluded that anxiety is an obstructive factor regarding breastfeeding pattern among mothers and depressive symptoms was high as well. However, in current study no meaningful difference was noticed between two groups. Advantage of current study is comparing two groups of samples and difference of studies was using different tools.

Assarian et al. (33), also studied relationship between feeding pattern among 458 mothers (successful with exclusively breastfeeding, unsuccessful exclusively breastfeeding), and psychological health. He used GHQ regarding obtaining data. Assarian concluded that there is meaningful difference in depression score between two groups. No meaningful difference was noticed regarding physical, anxiety and social functioning symptoms. Difference between results of our study and

Assarian's study (33) may be due to different sample size.

4-1. Limitations of the study

The data collected was drawn from only one hospital in this present study. In addition, the sample was restricted to those mothers who had attended in hospital who had to take rest at home because of side effects of caesarian section and delivery and were not able to visit their infants were excluded.

5- CONCLUSION

Based on the current results, only one dimension of general health (Social functioning) had significant differences between two groups. So only social functioning had significant relation with feeding pattern of infants. Also number of children had significant relationship with total score of GHQ. At first more studies are recommended to earn more detailed and trustable results. Then screening mothers psychological (anxiety, depression, social functioning) aspects before and after childbearing is essential. However, it appears plausible to conduct further study regarding assessment of parturition method (natural, cesarean), influential factors on social functioning, and feeding patterns of infants.

6- AUTHORS CONTRIBUTIONS

- Study design: MA and AAM
- Data Collection and Analysis: AAM and SJM
- Manuscript Writing: MA, AAM and SJM
- Critical Revision: SJM

7- CONFLICT OF INTEREST

The authors had not any financial or personal relationships with other people or organizations during the study. So there was no conflict of interests in this article.

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9- REFERENCES

1. Lucas A, Morley R, Cole T, Lister G, Leeson-Payne C. Breast milk and subsequent intelligence quotient in children born preterm. *The Lancet*. 1992; 339(8788): 261-4.
2. Sullivan S, Schanler RJ, Kim JH, Patel AL, Trawöger R, Kiechl-Kohlendorfer U, et al. An exclusively human milk-based diet is associated with a lower rate of necrotizing enterocolitis than a diet of human milk and bovine milk-based products. *The Journal of Pediatrics*. 2010; 156(4):562-7.
3. Lucas A, Cole T. Breast milk and neonatal necrotising enterocolitis. *The Lancet*. 1990; 336(8730-8731):1519-23.
4. Wambach K, Riordan J. *Breastfeeding and human lactation*: Jones & Bartlett Publishers; 2014.
5. Bin-Nun A, Bromiker R, Wilschanski M, Kaplan M, Rudensky B, Caplan M, et al. Oral probiotics prevent necrotizing enterocolitis in very low birth weight neonates. *The Journal of Pediatrics*. 2005; 147(2):192-6.
6. Newman J. How breast milk protects newborns. *Scientific American*. 1995; 273(6):76-9.
7. Ahmadi M, Moosavi SM. Evaluation of Occupational Factors on Continuation of Breastfeeding and Formula Initiation in Employed Mothers. *Global Journal of Health Science*. 2013; 5(6):166.
8. Cristofalo EA, Schanler RJ, Blanco CL, Sullivan S, Trawoeger R, Kiechl-Kohlendorfer U, et al. Randomized trial of exclusive human milk versus preterm formula diets in extremely premature infants. *The Journal of pediatrics*. 2013; 163(6):1592-5. e1.
9. Holmes AV, Auinger P, Howard CR. Combination feeding of breast milk and formula: evidence for shorter breast-feeding duration from the National Health and

Nutrition Examination Survey. *J Pediatr.* 2011; 159(2):186-91.

10. Ahmadi S, Kazemi F, Masoumi SZ, Parsa P, Roshanaei G. Intervention based on BASNEF model increases exclusive breastfeeding in preterm infants in Iran: a randomized controlled trial. *International Breastfeeding Journal.* 2016; 11(1):30.
11. Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *The Lancet.* 2016; 387(10017):475-90.
12. Alligood MR. *Nursing theorists and their work: Elsevier Health Sciences; 2014.*
13. Horta BL, Victora CG. Long-term effects of breastfeeding-a systematic review. 2013.
14. Bartick MC, Schwarz EB, Green BD, Jegier BJ, Reinhold AG, Colaizy TT, et al. Suboptimal breastfeeding in the United States: Maternal and pediatric health outcomes and costs. *Maternal and child nutrition.* 2017; 13(1). doi: 10.1111/mcn.12366.
15. Saeidi M, Vakili R, Khakshour A, Taghizade Moghaddam H, Kiani MA, Zarif B, et al. Iron and multivitamin supplements in children and its association with growth rate. *International Journal of Pediatrics.* 2013; 1(1):13-17.
16. Arifunhera JH, Srinivasaraghavan R, Sarkar S, Kattimani S, Adhisivam B, Vishnu Bhat B. Is maternal anxiety a barrier to exclusive breastfeeding? *The Journal of Maternal-Fetal and Neonatal Medicine.* 2016; 29(17):2798-801.
17. Li J, Kendall G, Henderson S, Downie J, Landsborough L, Oddy W. Maternal psychosocial well-being in pregnancy and breastfeeding duration. *Acta Paediatrica.* 2008; 97(2):221-5.
18. Bogen DL, Hanusa BH, Moses-Kolko E, Wisner KL. Are maternal depression or symptom severity associated with breastfeeding intention or outcomes? *The Journal of clinical psychiatry.* 2010; 71(8):1069.
19. Horta BL, Loret de Mola C, Victora CG. Long-term consequences of breastfeeding on cholesterol, obesity, systolic blood pressure and type 2 diabetes: a systematic review and meta-analysis. *Acta Paediatrica.* 2015; 104(S467):30-7.
20. Llewellyn G, McConnell D, Mayes R. Health of mothers with intellectual limitations. *Australian and New Zealand journal of public health.* 2003; 27(1):17-9.
21. Goldberg DP, Blackwell B. Psychiatric illness in general practice: a detailed study using a new method of case identification. *Br med J.* 1970; 2(5707): 439-43.
22. Villa G, Cristina I, Zuluaga Arboleda C, Restrepo Roldan LF. Propiedades psicométricas Del Cuestionario de Salud General de Goldberg GHQ-12 en una institución hospitalaria de la ciudad de Medellín. *Avances en Psicología Latinoamericana.* 2013; 31(3):532-45.
23. Endsley P, Weobong B, Nadkarni A. The psychometric properties of GHQ for detecting common mental disorder among community dwelling men in Goa, India. *Asian Journal of Psychiatry.* 2017; 28: 106-10.
24. Kaheni S, Rezai MS, Bagheri-Nesami M, Goudarzian AH. The Effect of Distraction Technique on the Pain of Dressing Change among 3-6 Year-old Children. *International Journal of Pediatrics.* 2016; 4(4):1603-10.
25. Kaheni S, Bagheri-Nesami M, Goudarzian AH, Rezai MS. The Effect of Video Game Play Technique on Pain of Venipuncture in Children. *International Journal of Pediatrics.* 2016; 4(5):1795-802.
26. Rostami S, Banaeipour Z, Zarea K. Relationship between the General Health of Mothers and the Anxiety of School-Age Children. *International Journal of Pediatrics.* 2017:5873-82.
27. Malakouti SK, Fatollahi P, Mirabzadeh A, Zandi T. Reliability, validity and factor structure of the GHQ-28 used among elderly Iranians. *International Psychogeriatrics.* 2007; 19(4):623-34.
28. Namjoo S, Shaghaghi A, Sarbaksh P, Allahverdipour H, Pakpour AH. Psychometric

properties of the General Health Questionnaire (GHQ-12) to be applied for the Iranian elder population. *Aging and mental health*. 2017; 21(10):1047-51.

29. Forgeron P, King S, Reszel J, Fournier K. Psychosocial Interventions to Improve Social Functioning of Children and Adolescents with Chronic Physical Conditions: A Systematic Review. *Children's Health Care*. 2017 (just-accepted).

30. Bahadoran P, Alijanpoor M, Usefy A. Relationship between infants' feeding pattern and mothers' physical and psychological health among the mothers covered by the health centers of Isfahan in 2013. *Iranian journal of nursing and midwifery research*. 2015; 20(2):216.

31. Akman İ, Kuscu MK, Yurdakul Z, Özdemir N, Solakoğlu M, Orhon L, et al.

Breastfeeding duration and postpartum psychological adjustment: role of maternal attachment styles. *Journal of paediatrics and child health*. 2008; 44(6):369-73.

32. Nishioka E, Haruna M, Ota E, Matsuzaki M, Murayama R, Yoshimura K, et al. A prospective study of the relationship between breastfeeding and postpartum depressive symptoms appearing at 1–5months after delivery. *Journal of affective disorders*. 2011; 133(3):553-9.

33. Assarian F, Moraveji A, Ghaffarian H, Eslamian R, Atoof F. The association of postpartum maternal mental health with breastfeeding status of mothers: a case-control study. *Iranian Red Crescent Medical Journal*. 2014; 16(3): e14839. doi: 10.5812/ircmj.14839. Epub 2014 Mar 5.