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Prevalence of Exclusive Breastfeeding During the First Six Months of Life and its Determinant Factors on the Referring Children to the Health Centers in Mashhad, Northeast of Iran-2007

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Abstract: Studies show that the prevalence of exclusive breastfeeding during the first six months of life in some regions of the world has decreased. This rate has been 28% in Iran in 2006. To determine the prevalence of exclusive breastfeeding during the first six months of life and its determinant factors on the referring children to the health centers in Mashhad, Northeast of Iran. Through a population-based, cross-sectional cluster sampling, 1450 seven to twelve month children from 30 clusters were chose in Mashhad, Northeast of Iran. The variables of the surveys included the information about the duration and patterns of breastfeeding and complementary feeding practices, childhood illnesses, education. The information was collected by using a questionnaire and interviewing with the mothers. The exclusive breastfeeding was defined as feeding the children with just breast milk. All variables were presented as numbers with percentage and statistical analysis was performed with the Stata 8.0. The 87.4% of mothers have intended in the study. The 51.2% were boys and 48.8% were girls. The prevalence of exclusive breastfeeding was 56.4%. The 91.7% of the studying infants were fed by their mother milk soon after being born. In the polygamous logistic regression model, the mother's age, the mother's information of milk adequacy and the relatives' suggestion to consume baby formula were the elements which had significant relation with the breastfeeding during the first six months. Almost, 43% of children had some substitutions like family foods or baby formula instead of their exclusive breastfeeding until 6th month. Considering the important role of mother milk, presenting educational plans and increasing the mothers' awareness about lactation, could be the priorities of the health ministry in children health.

Key words: Exclusive breastfeeding, lactation, infant nutrition, Iran

INTRODUCTION

Exclusive breastfeeding is the best nutrition for the children during the first 6 months of life. It fulfills the physical needs of the child and also is the psychotic complementary for the child and specially the mother (Agostoni *et al.*, 2009). World Health Organization recommends the practice of exclusive breastfeeding for the first six months, in addition to its continuation with the addition of supplementary foods until 2 years or more (Muula, 2009). The importance of breastfeeding in the prevention of infectious diseases during infancy is well-documented (Bahl *et al.*, 2005).

During the past years, the main reasons for children's mortality have been malnutrition, respiratory infections and diarrhea. Some reports claim that exclusive breastfeeding has a remarkable decreasing effect on such illnesses (Rakhshani and Mohammadi, 2009).

A meta-analysis of data from three developing countries showed that those infants who were not

breastfed had a six fold greater risk of dying from infectious diseases in the first two months of life than those who were breastfed (Anonymous, 2000) and a similar protective effect of breastfeeding has been shown in studies of morbidity from infectious diseases (Bhandari *et al.*, 2003).

Exclusive breastfeeding has positive effects on child and mother and it also causes some effects on family and society economy, because they have to avoid baby formula consumption (Marandy, 1992).

A recent estimation from the Bellagio Child Survival Study Group, using the results of systematic reviews from low and middle-income countries, predicted that exclusive breastfeeding in the first 6 months and continued breastfeeding for the first year of life could prevent 1.3 million child deaths worldwide, making promotion of breastfeeding a key strategy of child-survival programmes (Yates, 2009).

Despite the importance of this subject, there is little research on it in Iran. One of the most important surveys

was a national project, showing that only 43% of people perform breastfeeding in both rural and urban regions (Rakhshani and Mohammadi, 2009).

Although, exclusive breastfeeding is the most comfortable and cost-effective way of fulfilling the child's needs, but some factors such as practitioner mothers have negatively affected the subject (Mascarenhas *et al.*, 2006).

The relatives' recommendations and specially the mothers' attitude and wrong believes about lactation have negative effects on this subject too (Kannan *et al.*, 1999).

Because of the importance of the subject and lack of up to dated published studies in the country, the researchers felt the need for further studies on the subject. This study tends to determine the prevalence of exclusive breastfeeding during the first six months of life and some affecting factors on it among the referring children to Mashhad health centers (Northeast of Iran).

MATERIALS AND METHODS

This population based Cross-sectional study was performed in two phases and data of 7-12 month old infants from the Multiple Indicator Cluster Survey (MICS) of four main health centers of Mashhad, Northeast of Iran, collected in 2007, were used for analysis. The four main health centers were the classification categories and all the other sub-centers were the clusters. The samples were chosen proportionate to the population of the main centers (as categories). In the first step, some clusters from each center chose randomly and then sampling was done in each cluster.

The sample size was calculated based on Mahmood Imani and his colleagues' study in Zahedan (9). The sample volume for a ratio of 45%, confidence interval of 95% and precision of 3% was 1056. Considering the type of sampling, the influence of study and the answering rate were considered 1.25 and 90%, respectively and the ultimate amount of samples was 1450. Samples selected randomly from 30 clusters (the number of samples was proportion to the categories) (Table 1). Forty eight samples were systematically chosen from each health center in the city, inspecting the children with odd number files in the even days and those with even number files in odd days.

Table 1: Sampling method and sharing in each categories

Categories	Share (%)	Clusters	Sample (%)	Total
Health center (1)	23	7	21.8	276
Health center (2)	45	13	44.1	559
Health center (3)	26	8	26.9	341
Health center (4)	6	2	7.2	91
Total	100	30	100.0	1267

After the sample selection, mothers were asked to read and sign a consent form in which the executive's liability to keep the mother and child information confidential was mentioned and then, the questioner performs an interview. Inhabitaney for at least 5 recent years in Mashhad was the first condition after the filling and signing the consent. Data were collected via interview and a questionnaire including child and mother's along with some demographic information. To assess mothers' knowledge and attitude about lactation and exclusive breastfeeding, another questionnaire was filled with the mother by herself. Seven specialists did validate the questionnaires and through 50 questionnaires the validation was reassured. Exclusive breastfeeding was defined as feeding the child just with mother's milk and without any complementary foods except for drops and syrups (drugs, vitamins, etc.).

The study population included 1450 infants and the survey includes information about the duration and patterns of breastfeeding, complementary feeding practices, childhood illnesses and mothers' education. The publicity in the population was considered according to the gender, the child's birth rate, the mother's age at the time of delivery, the kind of delivery, the mother's education and etc. The information was collected by questionnaire and interviewing the mothers. The exclusive breastfeeding is defined as when children are given just breast milk.

The research project was approved by the Research Ethics Committee at MUMS and all mothers were duly informed about the research and signed a consent form. Mothers and their infants that were not located for application of the questionnaires, or who refused to participate or continue in the study, were considered losses.

Statistical analysis was performed using the STATA 8.0. All variables were presented as number with percentage. Associations between factors were analyzed by Chi-square test for univariate analysis and by multiple logistic regressions for multivariate analysis. Results were presented as adjusted Odds Ratio (OR) with 95% Confidence Interval (CI). The p-value <0.05 was considered statistically significant.

RESULTS

During the study period, 1267 mothers (Response rate: 87%) accepted to take part in the study (According to Table 1), the proportion of samples share in each cluster was not significantly different with the share of that cluster in whole population.

The 51.2% of the samples were boys (649) and 48.8% of them were girls (618). The average age was 8.2 (± 1.7 SD) month.

The least and the most ages were 7 and 12 months, respectively. Fifty seven percent of the children were the first child, 25%, the second child and 17.2%, the third or else. The average birth weight was 3190 (± 549 SD) g; their average height was 49.7 (± 3 SD) cm. Two children were deprived from their mothers' milk because of phenylketonuria and galactosemia and eleven children were done so due to use of certain medications. This amount remained in the denominator for computing the prevalence. The 91.7% of the children were breastfed soon after the delivery (Confidence interval: 95%; 88.7-94.7).

The prevalence of exclusive breastfeeding up to 6th months was 56.4% (CI: 95%; 49.7-63.2%, Design effect = 5.6). Up to 4th months, this amount was 91.4% (CI: 95%; 88.5-94.3%, Design effect = 2.7). 57.2% of boys (CI: 95%; 49.9-64.4%) were exclusively breastfed (Design effect = 3.3). Among girls, this amount was 55.7% (CI: 95%; 48.7-62.6; Design effect = 2.9) (Table 2). The prevalence of exclusive breastfeeding up to 6th months did not significantly differ statistically ($p = 0.486$). The prevalence of exclusive breastfeeding among those children who were breastfed soon after the delivery and those who did not so had no statistically significant difference ($p = 0.162$). This prevalence had no significant relationship with the children's birth weight and height ($p > 0.05$) (Table 3).

The 61.1% of naturally born children and 52% of those born via caesarian rout were breastfed up to 6th months (Table 2). In the univariate regression model showed significantly higher prevalence rate for exclusive breastfeeding among naturally born children ($p = 0.027$) (Table 3).

The prevalence of exclusive breastfeeding among the term born children was 57%; but it was 46.5 and 66.7% in the preterm and post-term ones, respectively (Table 2). There were no significant difference in the prevalence of exclusive breastfeeding between the term and non-term born children ($p = 0.159$, $p = 0.069$). The prevalence of exclusive breastfeeding among those mothers with underlying disease was not significantly different with that of the others ($p = 0.612$) (Table 3).

The prevalence of exclusive breastfeeding among the mothers under 20 years old was 68.3% and decreased to 48% in those between the ages of 36-40, indicating that as the mothers' age increases, the prevalence of exclusive breastfeeding decreases significantly ($p < 0.001$). Mothers' marriage age had also a contrary relationship with exclusive breastfeeding ($p = 0.034$) (Table 5).

Table 2: Prevalence exclusive breastfeeding during 6 first months related to children

Factors	Prevalence (95% CI)	Design effect
Gender		
Male	57.1 (49.9-64.4)	3.3
Female	55.6 (48.7-62.6)	2.9
Child's birth rate		
First	56.8 (49.6-63.9)	3.5
Second	55.7 (48.2-63.2)	1.8
Third or	56.7 (45.3-68.1)	2.7
Consumption breastfeeding soon after delivery		
Yes	57.2 (50.2-64.3)	1.1
No	49.1 (38.3-59.7)	5.6
Other relative illness		
Yes	52.8 (38.2-67.4)	1.4
No	56.8 (49.7-64)	5.8
Kind of delivery		
Natural	61.1 (34.9-54)	3.3
Cesarean	52 (43.9-60)	3.9
Time of delivery		
Term	57 (50.3-63.6)	4.5
Preterm	46.5 (31.6-61.4)	2.7
Post-term	56.4 (49.7-63.2)	1.6

Table 3: Association of exclusive breastfeeding during 6 first months with factors related to children by univariate logistic regression

Factors	OR*	95% CI†	p-value
Gender			
Male	1.06	0.89-1.26	0.486
Female	1.00		
Child's birth rate			
First	1.00		
Second	0.96	0.71-1.28	
Third	0.99	0.67-1.4	
Consumption breastfeeding soon after delivery			
Yes	1.40	0.86-2.23	0.162
No	1.00		
Other relative illness			
Yes	0.85	0.44-1.6	0.612
No	1.00		
Kind of delivery			
Natural	1.44	1.04-2.1	0.027
Cesarean	1.00		
Time of delivery			
Term	1.00		
Preterm	0.65	0.36-1.19	0.159
Post-term	1.50	0.96-2.3	0.069

*Adjusted odds ratio, †95% confidence interval

As the Table 4 shows breastfeeding had a contrary relationship with the mother's education and the less educated she was, the more exclusive breastfeeding would be ($p < 0.05$). Fifty three percent of employed mothers and 56% of housewife (non-employed) mothers breastfed their children up to six months ($p > 0.05$). There was no significant relationship between the number of children and exclusive breastfeeding ($p = 0.82$). The pre delivery training about breastfeeding did not have a significant relationship with exclusive breastfeeding up to 6th month ($p > 0.05$) (Table 5).

The mother's awareness about the criterion of milk adequacy had a significant relationship with exclusive breastfeeding up to 6th months ($p < 0.001$). Prepartum relatives' recommendations to use baby formula had a

Table 4: Prevalence exclusive breastfeeding during 6 first months related to mothers

Factors	Prevalence (95% CI)	Design effect
Mother's age		
<20	68.3 (53.1-83.5)	2.60
21-25	57.3 (49.7-64.8)	2.40
56-30	54.7 (47.3-62.1)	2.30
31-35	57.6 (47.6-67.6)	2.00
35-40	48 (34.5-61.5)	1.30
40<	0	
Mother's education		
None	85.1 (71.4-98.8)	1.60
Elementary School	55.5 (41.5-69.6)	4.30
Guidance School	64 (53.4-74.6)	3.50
High School	51.9 (46.9-56.9)	1.10
University	48.4 (35.9-60.8)	2.80
Other relative illness		
Yes	45.9 (30.4-61.5)	1.70
No	56.9 (50.4-63.5)	4.90
Mother's information of milk adequacy		
Yes	58.8 (52-65.5)	4.80
No	45.7 (38.9-52.6)	0.85
Times of breast feeding during the day		
Morning	57.6 (48.7-66.5)	3.10
Noon	40 (29.7-51.2)	0.89
Afternoon	61.9 (40.1-83.7)	2.00
Night	51.3 (38.7-63.8)	1.70
Midnight	55 (46.2-63.8)	2.40
Relatives' suggestion to consume baby formula		
Yes	46.2 (37.6-54.8)	1.90
No	59.3 (51.8-66.7)	5.40
Total	56.4 (49.7-63.2)	2.60

Table 5: Association of exclusive breastfeeding during 6 first months with factors related to mother by univariate logistic regression

Factors	OR	(95% CI)	p-value
Mother's age			
<20	1.000		
21-25	0.620	0.29-1.3	0.203
26-30	0.560	0.29-1.08	0.082
31-35	0.630	0.33-1.2	0.158
35-40	0.430	0.2-0.91	0.031
Mother's education			
None	1.000		
Elementary school	0.210	0.07-0.67	0.01
Guidance school	0.310	0.11-0.84	0.023
High school	0.190	0.06-0.56	0.004
University	0.160	0.04-0.55	0.005
Other relative illness			
Yes	0.064	0.37-1.09	0.103
No			
Mother's information of milk adequacy			
Yes	1.700	1.2-2.3	0.002
No	1.000		
Times of breast feeding during the day			
Morning	1.000		
Noon	0.500	0.28-0.88	0.018
Afternoon	1.190	0.46-3.04	0.700
Night	0.770	0.45-1.3	0.330
Midnight	0.890	0.65-1.2	0.500
Relatives' suggestion to consume baby formula			
Yes	1.000		
No	1.700	1.1-2.5	0.011

meaningful relation with exclusive breastfeeding up to 6th months; as 46.2% of the mothers who were urged to use formula did exclusive breastfeeding up to six months, whereas 60% of those who were not proposed to do so,

breastfed their children up to 6th months ($p<0.001$). Assessment of mothers' knowledge and attitude about the benefits of breastfeeding showed that there is no significant relationship between exclusive breastfeeding up to six months and mothers' attitude ($p<0.05$).

The relation between exclusive breastfeeding for 6 months and the mentioned elements were inspected in a multivariate regression model and the remaining effective elements were the mother age, the mother's awareness about the milk adequacy and the relatives recommendations to use formula.

DISCUSSION

Exclusive breastfeeding which is probably the best recommended infant feeding method during the first six months has a protective effect against mortality and morbidity. Nevertheless, it has not yet been universally accepted and practiced and reduction in breastfeeding rate is now considered as a serious problem, especially in developing countries.

Breastfeeding rates in Iran are not yet ideal as they are demonstrated by the existing data (Halahi *et al.*, 2005) also these studies are not representative of the general population.

It is clearly seen that a lower level of parental education has directly been associated with cessation of exclusive breastfeeding within the first six months. Higher educated mothers are probably better informed and aware of the benefits of breastfeeding, confirming the influence that mothers have on breastfeeding, generally underestimated by health professionals. The results found in a study undertaken by Littman17 also indicate this possibility (Littman *et al.*, 1994).

A statistically significant association was observed between maternal employment within the first six months of child's life and absence of exclusive breastfeeding at the same age. It is very probable that this is the result of some women returning to work from maternity leave during this period, separating them from their babies during a day, which demonstrates the importance of teaching women to express their milk so that their babies can still be breastfed exclusively even in their absence.

Another research done by Fewtrell *et al.* (2007) also confirms the decreasing prevalence of exclusive breastfeeding and the few recent studies showed that this important issue is getting forgotten and the purpose of this report is reminding the importance of it and the need for more notice (Halali *et al.*, 2005).

In 2001, the National Immunization Survey revealed that prevalence of exclusive breastfeeding within the first

six months was only 7.9% (Li *et al.*, 2003) and from the National Breastfeeding Survey 2001 in Singapore, only 7% of the mothers breastfed exclusively at first four months and this rate fell to near zero at six months (Foo *et al.*, 2005).

The information obtained from the previous studies is based on the significant differences in results, although these differences appeared by the passage of time, but is it possible to justify the decrease in children's health as the posterities of our country? (Borhani, 1998).

The prevalence exclusive breastfeeding in this study was 56.4%. Some other similar studies were done in other towns showing that the prevalence of this kind of child feeding was 40% in Mazandaran, North of Iran and 74% in Rasht, North of Iran (Halahi *et al.*, 2005). A study in Zahedan, South of Iran, done between 1997-1998, reported this amount as 45%, therefore, it is more frequent in Mashhad than in Zahedan (Imani *et al.*, 2003). Although, the comparison between this report and other studies represents the average proportion of exclusive breastfeeding in Mashhad, 44% of children are not fed with their mothers' milk and this is something we can pause on. Seema Mahrshahi and his colleagues' research confirms that although the prevalence of any breastfeeding in Bangladesh is high, the major barriers to achieve the recommendations of the Global Strategy for Infant and Young Child Feeding include a low prevalence of exclusive breastfeeding and a high prevalence of prelacteal feeding (Mahrshahi *et al.*, 2007).

Some other universally done studies have reported this amount 99% (Anonymous, 2000). A study in Boston reported the prevalence of exclusive breastfeeding as 37.1% and in Brazil, this amount was even less, around 13% (Merewood *et al.*, 2007). Considering the previous studies, we found that exclusive breastfeeding had relationship with the mothers' awareness about this issue therefore we can conclude that it is very possible that by culture making and constant training, we would reach exclusive breastfeeding (Khomami, 2004). Another research emphasizes that a lower level of paternal education is directly associated with cessation of exclusive breastfeeding within the first 3 months. It is possible that higher educated parents are better informed and aware of the benefits of breastfeeding, confirming the influence that parents have on breastfeeding, generally underestimated by health professionals (Aidam *et al.*, 2005).

The fluctuations in these amounts are concerning (Imani *et al.*, 2003). Studies show that TV and radio made lots of sensitiveness and it is one of the main reasons. Furthermore the emphasis on some illnesses like heart disease, accidents and cancers have made people to

forget this important issue either in our country or other developed ones.

One repeatedly reported result during at least 10 recent years is that the older the mother is, the lower the prevalence of the exclusive breastfeeding will be (Aidam *et al.*, 2005).

The relative's recommendation to mother to use baby formula was another factor which was discussed in this study, representing that the mother's awareness can be changed by others' trainings, so mothers negative awareness can be substituted with correct training and information (Rahman *et al.*, 2009). Fortunately, like other previous studies, a big number of mothers believed that the information during the pregnancy period had an important role in their awareness (Lauer *et al.*, 2004).

Some other factors such as, rout of delivery, mothers' education and time of breastfeeding were effective in exclusive breastfeeding up to 6th month, but, as they did not remain in the multivariate model and also because of the effect of other deranging variables on them, they are likely to be discussed later.

CONCLUSIONS

Data of a national survey in 1999 represent an upward tendency towards breastfeeding. Nevertheless, no significant increase was detected in exclusive breastfeeding, which fact confirms the global tendency whereby, despite major advances, exclusive breastfeeding duration is far from that laid out by the WHO.

These results suggest that the practice of exclusive breastfeeding is still at levels well below those recommended, which in turn reinforces the need to continue stimulating breastfeeding during the first months of life.

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