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## Mothers' Knowledge and Attitude toward Food Security in Complementary Feeding of 1-2 Year-Old Offspring and its Relation with Demographic Indices

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### Abstract

**Background:** Food insecurity denotes failure to provide adequate food. Knowledge and attitude play a key role in food security, which is of paramount importance in the first two years of life.

**Aim:** This study aimed to evaluate mothers' knowledge and attitude towards food security in complementary feeding of 1-2 year-old offspring.

**Method:** Using a cross-sectional study, 400 mothers of children 1-2 years old were selected from comprehensive health service centers in Bushehr, in 2016. The data collection instrument included a self-made questionnaire with 20 knowledge questions with CVR=0.95, CVI=0.95, and reliability 0.7 as well as a questionnaire with 26 questions on the attitude with CVI=0.94, CVR=0.91 and reliability 0.76 which were completed by the mothers and analysis with Spearman correlation, logistic regression and descriptive statistics.

**Results:** The mean age of the mothers was 29.5±4.9 years. We found that 74 (18.5%) of the mothers had an inappropriate level of knowledge and 10.5% of them had a negative attitude toward food security in complementary feeding. There was a significant positive correlation between knowledge and attitude ( $r=0.26$ ,  $P=0.001$ ). Maternal age ( $OR=1.10$ ,  $P<0.001$ ), maternal occupation ( $OR=3.09$ ,  $P=0.01$ ), mothers with diploma ( $OR=3.25$ ,  $P=0.01$ ) and academic education ( $OR=12.29$ ,  $P<0.001$ ), fathers with diploma ( $OR=3.37$ ,  $P=0.004$ ) and academic education ( $OR=5.59$ ,  $P<0.001$ ), household income ( $OR=7.13$ ,  $P=0.001$ ), and babysitting in kindergarten ( $OR=3.17$ ,  $P=0.03$ ) were the factors associated with mothers' knowledge of food security. Attitude was significantly related to maternal occupation ( $OR=3.33$ ,  $P=0.05$ ) and income higher than 2000\$ ( $OR=4.87$ ,  $P=0.03$ ).

**Implications for Practice:** Long-term planning regarding demographic determinants such as educational level and identifying factors related to food security should be considered.

**Keywords:** Attitudes, Complementary feeding, Food security, Iran, Knowledge, Mothers

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## Introduction

Food security denotes access to adequate and appropriate food for an active life (1), and it is a cornerstone of developed societies and paramount to the health of members of the community (2). Food security is of the utmost importance in the health of children as the most vulnerable members of the society (3). According to the statistics provided by the Food and Agriculture Organization of the United Nations (FAO), since 2015, globally one billion people do not have access to adequate and safe food, 13% of whom live in America and 62% in Asia (4). In Iran, a systematic review estimated food insecurity to range between 20% and 60% (5). In Bushehr, Iran, the rate of food insecurity is about 86% among women aged 19-49 years with low income and under financial support (6). The importance of food security is more prominent in the first two years of life that clearly affects the mental, physical, and psychological health and the learning ability of the child (7). In this period, food insecurity, defined as limited or uncertain access to feeding material (8), is associated with mortality, disability, and impaired mental and physical growth (9).

After six months of age, due to insufficiency of milk for growth, the child is introduced to other foods as complementary feeding with different patterns depending on the cultural conditions and local beliefs (10). Multiple factors are at play in complementary feeding including the knowledge and attitude of mothers (11). Today, the role of women in food security is obvious, such that FAO stated that women play a significant role in food security and developing countries in terms of sustaining production, food access, and nutrition security (12). The time and manner of starting complementary feeding, food type, amount of food, and maintaining it require specific knowledge (10). Lack of knowledge of mothers, as one of the most significant causes of feeding problems, has brought about problems such as insecure feeding, infectious diseases, and malnutrition (13) that usually start in the first 4-6 months (14) and continue until 18 months old (15), and after that, the child will hardly gain the lost weight (16).

However, increasing nutritional knowledge, adopting a proper attitude, and compensating the financial deficiency can promote food security among children and households (12). Previous studies on nutritional knowledge among Bushehr's mothers showed that 28.5% of Bushehr households spend less than 50% of their income on food products, and the average rate of knowledge on food groups was 50% (13).

Lowering the rate of food insecurity is an ethical priority, particularly in children. However, attempts to eliminate this problem are discouraging in Iran, which is ranked 12th in southwest Asia (17). Health promotion programs on healthy nutrition and food security will be successful if they are designed proportionate to the knowledge and attitudes of individuals (18). So far, many studies throughout Iran have studied food insecurity (5), but to the best of our knowledge, no study has investigated the knowledge and attitude of mothers, as the main caregivers, toward food security. Moreover, studies on infant food insecurity are also limited in Iran. Therefore, we aimed to assess mothers' knowledge and attitude towards food security and complementary feeding of 1-2 year-old offspring in Bushehr, Iran.

## Methods

This cross-sectional study was conducted in 2016 in Bushehr (the capital of Bushehr Province in southern Iran) to evaluate mothers' knowledge and attitude towards food security in complementary feeding of 1-2 year-old offspring. The target population included mothers of 1-2 year-old children who visited comprehensive healthcare centers of Bushehr for routine child care and received basic explanations related to complementary feeding.

The standard sample size was estimated at 400 based on the similar studies conducted in the field of knowledge-practice (19) and food security (5) in Iran (considering a 95% confidence interval, 5% absolute error, and 48% food insecurity prevalence among children in Iran) and using the Cochran's sample size formula of  $n = Z^2_{1-\alpha/2} P(1-P)/d^2$ . Sampling was performed by presenting to all the 10 comprehensive health service centers in Bushehr and after counting all mothers in each center; the participants were selected using stratified random sampling from each center. The largest number of participants was 64 subjects and the smallest 21. In total, sampling lasted for three months (from May to September 2016).

The inclusion criteria comprised no diagnosis of neurological disorders or chronic muscular-skeletal diseases for the mothers, children with birth weight higher than 2.5 kg and less than 4 kg, initiation of

complementary feeding after six months of age, and no acute or chronic gastrointestinal diseases or other chronic diseases affecting infants' feeding.

The data collection instruments included a demographic information form and self-designed questionnaires of knowledge and attitude. Questionnaires of mothers' knowledge and attitude toward food security were designed according to Waltz (20) and in four stages: 1) defining food security and complementary nutrition in children by reviewing the relevant literature, 2) outlining the questionnaire items with respect to the three aspects of food security (availability, accessibility, and utilization) and in accordance with domestic and foreign studies where the knowledge questionnaire was designed with 20 questions rated using a three-point Likert scale (*right*, *wrong*, and *do not know*) and attitude questionnaire including 26 questions scored on a five-point Likert scale (*strongly agree* to *strongly disagree*), 3) determining face and content validity of both questionnaires. The face validity of the knowledge and attitude questionnaires was evaluated by 10 mothers of different educational groups having a 1-2 year-old child; face validity coefficient for all the questions was above 1.5. Content validity of the questionnaires was confirmed by 12 nutritionists, social medicine specialists, as well as nursing and health education professors. In content estimation in the knowledge questionnaire, the scores were CVR=0.95 and CVI=0.95 and in the attitude questionnaire the scores were CVI=0.94 and CVR=0.91. 4). The reliability of the questionnaires was established by Cronbach's alpha coefficient using a pilot of 30 mothers meeting the inclusion criteria ( $\alpha=0.70$  for the knowledge questionnaire and 0.76 for the attitude questionnaire). It should be noted that 2 and 4 items were reverse scored in the knowledge and attitude questionnaires, respectively.

In scoring the knowledge and attitude questionnaires according to previous KAP study (21) and knowledge and practice (22) and FAO guidelines in the field of knowledge, nutritional attitude and practice (23); those mothers who correctly answered 70% and more of the questions (14 out of 20) had a favorable level of knowledge, and mothers who correctly answered less than 70% of the questions were considered as having unfavorable or insufficient knowledge (*false* and *do not know* were scored zero and *I know* was scored 1). Regarding attitude, those mothers who answered 70% of the questions *agree* and *strongly agree* (18 out of 26) had a positive or good attitude, otherwise, they were considered as having a negative or inappropriate attitude (*strongly disagree* and *no idea* were scored 0 and *strongly agree* and *agree* were scored 1). It should be noted that the negative questions were reverse scored (*I do not know* and *correct* were scored 0 and *false* was scored 1). The researcher completed the questionnaires for illiterate mothers by providing understandable explanations. The mothers had 15-45 minutes to complete the questionnaire, and the researcher attended the centers at the time of completion to answer any queries from the mothers.

The project was first reviewed and approved by the Deputy of Research of Bushehr University of Medical Sciences (BPUMS). In the course of sampling, research objectives, the voluntary nature of participation, and confidentiality of any disclosed information were explained to all the participants, and they were asked to fill out the informed consent forms before participation. The researcher provided mothers who finished the questionnaires with a complementary feeding manual containing information on food security and complementary feeding, as well as the correct answers to the questions.

To analyze the data, SPSS version 18 was employed. The descriptive statistics including median, mean, and standard deviation were used for classifying the demographic indices, and Spearman correlation coefficient was run to determine the relationship between knowledge and attitude, and logistic regression was performed to determine the relationship of demographic indices with knowledge and attitude. P-value less than 0.05 was considered statistically significant.

## Results

Four hundred mothers were enrolled, 81% of whom were housewives and the rest of them were employed (employees and outworkers). The mean age of the mothers was  $29.5 \pm 4.9$  years (age range: 17-45 years), and most of them had high school (41%) and university education (43.3%). Married mothers comprised 98.8% of the participants and 98% of them were not under support of any organizations. Level of income in the majority of the households was between 1000 and 2000\$, and 54.5% lived in private houses. Mothers who did not attend complementary feeding classes comprised 65.8% of the subjects, and 86.5% of them were the primary care provider. Among the mothers, 13.5% employed a babysitter or used kindergarten for at least one shift to at

**Table 1. The demographic features of mothers participating in the study(n=400)**

Variable		Frequency	(%)	
Mother's job*	Housewife	324	81	
	Employed	Employee	73	18.3
		Domestic	47	11.8
		Self-employed	1	0.3
Mother's education	Illiterate	5	1.3	
	Elementary education	18	4.5	
	Under diploma	40	10	
	Diploma	164	41	
	University	173	43.3	
Father's education	Illiterate	2	0.5	
	Elementary education	29	7.3	
	Under diploma	51	12.8	
	Diploma	153	38.3	
	University	165	41.3	
Father's Job	Employee	172	43	
	Worker	33	8.3	
	Self-employed	192	48	
	Unemployed	2	0.5	
Income	<500 \$	49	12.2	
	500- 1000\$	133	33.3	
	1000-2000\$	160	40	
	> 2000\$	58	14.5	

\* A number of housewives were outworkers

most 7 shifts per week (the number of work shifts was considered per week and each shift equivalent to 8 hours) with a mean and standard deviation of  $5.03 \pm 1.3$ . Most households had one (41.3%) or two (43.3%) children. The mean age of the children was  $16.4 \pm 3.9$  months, and 53.8% of them were girls (Table 1).

With respect to knowledge of food security, 74 (18.5%) of the mothers had insufficient knowledge and 81.5% had favorable knowledge. The results of logistic regression test showed a direct relationship between knowledge of mothers and their occupation ( $P=0.01$ ), education, and age ( $P<0.001$ ). Such that the chance of favorable knowledge of mothers with a college degree was more than 12 times higher and in mothers with high school diploma was more than three times higher than the illiterate mothers and those primary school education, while it was not so for mothers with educational level of below diploma. Increase in the age of mothers also increased the chance of appropriate knowledge ( $OR=1.10$ ). The chance of favorable knowledge in the working mothers was more than three times higher compared to housewives. There was a significant relationship between mothers' knowledge level with father's educational level, such that fathers' academic education increased the chance of mothers' favorable knowledge by five times and his diploma increased it by more than three times compared to illiterate or primary education husbands. Another determinant of mothers' knowledge level was income ( $P<0.001$ ) and sending children to kindergarten ( $P=0.03$ ). Higher income than 2000\$ increased the chance of mothers' favorable knowledge by seven times compared to mothers with an income of lower than 1000\$. No other relationship was found between other demographic indices (e.g., number of children, age, birth weight, and age of onset of complementary feeding) and mothers' knowledge ( $P>0.05$ ; Table 2).

Regarding the mothers' attitude and demographic indices, 10.5% ( $n=42$ ) of the mothers had an inappropriate attitude towards food security, while 89.5% of the mothers had a favorable attitude. The results of logistic regression also showed that income higher than 2000\$ ( $P=0.03$ ) and mother's occupation ( $P=0.05$ ) were the only effective indices on attitude, such that chances of favorable attitude in households with income of more than 2000\$ was more than four times higher than those with income of less than 1000\$, and in employed mothers it was more than three times higher than housewives. No relationship was found between other demographic indices and attitude ( $P>0.05$ ; Table 2). Spearman correlation coefficient showed a significant positive correlation between knowledge and attitude ( $r=0.26$ ,  $P=0.001$ ).

**Table 2. Odds ratios and 95% CIs of the relationship between demographic indices and mothers' knowledge and attitude towards food security (n= 400)**

Demographics		Knowledge			Attitude		
		OR	95% CI	P	OR	95% CI	P
Mother's age		1.10	1.04-1.17	0.001	1.05	0.98-1.12	0.12
Mother's job	Housewife		1			1	
	Employed	3.09	1.29-7.43	0.01	3.33	1.00-11.07	0.05
Mother's education	Illiterate and elementary		1			1	
	Under diploma	1.52	0.54-4.31	0.42	0.6	0.14-2.53	0.48
	Diploma	3.25	1.32-7.99	0.01	1.08	0.29-3.96	0.9
	University	12.29	4.49-33.65	0.001	2.2	0.56-8.59	0.25
Father's education	Illiterate and elementary		1			1	
	Under diploma	1.58	0.62-3.99	0.33	0.89	0.27-2.97	0.85
	Diploma	3.37	1.47-7.69	0.004	1.90	0.63-5.75	0.25
	University	5.89	2.48-14.01	0.001	2.07	0.68-6.24	0.19
Income	<1000\$		1			1	
	1000-2000\$	2.72	1.54-4.81	0.001	1.97	0.97-3.96	0.057
	> 2000\$	7.13	2.13-23.84	0.001	4.87	1.12-21.18	0.03
Father's Job	Employee		1			1	
	Worker	0.43	0.18-1.04	0.06	0.06	0.51-30.76	0.18
	Self-employed	0.61	0.35-1.07	0.08	0.08	0.5-1.8	0.9
	Unemployed	0.32	0.02-3.71	0.36	0.36	0.0	0.99
House	Live with other relatives		1			1	
	Rental	1.35	0.55-3.32	0.51	1.39	0.42-4.54	0.58
	Personal (owner)	1.96	0.81-4.78	0.13	1.30	0.41-4.70	0.64
Gender	Boy		1			1	
	Girl	1.37	0.82-2.27	0.21	1.18	0.62-2.24	0.60
Kindergarten or babysitter	No		1			1	
	Yes	3.17	1.10-9.07	0.03	3.39	0.79-14.49	0.09

At Significance level of P-value $\leq$ 0.05 OR: Odds Ratio CI: Confidence Interval (95%)

## Discussion

In this study, the knowledge and attitudes of 400 women with 1-2 year-old offspring were investigated regarding food security. Approximately 18.5% and 10.5% had inappropriate knowledge and attitudes, respectively, and a significant positive correlation was found between knowledge and attitude.

Mothers' education was among the factors that affected the knowledge of food security. The level of knowledge was higher in those with academic education because in academic settings knowledge regarding the complementary feeding practices, food security, suitable foods for children, proper ways of cooking foods, and ways of accessing the required information (the use of food and meeting feeding security) would increase. This finding was concordant with those of many other studies, including the studies by Wojcicki (2009) and Berisha et al. (24), who believed that higher education is among the positive factors affecting knowledge.

However, our results were inconsistent with the findings of Nagata et al., who found that the mother's level of education does not affect hunger and food insecurity (25). Nonetheless, in the study of Nagata, the rate of insecurity in households whose mothers had higher education was lower. The previous study carried out on food security in Bushehr suggested that educational level among 19-49 year-old women with low income in Bushehr did not affect food insecurity (6), which may be due to the low levels of education in most mothers. Mother's job is another effective factor in knowledge of food security, and employed mothers had higher information levels than others, which can be due to exposure to higher levels of information.

However, many studies, including the study by Chilton (26), showed no significant relationship between employment and food security. Father's level of education is also one of the factors influencing mother's knowledge, and academic education and diploma were effective in increasing mothers' knowledge. In fact, higher education of parents increases knowledge of mothers, which can be due to information exchange at home, which is consistent with the findings of Aires (2012) (27), where fathers' education (head of household) was considered as one of the factors reducing food

insecurity in the family. In addition, a study conducted by Soheili Azad et al. confirmed the effect of education on the knowledge of mothers (19). The study performed by Bilal et al. (2016) in the north of Ethiopia also approved the positive effect of feeding knowledge of father on children's nutritional status (28).

The level of income is another effective factor on knowledge of food security. The higher the household income the more will be the mother's knowledge that is justified by the increase of purchasing power, access to the financial and material resources (access to food), and enabling people to enhance their educational level, which is consistent with the study of Kac and Loopstra (29), who confirmed the effect of income on reducing food insecurity. That study showed a significant relationship between mothers' knowledge and age, which can be due to increase in experience and nutritional learning. These findings were consistent with those of Devi in India (30) and contradictory with the findings of Moradi-Shahrehabak et al. (2003) (31), who found no relationship between knowledge and attitude and mothers' age, the reason for which is unclear because the researcher in that article had not mentioned mothers' age classification.

One of the significant indices affecting attitude can be the mother's job since working in a social environment improves attitude through enhancement of satisfaction and relationship with other people, especially in Bushehr where mothers are mostly housewives. These findings are inconsistent with those of Kujur et al. (11). But the majority of employed women in Bushehr worked in one shift that could be a positive factor in the realm of food security. Income was among the factors affecting the attitude of mothers that can be attributed to having the opportunity of achieving the ideal conditions that is consistent with the results of Loopstra et al., who held that income is among significant indices affecting feeding security (29).

A qualitative research conducted in Damavand, Iran, showed that mothers in an attempt to compensate the hunger due to the absence or reduced income use cheap food with high density that adds to food insecurity (32). In fact, it may be said that job and income are two main factors enhancing attitude towards accessing, selecting, and using food. Other demographic indices had no effect on attitude, which can be due to family protection methods on food security, and partial effect of a variable on the attitude (23). In addition, feeding habits, food costs, and health and religious beliefs are effective in storing and using food among residents of Bushehr (33).

In the present study, we found a significant positive correlation between knowledge and attitude, which can be attributed to the effect of knowledge and interest on the attitude and after that the positive effect of attitude on improving the knowledge, which is consistent with the findings of Moradi-Shahrehabak et al. in Kerman (2006), where the knowledge and attitudes of mothers with 6-36 month-old children were evaluated, and the researcher stated that knowledge and attitude are two interrelated factors affecting nutrition (31). These findings are inconsistent with the results of Suparmi et al. (34), the reason behind this can be the difference in the level of knowledge and attitude, and as stated by Suparmi et al., the lack of relationship between knowledge and attitude can be attributed to low rates of attitude toward high rate of knowledge in the mothers(34).

### **Implications for Practice**

This study is among the rare studies in Iran evaluating the knowledge and attitude of mothers regarding food security in complementary feeding based on the local conditions and the customized questionnaire of knowledge and attitude. The findings showed that most of the participants had good levels knowledge and attitude. Besides, knowledge of food security was related to many demographic indicators, including income, education, and occupation of parents. In contrast, the attitude of mothers was related to few demographic indicators. It is suggested to identify other factors related to food insecurity, including the performance of mothers in complementary feeding.

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### Conflicts of Interest

The authors report no conflicts of interest.

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