

# Study of food security and its related factors in Iranian families referred to health centers in Qazvin

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**Summary.** Food insecurity is defined as limited access to nutritionally sufficient and safe foods to meet dietary needs for a healthy life. Over decades, several factors including food insecurity has led to rise on global hunger and malnutrition. The present study was aimed to investigate the prevalence of food insecurity and its related factors in the families supported by healthcare centers and health posts in Qazvin. All mothers referred to health centers in Qazvin during the year 2015, were entered in this descriptive and analytical survey. Two sets of survey questionnaires, the Food Security Questionnaire of U.S. Department of Agriculture (USDA) and Basic Family Information Questionnaire, were applied for data collection. Chi square test were applied for statistical analysis. The total prevalence of food insecurity among the families of studied population was 68.8%; comprised 41.4% without hunger, 21.7% with moderate hunger, and 5.7% with severe hunger. Eighty one percent of participants were housewives, otherwise the other were working mothers. A meaningful relationship was found between food security and some parental features including education, job, age, family size, monthly family income, and the settlement status. In conclusion our results indicated a high prevalence of food insecurity among families in Qazvin city. Effective prevention strategies and practical approaches by corresponding organizations are necessary to promote nutritional awareness of families to prevent food insecurity.

**Key words:** Food security, food insecurity, Family-level education, Monthly Family Income

## Introduction

In personalized nutrition, food is a fundamental source of essential nutrients necessary for human life and good health. Humans need to access to proper and sufficient food to provide their basic daily needs for nutritional well-being. According to the World Food Summit in 1996, a situation in which, all people at all times have access to sufficient, safe and nutritious food for an active and healthy life is referred as food security (3). On the contrary, deprived of such a situation is

called food insecurity, which is associated with a limited access to nutritionally sufficient and safe food (1-3). (4). As defined by the World Bank, the familial food security is characterized with four attributes including; 1) availability of sufficient food, both quantitatively and qualitatively, 2) food stability and availability at any time; 3) physical and economic access to food; and 4) beneficence and proficiency of food (4).

Millions of people suffer from hunger and malnutrition all over the world and food insecurity is among the factors causing these difficulties. Food insecurity

can appear chronically, seasonally, transiently, or at the levels of family, region, or nation. Along with its qualitative and quantitative effects on the life, this complex and multidimensional phenomenon, may also possess socio-cultural and mental aspects. It is clear that, this problem is not limited to people with insufficient energy and nutrient supplies, but also includes the situation in which people are not entitled to choose their own food and are worried about running out of food supplies or make remarkable changes in their nutritional preferences (5). Socioeconomic factors such as family income are determinant for food insecurity and hunger. Several factors affecting the family income, including loss of job, lack of permanent employment, unemployment, big family, or the loss of food aids, and the factors like nationality, regional nutritional habits, age and education of family protector (which influence the family diet), are among the causes of food insecurity (6).

According to the World Health Organization (WHO), chronic hunger and malnutrition account for about 60% of all child deaths in developing countries. Some researches have uncovered new evidence for hunger as a linking factor between poverty and food insecurity (7, 8). Based on the new report by U.S. Economic Policy Institute, the number of people suffering from food insecurity has increased from 849 million in 1998 to 982 million during 2006-2007 (9). Apart from the problem of rise in nutritional disorders, such crises could also result in 3.5 million deaths (10). Nearly, half of the global food insecurity is experienced in the Asia-Pacific region which contains more than 60% of the population of developing countries. It is also estimated that during 2007-2017, 20% of population in these countries would suffer from malnutrition (11). Existing data from Iran, showed that around 20% of people lack economic access for abdominal satiation and in even worse cases, about 50% of them has failed to reach the cellular satiation. In other words, one fourth of the Iranian population are experiencing an energy shortage and the other half are affected by micronutrient insufficiency (11, 12). In a recent study conducted by Payab, et al, the prevalence of food insecurity was reported to be 44% in Iranian mothers with school children living in Ray (13). In another study conducted by Farhangi et al. in a sample of population in

the northwest of Iran, results demonstrated that 26% and 41.6% of studied families has apparent and hidden food insecurity, respectively (14). Given the fact that food security is one of the family and personal health indexes, and food insufficiency lead to developmental, health and nutritional problems, measuring food insecurity and hunger may largely help policy holders, development agencies and other institutions to design all programs and interventions needed to eradicate the problem. Therefore, the present investigation is designed mainly to elucidate the current status of food security and related factors in families supported by healthcare centers and health posts in Qazvin city using the standard questionnaires.

## Materials and Methods

A total of 500 family mothers (representative of 2502 family members) were randomly selected among 15 health centers of Qazvin city. The appropriate sample size (family mothers) was calculated using the specific formula for estimation of a proportion as follows:  

$$N = \frac{[z_{(1-\alpha/2)} * \delta]^2}{d} = 50^2 * 10 = 500$$

$$N = 500 [z_{(1-\alpha/2)}=1.96] = 2 \quad (\delta=5) \quad (d=1.4)$$

We also estimated the minimum sample size needed to be enrolled from each healthcare center, based on the number of referring families to the center. Pregnant or lactating mothers and mothers with any disease were excluded from the study. At the time of the presence of family mothers in the healthcare centers, they were given the necessary information about the project and they were asked to participate in this survey if convinced. Two questionnaires including, Basic Family Information Questionnaire and Security Questionnaire, were then completed during the interview. Basic Family Information Questionnaire contained some information about parent such as age, job, education, family size, monthly family income, and settlement type. The mothers' weight and height, abdominal circumference, and hip girth were measured using Seca Scale (accuracy 0.1 Kg) and tape stadiometer (accuracy 0.1 cm), respectively. The body mass index (BMI) was calculated as weight (Kg) divided by the square of height (m<sup>2</sup>) and a BMI of  $\leq 18.5$  was considered thin, 18.5-25 normal, 25-30 over-weight,

and  $\geq 30$  obese. In order to measure the family food security status, an 18-item Food Security Questionnaire (USDA) which had previously been validated in other studies conducted in Iran, was used (15-17). Each item of the questionnaire was coded as follows: all answers including (often true), (sometimes true), (almost every month), (some months) and (yes) were coded as 1, and the answers such as (not true), (only 1-2 times every month), and (no) as 0.

Since the questionnaires were gathered with the person's consent and reassuring them that the family data was collected confidentially and without intervention, the ethical considerations were also taken into account in this study. Collected data were checked for quality, screened for clearing, completion, and correction, then analyzed by SPSS 16. The categories of food security status were determined for each family based on the scores gained. The mean and standard deviation of variables were determined and the relationship between qualitative variables and family food security status was evaluated through chi square test. The relationship between quantitative variables and family food security status was evaluated by one-way analysis of variance (ANOVA).

## Results

A total of 500 women corresponded to equal number of households from 7 health centers were enrolled in this study. Depending on the number of households covered by each health center, about 70 respondents were taken on average. The results are summarized in Table 1. The total prevalence of food insecurity among the families of studied population was 68.8%; comprised 41.4% without hunger, 21.7% with moderate hunger, and 5.7% with severe hunger. A great majority of participants (81.0%) were housewives while rest

(19.0%) were working mothers. More than half of fathers (56.6%) were on business as; skilled workers or foremen, business owners, senior employees, managers or heads of factory departments or governmental offices, doctors and dentists, university professors, and about 43.4% of them were engaged in other positions such as; shop footmen, workers, semi-skilled workers, clerks, workers of crafts such as carpet weaving and stitching. Regarding the parent's education, 56.5% of fathers and 57.3% of mothers had Diploma or high school degree. The highest monthly income was 1-2 million Tomans, accounting for 45.9% of households. About 49.8% of households were less than four people while the rest were  $\geq 4$ . Approximately, 51.3% of studied households were homeowners and the other 48.7% were renter.

In terms of the BMI measurements, all obtained data are summarized in Table 2. As shown in Table 2, about 2.2% of mothers participating in this study were thin, 45.2% were normal, 37.6% were overweight, and 14.9% were obese. The results of chi square test suggested a meaningful relationship between food security and some parental features including education, job, age, family size, monthly family income, and the settlement status (Table 3). As illustrated in Table 3 such association was statistically significant for all socioeconomic variables ( $P=0.000$ ). According to the findings contained in Table 4, Food insecurity increases with the increase in the number of family members and the households head age and vice versa. There was also a significant relationship between Food insecurity and the ratio of waist to hip circumference (WHR) as an index of cardiovascular diseases. As expected the higher rate of WHR was observed in families exposed to food insecurity.

## Discussion

The present study was designed to investigate food insecurity prevalence and associated factors among the families of studied population in Qazvin, Iran. Our finding indicated a relatively high prevalence of food insecurity among Qazvin families (68.8%). Compared with our results, several studies have reported various prevalence values for food insecurity in different

**Table 1.** The frequency distribution household food insecurity studied in the Qazvin

| Food security situation             | N (%)       |
|-------------------------------------|-------------|
| Food security                       | 779 (31.1)  |
| Food insecure without hunger        | 1037 (41.4) |
| Food insecure with hunger, moderate | 543 (21.7)  |
| Food insecure with hunger, severe   | 143 (5.7)   |

**Table 2.** The frequency of distribution and relative abundance of variables studied in households in Qazvin

| Variable                                     | N (%)       |
|--|-------------|
| Mother's job                                 |             |
| housewife                                    | 2026 (80.9) |
| Occupation                                   | 476 (19.1)  |
| Father's job                                 |             |
| Worker                                       | 1416 (56.6) |
| Skilled worker                               | 1086 (43.4) |
| Mother education                             |             |
| Illiterate / Reading and writing             | 271 (10.8)  |
| Less than high school / High school graduate | 1433 (57.3) |
| College education                            | 798 (31.9)  |
| Father education                             |             |
| Illiterate / Reading and writing             | 238 (9.5)   |
| Less than high school / High school graduate | 1414 (56.6) |
| College education                            | 850 (33.9)  |
| The number of family members                 |             |
| 3 Person                                     | 1246 (49.8) |
| 4 Person                                     | 973 (38.9)  |
| 5 Person                                     | 228 (9.1)   |
| 6 Person                                     | 44 (1.8)    |
| 7 Person                                     | 8 (0.3)     |
| 8 Person                                     | 3 (0.1)     |
| Income                                       |             |
| < 250.0 \$                                   | 991 (39.6)  |
| 250.0 - 500.0 \$                             | 1149 (45.6) |
| 500.0-800.0 \$                               | 328 (13.1)  |
| ≥800.0 \$                                    | 34 (1.4)    |
| Residential home                             |             |
| Landlord                                     | 1283 (51.3) |
| Renter                                       | 1219 (48.7) |
| BMI  |             |
| 18.5 >                                       | 55 (2.2)    |
| 18.5 - 25                                    | 1132 (45.2) |
| 25 - 30                                      | 941 (37.6)  |
| 30 <   | 374 (14.9)  |
| WHR  |             |
| 0.85 >                                       | 874 (34.9)  |
| 0.85 <                                       | 1628 (65.1) |
| Waist  |             |
| 80 >   | 390 (15.6)  |
| 80 - 88                                      | 695 (27.8)  |
| 88 <   | 1417 (56.6) |

regions of Iran. Ghasemi et. al, with the purpose of setting an appropriate model for assessing family food security in Tehran, through categorizing the families into food-insecure based on three income categories, found a prevalence of 20% for food insecurity (11). In another study, the prevalence of food insecurity was reported to be 26% in Tabriz (18). In one study conducted on 6-11 year-old students in Yazd, the prevalence of food insecurity was 30.5% (19). However, it was reported a prevalence of 70% for school-aged children in Farokhshahr (3). In general, the overall prevalence of food insecurity among Iranian households was 49% (20).

With respect to the levels of food insecurity between nations other than Iran, Studdert and colleagues reported the prevalence of 32.8% and 32% for adults, and children respectively among families in Java City, Indonesia (21). Food insecurity in, Bolivia, and Burkina Faso was reported to be about 70%, and 73%, respectively (22). The prevalence of food insecurity in the United States had fluctuated between 10.1-11.9% during 1995-2007 (23). Food insecurity in our study population was higher than those of the majority of previous studies in Iran, as well as the study form Indonesia and USA. However, there was a reverse trend regard to the Farokhshahr, Bolivia and Burkina.

This variation of food insecurity in different studies included, may result from social and cultural diversity that exist between people of different areas. Another reason may be attributed to the methods used to assess food insecurity. The recent economic crisis and rapid increase in food prices may also contribute to this variation over time. One important factor regarding the differences observed between Iran and developed countries is the various food aid programs provided to low-income households and individuals in USA.

We found no significant relationship between mother's weight and food safety status in this study. Studies addressing the relationship between food insecurity and body weight provided no conclusive results. Some surveys have shown that there is an inverse association between food insecurity and body weight, while some others have reported a direct relationship. In a research by Leyna et al., family hunger had a significant relationship with mother's emaciation, but food insecurity was not associated with mother's overweight (24).

**Table3.** Relationship of food security situation with socioeconomic variables studied and the  $\chi^2$  test result in households

| Variable (%)                                 | Food security (%) | Food insecure without hunger (%) | Food insecure with hunger, moderate (%) | Food insecure with hunger, severe (%) | Test P-value $\chi^2$ |
|--|-------------------|----------------------------------|---|---------------------------------------|-----------------------|
| Mother's job                                 |                   |                                  |   |                                       |                       |
| housewife                                    | 70.7              | 82.5                             | 89.9                                    | 91.6                                  | 0.000                 |
| working                                      | 29.3              | 17.5                             | 10.1                                    | 8.4                                   |                       |
| Father's job                                 |                   |                                  |   |                                       |                       |
| Skilled Worker                               | 71.8              | 56.6                             | 42.2                                    | 28.7                                  | 0.000                 |
| worker                                       | 28.2              | 43.4                             | 57.8                                    | 71.3                                  |                       |
| Mother education                             |                   |                                  |   |                                       |                       |
| Illiterate / Reading and writing             | 5.8               | 7.3                              | 16.9                                    | 40.6                                  | 0.000                 |
| Less than high school / High school graduate | 47.6              | 60.5                             | 67.2                                    | 49                                    |                       |
| College education                            | 46.6              | 32.2                             | 15.8                                    | 10.5                                  |                       |
| Father education                             |                   |                                  |   |                                       |                       |
| Illiterate / Reading and writing             | 4.2               | 5.6                              | 15.8                                    | 42.7                                  | 0.000                 |
| Less than high school / High school graduate | 45.3              | 59.8                             | 68                                      | 50.3                                  |                       |
| College education                            | 50.4              | 34.6                             | 16.2                                    | 7                                     |                       |
| Residential home                             |                   |                                  |   |                                       |                       |
| Personal property                            | 66                | 49.6                             | 38.7                                    | 31.5                                  | 0.000                 |
| Rent or mortgage                             | 34                | 50.4                             | 61.3                                    | 68.5                                  |                       |
| Average income monthly household             |                   |                                  |   |                                       |                       |
| < 250.0 \$                                   | 17.6              | 38.4                             | 91.1                                    | 86.7                                  | 0.000                 |
| 250.0-500.0 \$                               | 48.9              | 52.8                             | 37                                      | 13.3                                  |                       |
| 500.0-800.0 \$                               | 29.8              | 8.3                              | 1.8                                     | 0.000                                 |                       |
| $\geq 800.0$ \$                              | 3.7               | 0.5                              | 0.000                                   | 0.000                                 |                       |
| BMI  |                   |                                  |   |                                       |                       |
| 18.5 >                                       | 2.2               | 1.9                              | 2                                       | 4.9                                   | 0.117                 |
| 18.5 – 25                                    | 47.1              | 44.5                             | 44.9                                    | 42                                    |                       |
| 25 – 30                                      | 38.8              | 37.4                             | 36.1                                    | 38.5                                  |                       |
| 30 <   | 11.9              | 16.2                             | 16.9                                    | 14.7                                  |                       |
| WHR  |                   |                                  |   |                                       |                       |
| 0.85 >                                       | 39.8              | 34.5                             | 30.9                                    | 26.6                                  | 0.001                 |
| 0.85 <                                       | 69.2              | 65.5                             | 69.1                                    | 73.4                                  |                       |
| Waist  |                   |                                  |   |                                       |                       |
| 80 >   | 17.3              | 14.5                             | 15.3                                    | 15.4                                  | 0.689                 |
| 80 - 88                                      | 28                | 27.9                             | 26.7                                    | 30.1                                  |                       |
| 88 <   | 54.7              | 57.7                             | 58                                      | 54.5                                  |                       |

Our results showed a significant correlation of food security with some parental features including education, job, age, family size, monthly family income, and the settlement status. These findings were in line with some studies conducted in different cities of Iran

in which food insecurity was significantly associated with more numbers of children, household dimension, job status, education level and ownership of home (15, 18, 19). Contrary to our results, Gullifird et al. found no correlation between food security and employment

**Table 4.** Relationship between food security and quantitative variables in household survey of Qazvin.

| Variables of studied                | Max - Min   | Average | Standard deviation | Standard error | (%95) CI    | P value |
|-------------------------------------|-------------|---------|--------------------|----------------|-------------|---------|
| Age of mother                       |             |         |                    |                |             |         |
| Food security                       | 18-58       | 30.46   | 6-26               | 0.224          | 30.02-30.91 |         |
| Food insecure without hunger        | 17-52       | 30.31   | 6.21               | 0.193          | 29.93-30.69 | 0.000   |
| Food insecure with hunger, moderate | 17-58       | 31.81   | 7                  | 0.301          | 31.22-32.40 |         |
| Food insecure with hunger, severe   | 17-58       | 32.34   | 6.56               | 0.549          | 31.25-33.42 |         |
| Age of father                       |             |         |                    |                |             |         |
| Food security                       | 21-61       | 34.80   | 6.58               | 0.236          | 34.34-35.27 |         |
| Food insecure without hunger        | 19-67       | 34.60   | 6.49               | 0.202          | 34.21-35.00 | 0.000   |
| Food insecure with hunger, moderate | 19-71       | 36.15   | 7.39               | 0.317          | 35.53-36.78 |         |
| Food insecure with hunger, severe   | 23-64       | 36.34   | 7.17               | 0.600          | 35.16-37.53 |         |
| The number of family members        |             |         |                    |                |             |         |
| Food security                       | 3-7         | 3.59    | 0.72               | 0.026          | 3.54-3.64   |         |
| Food insecure without hunger        | 3-8         | 3.57    | 0.68               | 0.021          | 3.53-3.61   | 0.000   |
| Food insecure with hunger, moderate | 3-8         | 3.79    | 0.86               | 0.037          | 3.72-3.86   |         |
| Food insecure with hunger, severe   | 3-8         | 3.91    | 0.96               | 0.081          | 3.75-4.07   |         |
| BMI                                 |             |         |                    |                |             |         |
| Food security                       | 16.23-43.96 | 25.58   | 3.98               | 0.142          | 25.30-25.86 |         |
| Food insecure without hunger        | 14.71-69.20 | 25.82   | 4.36               | 0.135          | 25.55-26.08 | 0.314   |
| Food insecure with hunger, moderate | 16.20-56    | 26.02   | 4.63               | 0.198          | 25.63-26.41 |         |
| Food insecure with hunger, severe   | 16.02-39.06 | 25.63   | 4.57               | 0.382          | 24.87-26.39 |         |
| WHR                                 |             |         |                    |                |             |         |
| Food security                       | 0.62-1.39   | 0.869   | 0.078              | 0.0028         | 0.863-0.874 |         |
| Food insecure without hunger        | 0.56-1.55   | 0.878   | 0.083              | 0.0025         | 0.873-0.883 | 0.001   |
| Food insecure with hunger, moderate | 0.6-1.20    | 0.886   | 0.074              | 0.0032         | 0.879-0.892 |         |
| Food insecure with hunger, severe   | 0.67-1.09   | 0.884   | 0.068              | 0.0057         | 0.873-0.895 |         |

status in northern California (8). This is the fact that family's socioeconomic status is associated with food insecurity. This implies that low-income families often experience some streaks of food insecurity more than high-income families. In a survey conducted on 1662 families in Mississippi, the highest level of food insecurity was detected in families without permanent employment (25). Higher income households have often healthier food and usually spent significantly more money per food.

With respect to the parents' age and food insecurity, studies on Canadian families revealed that despite a considerable percentage of Canadian population (10%) lived in food-insecure families, there wasn't any significant relationship between mother's age and food insecurity/hunger (26). In an investigation on food-insecure

families in Australia and Queensland, no relationship was detected between age and food insecurity status (26). The relationship observed between parents' age and food insecurity in the present study, may be due to the decrease in mental and physical capabilities, social isolation, financial difficulty, and ailments, as the age rises. Likewise, there is a relationship between parents' education and food insecurity (27). Additionally, the findings of a study on 199 Thai families clarified that just 44.2% of Thai families had food security (28). In studies of Usfar on Indonesian urban and rural families, a significant relationship was observed between education level and food insecurity (29). It can be concluded that with increasing parents' educational level, a greater improvement occurs in their knowledge, attitude and performance regarding to family's nutritional status.

In the present study, family food insecurity was associated with increasing family size. In an assessment on 200 Malaysian and Indian females, food insecurity was positively correlated with household size (30). Through examining 35107 Canadian families, Willow et al. detected a significant relationship between family size and food insecurity (31). Ali Hosseini et al. by examining the families supported by Relief Committee in District 20 of Tehran distinguished a meaningful relationship between food security and family size (32). This can be explained that by increasing family size, the amount of accessible food per family member is decreased.

In conclusion our results indicated a high prevalence of food insecurity among families in Qazvin city. Considering the factors influencing the situation, practical preventive measures by corresponding organizations is critical to alleviate the food insecurity in families.

## Acknowledgments

We would like to thank all the mothers' who took part in the study.

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