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## *Evaluation of Food Security of Women Referring to Healthcare Centers Affiliated to Mashhad University of Medical Sciences during 2017-2019*

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### ABSTRACT

**Background:** Food security is one of the basic needs of humans and is regarded as a priority in the development goals of all countries. This study aimed at an epidemiological assessment of food security in healthcare centers affiliated with Mashhad University of Medical Sciences (MUMS). **Methods:** In this analytical cross-sectional study, information on food security, body mass index (BMI), physical activity, education, smoking, hypertension, domestic violence, psychological status, and demographic characteristics were extracted using SINA health records. A total of 60625 mothers referring to MUMS healthcare centers were studied from May 2017 to June 2019. Food security was measured using the Household Food Insecurity Access Scale (HFIAS). Multinomial logistic regression was run to assess the relationship between study variables and food security adjusted for important potential confounders. **Results:** The mean age of participants was  $42.01 \pm 14.3$  years. Also, 64.7% (N=39209) of the participants had food security; 25.3% (N=15321) suffered from mild food insecurity; 6.7% (N=4044) suffered from moderate, and 3.4% (N=2051) suffered from severe food insecurity. Physical activity, BMI, education, nationality, smoking, and psychological distress were significantly associated with odds of severe food insecurity in comparison to normal food security ( $P < 0.05$ ). However, there was no significant association between having diabetes, hypertension, fast foods, and domestic violence, and odds of severe food insecurity. **Conclusions:** Nearly two-thirds of households had food security and a positive significant association was observed between variables and odds of food insecurity. Further research, however, is needed to consolidate the findings.

**Keywords:** Food insecurity; Women; Body mass index

### Introduction

The importance of proper nutrition for physical, mental and psychological development of the human is an indisputable fact (Khodabakhshzadeh *et al.*, 2018), which has made the concept of food security a key issue and

as the top priorities in public health and an indicator of family and individual health (Behzadifar *et al.*, 2016). Since its emergence in the 1970s, this concept has gone through different transitions and has been defined differently by

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different organizations, scholars, and researchers, so that more than thirty definitions can be found for the concept in the literature (Yousaf *et al.*, 2018). In 2009, the Food and Agriculture Organization of the United Nations (FAO) defined food security as "when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets dietary needs and food preferences for an active and healthy life" (Damari *et al.*, 2018, Nord *et al.*, 2016, Pandey and Bardsley, 2019).

Food security is important, since it addresses all aspects of development and it is a global concern in both developed and developing countries. However, the situation is more acute in low-income communities and the marginal regions of developing countries (Ghodsi *et al.*, 2016, Pandey and Bardsley, 2019, Yousaf *et al.*, 2018), where it is a great challenge due to food prices and global economic crises (Zamani-Alaei *et al.*, 2018).

Food security is under the influence of various factors such as political, social, and economic stability, type of resources available to community producers, conservation and sustainable use of sustainable resources, different consumption cultures, level of income and financial ability of households, demographic indicators, price policies, and rural and agricultural development (Zamani-Alaei *et al.*, 2018).

A new study by Jones in 2017 also compared food insecurity across 149 countries and reported that 78.2% of people in North America could be described as food secure, while 4.9% could be considered suffering from severe food insecurity. In Europe also, 74.3% of people were considered food secure, while 3.5% were severely food insecure (Depa *et al.*, 2018). The report by FAO, which estimates comparable prevalence rates of food insecurity in national populations for more than 140 countries every year, shows that in 2014, out of 146 countries under the study, half of the population in 28 countries experienced moderate to severe food insecurity, and the prevalence rates of food insecurity were very high in 30 countries

(Nord *et al.*, 2016).

In Iran, also food security has always been one of the main objectives of agricultural and rural development plans and it is one of the strategic objectives and priorities in Iran's 20-Year Vision Plan (Khodabakhshzadeh *et al.*, 2018). Food insecurity is one of the main concerns of the 5th National Development Program of the Islamic Republic of Iran (2011–2016) (Damari *et al.*, 2018).

As Damari (Damari *et al.*, 2018) maintain, Iranian dietary patterns in recent decades are in the process of change from healthy traditional diets to high consumption of red and processed meats, refined grains, and fried food. Behzadifar *et al.* conducted a systematic review on the prevalence of food insecurity in Iran. They found that in those studies that divided households into four categories of secure, slightly insecure, moderately insecure, and severely insecure, the overall prevalence of insecurity was 50% (95% CI: 35%–64%) (Behzadifar *et al.*, 2016).

Studies on food security of Iranian women have indicated that more than 55% of women had food insecurity (Mortazavi *et al.*, 2017). Siahpour *et al.* also observed a significant relationship between food security and education, job, age, family size, monthly family income, and the settlement status of the participants. Yadegari *et al.* also studied food security among pregnant women and reported that 30.9% of them had food insecurity, while 69.1% had complete food security. Also, a study reported that more than half of the pregnant women were in the mild to severe range of food insecurity and the prevalence of this situation was higher in women with low social economic status and non-native groups (Rajizadeh *et al.*, 2019).

Due to the importance of food security of women and since there was no comprehensive study of the status of food security of women under the coverage of healthcare centers affiliated with Mashhad University of Medical Sciences (MUMS), this secondary analysis study examined the status of food security and its determinants in this group.

## Materials and Methods

**Study design and participants:** In this analytical cross-sectional study, the data were extracted from SINA health records, which is the routine database of MUMS. This database included the health records of a total of 60625 women who referred to healthcare centers affiliated to MUMS from May 2017 to June 2019. The healthcare centers included three healthcare centers in Mashhad (Centers 1, 3, 5, and Samen) and fifteen healthcare centers in other cities of Khorasan Razavi including Bakharz, Bardaskan, Binaloud, Chenaran, Dargaz, Khaf, Fariman, Ghouchan, Kalat, Kashmar, Khalilabad, Khoushab, Roshtkhar, Sarakhs, and Taibad. The inclusion criterion was women who for whatever reason referred to the healthcare centers affiliated to MUMS.

**Measurements:** Information on food security, BMI (estimated by the researchers based on the weight and height information recorded on the SINA database), physical activity, education, smoking, hypertension, domestic violence, psychological distress, using fast foods having diabetes, and demographic variables including age, marital status, and nationality were extracted from the SINA database. Food security was measured using the Household Food Insecurity Access Scale (HFIAS), which was developed by USAID to manage the complexity of food security issues (Swindale and Bilinsky, 2007). The Persian validated version of this scale was used in the SINA database. The scale included nine items on the occurrence of food insecurity in the past four weeks on a two-point scale Yes, scored as 1 or No, scored 0. Each item was followed by a frequency-of-occurrence item asking the respondent how often the condition occurred on a three-point scale of 'Rarely', 'Sometimes' and 'Often', which were scored from 1 to 3, respectively. The frequency-of-occurrence item would be skipped if the respondent's answer to the main item was "No". The nine items were based on three main domains of (A) anxiety and uncertainty about the household food supply, (B)

insufficient quality of food, and (C) insufficient food intake and its physical consequences (Swindale and Bilinsky, 2007). The total score on HFIAS was calculated by summing the scores on each frequency-of-occurrence item, ranging from 0 to 27. A total score of 0 or 1 indicated food security, a score of 2 to 7 indicated mild food insecurity, a score of 8 to 14 indicated moderate food insecurity, and a score of 15 and over indicated severe food insecurity. The participants were measured for their body mass index (BMI) and were categorized into six categories of thin ( $BMI < 18.5 \text{ kg/m}^2$ ), normal ( $18.5 \leq BMI \leq 24.9 \text{ kg/m}^2$ ), overweight ( $25 \leq BMI \leq 29.9 \text{ kg/m}^2$ ), obese ( $30 \leq BMI \leq 34.9 \text{ kg/m}^2$ ), clinically obese ( $35 \leq BMI \leq 39.9 \text{ kg/m}^2$ ), and dangerously obese ( $BMI \geq 40 \text{ kg/m}^2$ ).

To estimate the domestic violence experience of the participants, the Hurt, Insult, Threaten, Screamed (HITS) domestic violence screening tool was used. HITS included four items based on a five-point Likert scale of never, rarely, sometimes, fairly often, and frequently, which were scored from 1 to 5, respectively. The total score on HITS ranged from 4 to 20 and a score of 10 and higher indicated that the person was at the risk of domestic violence. The psychological distress of the participants was also measured using Kessler Psychological Distress Scale (K6). This scale included six items on a Likert scale ranging from 'all of the time' scored as '1' to 'none of the time' scored as '5'. Total scores higher than 10 indicated the necessity of medical follow-up.

**Ethical considerations:** The Ethics Committee of MUMS approved the proposal for this study. The approval code is IR.MUMS.REC.1399.609.

**Data analysis:** The Data from the SINA data bank were entered into SPSS 20 and were analyzed for descriptive statistics. The data then were exported to STATA 14.0 and were analyzed through multinomial logistic regression to assess the relationship between study variables and food security adjusted for important potential confounders at the significance level of 0.05.

## Results

The mean age of the participants was  $42.01 \pm 14.30$  years. Also, 94% of the participants were Iranians, and 93% were married. The mean domestic violence score was  $3.87 \pm 2.50$  and the mean psychological state score was  $4.80 \pm 4.06$ . **Table 1** shows the distribution of the other variables among the participants.

Among the participants, 64.7% (N=39209) had food security, 25.3% (N=15321) suffered from mild food insecurity, 6.6% (N=4044) suffered from moderate food insecurity, and 3.4% (N=2051) suffered from severe food insecurity.

Results of multinomial logistic regression (CI and P-values in **Table 2**) showed that physical activity, BMI, education, nationality, smoking, and psychological distress were significantly associated with odds of severe food insecurity in comparison to normal food security. However,

there was no significant association between having diabetes, hypertension, fast food, domestic violence, age, and marital status, with odds of severe food insecurity. Results (CI and P-values in **Table 2**) also showed that moderate food insecurity is significantly associated with BMI, physical activity, education, hypertension, and nationality, smoking, psychological distress, and domestic violence. However, no significant association was found between moderate food insecurity with age, diabetes, and fast food. Moreover, the results also indicated that mild food insecurity was significantly associated with age, physical activity, education, hypertension, diabetes, nationality, and psychological distress. However, there was no significant association between mild food insecurity and variables including smoking, domestic violence, fast food, and marital status.

**Table 1.** Distribution of the participants based on the variables.

Variables	Categories	N	%
Weight status	Thin	2191	3.6
	Normal	10025	16.5
	Overweight	21032	34.7
	Obese	19112	31.5
	Clinically obese	5688	9.4
	Dangerously obese	1482	2.5
Education	Illiterate	4658	7.7
	Below diploma	41591	68.6
	Diploma	2887	4.8
	University degree	11490	19.0
Physical exercise	Yes	6542	10.8
	No	39186	64.6
Smoking	Yes	2477	4.1
	No	58149	95.9
Fast food	Nothing	42258	69.7
	Less than two units a week	8462	14.0
	Two units or more a week	5069	8.4
Hypertension	Yes	11786	19.4
	No	48840	80.6
Diabetes	Yes	8874	14.6
	No	51752	85.4

Table 2. Association between severe food security and study variables.

Variables	Severe food insecurity			Moderate food insecurity			Mild food insecurity		
	OR	P-value	CI	OR	P-value	CI	OR	P-value	CI
Age	0.99	0.16	0.98-1.00	0.99	0.96	0.99-1.00	0.99	<.001	0.99-0.99
Body mass index	0.74	<.001	0.69-0.80	0.90	<.001	0.86-0.95	1.01	0.29	0.99-1.04
Physical activity	0.56	<.001	0.44-0.72	0.77	<.001	0.66-0.90	0.89	<.001	0.81-0.96
Education	0.33	<.001	0.29-0.38	0.49	<.001	0.45-0.52	0.68	<.001	0.65-0.70
Smoking	2.13	<.001	1.65-2.70	1.78	<.001	1.46-2.18	1.10	0.09	0.77-1.03
Domestic violence	0.99	0.94	0.97-1.02	1.02	<.001	1.00-1.04	1.00	0.13	0.99-1.01
Fast food	0.94	0.36	0.84-1.06	0.98	0.75	0.91-1.06	0.99	0.97	0.95-1.04
Hypertension	0.92	0.44	0.75-1.13	0.79	<.001	0.69-0.92	0.84	<.001	0.77-0.91
Diabetes	0.96	0.77	0.78-1.99	0.99	0.98	0.85-1.16	0.90	0.04	0.82-1.02
Psychological distress	1.07	<.001	1.06-1.08	1.04	<.001	1.03-1.05	1.01	<.001	1.01-1.02
Nationality	0.39	<.001	0.32-0.49	0.24	<.001	0.20-0.28	0.57	<.001	0.51-0.65
Marital status	1.00	0.76	0.98-1.02	0.99	0.83	1.02-1.26	0.99	0.45	0.96-1.01

## Discussion

The results of the study showed that the majority of the women had food security (64.7%) and the prevalence of food insecurity was 35.3% (25.3% for mild, 6.6% for moderate, and 3.4% for severe food insecurity) among the women under the coverage of healthcare centers of MUMS. This is not consistent with Behzadifar (Behzadifar *et al.*, 2016) who reported the overall prevalence of 50% for food insecurity in studies that assessed food insecurity at three levels in their systematic review. It is neither consistent with the finding of Mortazavi (Mortazavi *et al.*, 2017) who reported that the prevalence of food security among women in Qazvin was 58.8%. The findings are not in line with some other studies (Bahrami *et al.*, 2018, Fathollahi *et al.*, 2018, Moafi *et al.*, 2018, Siahpour *et al.*, 2019) who reported much higher prevalence. The findings of this study, however, are consistent with the reported prevalence of 28.5% for mild insecurity by Mohammadi-Nasrabadi (Mohammadi Nasrabadi *et al.*, 2014) and with the results of Yadegari (Yadegari *et al.*, 2017) who reported a prevalence of 30.9% for overall food insecurity. These differences might be due to the fact that some studies (Moafi *et al.*, 2018, Mortazavi *et al.*, 2017) used other tools to measure food insecurity. Moreover, the participants in this study were from different parts of Khorasan Razavi, and some were from rural areas and this might have

influenced the prevalence of food security and insecurity.

Based on the findings, physical activity, education, and nationality were associated with decreased odds of all levels of food insecurity, so that Iranian women with higher levels of education who had physical activity had lower levels of all kinds of food insecurity. Previous research did not study the association between these variables and food insecurity, but since variables such as education and nationality are important factors in determining the socioeconomic status of the households, which is a factor logically related to food security, it enables households to afford food and nutrients. Higher scores of psychological distress increased the risk of all levels of food insecurity, since more psychological distress is expected to exist in families with variables such as lower levels of education which is food security relevant factor. BMI was significantly associated with decreased odds of severe and moderate food insecurity and smoking was associated with increased risk of severe and moderate food insecurity. Age and diabetes were associated with decreased odds of mild food insecurity. The reason might be due to the fact that those who are older and diagnosed with diabetes are more careful about their diet. Hypertension was associated with decreased odds of moderate and mild food insecurity. Domestic violence was associated only with increased odds of moderate food insecurity.

Part of these findings is consistent with the findings of Mortazavi (Mortazavi *et al.*, 2017) and Siahpour (Siahpour *et al.*, 2019), who found that education level of the mother and the age of the mother were associated with food insecurity. The study results were also consistent with the findings of Sadat Bahrami *et al.* who reported a strong association between diabetes, hypertension, BMI, and food security.

It should be noted that since the data were collected during a certain time, and the participants were limited to women who referred to healthcare centers, the findings need to be interpreted cautiously, and more studies need to be conducted to verify the findings.

### Conclusions

Most of the women had food security, but still, around 35% of them showed food insecurity. This fact that food insecurity is significantly associated with many health risk factors implies that Iranian women need to be informed through educational programs of the importance of proper nutrition. They should also know that physical activity and avoidance of smoking help the status of food security. Moreover, education and domestic violence, and psychological distress were associated with food insecurity which implies the necessity of solving their background problems through education and perhaps psychological intervention. In general, improving the mental health of women and society can help the food security status.

### Conflict of interests

There is no conflict of interest to declare.

### Authors' contributions

Taghipor A and Afzalaghaee M designed the study. Mosa Farkhani E extracted the data. Khosravi Z analyzed the data and wrote the report. The three other coauthors reviewed the report.

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