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Original Article

Depression and Its Association with Food Insecurity in Household Women Living in Northwest of Iran

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ABSTRACT

Background and Objectives: Depression is the most common mood disorder, which may be experienced by most of the people during their life. Food insecurity may result in mental disorders such as anxiety and depression. The aim of this study was to assess depression status and its relation to household food insecurity in women living in Northwest of Iran.

Materials and Methods: In this cross-sectional community-based study, 480 women with high-school children were selected from East Azerbaijan Province, Iran, using random sampling method. Beck depression inventory, 18-item food security questionnaires and socio-economic questionnaires were completed by the participants and then weight and height of the participants were measured. Independent sample t-test, chi-square test and binary multiple logistic regressions were used for data analysis. The $P<0.05$ was considered statistically significant.

Results: In this study, frequencies of depression and household food insecurity included 43.1 and 48.3%, respectively. Results indicated significant positive correlations between the food insecurity and depression in women. Of the studied socio-economic variables, age, family size, economic status, occupational status of women and their husbands and educational levels were significantly associated with depression. Body mass index (BMI) of women was negatively associated with depression.

Conclusions: Results showed that frequencies of depression and household food insecurity were high in participants. It seems that the improvement of socioeconomic status and subsequently improvement of the women's food security can positively affect their mental health.

Keywords: Depression, food security, socio-economic status, women, Iran

Introduction

According to World Health Organization (WHO) report in 2000, mental disorders is considered as the fourth cause of the most urgent health problems and mental disorders, the greatest disability rates in the world are linked to depression (1). These disability rates are comparable or even higher than those caused by hypertension, diabetes mellitus, coronary artery diseases and chronic pains (2). Symptoms of depression (e.g. poor appetite, diminished interest, lack of energy and an impaired ability to think, concentrate or decision-making) develop over time and negatively affect women's quality of life (3, 4).

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Therefore, depressed mothers may be less able to plan, work, shopping and cook for their families (5). In the United States, one in every six people suffers from depression (6). Prevalence of depressive disorders varies in various regions of Iran. Studies have shown depression at the top of mental disorder lists with a mean prevalence of 3.8% (7). Results of a study by Kavyani *et al*. (2002) have shown that rates of depression in 20–65 years of old women and men in Tehran, the capital city of Iran, include 12.16 and 8.47%, respectively (8). Food insecurity is described as limited or uncertain access to adequate and safe food or limited or uncertain ability to gain acceptable foods in socially acceptable ways (9). More than 852 million people around the world are faced food insecurity; mostly live in developing countries (10). Since food insecurity has been suggested as a serious public health problem in the last two decades, it has increasingly been focused by the health professionals and policymakers (11). Results of the previous studies have demonstrated that the likelihood of various degrees of depression in food insecure households is greater (12, 13). Previous studies have also indicated that household food insecurity is associated with poor mental health conditions such as anxiety and depression and multiple chronic conditions such as diabetes, hypertension, heart disease, overweight, obesity and higher rates of hospitalization in adults (14, 15, 16, 17, 18). Chilton *et al.* (2007) have reported that poor women belonged to food-insecure societies experience 'hunger of the mind'; the term that the authors described as a sense of hopelessness and depression (19). Women form nearly half of every society population and are one of the most vulnerable groups. Mothers usually feel the household food security and are hence more likely to be depressed (20). A very limited information exist on the prevalence of depression in mothers in East Azerbaijan Province. Further studies on the topic have been recommended by the previous studies (21, 22). Therefore, the aim of the current study was assessment of depression status in women living in northwest of Iran and association of depression with household food insecurity.

Materials and Methods

Study population: This cross-sectional community-based study was carried out in Bostan-Abad region of East Azerbaijan Province, Iran, 2015. Based on the previous reports, a 95% confidence level and a 95% power, the sample size was calculated as 199 using SPSS v.17 software (IBM Analytics, USA). This was multiplied by design effect of 2 and consider of 20% for dropout, resulting in a final sample size of 480 women with high-school students through a random sampling method (22). Participants were first informed about the study objectives and then signed written informed consents.

Measurements

Depression assessment: The Persian version of Beck Depression Inventory (BDI) was used to assess maternal depression (23, 24). The BDI was a 21-item standard self-report questionnaire with each item representing a state in the person. The respondent person should select the option that best represents his/her current feeling (e.g. what he/she felt at the time of completing the questionnaire). Every item included four options and a score of 0 to 3 for each item was given. The minimum and maximum scores included 0 to 54. Based on the BDI scores, participated mothers were divided into six major groups of normal, a little depressed, required consultation with a psychiatrist, moderately depressed, severely depressed and excessively depressed (Table 1). Then, these groups were classified into three groups of normal, mild to moderate depressed and severely depressed. Cronbach's alpha coefficient for food security questionnaire and BDI were calculated as 0.84 and 0.90, respectively.

Food security assessment: Household food insecurity was assessed using US Department of Agriculture (USDA) household food security questionnaires. These 18-item questionnaires addressed the household food security status of the participants in the last 12 months (9) and was completed by the interviewers. The 18-item USDA household food security questionnaires were validated in previous studies (25). To better assess responses to the questionnaires, positive responses of yes, often true, sometimes true, and almost for every month and/or some months were given Code 1 and negative responses of no, for just one or two months as well as unanswered questions were given Code 0. Then, the participants were divided into four groups based on the scores of the questionnaire (Table 1) (9).

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Table 1. Classification and frequency of depression and household food security among women (*n* = 480)

Variable	Scores	No. (%)
Depression status		
Normal	1-10	273 (56.9)
A little depressed	11-13	91 (19)
Require consultation with a psychiatrist	17-20	35 (7.3)
Moderately depressed	21-30	60 (12.5)
Severely depressed	31-40	17 (3.5)
Excessively depressed	> 40	4 (0.8)
Food security status		
Food secure	0-2	248 (51.7)
Food insecure without hunger	3-7	124 (14.6)
Food insecure with moderate hunger	8-12	70 (25.8)
Food insecure with severe hunger	13-18	38 (7.9)

Anthropometric measurements: Height of the participants was measured using portable wall-mounting height scale with a precision of 0.1 cm, while the person was attached to the wall without shoes, looking forward. Weight was measured using flat digital scale (Beurer PS 07, Germany) with a precision of 0.1 kg, while the person was wearing minimal clothing with no shoes. The body mass index (BMI) was calculated by dividing weight in kilogram by height in meter squared. Weight status was classified according to BMI categories as underweight (< 18.50), normal weight (18.50–24.99), overweight (25.00–29.99), obese class I (30.00–34.99), obese class II (35.00–39.99) and obese class III (≥ 40.00) (26).

Socio-economic and demographic data: General socio-economic questionnaires (SEQ) were completed by interviewing the participants. The SEQ included items of age, family size, education and job status of the women and their husbands, number of women having living facilities (economic level), residential ownership status and size of houses. To assess economic levels, the participants were asked about having the following items: side by side refrigerators, handmade carpets, cars, houses, computers, flat-screen color TVs, dishwashers, washing machines and microwave ovens. Having three of these appliances or less was considered as weak, four to six as moderate and seven to nine as good economic status (20).

Statistical analysis: Statistical analysis was carried out using SPSS v.17 software (IBM Analytics, USA). Data were presented as mean ±SD (standard deviation) and frequency (%) for quantitative and qualitative variables, respectively. Independent sample t-test, chi-square test and binary multiple logistic regressions were used. The $P < 0.05$ was considered as statistically significant.

Results

In this study, 480 women were participated. Mean age of the women included 40.7 years. Table 2 demonstrates demographic characteristics of the participants.

Table 2. Demographic characteristics of the studied subjects (*n* = 480)

Characteristics	No. (%)
Age*	40.7±5.6
BMI*	27.6±4.2
Occupational status of women	
Housewife	422 (87.9)
Employed	58 (12.08)
Occupational status of husband	
Unemployed/ Worker/ Farmer	92 (19.1)
Governments employee	107 (22.2)
Self-employment	281 (58.5)
Education level of women	
Illiterate/Primary school	191 (39.7)
Middle school	146 (30.4)
Diploma	136 (24.1)
University	27 (5.6)
Education level of husband	
Illiterate/Primary school	136 (28.3)
Middle school	156 (32.5)
Diploma	84 (17.5)
University	104 (21.6)
Family size	
3≥	43 (8.9)
4-5	327 (68.1)
6≤	110 (22.9)
Economic levels	
Weak	152 (31.7)
Moderate	191 (39.8)
Good	137 (28.5)
Home ownership status	
Private home	454 (94.6)
Rent or mortgage	26 (5.4)

*Results are presented as mean ±SD

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Mean BMI of the participants included 27.6 (SD = 4.2) with a majority of participants were housewives (87.9%). Frequencies of normal weight, overweight and obesity in participants included 27.3, 45.6 and 27.1%, respectively. Frequency of depression in participants included 43.1% of mild, 38.8% of moderate and 4.4% of severe depressions. Of the variables, age, number of household members, economic status, occupational status and educational level of women and husbands and the women BMI were significantly associated with depression (Table 3). Based on the multiple logistic regression final model, food security status, occupational status of women, economic level, family size and women BMI included further significant association with depression, compared to that other variables did (Table 4).

Table 3. Correlation between levels of depression and studied variables among northwest Iranian women (n = 480)

Variable	Depression levels			*P-Value***
	Normal n=273	Mild and Moderate n=186	Major n=21	
Weight*	71.58±10.69	72.54±10.49	76.34±12.06	0.12
Height*	163.29±7.19	159.57±8.29	159.76±7.30	<0.001
BMI*	26.87±3.85	28.60±4.46	30.10±5.61	<0.001
	No. (%)	No. (%)	No. (%)	
Age of women				
≤37	96 (20)	44 (9.2)	4 (0.8)	0.001
38-40	88 (18.3)	47 (9.8)	7 (1.5)	
41-44	44 (9.2)	36 (7.5)	2 (0.4)	
≥45	45 (9.4)	59 (12.3)	8 (1.7)	
women BMI				
18.5-24.9	92 (19.2)	36 (7.5)	3 (0.6)	<0.001
25-29.9	125 (26)	85 (17.7)	9 (1.9)	
≥30	56 (11.7)	65 (13.5)	9 (1.9)	
Family size				
3≥	30 (6.3)	11 (2.3)	2 (0.4)	<0.001
4-5	204 (42.5)	114 (23.7)	9 (1.8)	
≥6	39 (8.1)	61 (12.7)	10 (2)	
Occupational status of husband				
Unemployed/ Worker/ Farmer	29 (6)	53 (11)	10 (2.1)	<0.001
Governments employee	77 (16)	28 (5.8)	2 (0.4)	
Self-employment	167 (34.8)	105 (21.9)	9 (1.9)	
Occupational status of women				
Employed	49 (10.2)	9 (1.9)	0	<0.001
Housewife	224 (46.7)	177 (36.9)	21 (4.4)	
Education level of husband				
Illiterate/Primary school	52 (10.8)	71 (14.8)	13 (2.7)	<0.001
Middle school	90 (18.8)	62 (12.9)	4 (0.8)	
Diploma	52 (10.8)	29 (6)	3 (0.6)	
University	79 (16.5)	24 (5)	1 (0.2)	
Education level of women				
Illiterate/Primary school	89 (18.5)	87 (18.1)	15 (3.1)	0.001
Middle school	85 (17.7)	56 (11.7)	5 (1)	
Diploma	78 (16.3)	37 (7.7)	1 (0.2)	
University	21 (4.4)	6 (1.3)	0	
Economic levels				
Weak	36 (7.5)	105 (21.9)	11 (2.3)	<0.001
Moderate	134 (27.9)	52 (10.8)	5 (1)	
Good	103 (21.5)	29 (6)	5 (1)	

*Results are presented as mean ±SD; **P-values were obtained by ANOVA and chi-square test methods where appropriate.

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Findings showed that women who lived in food insecure households included an 81% higher chance rate to have depression, compared to those who lived in food secure households. In this study, prevalence of household food insecurity included 48.3%; of which, 25.8% included food insecure without hunger**,** 14.6% included food insecure with moderate hunger and 7.9% included food insecure with severe hunger based on the USDA household food security questionnaires. Number of household members, educational level, job status and age of women and husbands, economic status, size of houses and women BMI were significantly associated to food security status (Table 5). Generally, 18.9% of women in food secure group and 68.9% in food insecure group were depressed. Food insecurity and depression revealed a significant positive correlation in women ($P < 0.001$).

Table 4. Results for multiple logistic regressions analysis on the relationship between depression and studied variables among the northwest Iranian women ($n = 480$)

Variable	OR	95% CI	*P-Value*
Food security status	0.19	0.10-0.33	<0.001
Occupational status of women	2.69	1.19-6.06	0.01
Economic levels			
Weak	1		
Moderate	7.71	4.36-13.61	<0.001
Good	1.17	0.70-1.98	0.53
Women BMI			
18.5-24.9	1		
25-29.9	0.35	0.19-0.64	0.001
≥30	0.54	0.33-0.89	0.01
Family size			
≤3	1		
4-5	0.32	0.11-0.95	0.04
≥6	0.42	0.18-0.95	0.03

OR, odds ratios; CI, confidence interval

Table 5. Anthropometric and demographic characteristic of food secure and insecure participants of study ($n = 480$)

Variable	Food secure ($n = 248$)	Food insecure ($n = 232$)	**P-Value*
Women age*	39.48±5.04	42.01±6.00	<0.001
Husband age*	45.81±5.17	47.19±6.40	0.01
	No. (%)	No. (%)	
Women BMI			
18.5-24.9	81 (16.9)	50 (10.4)	0.03
25-29.9	114 (23.8)	105 (21.9)	
≥30	53 (11)	77 (59.2)	
Family size			
3≥	32 (6.7)	11 (2.3)	<0.001
4-5	196 (40.8)	131 (27.3)	
6 ≤	20 (4.2)	90 (18.7)	
Occupational status of husband			
Unemployed/ Worker/ Farmer	13 (2.7)	79 (16.4)	<0.001
Governments employee	83 (17.3)	24 (5)	
Self-employment	152 (31.7)	129 (26.9)	
Occupational status of women			
Employed	203 (42.3)	219 (45.6)	<0.001
Housewife	45 (9.4)	13 (2.7)	
Education level of husband			
Illiterate/Primary school	26 (5.4)	110 (22.9)	<0.001
Middle school	86 (17.9)	70 (14.6)	
Diploma	55 (11.9)	29 (6)	
University	81 (16.9)	23 (4.8)	
Education level of women			
Illiterate/Primary school	63 (13.1)	128 (26.7)	<0.001
Middle school	85 (17.7)	61 (12.7)	
Diploma	81 (16.9)	35 (7.3)	
University	19 (4)	8 (1.7)	
Economic levels			
Weak	9 (1.9)	143 (29.8)	<0.001
Moderate	118 (24.6)	73 (15.2)	
Good	121 (25.2)	16 (3.3)	

*Data for the age is mean ±SD; **P-values were obtained by independent sample t-test and chi-square test methods where appropriate

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Discussion

Results of the current study have shown that 43.1% of participated women included depressive disorders. In a study on women referred to Rafsanjan health centers in center of Iran, prevalence of depression was reported as 40.5% (27). In a study on Kurdish and Azeri ethnic groups in Urmia, northwest of Iran, Rezazadeh *et al.* (2017) reported that a higher number of Kurd people included moderate to severe depression, compared to that Azeri people did (17.3 instead of 27.9%) (21). In 2014, Payab *et al*. found that the prevalence of depression in mothers having primary-school children in Shahr-e Ray, north of Iran, included 51.4% (20). These differences could be attributed to factors such as differences in tools and methods of assessment, sample sizes and age groups. Similar to several previous studies, the current results showed a significant positive association between the depression and age of the women (20, 27, 28). However, other studies such as that by Akhtar-Danesh have shown controversial results (29). Increased age of women is associated with hormonal changes and menopause and as children leave the family, women feel lonely, worthless and frustrated. These make women vulnerable to depression. Findings from the present study were similar to those from previous studies (20, 28, 30). These findings show significant negative associations between depression and socio-economic condition. However, other findings by Hadavi and Akhtar-Danesh show differences (27, 29). It seems that households with inappropriate economic and social conditions cannot afford routine needs; therefore, mental health and quality of life of these groups downgrade. Furthermore, the current study results have demonstrated a higher rate of depression within the women whose husbands are workers, farmers or unemployed. Furthermore, results have shown that depression is more prevalent in women whose husbands have lower educational levels. These findings are similar to findings from other studies (20, 28). Higher educational levels seem to help people to better adopt with their environments and challenge problems. This hence improves people mental health status.

Results of the current study have revealed that respectively 18.9 and 68.9% of the women in food secure and food insecure groups suffer from depression. Moreover, a significant positive correlation is seen between the food insecurity and depression in women ($P < 0.001$); similar to other studies (20, 22, 31). Results of a study by Casey et al. on mothers of under 3-year-old children in Columbia, USA, revealed that 32.9% of the mothers in food secure group and 67.1% of the mothers in food insecure group were depressed (32). In another study by Whitaker *et al*. in 2006, 15.7% of mothers of under 3-year-old children in food secure group, 20.2% of mothers in marginally food secure group and 28.5% of mothers in food insecure group were depressed (33). In the current study, lack of proper access to food supplies might partially create concerns in the participants. This extra psychological burden could affect maternal depression. The current findings showed that frequencies of food insecurity within the families in northwest of Iran included 48.3%. Previous studies in East Azerbaijan Province used different questionnaires to assess the household food security status. Using 6-item questionnaires to assess food insecurity in Qumtepe region of Tabriz, northwest of Iran, Farhangi *et al*. (2014) reported a 36.6% frequency rate of food insecurity in households referring to health centers (34). In another study using 8-item USDA food security modules, frequencies of food insecurity in children included 30% (35). In a study on households with primary-school children in Sistan and Baluchestan Province, southeast of Iran, 42.3% of the households showed degrees of food insecurity (36). In other studies on households in Bangladesh, Vietnam and Ethiopia, frequencies of food insecurity were reported as 32, 40 and 66%, respectively (37). Generally, differences in frequencies of food insecurity could be attributed to differences in populations and instruments used in the studies. However, the current study included some limitations. The major limitation included the cross-sectional design, which restricted interpretations of the results. Furthermore, other causes of depression were not assessed in participants. Another limitation included lack of laboratory analysis.

Conclusion

In general, results of this study have shown that the frequencies of depression and household food insecurity are high in studied populations. Since a significant association exists between the food insecurity and depression, further attentions must be paid to education, employment and economy of these groups. It seems that the improvement of socioeconomic status and food security can improve

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women mental health. Therefore, governmental and non-governmental health, food and nutrition organizations can play significant roles in this field.

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