

# The Association between Food Security Status and Depression in Two Iranian Ethnic Groups Living in Northwest of Iran

A. Rezazadeh, N. Omidvar, H. Eini-Zinab

**Abstract**—Food insecurity (FI) influences may result in poor physical and mental health outcomes. Minor ethnic group may experience higher level of FI, and this situation may be related with higher depression prevalence. The aim of this study was to determine the association of depression with food security status in major (Azeri) and minor (Kurdish) ethnicity living in Urmia, West Azerbaijan, north of Iran. In this cross-sectional study, 723 participants (427 women and 296 men) aged 20–64 years old, from two ethnic groups (445 Azeri and 278 Kurdish), were selected through a multi stage cluster systematic sampling. Depression rate was assessed by “Beck” short form questionnaire (validated in Iranians) through interviews. Household FI status (HFIS) was measured using adapted HFI access scale through face-to-face interviews at homes. Multinomial logistic regression was used to estimate odds ratios (OR) of depression across HFIS. Higher percent of Kurds had moderate and severe depression in comparison with Azeri group (73 [17.3%] vs. 86 [27.9%]). There were not any significant differences between the two ethnicities in mild depression. Also, of all the subjects, moderate-to-sever FI was more prevalent in Kurds (28.5%), compared to Azeri group (17.3%) [ $P < 0.01$ ]. Kurdish ethnic group living in food security or mild FI households had lower chance to have symptom of severe depression in comparison to those with sever FI (OR=0.097; 95% CI: 0.02-0.47). However, there was no significant association between depression and HFI in Azeri group. Findings revealed that the severity of HFI was related with severity depression in minor studied ethnic groups. However, in Azeri ethnicity as a major group, other confounders may have influence on the relation with depression and FI, that were not studied in the present study.

**Keywords**—Depression, ethnicity, food security status, Iran.

## I. INTRODUCTION

**F**OOD security is the physical, social, and economic access of all people at all times to sufficient, safe, and nutritious food for a healthy and active life [1]. Food security is related with many aspects of physical and psychological health [1]-

A. R. is with the National Nutrition and Food Technology Research Institute. Faculty of Nutrition and Food Technology. Shahid Beheshti University of Medical Sciences and Health Services. Iran (phone: +989141003389; fax: +98 21 2236 0660; e-mail: Arezoo.rezazadeh@gmail.com).

N. O. is with the National Nutrition and Food Technology Research Institute. Faculty of Nutrition and Food Technology. Shahid Beheshti University of Medical Sciences and Health Services. Iran (phone: +989125330191; fax: +98 21 2236 0660; e-mail: omidvar.nasrin@gmail.com).

H. E-Z is with the National Nutrition and Food Technology Research Institute. Faculty of Nutrition and Food Technology. Shahid Beheshti University of Medical Sciences and Health Services. Iran (phone: +98 914 849 2321; fax: +98 21 2236 0660; e-mail: hassan.eini@sbmu.ac.ir).

[3]. Previous studies presented that people with lower socioeconomic status and food insecure households had higher possibility to experience different degrees of depression [3]-[5].

Iran is a country that experiences an accelerated nutrition transition [6]. During the last decades, Iranians' major dietary patterns have been changing from healthy traditional to Western and unhealthy dietary habits [7]-[9]. Nutrition transition led to higher prevalence of chronic disease. Besides, previous reports showed higher prevalence of depression in Iranian population [10], [11]. Another worrying concern according to the international map of food security is that Iran is categorized as the countries of the "high risk" group [12]. A national study revealed that three states of Iran were "very insecure" (Hormozgan, Kohkilouieh and Boyerahmad, Sistan and Baloochestan), four states were "insecure" (Khuzestan, Kerman, Ilam, Booshehr) and six states "relatively insecure" (n=4: Ardebil, Charmahal and Bakhtiari, Fars, Kermanshah, Kordestan, Lorestan, South Khorasan) [13]. Also, in another study, prevalence of FI (moderate to severe) based on household income/expenditure surveys amounted 10% [14]. There is a valid report implying the fact that depression may be a result of food and nutrition [15]-[17]. FI is linked with poor mental health such as anxiety and depression. Hence, in people with low socioeconomic affordability and in immigrants or minor ethnic groups that have lower social position, higher rate of depression may be as a result of FI [18]. Seligman et al. [1] stated that "food-insecure households usually report that they are unable to afford balanced meals, worrying about the adequacy of their food supply, running out of food, and cutting the size of meals or skipping meals". The severe levels of FI usually result in hunger because of lack of money for food and not being able to eat food for entire day. Urmia city located in west Azerbaijan Province, the north-west of Iran, has diverse ethnic populations (including Azeris [76.2%], Kurds [21.7%], Persians [0.8%] and others [1.4%]) living together [19], [20]. There is not enough information about the diverse ethnic groups' FI status and its relation with health outcomes such as depression. The current study aimed to determine the association between FI and depression in Azeri and Kurdish ethnic groups living in Urmia.

## II. METHODS

The design of study is cross-sectional. The sample size was 723 participants (427 women and 296 men) from two ethnic groups (445 Azeris and 278 Kurds), aged 20–64 in Urmia city

collected by a multistage systematic sampling methods. Data were obtained through home participants and face-to-face interviews with heads of households or their spouse at the households' home. General characteristics of participants such as age, gender, demographic, and socioeconomic status, belonging to Azeri or Kurdish ethnic groups, were obtained by a questionnaire. Household food security (HFS) was measured by using a validated household FI access scale (HFIAS) [21], [22]. The questionnaire was consisted of nine items with four frequency options that classified households into secure, mild, moderate, and severe FI categories. Depression score was examined by short form of "Beck" questionnaire through interview. This questionnaire was previously validated in Iranians [23]. In this 13-item questionnaire, there are several sentences which show an emotional status, and individuals should select the option that represents their exact feeling at that time. Respondents to this test must be at least the fifth or sixth grade and must have the ability to read in order to understand its provisions. They should respond items based on a four-point Likert scale ranging from three to zero (the scales were categorized as decreasing score in terms of the severity of depression). The total score was in the range of minimum score of zero and a maximum of 39, that is interpreted as follows: 0 to 4: no or minimal depression; 5 to 7: mild depression, 8 to 15: Moderate depression, 16 and higher:

severe depression.

#### A. Statistical Analysis

Data were analyzed using SPSS software V.21 (SPSS Inc., USA). The Kolmogorov-Smirnov test and histograms were used to test the normality of variables. To compare general characteristics within the two ethnic groups, independent sample T-test and chi-square test were used wherever applicable. Binary logistic regression method was used to estimate OR and 95% confidence interval (95% CI) of moderate and severe depression adjusted for various confounders.  $P < 0.05$  was considered as significant.

### III. RESULTS

Characteristics of the participants from the two ethnic groups, Azeris and Kurds, are presented in Table I. Azeri households were more food secure than Kurdish households; in contrast, moderate-to-severe FI was significantly higher in Kurds than Azeri group. The two groups were not significantly different in mild FI. Mild depression was not significantly differed between the two ethnic groups. On the other hand, moderate and severe depression had higher frequency in Kurdish minor ethnic group when compared to Azeri ethnic group.

TABLE I  
FI STATUS AND DEPRESSION OF AZERI AND KURD ETHNIC GROUPS IN URMIA

Variable	Azeri		Kurd		P-value
	N	%	N	%	
<b>FI status</b>					
Total FI score	2.41 <sup>a</sup>	3.7 <sup>b</sup>	3.6 <sup>a</sup>	5.0 <sup>b</sup>	0.00
Food secure	261	59.3	138	49.8	0.01
Mild food insecure	103	23.4	60	21.7	0.58
Moderate and severe food insecure	76	17.3	79	28.5	0.00
<b>Depression Status</b>					
Depression Total Score	4.07 <sup>a</sup>	4.9 <sup>b</sup>	5.6 <sup>a</sup>	5.8 <sup>b</sup>	0.000
Non	278	65.9	146	53.5	0.001
Mild	51	16.8	51	18.7	0.53
Moderate	78	13.7	51	18.7	0.08
Sever	15	3.6	25	9.2	0.002

Notes: <sup>a</sup> Mean, <sup>b</sup> Standard deviation, P-values were calculated by independent sample T-test and chi-square test methods where appropriate.

In Table II, binary logistic regression analysis was applied to reveal the odds of moderate and severely according to FI status. Findings showed that Kurdish ethnic group who lives in severe food insecure households had higher chance to have moderate and severe depression in comparison with those who

live in food secure or mild food insecure households. However, there was no significant association between depression and household FI in Azeri group. After adjustment for various confounders such as age, gender, socioeconomic status, and energy intake, the results remained significant.

TABLE II  
THE OR OF MODERATED AND SEVERE DEPRESSION ACCORDING TO FI STATUS

Variable	Azeri			Kurd				
	Crude OR <sup>1</sup>	95% CI	Adjusted OR <sup>2</sup>	95% CI	Crude OR <sup>1</sup>	95%CI	Adjusted OR <sup>2</sup>	95% CI
Food secure	1		1		1		1	
Mild food insecure	1.46	0.82–2.62	1.39	0.77–2.51	0.66	0.30–1.41	0.71	0.29–1.72
Moderate and severe food insecure	0.90	0.44–1.85	0.85	0.39–1.84	1.66*	1.001–3.18	1.65*	1.001–3.13

OR values were significantly different from the reference group: \* $P < 0.05$ , CI: confidence interval, <sup>1</sup>Crude model: without any adjustment, <sup>2</sup> Adjustment for age, gender, socioeconomic status and energy intake.

#### IV. DISCUSSION

In the present study, the possible association of FI with depression was explored in Kurdish and Azeri ethnic groups in Urmia, Northwest Iran. Findings revealed that the association of FI with depression and its severity were not similar in these two Iranian ethnic groups. Severe FI increased the chance of moderate and severe depression in Kurds, while there were not any significant correlations in Azeris.

The relation between FI and depression is mutual. Some studies showed that those peoples who experienced depression may be at higher risk of FI. In a study by Vilar-Compte et al. [24], FI and its association with depression were assessed in urban older adults (65 years and older). Findings showed that probability of moderate-severe FI was about 2.8 times higher among elders at risk of depression (OR=2.84). Also, FI was independently associated with high symptoms of depression, anxiety in rural Ethiopia [3]. In a study on urban Ecuadorian women with children, household FI was associated with the mental and physical health in low-income households, and they suggested that food security improvement in these households may alleviate the burden of mental distress in these women [18]. In another study by Munger et al. [25], the effect of an interventional program (Supplemental Nutrition Assistance Program: SNAP) on FI and probability of maternal depression was examined. They found that FI was connected to risk of depression over time. Also, in food insecure group, losing SNAP benefits was related with higher risk of depression during two-year, while receiving benefits was related with reduced risk. This study suggested that this assistant program may reduce the emotional hardship FI experience. Furthermore, in a study applied by Leung et al. in 2015 [26], the association between FI and depression by SNAP participation status was assessed. Among low-income, eligible nonparticipants, very low food security was significantly associated with higher odds of depression (OR: 5.10; 95% CI: 3.09, 8.41).

The depression and FI was related in the present study only in Kurds that were a minor ethnic group living in Urmia. Minor ethnic group usually have weak health status due to lower economic affordability [27]. Some studies found similar findings in minor ethnic groups of immigrants. As an instance, Maharaj et al. in 2017 [28] investigated the FI and risk of depression among refugees and immigrants in south Africa. About 23% of immigrants was food insecure and eating less was related with anxiety and depression. Also, in a study by Kapulsky et al. in 2015 [29], FI was significantly related with depression in HIV-infected Hispanic individuals. These studies suggest that economic status and social support are the main determinants of relationship between FI and depression.

#### V. CONCLUSION

Findings suggested that household FI was strongly related with depression in Kurds as the minor ethnic groups and the severity of depression was associated with the severity of depression. However, in Azeris, other confounders may have influence on the association between depression and FI (such

as genetic susceptibility and cultural background) that was not considered in the current research.

Further studies seem to be necessary to consider other influencing factors such as cultural background, eating habit and genetic determinants on relation between FI and depression in ethnic group.

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