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Prevalence of household food insecurity among people living with HIV/AIDS (Kerman- the southeast of Iran)

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Abstract

Background: Household food insecurity is one of the major public health issues that may affect an individual's nutritional state, especially in patients with chronic diseases. The aim of this study was to evaluate the prevalence of household food insecurity and its association with sociodemographic and clinical factors among patients with HIV/AIDS in Kerman province, Iran.

Methods: A cross sectional study was performed among the 179 patients with HIV/AIDS in Kerman province. Participants completed a questionnaire focusing on personal information, health, and clinical status. Also, household food security status was evaluated by the USDA (US Department of Agriculture) questionnaire. Data were analyzed using SPSS (Version 22) by descriptive, univariate, and multivariate logistic regression. $P<0.05$ was considered statistically significant.

Results: Overall, 98 responding men and women were classified as household food secure (n=41; 40.8%) and household food insecure (n=58; 59.2%). Among the household food insecure patients, 14% (n=8) experienced lower household food insecurity, 38% (n=22) moderate household food insecurity, and 48% (n=28) severe household food insecurity. No significant differences were observed between household food secure and insecure groups in demographic variables. In clinical variables, only BMI index was significantly different between the two groups (p=0.040), but CD4 count was not significant between groups (p=0.220).

Conclusion: Prevalence of household food insecurity was high among people living with HIV/AIDS in Kerman. It seems clinical variables such as BMI index, which indicates the nutritional status of individuals, affect household food security status among people living with HIV/AIDS.

Keywords: AIDS, HIV, Food insecurity, CD4 cell counts

Conflicts of Interest: None declared
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Introduction

Household food insecurity is the most important cause of poor health conditions (1) and occurs when there is uncertainty about the future of access to a sufficient quantity of affordable, nutritious food due to economic or social limitations (2). An estimated 1 billion people worldwide do not have access to adequate food energy (1). Household food insecurity is associated with household dimension, drug abuse, poo r social support, and markers

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↑What is "already known" in this topic:
People living with HIV/AIDS (PLWHA) have greater household food insecurity risk factors compared to general population; thus, the prevalence of household food insecurity among PLWHA is also higher than general population. Previous studies in other countries showed most of PLWHA experienced some levels of household food insecurity.

→What this article adds:
This study aimed to evaluate household food insecurity prevalence among PLWHA in Kerman (southeast of Iran) and to investigate possible associations between HIV/AIDS and household food insecurity and some demographic and clinical variables.

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of low socioeconomic status, such as low education, low income, lack of health insurance, unemployment and homelessness (3). Household food insecurity is intricately associated with the HIV epidemic. People living with HIV/AIDS (PLWHA) have greater household food insecurity risk factors compared to general population; thus, the prevalence of household food insecurity among PLWHA is also higher than general population (3, 4). Prevalence of household food insecurity is often high among PLWHA in both developed and developing countries. For example, studies were conducted in San Francisco, Vancouver, Kenya and Uganda showed most of PLWHA experienced some levels of household food insecurity (5, 6). Clinically, starvation or cachexia leads to HIV-related malnutrition (3). Both modes decrease active body cell mass as well as fat cells, CD_4 count, and as a result increase viral load (7). HIV infection increases the consumption of energy and protein (8). Therefore, PLWHA have higher dietary needs in terms of energy, protein, and nutrients (3).

An estimated, 37.9 million individuals were living with HIV/AIDS worldwide at the end of 2018; unfortunately, since then, around 74.9 million people have become infected with HIV and 32 million people have died of AIDS-related illnesses. Between 2000 and 2017, a total of 240 000 [160 000–390 000] people were living with HIV in the Middle East and North Africa, and new HIV infections rose by 26% in the region. Treatment coverage is 32% of adults living with HIV in the Middle East and North Africa. An estimated, 61 000 individuals were living with HIV in Iran at the end of 2018 (9).

The probability that PLWHA can control their household food security is dependent on their sources of food and whether they are exposed to hunger (3). Assessments of factors influencing household food insecurity are important in providing strategies to allow the early screening of people at risk. The aim of this study was to evaluate household food insecurity prevalence among PLWHA in Kerman (southeast of Iran) and to investigate possible associations between HIV/AIDS and household food insecurity and some demographic and clinical variables.

Methods

Study design

This cross sectional study was conducted in Kerman (southeast of Iran) in 2017.

Sample size and sampling method

The population of this study composed of all PLWHA who were under the surveillance system and referred to the Center for Disease Control and Prevention (CDC) (n=170). This study was conducted within an environment in which the treatment, laboratory monitoring, and medical care are fully covered by the governmental health care system. The Treatment Program provides Anti-Retroviral Therapy (ART) free of charge to eligible HIV-infected residents of Kerman, which is the only source of free HIV medications for patients in Kerman.

Table 1. Classification of the household food security status based on scores

Food security status	Number of positive responses
Food secure	0-2
Food insecure without hunger	3-7
Food insecure with moderate hunger	8-12
Food insecure with severe hunger	13-18

Household food security status assessment

Household food security status was evaluated by the USDA (US Department of Agriculture) questionnaire, which has been used in the US Current Population Survey annually since 1995 (10). This 18-statement questionnaire, which examined household food security status in the last 12 months, was completed by interviewing patients. The studied patients were divided into four groups based on the scores of the questionnaire: household food secure, household food insecure without hunger, household food insecure with moderate hunger, and household food insecure with severe hunger (Table 1). Scoring and classifying was done based on Bickel et al technique (11). The validity of this questionnaire has been previously evaluated in Iran (12). We assessed the impact of demographic and clinical variables on household food security status and severity of household food insecurity. For the latter purpose, we merged household food secure and household food insecure without hunger groups as the household without hunger group. Also, we merged household food insecure with moderate hunger and household food insecure with severe hunger as the household with hunger group.

We obtained consent form from participants after clarifying the objective of the study. Interviewers completed the USDA questionnaire. Demographic variables, such as sex, age, education, marital status, and household dimension, were obtained alongside the validated questionnaire. Moreover, clinical variables, such as BMI, CD_4 counts in the last exam, HIV/AIDS status, and disease duration (time of diagnosis), were obtained by information recorded in their records. Data were analyzed using SPSS (21st version) by descriptive, t independent, Mann-Whitney U, chi-square and Fisher's exact tests.

Results

Sociodemographic and clinical characteristics of people living with HIV/AIDS

At the beginning of the study, 170 participants had electronic health records in Kerman Counseling Center for Behavioral Illnesses. Of them, 15 were in prison and 15 were not referred to the counseling center for treatment, and 42 were not willing to cooperate with the interviewers. Finally, 98 people were included in the final analysis. The mean age of respondents was 41.99±7.96 years. Males constituted 70% and females 30% of the respondents. Also, 41% of participants were single, 38% married, and 21% separated/divorced. The mean age (SD) was 42 (±7.36) years in HIV patients with household food secure and 42 (±8.44) in patients with household food insecure. No significant difference was found between the two

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Table 2. Demographic and clinical characteristics in the two study groups (Household food secure and household food insecure in People Who Living with HIV/AIDS

Variables type		Food security status	
		Secure	Insecure
Demographic			
Age (mean (SD))		42 (7)	42 (8)
Household dimension (median(N))		3	2
Sex (%)	Male	42	58
	Female	38	62
Education (%)	≤ 5 year	28	72
	6-12 year	45	55
	12 year >	50	50
Material status (%)	Single	36	64
	Married	53	47
	Others	30	70
Clinical			
BMI (mean (SD))		23 (5)	21 (3)
CD_4 (median (N))		412	274
WBC (mean (SD))		5632 (1649)	5243 (1666)
Duration* (mean (SD))		76 (47)	78 (41)
Disease status (%)	HIV	33	67
	AIDS	41	59

N: reported by number
%: reported by percent
*: time distance in week (disease diagnosis to study time)

groups in demographic variables. Table 2 shows some demographic and clinical characteristics in the two study groups (household food secure and household food insecure People Who Living with HIV/AIDS).

The median CD_4 cell count was 412 cells/µL in patients with household food security and 274 cells/µL in patients with household food insecurity; this difference was not significant between the two groups (p=0.220). Also, the mean (SD) of white blood cell (WBC) count was 5632 (1649) cells/µL in patients with household food security and 5243 (1666) cells/µL in patients with household food insecurity (p=0.260).

Among the clinical characteristics, only BMI-index had a significant difference between the two groups (p=0.040) (Table 3). After univariate analysis, variables with a significance level≤0.2 entered in multivariable analysis (13). Result of multivariable logistic regression (backward method) showed only BMI index had a significant effect on household food security status (Table 4). The risk of household food insecurity decreased by 10% for the 1-unit increase in BMI index.

The severity of household food insecurity

In this study, 59.2% of participants (n=58) reported experiencing household food insecurity in the past 12 months. Among individuals with household food insecurity, 14% had mild insecurity (without hungry), 38% moderate insecurity (with moderate hungry), and 48% severe

Table 3. Relation between demographic and clinical variables with food security status in people living with HIV/AIDS (univariate logistic Regression)

Variable		B	p	Exp (B)	95 % CI for Exp (B)	
					Lower	Upper
Age		0.001	0.988	1	0.95	1.05
Household dimension		-0.102	0.421	0.9	0.96	1.17
Sex: (male) (base: female)		-0.171	0.711	0.84	0.35	2.05
Education			0.323			
(base:<=5 year)	6-12 year	-0.741	0.144	0.48	0.17	1.29
	>=12 year	-0.944	0.392	0.39	0.5	3.32
Material status			0.170			
Base: Divorced	Married	-0.94	0.091	0.39	0.13	1.18
	Single	-0.25	0.666	0.78	0.26	2.35
BMI		-0.103	0.040	0.9	0.81	0.99
CD_4		-0.001	0.220	0.99	0.99	1.001
WBC		0.001	0.260	0.99	0.99	1.01
Duration		0.001	0.826	1	0.99	1.01
Disease status (AIDS) (Base: HIV)		-0.365	0.574	0.69	0.19	2.48

Table 4. Multivariable logistic regression (backward method)

Variable	B	Standard Error	Wald	Df	p	Exp (B)	95 % C.I. for Exp (B)	
							Lower	Upper
BMI	-0.102	0.52	3.88	1	0.040	0.90	0.81	0.99
Constant	2.69	1.19	5.12	1	0.024	14.8		

Variables entered on step1: marital status, CD_4, BMI.

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insecurity (with severe hungry). Among the 69 male participants, 40 had household food insecurity, and from the 29 female patients, 18 had household food insecurity.

Table 5 demonstrates demographic and clinical characteristics in the two study groups (food insecure group without hunger Vs food insecure hunger group).

As shown in Table 6, the results of the study showed similar to household food security status, there was no significant association between demographic variables and severity of household food insecurity. In clinical variables, only BMI index was different between the two groups (without hunger group Vs with hunger group). The risk of sever food insecurity (hunger) decreased by 10%, with 1-unit BMI index increment.

Discussion

This study evaluated the relationship between household food insecurity and its subcomponents in a community-based sample of people living with HIV across the province of Kerman, Iran. Our finding showed that 59.2% of participants (n=58) reported experiencing household food insecurity in the past 12 months. In line with our findings, Aranka et al in a cross sectional study showed 73% of people living with HIV across British Columbia, Canada, experienced household food insecurity (14).

Economic intensification and increased costs of social and medical care for patients in Iran has led to an increase in household food insecurity (15). Research shows that in patients with HIV, the risk of household food insecurity increases because of the patients' economic problems and increase in the cost of health care (16). Undernutrition and HIV status have negative feedback loops, resulting in severe effects on the resilience of individuals, households, and communities. At the individual level, patients with HIV/AIDS are at risk of malnutrition and impaired immune system due to inadequate food intake. Patients with malnutrition have a deficit of energy, protein, vitamins, or minerals, and this has measurable adverse effects on the body (17). On the other hand, patients with HIV/ AIDS experienced impaired absorption due to digestive problems such as nausea and diarrhea (18, 19). Also, household food insecurity was associated with multiple barriers

Table 5. Demographic and clinical characteristics in the two study groups (Household food insecure group without hunger vs household food insecure hunger group)

Variables type		Severity of food insecurity	
		No hunger	Whit hunger
Demographic			
Age (mean (SD))		42.5 (7)	41.4 (8)
Household dimension (median (N))		3	2
Sex (%)	Male	50	50
	Female	48	52
Education (%)	≤ 5 year	44	56
	6-12 year	50	50
	12 year >	50	50
Material status (%)	Single	44	56
	Married	59	41
	Others	43	57
Clinical			
BMI (mean (SD))		23.4 (4.6)	21.5 (3.7)
CD_4 ((median (N))		408	290
WBC (mean (SD))		5515 (1567)	5300 (1757)
Duration* (mean (SD))		74 (46)	80 (40)
Disease status (%)	HIV	34	66
	AIDS	52	48

N: reported by number
%: reported by percent

Table 6. Relation between demographic and clinical variables with severity of food security in people living with HIV/AIDS (univariate logistic Regression)

Variable		B	p	Exp (B)	95 % CI for Exp (B)	
					Lower	Upper
Age		-0.19	0.471	0.98	0.93	1.03
Household dimension		-0.158	0.236	0.85	0.65	1.11
Sex: (male) (base: female)		-0.04	0.933	0.96	0.4	2.3
Education (base:<=5 year)			0.854			
	6-12 year	-0.27	0.567	0.76	0.3	1.9
	>=12 year	-0.24	0.824	0.78	0.09	6.5
Material status Base: Divorced			0.371			
	Married	-0.59	0.277	0.55	0.19	1.58
	Single	-0.005	0.999	0.99	0.35	2.81
BMI		-0.113	0.031	0.9	0.8	0.99
CD_4		-0.001	0.333	0.99	0.99	1.001
WBC		0.001	0.523	1	0.99	1.001
Duration		0.003	0.471	1	0.99	1.001
Disease status (AIDS) (Base: HIV)		-0.74	0.252	0.47	0.13	1.7

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to HIV treatment such as delays in refilling medications, medication side effects, lack of transportation, substance use, depression, lack of social support, and viral nonsuppression (20).

Our estimate of household food insecurity with hunger revealed 51% of patients with household food insecurity experienced household food insecurity with hunger, which is much higher than reported in previous studies (3, 21). In the Normen et al study (3), they showed among the 1213 patients with HIV/AIDS participating in this study, 52% had household food security, 27% had household food insecurity without hunger, and 21% had household food insecurity with hunger, which is in line with our results. One of the reasons for household food insecurity with hunger was low annual income in HIV-positive individuals (16). Normen et al have shown that the predicted annual income of AIDS patients in their study was ≤Can$10,000 (≤US$7,600)/y, and this annual income was much lower than that of healthy people (3). In this study only BMI-index had a significant association with household food insecurity in HIV positive individuals, and these findings contradicted with some previous findings (3, 22, 23). Karimi et al in a cross sectional study among the HIV-Infected patients showed the intake of energy and some micronutrients such as folate, cobalamin, and vitamin E in women was lower than the recommended standard values. However, men received standard amounts of macronutrients and micronutrients (24). Also, in a study on 71 HIV positive Indians patients in 2008, it was found that energy, fat, fiber, vitamin C, and iron consumption in these patients were lower than the RDA values (25).

In this study we did not find any significant difference between household food secure and insecure patients in CD_4 counts. In a study in Iran, researchers reported no significant association between nutritional factors and CD_4+ count (24). Contrary to our findings, recent studies indicate a connection. In a cross-sectional study, Wang et al found an inverse relationship between household food insecurity and CD_4+ count among the 2353 HIV patients (26). Also, Kalantari et al evaluated 123 HIV-infected participants and found household food insecurity significantly affected the CD_4+ cell counts (27).

The findings of this study should be interpreted in light of its methodological limitations. Unfortunately, due to patient dissatisfaction, we were not able to predict the annual income of patients. Information about the average income of patients could provide a more accurate interpretation of the patients' household food insecurity. On the other hand, we used a 1-year window to define household food insecurity. In addition, although we assessed multiple socioeconomic factors associated with household food insufficiency, some other factors, such as macronutrients and micronutrients, energy, body composition changes, and the quality of food intake, were not evaluated.

The present study, as one of the few surveys conducted on the population of HIV/AIDS patients in one of the largest provinces of Iran, showed household food insecurity could have very adverse consequences in the patients' treatment process and most of the people living with HIV/AIDS experience hunger and insufficient food. Our data suggest adequate access to high-quality food among patients with AIDS can have a significant effect on the patients' treatment process. One study that evaluated this hypothesis showed improvement in nutritional status of these patients through nutritional supplements and foodstuffs had a significant impact on the health of people living with HIV/AIDS, including on HIV treatment adherence and on avoiding viral resistance (28).

Conclusion

Prevalence of household food insecurity was high among people living with HIV/AIDS in Kerman. It seems clinical variables, such as BMI index, which indicates the nutritional status of individuals, affected household food security status and severity of household food insecurity among people living with HIV/AIDS.

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Conflict of Interests

The authors declare that they have no competing interests.

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