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The State of Food Insecurity and Its Relationship with the Physical and Mental Health of the Elderly (Sanandaj, 2019)

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ABSTRACT

Background and Objective: Food insecurity is defined as limited or uncertain access to adequate and healthy food in terms of nutrition or limited ability to obtain food in socially acceptable ways, which can affect the health of the elderly. The aim of this research is to investigate the state of food insecurity and the factors affecting it and its role in physical and mental health in the elderly.

Methods: This cross-sectional study was conducted on 550 elderly people aged 60 years and older who referred to 10 health centers in Sanandaj, and were selected via random cluster sampling. Demographic information questionnaire, HFIAS food security questionnaire (8 questions with a score range of 0 to 24) and Goldberg General Health Questionnaire (28 questions with 4 subscales) were completed and reviewed.

Findings: In this study, 324 elderly women and 224 men were evaluated, 75.6% were married and 73.6% were illiterate. The findings showed that 59.1% (325 people) of the elderly had some degree of food insecurity and severe insecurity was observed in 62 people (11.3%). Food insecurity in people with moderate to severe physical symptoms (OR=7.33), anxiety and sleep disorder (OR=8.63), functional disorder (OR=6.78), depression (OR=21.12) and in general, moderate to severe general health disorder (OR=11.85) was seen more. In addition, food insecurity, not being married, being illiterate, living alone, and low income were observed to a greater extent in women.

Conclusion: The results of the study showed that the prevalence of food insecurity among the elderly in Sanandaj is significant and is related to factors such as general, physical and mental health disorders.

Keywords: *Elderly, Food Insecurity, Physical and Mental Health.*

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Introduction

With the gradual decrease in birth and death rates along with the increase in life expectancy, we are witnessing an increase in the number of elderly people in the world (1). According to the definition of the World Health Organization, aging is a comprehensive and general biological change caused by the increase in age and the passage of time, which does not arise due to environmental factors or disease, and is unavoidable and irreversible, and people over 60 years of age are known as the elderly population (2).

Food and nutrition are among the basic needs of human society, the provision of which is hidden in the category of food security (3). Food security refers to the physical, social and economic access of all people at all times to sufficient, healthy and nutritious food that can meet their nutritional needs and food preferences for a healthy and active life, which can have an impact on the quality and quantity of life. According to the presented definition, the limited and uncertain access of all people to enough food at all times to have a healthy body implies food insecurity (4). Food insecurity is not only limited to people who do not have enough reserves of energy and nutrients, but also refers to when people not only do not have the right to choose food, they are afraid of running out of food, or they have major changes in their food preferences (5). Unlike malnutrition, food insecurity does not endanger a person's life, but it has profound effects on a person's health (6). Studies have shown that food insecurity causes disturbances in daily functions and also affects various dimensions of health (physical, mental, social) and well-being, therefore providing food security can guarantee the development and progress of society (7, 8).

Food insecurity is a constant and global problem, and according to the UNICEF report in 2018, about 821 million people, or 12.5% of the world's population, suffered from chronic hunger between 2014 and 2017 and did not have enough food to benefit from a healthy and active life. According to this report, 65% of these people live in Asia (8). The prevalence of food insecurity in developed and developing countries is different due to various social, economic, political and cultural reasons (9). The prevalence in developing countries is reported on average from 5.7 to 73% and in developed countries from 10 to 11.2% (3). Iran is in a state of medium risk of food insecurity, and about one-fifth of our country's population suffers from lack of energy or satiety, and half of the people suffer from lack of micronutrients (inability in cellular satiety) (10).

In a developed country like Canada, the prevalence of food insecurity is 12%, moderate insecurity is 5.5%, and severe insecurity is 2.7% (11). Furthermore, in North America, the prevalence was reported to be 7.8% from 2011 to 2013 (12). In addition, in the study of Milani-Bonab et al. which was conducted among the elderly, 35% of people were safe in terms of food security, 15% were insecure without hunger, 25% were insecure with moderate hunger, and 25% were insecure with severe hunger (13).

In the elderly, the state of food security and the factors affecting it are different from other groups of society due to differences in nutritional factors and health status (14). Food insecurity and its consequences, while intensifying and speeding up the progression of age-related degenerative diseases and prolonging the time required for recovery and increasing healthcare costs, have an adverse effect on social relations and create a kind of hostility between the elderly and the outside environment, and this negative feeling towards one's human value is one of the other effects of chronic hunger and food insecurity (15). In addition, physical dysfunction, lack of social support, living alone, low income and inability to perform daily tasks, especially shopping or preparing food, and on the other hand, suffering from some diseases, make the elderly more at risk of insecurity compared to other people. This provides the basis for creating food insecurity independent of other influencing factors (16).

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Due to the increase in the growth rate of the elderly in Iran, the category of food security as a stressful event that affects various aspects of the physical and mental health of the elderly has unfortunately received less attention, and in some parts of the country, this problem is more conspicuous. Based on the research findings of the Ministry of Health's community nutrition improvement office in February 2012 (17), Sanandaj is located in a relatively food insecure area, and according to the evidence, this problem is possibly more common in the elderly who live in border areas compared to other areas. Therefore, due to the lack of sufficient research regarding food insecurity and physical and mental health in the elderly, the present study was conducted to investigate the relationship between food insecurity and physical and mental health in the elderly in Sanandaj.

Methods

This cross-sectional study was conducted after approval by the ethics committee of Babol University of Medical Sciences with the code IR.MUBABOL.HRI.REC.1397.052 on male and female elderly aged 60 years and older covered by Sanandaj health centers in 2019.

The number of samples was calculated about 550 people based on the sample size formula, based on the prevalence of food insecurity of 15% (13) and accuracy of 0.03 and alpha of 0.05. The selection of the elderly was done based on multi-stage sampling method including cluster and random sampling. Clusters (health centers) were randomly selected from among the 10 districts of Sanandaj, and then random samples were selected from the list of qualified health centers of both genders in each cluster. After explaining the goals of the project and obtaining informed consent from all the elderly (both literate and illiterate), the relevant questionnaires were collected and completed by the researcher in the form of an interview.

The weight of people with minimal clothes and without shoes was measured using an OMRON digital scale with an accuracy of 100 grams. The height of these people was measured using a tape measure in an upright position without shoes while the shoulders were in normal conditions with an accuracy of 0.5 cm. Body mass index was calculated by dividing weight (in kilograms) by the square of height (in meters).

To assess food insecurity, the Household Food Insecurity Access Scale (HFIAS) questionnaire was used, which was validated by Milani-Bonab et al. in 2013 and Cronbach's alpha was reported as 0.858 (13). This questionnaire has 8 questions based on 4-point scale (often, sometimes, rarely, and never) that measures different dimensions (food quality, sufficiency of food intake). The total scores obtained from answering the questions in the questionnaire were placed in 4 categories: secure (score 0-1), mildly insecure (score 2-6), moderately insecure (score 7-13) and severely insecure (score 14-24) (13).

To evaluate physical and mental health, the General Health Questionnaire (GHQ-28 Goldberg) was used. It includes 28 questions with 7 questions in each of its 4 subscales of physical symptoms, anxiety and sleep disorder, social functioning disorder and depression. Its reliability, validity and factor analysis of its mental health scale in Iranian elderly people had been evaluated (18).

Data analysis was done using SPSS 18 software and by calculating descriptive statistics (prevalence, mean, standard deviation and percentage) as well as analysis of variance, independent t-test and paired t-test, Pearson and Spearman correlation and multivariate regression analysis. $P<0.05$ was considered significant.

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Results

Out of 550 elderly people, 324 (58.9%) were women and 226 (44.1%) were men. 239 people were in the age group of 60-64 years (Table 1). 75.6% (416 people) of the samples were married and education status of 73.6% of samples (405 people) was illiterate and in terms of way of life, 73.3% (403 people) lived with their spouse, 14.4% (79 people) with their children and 12.4% (68 people) lived alone or with others.

82.5% of the elderly included in the study (454 people) had a house, and 46.5% (256 people) were under the financial supervision of their families and others. In the present study, 40.9% (225 people) of the samples had food security (34.3% men versus 50.4% women) and 59.1% (325 people) of the elderly were food insecure (Figure 1).

Food insecurity in women was 1.95 times that of men (p=0.001), unmarried elderly was 1.88 times that of married people (p=0.001), but the prevalence of this problem was not significantly different in terms of age, education status and number of children. Food insecurity in the elderly who lived with anyone other than their spouse (living with children, living with others, or living alone) was higher than the elderly who lived with their spouse (odds ratio 1.71 and 2.97 for living with children and living alone, respectively). The level of food insecurity was higher in people with low income, people without housing, and elderly people without certain income (Table 2); food insecurity in the elderly who were financially dependent was 2.96 times (CI 95%: 2.07-4.24) that of people with fixed salary.

Table 1. Age and gender distribution of elderly subjects (Sanandaj, 2019)

Age group (years)	Men (n=226) Number(%)	Women (n=324) Number(%)
60-64	80(35.4)	159(49.1)
65-69	56(24.8)	70(21.6)
70-74	41(18.1)	45(13.9)
75-79	23(10.2)	27(8.3)
≥80	26(11.5)	23(7.1)

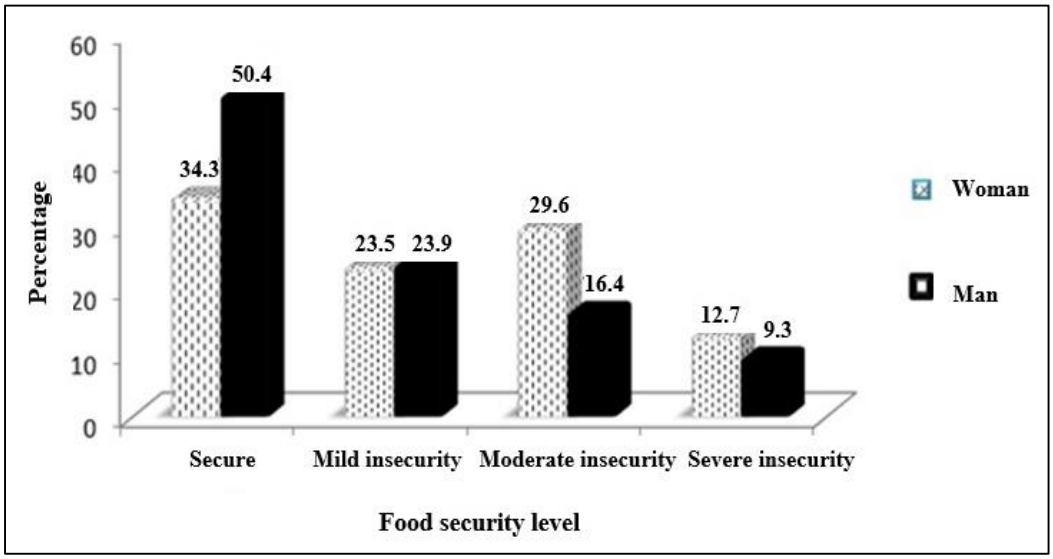

Figure 1. Comparison of food security in elderly men and women surveyed in Sanandaj (2019)

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Table 2. Relationship between demographic variables and food security state in the elderly of Sanandaj (2019)

Variables	Food security Number(%)	Food Insecurity Number(%)	OR (CI 95%)	p-value
Gender				
Male	114(50.4)	112(49.6)	1	0.001
Female	111(34.2)	213(75.8)	1.95 (1.38-2.76)	
Age				
60-64	97(40.5)	142(59.5)	1	
65-69	57(45.2)	69(54.8)	0.83 (0.53-1.28)	
70-74	41(47.6)	45(52.4)	0.75 (0.46-1.23)	0.082
75-79	16(32)	34(68)	1.45 (0.76-2.77)	
≥80	14(28.6)	35(71.4)	1.71 (0.87-3.34)	
Marital Status				
Married	185(44.4)	231(55.6)	1	0.001
Unmarried	40(29.8)	94(71.2)	1.88 (1.24-2.86)	
Education				
High school and above	21(43.7)	27(56.3)	1	
Elementary school	61(62.8)	36(37.2)	0.46 (0.23-0.93)	0.08
Illiterate	143(35.3)	262(64.7)	1.43 (0.78-2.61)	
Living Status				
With wife	184(45.6)	219(54.4)	1	
With child	26(32.9)	53(67.1)	1.71 (1.03-2.85)	0.001
Alone or with others	15(22.1)	53(77.9)	2.97 (1.62-5.44)	
Number of children				
Up to 3 children	60(40.5)	88(59.5)	1	0.925
More than 3	165(63.7)	94(36.3)	0.98 (0.67-1.44)	
Income				
Self-sufficient	155(52.7)	139(47.2)	1	0.001
Under supervision	70(27.3)	186(72.6)	2.96 (2.07-4.24)	
Income level				
Good	30(60)	20(40)	1	
Appropriate	141(54.02)	120(45.9)	1.28 (0.69-2.36)	0.001
Low	54(22.6)	185(77.4)	5.14 (2.7-9.76)	
Job				
Employee/self-employed	82(42.8)	67(57.1)	1	
Worker	37(55.3)	28(44.6)	0.93 (0.51-1.67)	0.001
Unemployed	106(31.5)	230(68.4)	2.66 (1.79-3.95)	

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In the studied subjects, body mass index had a significant relationship with food insecurity (p=0.02). The level of food insecurity in thin people was 18%, in people with normal BMI was 22.3% and in overweight and obese people it was 36.5%.

The results of this study showed that food security in people with heart disease (OR=2.01), hypertension (OR=1.73), diabetes (OR=2.04), sleep disorder (OR=2.28) and dental problem (OR=2.29) was lower (Table 3).

General health status based on 4 subscales (physical symptoms, anxiety and sleep disorder, social functioning disorder and depression) was impaired in 52.9% (291 people) of the elderly (38.5% men and 62.9% women).

According to the Goldberg questionnaire, general health had a significant relationship with the level of food insecurity (p=0.001). The level of food insecurity was higher in people with lower general health (95% CI=6.02-23.33, OR=11.85).

In addition, food insecurity in moderate and severe cases of depression (21.1 times), functional disorder (6.8 times), anxiety and sleep disorder (8.6 times) and physical symptoms (7.3 times) was higher than people without the above disorders (Table 4).

Table 3. The relationship between food security and the history of disease in the elderly in Sanandaj (2019)

Disease history	Food security		OR (CI 95%)	p-value
	Normal Number(%)	Insecurity Number(%)		
Cardiac disease				
No	198(88.0)	255(78.5)	1	0.004
Yes	27(12.0)	70(21.0)	2.01 (1.24-3.26)	
Hypertension				
No	139(61.8)	157(48.3)	1	0.002
Yes	86(38.2)	168(51.7)	1.73 (1.22-2.44)	
Sleep disorder				
No	208(92.4)	274(84.3)	1	0.004
Yes	17(7.6)	51(15.7)	2.28 (1.28-4.06)	
Diabetes				
No	197(87.6)	252(77.5)	1	0.003
Yes	28(12.4)	73(22.5)	2.04 (1.27-3.27)	
Dental problems				
No	194(86.2)	238(73.2)	1	0.00
Yes	31(13.8)	87(26.8)	2.29 (1.46-3.59)	
Lipid disorders				
No	190(84.4)	274(84.3)	1	0.965
Yes	35(15.6)	51(15.7)	1.01 (0.63-1.61)	
Cancer				
No	223(99.1)	317(97.5)	1	0.175
Yes	2(9.0)	8(2.5)	2.81 (0.59-13.38)	

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Table 4. The relationship between food insecurity and physical and mental health in the elderly studied in Sanandaj (2019)

Physical and mental disorder and its severity	Food security Number(%)	Insecurity Number(%)	OR (CI 95%)	p-value
Physical symptoms				
No symptoms	153(56.5)	118(43.5)	1	
Mild	58(31.2)	128(68.8)	2.86 (1.93-4.24)	0.001
Moderate and Severe	14(15.1)	79(84.9)	7.32 (3.95-13.56)	
Anxiety and sleep disorder				
No symptoms	138(58.7)	97(41.3)	1	
Mild	71(35.1)	131(64.9)	2.62 (1.78-3.87)	0.001
Moderate and severe	16(14.2)	97(85.8)	8.63 (4.78-15.55)	
Functional disorder				
No symptoms	73(60.8)	47(39.2)	1	
Mild	141(38.0)	230(62.0)	2.53 (1.66-3.86)	0.001
Moderate and Severe	11(15.8)	48(84.2)	6.78 (3.2-14.36)	
Depression				
No symptoms	214(47.9)	233(52.1)	1	
Mild	10(12.7)	69(87.3)	6.34 (3.18-12.62)	0.001
Moderate and Severe	1(20.0)	23(80.0)	21.12 (2.83-157.8)	
General Health disorder				
No symptoms	159(61.4)	100(38.6)	1	
Mild	55(27.8)	132(72.2)	3.82 (2.55-5.7)	0.001
Moderate and Severe	11(12.4)	82(87.6)	11.85 (6.02-23.33)	

Discussion

In the present research on 550 elderly men and women living in Sanandaj, the rate of food insecurity was 59.1%; 23.6% had mild food insecurity, 24.2% had moderate food insecurity, and 11.3% had severe food insecurity. The estimated prevalence of food insecurity in the present study was consistent with the results of most studies conducted in Iranian elderly. In a study by Cheraghi et al., only 10.9% of the elderly in Zanjan had food security and 46.6% of the elderly had severe food insecurity (19). The rate of food insecurity in the elderly of Arak (2012) was 60.7% (20), in the elderly in Tehran (2019) was 63.2% (21), in Bavi city of Khuzestan (2016) was 87% (22) and this rate was reported to be 37.6% (4) in Dezful (2012).

The rate of food insecurity in the elderly in industrialized and advanced countries varies between 10 and 17% (23-26), which is lower than these values in some regions of Africa (80%) (27), and India (70%) (28), which can be due to the differences between the investigated societies and the economic, social and cultural factors that are effective in the way of allocating resources in the household, determining the food budget and eating patterns.

Like many studies in Iran and other countries, food insecurity in elderly women was more than men (21, 23, 29, 30), while in a number of other studies, no significant difference was reported (20, 31, 32).

Although it is generally believed that the elderly who live alone have a poor nutritional status and it is a nutritional risk factor as a result of living alone, but it is not clear whether this is because of eating alone or because of living alone (33). In this study, food insecurity was higher in unmarried people (single, widowed,

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divorced) compared to married and elderly people who lived with anyone other than their spouse (living with children, living with others, alone). These findings were consistent with the studies of Fallah Tafti et al. (20), Milani-Bonab et al. (13), Strickhouser et al. (24), Mohammadi et al. (34), and Mirzadehahari et al. (35). In the study of Mohammadi et al. (34), the marital status of the head of the household was not significantly different in different groups of food security.

In this regard, the emotional support from the spouse can be the reason for the difference in the food security state in these groups. The isolation and loneliness of the elderly in the form of permanent loneliness prevent them from entering into social activities, and lead to inability to visit relatives and friends and therefore, the inability of these groups to express problems related to food security and this increases food insecurity among them. The absence of children also has a negative effect on the emotional support and instrumental support of the elderly. It can be justified that widowed and divorced people are likely to have lower income and lack financial support, which leads to their food insecurity.

In the present study, there was a significant relationship between the level of education and food insecurity. In illiterate elderly and with lower level of education, food insecurity was higher than in other categories. The level of education in people with food insecurity was lower, which was similar to other studies conducted in Iran (20, 22, 24, 34), which can show the role of education level on job opportunities and income, along with its impact on nutritional awareness in Iranian society.

Among the many other obstacles to having food security is the status of socio-economic indicators in such a way that higher income or financial support from people around showed an inverse relationship with food insecurity. The level of food insecurity in people who are below the poverty line was 40%, while among those who were above the poverty line, this rate reached 11% (36).

In the present study, as in a study in Australia (37), there was no significant relationship between age and food security. However, the level of food insecurity has increased with increasing age. It can be said that perhaps one of the reasons for the high level of food insecurity in old age is the increase in problems related to chewing food and not having teeth, living alone and depression at this age.

In the present study, with the increase in food insecurity, the rate of obesity and overweight in the elderly was higher, which was consistent with the studies of Fallah Tafti et al. (20) and Gao et al. (23). That's because in food insecure households, more attention is paid to energy intake, or in other words, stomach fullness of family members; for this reason, the intake of energy from cheap sources such as potatoes and bread increase in families (20), and in contrast, the intake of major micronutrients (38) decreases due to the reduction in the consumption of rice and vegetables, fruits, red meat, milk and dairy products (39). In other words, the variety of food consumption in food insecure families decreases (39).

In the present study, food insecurity in the elderly had a significant relationship with heart diseases, dental problems, sleep disorders, blood pressure, and diabetes.

Thus, food insecurity increased with the increase of diseases in the elderly. Various researches about the health status of the elderly and the incidence of chronic diseases and food insecurity have shown that food insecurity is correlated with obesity, cardiovascular diseases, high blood pressure, dyslipidemia, diabetes, osteoporosis, and smoking in adults (40-45).

The RTI international study showed that improper nutrition as a source of chronic disease can lead to mental disorders, especially depression (46). Among the elderly, research shows that households suffering from food insecurity are more likely to experience long-term physical health problems (47), higher rates of chronic diseases (42), diabetes (48), higher levels of depression (49) and lower scores on physical and mental health tests (43).

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Health problems such as high blood pressure and diabetes are likely to increase the financial burden of the household, and eventually, these health issues caused by food insecurity harm the household at a micro level and harm the society at a macro level (46).

Neuropsychological problems in the elderly affect appetite and affect daily intake, digestion, and weight status, thereby exposing a person to food insecurity. Weight loss and food insecurity in the elderly may be due to poor nutrition that occurs as a result of psychological factors. Losing an active social role and lack of emotions can cause depression and show symptoms of anorexia. The fact is that a kind of emptiness and inactivity and a sedentary lifestyle are also observed in the elderly, which worsen the situation in parallel with the aging process, and the first sign of depression is their lack of interest in food (50).

In a study by Mirzadehahari et al., a significant positive relationship was observed between major depressive disorder and food insecurity. This relationship remained constant after adjusting for age, household size, birth rank, number of years of education, marital status, body mass index, income and home ownership status (35). In a study by Hadley et al., they observed that the level of stress and depression is higher in food insecure people, and if there is social support, the effect of food insecurity on depression will be curbed (50).

The inability to buy nutritious and sufficient food and the mental and emotional stress caused by it can have a bad effect on health. Inadequate intake can be associated with disorders in the mental and behavioral functioning of people and cause disease, or aggravate the disease caused by other risk factors.

In another study, depression, knee osteoarthritis, other joint diseases, stroke, and high blood pressure all increased the risk of disability. Those with knee osteoarthritis were more disabled than those with high blood pressure, diabetes, and heart disease (51). In a study by Mesgar et al., there was a significant relationship between depression and life activities (52). Aging is associated with an increase in the risk of chronic diseases such as diabetes, arthritis, high blood pressure, and heart diseases, and a higher level of depression and related symptoms have been seen in these disorders (53). These disorders are associated with a decrease in a person's ability to perform daily life activities and daily instrumental activities, which is not only a major cause of depression, but also an independent factor in reducing the quality of life of the elderly (52).

The study of Mokhtari et al. showed that elderly people living in nursing homes have lower quality of life and more depressive disorders than elderly people living freely due to limited social contacts and other restrictions (54). Chang-Quan et al. also showed that elderly people with depressive disorders had a lower quality of life, more severe depression, and lower instrumental activities of daily living compared to the healthy control group, and all these results were statistically significant (55).

Finally, based on the results of this study, it can be said that the elderly who live in a family with food insecurity are more likely to show physical and mental health disorders, and these elderlies have low-income levels, have functional impairment in daily life activities, and a larger number of them were without a spouse, all of which can put higher psychological pressure on a person and lead to depression and general health disorders.

Considering that the economic status of the household was the most important factor determining food insecurity, and the sudden increase in the price of some basic goods can cause food insecurity, especially in low-income households, so the government's policies should be aimed at solving such problems.

In order to increase the well-being and quality of life of the elderly and to maximize the health and functional status, it is necessary to pay special attention to the independence of the elderly by the policymakers responsible for physical and mental health of the elderly. Therefore, using special measures such as supporting elderly organizations, creating parks and elderly-friendly spaces, setting up public transportation with special seats for the elderly, planning to hold training courses, preparing educational

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posters and pamphlets focusing on lifestyle correction, and prevention of musculoskeletal diseases in societies can be useful in smoothing the effect of active aging experience and having an elderly-friendly society.

In short, the prevalence of food insecurity among the elderly in Sanandaj is considerable, and due to its relationship with factors such as general health disorders (physical and mental), policies such as paying more attention to the economic status and easy access to food and empowering the elderly in the community are recommended.

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