

Original Paper

Malnutrition and Its Relation to General Health and Multimorbidity in the Older People



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Citation Papi S, Karimi Z, Zilaei M, Shahry P. Malnutrition and Its Relation to General Health and Multimorbidity in the Older People. *J Holist Nurs Midwifery*. 2019; 29(4):228-235. <https://doi.org/10.32598/JHNM.29.4.228>

Running Title Malnutrition in the Older People

doi <https://doi.org/10.32598/JHNM.29.4.228>



Article info:

Received: 04/07/2019

Accepted: 10/08/2019

Available Online: 01/10/2019

Keywords:

Nursing home, Nutritional status, Aging, General health

ABSTRACT

Introduction: Nutrition is one of the essential determinants of health in the elderly so that in older age, malnutrition and chronic diseases become prevalent, and one leads to another and vice versa.

Objective: This study aimed to investigate the prevalence of malnutrition and its association with general health and multimorbidity among older people living in nursing homes in Ahvaz City in 2016.

Materials and Methods: This analytical cross-sectional study was conducted on 184 older people living in nursing homes located in Ahvaz. The participants were assessed using a demographic form, mini nutritional assessment tool, and the 12-item general health questionnaire. The collected data were analyzed in SPSS V. 18 using descriptive statistics as well as the Spearman correlation coefficient, independent t-test, and one way ANOVA.

Results: Of 184 participants, (66.2%) were female and (33.8%) male with a Mean±SD age of 68.9±7.8 year. Also, (19.2%) had malnutrition, (52.17%) risks of developing malnutrition, (28.8%) normal nutritional state, and (99.26%) undesirable general health status. There was no statistically significant relationship between their general health and nutritional status. About (35%) of the elderly had 3 or more diseases, where their most common disease was depression. Based on the results, their nutritional state had a significant correlation with multimorbidity ($r=0.92$, $P=0.02$) and between high-protein food intake and skin problems ($r=0.71$, $P<0.001$).

Conclusion: Regarding the undesirable nutritional status and the low level of general health in the elderly, nutritional, and psychological interventions for this group seems necessary.

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Highlights

- Malnutrition is one of the most common problems of older people.
- Most of the elderly under study had poor nutritional status.
- The general health status of the elderly under study was poor.
- There is a significant relationship between nutritional status and multimorbidity in older people.
- There is no significant relationship between nutritional status and general health in older people.

Plain Language Summary

Increasing growth of the aging population can be a significant issue for countries and governments, as with this increase, society will face the challenges and issues related to the aging population. Malnutrition is one of these common problems, which is also prevalent among residents of nursing homes. Also, older people suffer from one or more diseases at the same time that affects their quality of life. According to studies, general health status is also undesirable in the aging period. This study was conducted to evaluate the association of nutritional status with general health and multimorbidity among older people living in nursing homes in Ahvaz City. The findings showed that their nutritional status and general health was undesirable and unfortunate, and depression was the most frequent disease in this population. Nutritional status had a significant relationship with multimorbidity, but not with general health. It is suggested that proper interventions be conducted to improve nutritional status in nursing homes and control the factors that affect it, such as disease, and the caregivers should receive the necessary education in this area.

Introduction

Malnutrition is usually defined as a faulty or bad nutritional status, which has adverse effects on the health and the quality of life of the older people [1]. In addition, it imposes a high cost on health care systems [2]. Malnutrition is an essential component of geriatric care [1]. Older people are vulnerable to malnutrition, and it is one of the common problems in this age group [3, 4]. Its prevalence in healthy older people is (5-10%), in older patients (30-60%), and in older people living in nursing homes (2-74%) depending on the assessment method [4]. In Iran, the prevalence of malnutrition has been reported (9.2%) among older people living independently and (26.1%) among those living in nursing homes [5]. Recent studies have identified several predisposing factors for malnutrition in older people, including demographic characteristics, economic conditions, diet, appetite, disease, social factors, and healthy behaviors [1, 6]. Inadequate nutritional status predisposes older people to develop diseases such as osteoporosis, diabetes, cardiovascular disease, and high blood pressure and incur higher health costs [7].

On the other hand, these people usually suffer from one or more diseases at the same time, and recent studies have reported the prevalence of multimorbidity in the elderly as (56-67%) [8-10]. Malnutrition is crucial both for the health system and for the patient as it reduces the quality of life, causes longer stay in hospital and higher costs and mortality rate [11, 12]. The presence of various diseases in older people and their poor general health status are effective and predictors of malnutrition [13-15]. According to studies conducted in Iran, the general health status of older people is moderate or undesirable. One study reported that (61.7%) of them had a poor health status [16]. Despite the growth of the elderly population in Iran and change in the population pyramid, less attention has been paid to the general health status of older people as a vulnerable group [17].

Regarding what was discussed, the study of nutritional status in older people living in nursing homes in order to identify general problems and factors associated with their malnutrition can enrich our knowledge about the aging and its threatening factors. On the other hand, providing health and identifying the needs of the elderly requires a comprehensive and accurate understanding of their health status. Furthermore, considering the ag-

ing of the population in the future, the prevalence of malnutrition among older people, and particularly in nursing homes, it is crucial to pay more attention to this issue [5]. By studying the relationship between nutritional status, general health, and multimorbidity, it is possible to design interventions to influence factors associated with malnutrition and thus reduce its prevalence. A few studies have evaluated the prevalence of malnutrition concerning general health and multimorbidity among older people in Iran. In this regard, this study aimed to assess this issue among older people living in nursing homes of Ahvaz City, Iran.

Materials and Methods

This is an analytical cross-sectional study. Study population consisted of all 250 older people living in 4 nursing homes in Ahvaz City, who were selected using the census method and met the inclusion criteria as follows: able to speak; informed consent to participate in the study; age >60 years; no Alzheimer disease, memory impairment, or dementia (according to the medical records); and not participating in other studies. The exclusion criterion was their unwillingness to continue the study. Based on these criteria, 184 older people were entered into the study.

To consider ethical principles, the objectives of the study were explained to the participants, and they were ensured about the confidentiality of their information. They signed a written informed consent form and were free to leave the study at any time.

The data collection tools were a demographic form, Mini Nutritional Assessment (MNA), and the General Health Questionnaire (GHQ). They were completed by the researcher through the interview with participants. The MNA is a simple, low-cost, non-invasive method that can be performed at the bedside. It is a useful screening tool for diagnosing malnutrition and the risk of malnutrition in the elderly. It consists of 18 items and anthropometric indicators to rank the subjects at three levels of malnourished (total score <17), at risk of malnutrition (total scores of 17-23.5), and normal nutritional status (total scores of 24-30) [18].

The MNA questions are divided into four categories of anthropometric indices, general condition, eating patterns, and self-perceived nutrition/health. The surveyed information is about declined food intake, weight loss greater than 3 kg, mobility, bound to bed or chair, psychological stress, neuropsychological problems, Body Mass Index (BMI), inability to live independently,

taking more than three prescription drugs, having pressure sores or skin ulcers, number of full meals per day, high-protein food intake, consumption of fruits and vegetables, amount of liquids consumed daily, inability to self-feed, self-feeding with difficulty, self-perception of nutritional status, self-perception of health status, Mid-Arm Circumference (MAC), and Calf Circumference (CC) [19, 20]. In the present study, the Cronbach alpha coefficient for MNA was obtained at 0.83.

The GHQ has 12 items, 6 positive and 6 negative ones. The items are rated on a 4-point scale from "never" to "always". There are two scoring styles for this questionnaire, bimodal (0-0-1-1) and Rating-type (0-1-2-3) method. We used the bimodal scoring method. The score >3.7 shows undesirable general health [21-23].

The demographic form collected the information on gender, age, weight, height, and body mass index and history of diseases. Based on BMI, the participants were divided into four groups of lean (BMI <20), normal (BMI=20-26), overweight (BMI=26-30), and obese (BMI >30) [24]. History of diseases was examined using their medical records.

The body weight was measured by two trained individuals using a digital scale (SECA model), while the participants were with light clothing and no shoes; for the body height measurement, an inelastic stadiometer with an accuracy of 0.5cm was used. Mid-arm circumference and calf circumference of participants were also measured. Moreover, BMI was estimated by dividing the weight in kilograms by the height in meters squared. The collected data were analyzed in SPSS V. 22. The Kolmogorov-Smirnov test was used to investigate the normal distribution of the study variables. Descriptive statistics and Spearman correlation coefficient, independent t-test, and one way ANOVA were used for analyzing data. The significance level was set as P=0.05.

Results

Of 184 participants, 113(66.2%) were female and 71 (33.8%) male. Their Mean±SD age was 68.9±7.8 year. The Mean±SD MNA score was reported 20.9±2.7 in men and 20.9±3.6 in women, and based on t-test results, and there was no significant difference between groups. About (19.2%) had malnutrition (Mean±SD= 15.1±1.20), (52.17%) were at risk of developing malnutrition (Mean±SD=20.4±1.9), and (28.8%) had normal nutritional state (Mean±SD=24.7±9). Table 1 presents the nutritional status of the participants based on gender.

The MNA scores showed that (86.2%) of the participants were taking more than three prescription drugs; (26.4%) suffered from psychological stress or acute disease in the past three months; (58.5%) considered their health status worse than others, and (29.2%) did not know about it. Also, (20.8%) had pressure sores or skin ulcers; (40%) were bed- or chair-bound; (20%) had self-perception of being malnourished, and (41.5%) were uncertain of their nutritional state. None of them had weight loss greater than three kg during the last three months. About (32.2%) had neuropsychological problems, and (19.2%) had one full meal per day. Around (30%) had fruits and vegetables less than two times per day, and (29.2%) drank liquids less than three cups per day. Of them, (37.7%) were unable to eat without assistance, and (30.8%) had reduced food intake due to loss of appetite.

To examine the correlation between variables, the Spearman correlation test was carried out. The results showed that MNA score had a significant correlation with reduced food intake ($r=0.56, P=0.001$), mobility ($r=0.60, P=0.001$), BMI ($r=0.43, P=0.001$), and neuropsychological problems ($r=0.37, P=0.001$). Moreover, there was a significant relationship between BMI and inability to live independently ($r=-0.24, P=0.006$), also between BMI and MAC ($r=0.48, P=0.001$), and between high-protein food intake and CC ($r=0.26, P=0.003$) and between high-protein food intake and skin problems

($r=0.71, P<0.001$). Regarding multimorbidity status, (5%) had no disease, (24%) one disease, (36%) two diseases, and (35%) three or more and. Among the diseases that subjects were suffering from, depression was the most common disease (62.8%) followed by cardiovascular disease (47%) and joint pain (44.6%). The Mean±SD of nutritional state in subjects with depression was 20.44 ± 3.37 and in non-depressed ones, it was 21.79 ± 3.07 indicating the poorer nutritional status of the elderly with depression ($P=0.02$). Comparing the nutritional status with the type of disease showed no significant relationship between them.

The Mean±SD GHQ score was reported 9.26 ± 1.7 ranging from 0-12. A total of 182 (99.26%) samples had undesirable general health status (GHQ score >3.5). There was no statistically significant relationship between general health and malnutrition. The comparison of general health status based on BMI showed that the most favorable general health status was related to the elderly group with normal BMI, and other BMI groups had a lower general health status ($P=0.01$). In comparing the relationship between multimorbidity and BMI, it was found that with the increase in BMI, the multimorbidity level increased; however, the mean difference was not statistically significant (Table 2).

Regarding the association between general health and multimorbidity, the results revealed a significant

Table 1. Nutritional status of the study participants

Nutritional Status	N(%)		Total
	Women	Men	
Malnourished	23(20.35)	12(16.9)	35(19.2)
At risk of malnutrition	52(46.01)	44(61.97)	96(52.17)
Normal nutritional status	38(33.62)	15(21.12)	53(28.8)
Total	113(61.41)	71(38.58)	184(100)

Table 2. Comparing general health and multimorbidity concerning BMI

Variable	BMI				Sig.*
	Mean±SD				
	Lean	Normal	Overweight	Obese	
General health	9.71±1.88	8.26±2.17	9.38±1.35	9.48±1.53	0.01
Multimorbidity	2.71±1.25	3.3±1.99	3.96±1.98	3.35±1.89	0.37

*ANOVA test

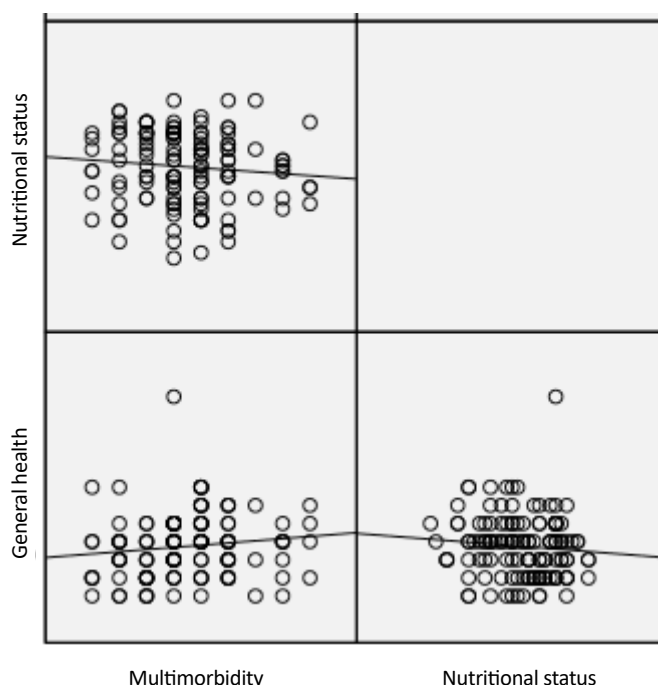


Figure 1. Scatter plot of study variables

positive association ($r=0.92$, $P=0.02$). Considering that higher scores represent lower general health level, with the increase in multimorbidity, the general health score increased, and as a result, the general health condition became more unfavorable. The correlation of nutritional status with multimorbidity and general health was not statistically significant. **Figure 1** presents the scatter plot of study variables.

Discussion

The study showed that a high percentage of older people living in nursing homes were malnourished or at risk of malnutrition. The health status of the residents was undesirable, too, and more than two-thirds of them had three or more diseases. These results are consistent with the results of Konda et al. in India [18]. In their study, (9.1%) of the samples were malnourished, and (32.5%) were at risk of malnutrition. The difference in the prevalence rate between ours and their study may be related to the difference in the study area. Moreover, their study was conducted on older people in the general population, while our study was conducted on the elderly residents of nursing homes. Shivraj et al. also reported the undesirable nutritional status of older people in their research [25].

Based on the findings of this study, the undesirable nutritional status in the elderly residents of nursing homes was high and considerable. Comparing the nutritional

status of older people living in their own houses with that of the elderly living in nursing homes, various studies have shown that malnutrition in the elderly residents of nursing homes is more prevalent than in those living with their families [15, 26]. In this case, it can be said that nutritional status in the elderly is affected by various cultural, social, economic, and health conditions. On the other hand, the high prevalence of malnutrition among the elderly living in nursing homes can be due to social deprivations and loneliness [27]. Other factors can also be involved, including the type of food, limitation in doing delicate tasks such as grasping a spoon, concurrent use of medications, and food composition [28]. Because of this inability and the need for care or assistance, a high prevalence of malnutrition among older residents is not surprising [4].

Regarding the undesirable general health status of the elderly in our study, it is in agreement with the results of Maghsoudi and associates [16]. This finding can be explained by older people's residing in the nursing home care, that changes their past social relationships losing their support previously received from the family [29]. This change may result in a reduction in their general health in various dimensions.

In our study, more than one-third of the samples had three or more diseases, most commonly depression, cardiovascular disease, and joint pain. The study results indicate that the prevalence of multimorbidity

among older people is (20-60%) [12, 30, 31]. However, our result is consistent with the results of Doumit and Nasser and Pilania et al. The high prevalence of depression among the elderly, especially those living in nursing homes, can be due to loneliness and separation from the family [32, 33].

Our results also showed no significant relationship between nutritional status and general health of the elderly residents, and with the increase of nutritional status score, their general health score decreased. According to the scoring style of GHQ questionnaire, lower scores indicate a better level of general health [21]. Thus, any improvement in nutritional status will improve the general health level of older people. Possibly, the non-significant relationship between these two variables may be due to the low sample size of the study. Therefore, it is recommended to use a larger sample size in future studies. In the present study, a significant positive relationship was found between general health and multimorbidity. The presence of various diseases in the elderly influences cognitive functions, causes depression, and reduces mobility in them, and thus lowers their general health [34-36]. Since with the increase of age, the risk of chronic diseases in the elderly increases, it is necessary to pay attention to the supportive factors and other underlying variables to empower them so that their general health be promoted.

Among the various diseases reported by the elderly in our study, depression was significantly associated with the MNA score, which is consistent with the results of Otte [37]. Cognitive impairments in older people seem to affect their functional status and physical activity, which cause reduced food intake and loss of appetite. Bailly et al. stated that physical, psychological, and social factors such as living alone, low social and economic status, the individual's view of health, and disability affect depression, which in turn decline the nutritional status of the elderly [38].

In our study, we found a significant positive correlation between the MNA score and BMI of the elderly, which is in agreement with the results of Soini and Routasalo [39]. The general health of the participants was also significantly correlated with BMI. The BMI of women was higher than that of men. Meenu et al. also reported a higher BMI in women [40]. Naturally, body fat in women is more than men, and women are less involved in physical mobility, which increase the likelihood of women's being overweight and obese.

One of the limitations of this study was the non-generalizability of the results to the all Iranian aging population. Given the high prevalence of poor nutritional status and general health in the elderly living in nursing homes, it seems that, in addition to dietary interventions for this group, it is essential to provide the necessary facilities for their social and economic support and training the nursing staff of elderly care centers. The high prevalence of depression among residents of nursing homes and its relationship with nutritional status is noticeable, too. In this regard, it is recommended that other interventional studies, the presence of psychologists in nursing homes, educating caregivers, controlling the causes of depression and considering other psychological aspects of life in nursing homes be conducted and taken into account.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Research Ethics Committee of Ahvaz University of Medical Sciences (Code: IR.AJUMS.REC.1394.508).

Funding

The Deputy for Research of Ahvaz University of Medical Sciences financial supported this study with the registered project No. SDH-9416.

Authors contributions

Conceptualization, proposal: Shahab Papi, Marzie Zilaei, Parvin Shahry; Investigation, Writing-original draft: Parvin Shahry, Shahab Papi, Marzie Zilaei, Marzie Zilaei.

Conflict of interest

The authors declared no conflict of interests.

Acknowledgements

The authors would like to thank the management and elderly residents of study nursing homes for their valuable cooperation.

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