ORIGINAL ARTICLE

ASSESSING THE NUTRITIONAL STATUS OF COMMUNITY-DWELLING ELDERLY REGISTERED WITH FAMILY MEDICINE CENTERS

Turkish Journal of Geriatrics
DOI: 10.29400/tjgeri.2023.368
2023; 26(4):404-412

Esranur YAYIN [1]
Hasan Esad YAYIN[2]

Abstract

Introduction: Malnutrition is a serious health problem that threatens the health of individuals, with a prevalence rate of 5–15% among community-dwelling elderly people. This study aimed to assess the prevalence of malnutrition among community-dwelling elderly people in primary care using the Mini Nutritional Assessment test and to analyse its relationship with sociodemographic characteristics and geriatric syndromes.

Materials and Method: Data of 248 out of 826 elderly patients registered at family medicine centers were analyzed. Malnutrition was assessed using the Mini Nutritional Assessment test, and sociodemographic characteristics and geriatric syndromes were assessed using an interviewer-administered questionnaire.

Results: This study included 248 participants aged 72.51±5.85 years, 50.4% (n=125) of whom were males. The Mini Nutritional Assessment results showed that 85.9% (n=213) had a normal nutritional status and 14.1% (n=35) were malnourished or at risk of malnutrition. Malnutrition was statistically significantly associated with income status (p =0.003), body mass index (p =0.002), hearing and vision loss (p =0.011; p ≤0.049, respectively), history of falls (p =0.001), oral health (p =0.001), and polypharmacy (p =0.010).

Conclusion: Malnutrition rates are low among community-based elderly individuals in family medicine centers. To prevent malnutrition and its related diseases, family medicine physicians play an important role in facilitating early screening, and thus minimizing the risk of increased malnutrition rates increase and irreversible damage. So Mini Nutritional Assessment should be applied at primary health care.

Keywords: Malnutrition; Aged; Primary Health Care.

CORRESPONDANCE

[1]Esranur YAYIN

Phone : +905355717777
e-mail : esranuryayin@gmail.com

Received : Oct 30, 2023
Accepted : Dec 07, 2023

[1] Baglar Family Health Center, Family Medicine, Tokat, Turkey

[2] Artova Family Health Center, Family Medicine, Tokat, Turkey

INTRODUCTION

Malnutrition in elderly is a nutritional concern; it is exacerbated by increasing obesity rates, leading to health decline, reduced quality of life, diminished functionality, increased health costs, and prolonged hospitalization. Significant improvements in cognitive and physical functions and health-related quality of life have been observed when malnutrition is identified early and effectively treated, underscoring the importance of addressing malnutrition and its risk in community-dwelling elderly (1). Malnutrition is a condition in which body structure and function are adversely affected by impaired nutrient utilization due to inadequate or excessive intake of energy and essential nutrients (e.g., proteins, carbohydrates, vitamins, minerals). Malnutrition is a serious health problem that threatens the health of individuals, and previous studies have reported a rate of 5–15% among community-dwelling elderly people, approximately 40% among hospitalized elderly, and an increase to 85% among those in nursing homes (2,3). Geriatric syndromes are in a vicious cycle of malnutrition, and malnutrition and its risk should be detected early to break this cycle (4). The European Society of Clinical Nutrition and Metabolism (ESPEN) recommends the Mini Nutritional Assessment (MNA) test to detect malnutrition and its risk. The MNA has been reported to detect prevalence rates of 2% and 24% for malnutrition and its risk, respectively (5). Moreover, Sarıkaya et al. showed that the MNA test could be used in Turkish older adults. In addition, the sensitivity and specificity have been reported as 92% and 86% for the MNA, respectively, and 94% and 81% for its short-form (MNA-SF), respectively (6). This study aimed to assess the prevalence of malnutrition among community-dwelling elderly people in primary care using the MNA and to analyse its relationship with sociodemographic characteristics and geriatric syndromes.

MATERIALS AND METHOD

Participants

This cross-sectional and descriptive study included 826 patients aged ≥65 years who registered at Family Health Center in two different districts and volunteered to participate in the study. Based on a power analysis with 95% reliability, 5% margin of error, and 15% prevalence, at least 159 patients were required for this study.

The patients were categorized into three age groups: young (65–74 years), old (75–84 years), and very old (≥85 years) elderly, and were evaluated by two physicians. Body mass index (BMI, kg/m^2) was calculated and categorized as normal (18.5–24 kg/m^2), overweight/pre-obesity (25–30 kg/m^2), class 1 obesity (30–34 kg/m^2), class 2 obesity (35–39 kg/m^2), and class 3 obesity/morbid obesity (> 40 kg/m^2) (7).

The MNA tests were applied to the participants, while a face-to-face interviews were was conducted using questionnaires comprising sociodemographic characteristics and geriatric syndromes. Patients who refused to participate or were diagnosed with severe psychiatric illnesses were excluded.

Data collection

The MNA-SF, which comprises six items inquiring about appetite status, weight loss, mobility, psychological stress, acute disease, and BMI, was applied first. This form had a total score of 14 points, with a score >12 indicating the absence of malnutrition, 8–11 indicating malnutrition risk, and <7 indicating the presence of malnutrition. If the MNA-SF score is 11 and below, it indicates undernutrition status and the long form of test (MNA-LF) should be performed (8). The long form of the test, which comprises 12 items assessing bed dependency, polypharmacy, number of meals, pressure sores, independent living status, type of food consumed, amount of water consumed daily, and anthropometric measurements, was determined to participants with MNA-SF score

<12 points. The MNA-LF had a total score of 30 points, with a score ≥24 indicating the absence of malnutrition, 17–24 indicating malnutrition risk, and <17 indicating the presence of malnutrition.

Oral health examinations included oral cavity hygiene (e.g., tooth brushing and tooth stones), pain in the oral cavity, presence of mouth sores, and three or more missing or decayed teeth. Patients with prosthetic teeth and no complications were considered to have good oral health.

Ethical approval statement

This study was approved by the Provincial Health Directorate and Clinical Research Ethics Committee (approval number: 23-KAEK-004). Written informed consent was obtained from all the participants.

Statistical analysis

All statistical analyses were performed using the IBM SPSS Statistics 22. In addition to descriptive statistical methods (mean, standard deviation, and frequency), the chi-square, Fisher's Exact chi-square, and Fisher–Freeman–Halton Exact chi-square tests were used to compare qualitative data. Statistical significance was set at P <0.05.

RESULTS

This study included 248 participants (125 males [50.4%] and 123 females [49.6%]). The mean age of the participants were 72.51±5.85 (65-95) years: 64.9% (young elderly), 31.5% (old elderly), and 3.6% (very old elderly). Regarding BMI, 21.4%, 45.2%, and 33.4% had normal weight, overweight, and obesity, respectively. Of those with obesity, 26.6%, 6%, and 0.8% had class 1, class 2, and class 3 (morbid) obesity. Most of the participants were married (77%), a majority (61.3%) had primary school education, and very few (8.9%) were active smokers. Out of total, 66.9% had a balanced income and expenses, while 14.9% had more expenses than income. Only a few of the participants (9.7%) were living alone, while approximately one-quarter (26.6%) with an extended family (e.g., son-daughter and grandchildren).

Hearing loss, vision loss, falls history, and fracture history were reported by 35.5%, 42.3%, 19%, and 2.6% of the participants, respectively. While 59.3% participants had good oral health, 40.7% had poor oral health, and dentures were used by 62.5% of the participants. Less than a quarter (24.6%) received help while eating and shopping, and only 4.8% of the participants had a history of hospitalization. The most common co-morbidity was hypertension (70.2%), followed by diabetes (34.3%), mental illness (22.6%), osteoporosis (10.1%), cerebrovascular disease (6%), and cancer (2.4%). Polypharmacy was present in more than half of the participants (52.8%).

Participants' responses to the MNA-SF are presented in Table 1. The MNA-SF scores ranged from 2 to 14 (mean 12.7±1.73 and median 13). The results showed that most of the participants (85.9%) had a normal nutritional status, 12.5% had a risk of malnutrition, and 1.6% had malnutrition. The MNA-LF was applied to 35 patients who scored <12 on the MNA-SF. The MNA-LF scores ranged from 10 to 25.5 (mean 20.63±3.73 and median 21.5). The results showed that most of the participants (74.3%) in the risk category of the MNA-SF were at risk of malnutrition, 14.3% had a normal nutritional status, and 11.4% were malnourished.

As shown in Table 2, no statistically significant differences were observed in nutritional status across the age group, gender, marital status, educational level, and smoking status categories (p >0.05). There was a statistically significant difference in income status and BMI classification according to nutritional status (p =0.003 and p =0.002, respectively). The rate of malnutrition in individuals with normal weight (7.5%) was significantly lower than that in those with overweight, obesity class 1, obesity class 2, and morbid obesity. Malnutrition risk rate was significantly higher in those whose

Table 1. Evaluation of MNA-SF test questions

		N (248)	%
Food intake	severe decrease	3	1.2
	moderate	35	14.1
	no decrease	210	84.7
Weight loss	> 3 kg	4	1.6
	unknown	3	1.2
	1–3 kg	29	11.7
	none	212	85.5
Mobility	bed or chair bound	1	0.4
	able to get out of bed	23	9.3
	goes out	224	90.3
Acute illness	yes	33	13.3
	no	215	86.7
Neuropsychological problems	severe dementia	9	3.6
	mild dementia	89	35.9
	none	150	60.5
Body mass index (kg/m^2)	< 19	2	0.8
	19 ≤ BMI* < 21	2	0.8
	21 ≤ BMI* < 23	24	9.7
	≥ 23	220	88.7
MNA-SF**	≥ 12	213	85.9
	8≤ Risky ≤ 11	31	12.5
	≤ 7	4	1.6
MNA-LF* (n=35)**	≥ 24	5	14.3
	17 ≤ Risky < 24	26	74.3
	< 17	4	11.4

*BMI: body mass index; **MNA-SF: short form of the mini nutritional assessment, ***MNA-LF: long form of the mini nutritional assessment

expenditures were higher than their income (18.9%) than those in those whose income was higher than their expenditures (4.4%).

Table 3 shows the nutritional status of the patients according to their health records. The rate of malnutrition risk was significantly higher in patients with hearing and vision loss (20.5% and 17.1%, respectively) than in those without hearing and vision loss (8.1% and 9.1%; respectively; p = 0.011 and p ≤0.049, respectively).

The rates of malnutrition risk and malnutrition were significantly higher in participants with a history of falls (29.8% and 6.4%, respectively) than in those without (8.5% and 0.5%, respectively; P = 0.001), with no statistically significant difference between patients with and without a history of fractures (p >0.05).

The proportion of participants with poor oral health (21.8%) was significantly higher than that of participants with good oral health (6.1%) (p =0.001).

Table 2. Evaluation of nutritional status according to demographic characteristics

		MNA-SF ≥12	8≤MNA-SF ≤11	MNA-SF ≤7	
		n (%)	n (%)	n (%)	p
Age groups	Young elderly	145 (90.1%)	14 (8.7%)	2 (1.2%)	
	Old elderly	61 (78.2%)	15 (19.2%)	2 (2.6%)	0.073*
	Very old elderly	7 (77.8%)	2 (22.2%)	0 (0%)	
BMI	Normal	38 (71.7%)	11 (20.8%)	4 (7.5%)	
	Pre-obesity	99 (88.4%)	13 (11.6%)	0 (0%)	
	Obesity class 1	62 (93.9%)	4 (6.1%)	0 (0%)	**0.002****
	Obesity class 2	13 (86.7%)	2 (13.3%)	0 (0%)	
	Morbidly obesity	1 (50%)	1 (50%)	0 (0%)	
Gender	Male	109 (87.2%)	13 (10.4%)	3 (2.4%)	0.387***
	Female	104 (84.6%)	18 (14.6%)	1 (0.8%)	
Marital status	Married	165 (86.4%)	23 (12%)	3 (1.6%)	
	Single	3 (100%)	0 (0%)	0 (0%)	0.863*
	Widow	45 (83.3%)	8 (14.8%)	1 (1.9%)	
Education	İlliterate	68 (84%)	11 (13.6%)	2 (2.5%)	
	Primary school	130 (85.5%)	20 (13.2%)	2 (1.3%)	0.798**
	High school	7 (100%)	0 (0%)	0 (0%)	
	University	8 (100%)	0 (0%)	0 (0%)	
Smoking	Yes	20 (90.9%)	1 (4.5%)	1 (4.5%)	
	No	143 (85.1%)	22 (13.1%)	3 (1.8%)	0.459*
	Quit	50 (86.2%)	8 (13.8%)	0 (0%)	
Income status	Income > exes	42 (93.3%)	2 (4.4%)	1 (2.2%)	
	Income = exes	144 (86.7%)	22 (13.3%)	0 (0%)	0.003*
	Income < exes	27 (73%)	7 (18.9%)	3 (8.1%)	
Household	Alone	21 (87.5%)	3 (12.5%)	0 (0%)	
	Nuclear family	140 (88.6%)	15 (9.5%)	3 (1.9%)	0.280*
	Extended family	52 (78.8%)	13 (19.7%)	1 (1.5%)	

*Fisher's Exact test, **Chi-square test, ***Fisher–Freeman–Halton Exact test, MNA-SF: short form of mini nutritional assessment

Table 3. Assessment of nutritional status according to health records *

		MNA-SF ≥12	8≤MNA-SF≤11	MNA-SF ≤7	
		n (%)	n (%)	n (%)	p
Deafness	Yes	68 (77.3%)	18 (20.5%)	2 (2.3%)	**0.011**
	No	145 (90.6%)	13 (8.1%)	2 (1.3%)	
Vision loss	Yes	84 (80%)	18 (17.1%)	3 (2.9%)	**0.049**
	No	129 (90.2%)	13 (9.1%)	1 (0.7%)	
Falling history	Yes	30 (63.8%)	14 (29.8%)	3 (6.4%)	**0.001**
	No	183 (91%)	17 (8.5%)	1 (0.5%)	
Fracture history	Yes	7 (77.8%)	2 (22.2%)	0 (0%)	0,414
	No	206 (86.2%)	29 (12.1%)	4 (1.7%)	
Oral health	Good	137 (93.2%)	9 (6.1%)	1 (0.7%)	**0.001**
	Bad	76 (75.2%)	22 (21.8%)	3 (3%)	
Dentures	Yes	133 (85.8%)	19 (12.3%)	3 (1.9%)	1.000
	No	80 (86%)	12 (12.9%)	1 (1.1%)	
Assistance with meals and shopping	Yes	41 (67.2%)	16 (26.2%)	4 (6.6%)	**0.001**
	No	172 (92%)	15 (8%)	0 (0%)	
Hospitalization (in last 3 months)	Yes	3 (25%)	6 (50%)	3 (25%)	**0.001**
	No	210 (89%)	25 (10.6%)	1 (0.4%)	
Diabetes	Yes	70 (82.4%)	14 (16.5%)	1 (1.2%)	0.375
	No	143 (87.7%)	17 (10.4%)	3 (1.8%)	
Hypertension	Yes	149 (85.6%)	23 (13.2%)	2 (1.1%)	0.623
	No	64 (86.5%)	8 (10.8%)	2 (2.7%)	
Hyperlipidemia	Yes	59 (85.5%)	9 (13%)	1 (1.4%)	0.930
	No	154 (86%)	22 (12.3%)	3 (1.7%)	
Cerebrovascular diseases	Yes	11 (73.3%)	3 (20%)	1 (6.7%)	0.122
	No	202 (86.7%)	28 (12%)	3 (1.3%)	
Osteoporosis	Yes	23 (92%)	2 (8%)	0 (0%)	0.837
	No	190 (85.2%)	29 (13%)	4 (1.8%)	
Cancer	Yes	3 (50%)	1 (16.7%)	2 (33.3%)	**0.001**
	No	210 (86.8%)	30 (12.4%)	2 (0.8%)	
Polypharmacy	Yes	105 (80.2%)	22 (16.8%)	4 (3.1%)	**0.010**
	No	108 (92.3%)	9 (7.7%)	0 (0%)	

* Fisher–Freeman–Halton exact test, MNA-SF: Short form of Mini Nutritional Assessment

There was no statistically significant difference in nutritional status between those with and without dentures (p>0.05).

The rates of malnutrition risks (26.2%) and malnourishment (6.6%) were significantly higher (p = 0.001) among those who received assistance during eating and shopping than among those who did not receive assistance (8%, 0%).

The rates of malnutrition risks (50%) and malnourishment (25%) were significantly higher in those with a history of hospitalization than in those without (10.6% and 0.4%, respectively; (p =0.001). The rate of malnutrition (33.3%) was significantly higher in participants with a history of cancer than in those without (0.8%; p =0.001), with no significant differences between patients with and without other chronic diseases (p >0.05).

In addition, the malnutrition risk prevalence among the elderly with polypharmacy (16.8%) were significantly higher than those without polypharmacy (7.7%; p =0.010).

DISCUSSION

Malnutrition rates in patients aged >65 years vary between 1.3% and 90% depending on the population studied (2,6,9,10). A study conducted among elderly individuals in Family Health Centers reported a malnutrition prevalence of 1.3% and a malnutrition risk prevalence of 24% (10). In our study, the prevalence of malnutrition according to the MNA-SF was 1.6%, and the rate of malnutrition risk was 12.5%. Meanwhile, the MNA-LF, which was administered to participants (n=35) who scored <12 points on the MNA-SF, showed a malnutrition rate of 11.4% and a malnutrition risk rate of 74.3%. We think that, our study included elderly individuals who were registered to our polyclinics, who did not apply due to any health problems, and who thought they were healthy, reduced the malnutrition rates.

As seen in many studies, malnutrition and malnutrition risk rates increase as studies move away from primary care (4,11,12). Moreover, these rates are high among individuals living in nursing homes or receiving home care services (9,13).

Previous studies have suggested that age is not associated with malnutrition or its risk in elderly patients (10,14). In our study, no significant difference was observed between age and nutritional status. This can be attributed to the fact that the participants comprised patients aged >65 years and that a different result may be obtained in studies wherein all age groups were evaluated together.

Bayrak et al. compared patients with normal nutritional status with those who were malnourished and at risk of malnutrition and found no significant differences in terms of income level, chronic diseases, educational level, and marital status (p >0.05) (2). In another recent study, a significant association was found between income status and malnutrition (p <0.038) (10). In our study, no significant differences were observed between nutritional status and gender as well as marital, educational, and smoking statuses among the participants (p >0.05). However, the rate of malnutrition risk in those with expenses exceeding their income (18.9%) was significantly higher than that in those with higher income than expenses (4.4%). We can say that this results are due to the fact that the elderly, who have limited purchasing power, cannot access the necessary foods for a balanced diet.

Polypharmacy may lead to decreased food consumption and malnutrition in elderly individuals (15). In our study, the rate of malnutrition risk was significantly higher in older adults with polypharmacy (16.8%) than in those without polypharmacy (7.7%; p =0.010), underscoring the necessity of addressing inappropriate drug use and implementing restrictions on drug categories that are repeatedly prescribed (16).

In addition, our findings revealed that the rate of malnutrition was significantly lower in participants with normal weight (7.5%) than in participants with overweight as well as those with obesity class

1, obesity class 2, and morbid obesity (p =0.002). However, those with obesity and low BMI have been considered to have malnutrition (17). Healthcare professionals should be aware of this issue. When assessing the nutritional status of elderly individuals, the MNA-SF and similar screening tests should be used in addition to BMI. In our study, 14.1% of elderly individuals were at risk of malnutrition, although none had a BMI <18.5 kg/m^2.

The risk of malnutrition was positively correlated with the number of geriatric syndromes. Functional dependence, multiple comorbidities, and malignancies have been associated with malnutrition (4). In our study, malnutrition risk was significantly higher in participants who required assistance with meals and shopping (p =0.001), elderly people with hearing and visual problems (p =0.011, p ≤0.049), those with a history of hospitalization in the last 3 months (p =0.001), and in those with malignancy (p =0.001).

Inadequate protein intake in malnutrition may increase the risk of falls and osteoporotic fractures due to decreased physical fitness and bone mineral density, muscle weakness, and impaired coordination (18). In another study, no significant association was found between malnutrition and fall risk and fracture occurrence (11). In our study, no significant association was observed between malnutrition and fracture occurrence; however, a significant association was observed between falls and malnutrition.

A study conducted in Japan reported that 74.1% of elderly individuals used dentures, and their nutritional status was negatively affected, as they consumed less meat and fish (19). In our study, denture use rate was 62.5%, which did not affect their nutritional status. The percentage of elderly people with dentures was lower because we categorized those who did not actively use dentures because of their dissatisfaction from poor oral hygiene when using dentures. In addition, the nutritional status of elderly people who were satisfied with their dentures may not have been affected because they had no food intake problems. However, the rate of malnutrition risk was significantly higher in individuals with poor oral health (21.8%) than in those with good oral health (6.1%; p = 0.001).

The strength of our study is that it comprehensively assessed the nutritional status of community-dwelling elderly individuals in primary care institutions. The inclusion of elderly participants who were registered at our family center, were not any symptoms were deemed healthy, rendered our study valuable. In addition, studies in the literature MNA-SF were generally used. In our study, we additionally applied the long form of the test to the patients required according to the MNA-SF results, this makes our work powerful. Nonetheless, our study has some limitations. We superficially used the calculations applied by dentists to assess the oral health of elderly individuals. There is a need for more comprehensive studies involving dentists on older adults, wherein these calculations can be assessed more professionally.

CONCLUSION

Our findings show that, among community-based elderly individuals in family medicine centers, malnutrition rates were found to be low and malnutrition risk was higher in elderly who required assistance with meals and shopping, with hearing and visual problems, with a history of hospitalization and with polypharmacy. Considering the registered elderly population of each family physician working in primary care, nutritional status assessment for this population and interventions aimed at solving problems can be effective. Family medicine polyclinics, where elderly individuals visit every three months for their chronic diseases and medications, constitute a suitable ground for malnutrition screening. Malnutrition measurement and evaluation tests are requested by family physicians in the elderly individuals' follow-up section of the Disease Management Platform (20). To prevent malnutrition and its related diseases MNA should be applied in family medicine centers.

Conflict of interest: All authors declare that they have no conflicts of interest.

REFERENCES

1. Gomez G, Botero-Rodríguez F, Misas JD, et al. A nutritionally focused program for community-living older adults resulted in improved health and well-being. Clin Nutr 2022;41(7):1549-56. (DOI: 10.1016/j.clnu.2022.05.003).
2. Bayrak F, Ersoy S, Emin P. Prevalence of malnutrition and related conditions in patients over 65 years of age admitted to Umraniye Durmus Tanis family health center. Abant Medical Journal 2021;10(1): 93-103. (DOI: 10.47493/abantmedj.2021.38).
3. Donini LM, Poggiogalle E, Molfino A, et al. Mini-nutritional assessment, malnutrition universal screening tool, and nutrition risk screening tool for the nutritional evaluation of older nursing home residents. J Am Med Dir Assoc 2016;17(10):959.e11-959.e18. (DOI: 10.1016/j.jamda.2016.06.028).
4. Saka B, Kaya O, Ozturk GB, Erten N, Karan MA. Malnutrition in the elderly and its relationship with other geriatric syndromes. Clin Nutr 2010;29(6): 745-8. (DOI: 10.1016/j.clnu.2010.04.006).
5. Guigoz Y. The mini nutritional assessment (MNA®) review of the literature-what does it tell us? J Nutr Health Aging 2006;10(6):466-87.
6. Sarikaya D, Halil M, Kuyumcu ME, et al. Mini nutritional assessment test long and short form are valid screening tools in Turkish older adults. Arch Gerontol Geriatr. 2015; 61(1), 56-60. (DOI: 10.1016/j.archger.2015.04.006)
7. Weir CB, Jan A. BMI Classification Percentile And Cut Off Points. StatPearls Publishing; 2023 [Internet]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK541070/. Accessed:27.11.2023
8. Cuervo M, García A, Ansorena D, et al. Nutritional assessment interpretation on 22 007 Spanish community-dwelling elders through the Mini Nutritional Assessment test. Public Health Nutr. 2009; 12(1), 82-90. (DOI: 10.1017/S136898000800195X).
9. Ayraler A, Akan H, Hayran O. Nutritional status of elderlies admitted to home health care service. Turkish Journal of Family Practice 2013;17(3):106-12. (DOI: 10.2399/tahd.13.36035).
10. Selcuk KT, Atan RM, Arslan S, Şahin N. Relationship between food insecurity and geriatric syndromes in older adults: A multicenter study in Turkey. Exp Gerontol 2023;172; 112054. (DOI: 10.1016/j.exger.2022.112054).
11. Ülger Z, Halil M, Kalan I, et al. Comprehensive assessment of malnutrition risk and related factors in a large group of community-dwelling older adults. Clin Nutr 2010;29(4): 507-11. (DOI:10.1016/j.clnu.2010.01.006).
12. Kuyumcu M, Yeşil Y, Oztürk Z, et al. Challenges in nutritional evaluation of hospitalized elderly; always with mini-nutritional assessment? Eur Geriatr Med 2013;4(4):231-36. (DOI: 10.1016/j.eurger.2013.01.010).
13. Çevik A, Basat O, Uçak S. Evaluation of nutritional status and its effect on biochemical parameters in elderly people admitted to home health care services. Konuralp Medical Journal 2014;6(3):31-7. (DOI: 10.18521/ktd.58144).
14. Hengstermann S, Nieczaj R, Steinhagen-Thıessen E, Schulz RJ. Which are the most efficient items of mini nutritional assessment in multimorbid patients? J Nutr 2008;12(2):117-22. (DOI: 10.1007/BF02982563).
15. Cruz-Jentoft AJ, Kiesswetter E, Drey M, Sieber CC. Nutrition, frailty, and sarcopenia. Aging Clin Exp Res 2017;29:43-8. (DOI: 10.1007/s40520-016-0709-0).
16. Yayın E, Yayın HE. Rational drug use knowledge levels of individuals aged 65 and over with multiple drug use. Turkish Journal of Family Practice 2023;27(2):29-35. (DOI: 10.54308/tahd.2023.50455).
17. Sieber CC. Malnutrition and sarcopenia. Aging Clin Exp Res 2019;31(6):793-98. (DOI: 10.1007/s40520-019-01170-1).
18. Geinoz G, Rapin CH, Rizzoli R, et al. Relationship between bone mineral density and dietary intakes in the elderly. Osteoporos Int 1993;3(5): 242-48. (DOI: 10.1007/BF01623827).
19. Su Y, Yuki M, Hirayama K, Sato M, Han T. Denture wearing and malnutrition risk among community-dwelling older adults. Nutrients 2020;12(1):151. (DOI: 10.3390/nu12010151).
20. DMP user guideline. Republic of Turkey Ministry of Health General Directorate of Public Health; 2023. [Internet]. Available from: https://hyp.saglik.gov.tr/docs/HYP-KullanimKilavuzu.pdf. Accessed: 27.11.2023