ARAŞTIRMA / RESEARCH

The Malnutrition Risk and Physical Activities in Home-Dwelling Older Adults During the COVID-19: A Cross-Sectional Study

COVID-19 Pandemisinde Evde Yaşayan Yaşlı Yetişkinlerde Malnütrisyon Riski ve Fiziksel Aktivite: Kesitsel Bir Çalışma

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Abstract

Objective: During the COVID-19 pandemic, elderly adults' nutritional habits, physical activity levels and the levels of malnutrition were affected. This study investigated the prevalence of malnutrition and physical fitness and exercise activity levels in home dwelling elderly during the COVID-19 pandemic.

Material and Method: This cross-sectional study was conducted with a face-to-face questionnaire on 670 (male: 241, female: 429) home-dwelling older adults with a mean age of 70.66±5.83 years. The nutritional screening and evaluation were performed using Mini Nutritional Assessment (MNA), and physical conditions were evaluated with Physical Fitness and Exercise Activity Levels of The Older Adults' Scale (PFES).

Results: Findings were (1) malnutrition risk was higher at both age groups (65-74 and 75-90 aged) (p=0.001), (2) marital status (p=0.025), presence of chronic illness (p=0.001), use of drugs (p=0.006) affected nutritional status, (3) health status was affected by COVID-19 pandemic (p=0.001). Nutritional status and PFES scores did not changed according to malnutrition levels (p>0.05).

Conclusion: Age, marital status, comorbidity, and use of drugs were independently associated with malnutrition in the elderly. Due to the time restrictions imposed during the COVID-19 pandemic, older adults might have had to engage in physical activity to meet their nutritional and personal needs.

Keywords: COVID-19, older adults, malnutrition, physical activity.

Öz

Amaç: COVID-19 pandemisi sırasında, yaşlıların beslenme alışkanlıkları, fiziksel aktivite düzeyleri ve malnütrisyon düzeyleri etkilenmiştir. Bu çalışmada, COVID-19 pandemisinde malnütrisyon prevalansı ile fiziksel sağlık ve egzersiz aktivite düzeylerinin evde yaşayan yaşlılar üzerindeki etkisi araştırılmıştır.

Gereç ve Yöntem: Kesitsel tipteki bu çalışma, evde yaşayan yaş ortalaması 70,66±5,83 yıl olan, 670 (erkek:241, kadın:429) yaşlı bireyin katılımıyla yüz yüze anket yöntemi kullanılarak gerçekleştirilmiştir. Bireylerin beslenme taraması ve değerlendirmesi Mini Nütrisyonel Değerlendirme (MNA) Testi kullanılarak yapılmıştır, fiziksel aktivite seviyeleri ise Yaşlı Bireylerin Fiziksel Fitnes ve Aktivite Ölçeği (PFES) ile değerlendirilmiştir.

Bulgular: (1) Her iki yaş grubunda da (65-74 ve 74-90 yaş) malnütrisyon riskinin yüksek olduğu (p=0,001), (2) medeni durum (p=0,025), kronik hastalık varlığı (p=0,001), ilaç kullanımının (p=0,006) beslenme durumunu etkilediği, (3) sağlık durumunun COVID-19 pandemisinden etkilendiği (p=0,001) saptanmıştır. Malnutrisyon düzeylerine göre beslenme durumu ve PFES skorları değişmemiştir (p>0.05).

Sonuç: Yaşlılarda yaş, medeni durum, komorbidite ve ilaç kullanımı bağımsız olarak malnütrisyon ile ilişkili bulunmuştur. COVID-19 pandemisi sırasında uygulanan saat kısıtlamaları nedeniyle yaşlı yetişkinler beslenme ve kişisel gereksinimlerini karşılamak için fiziksel aktivite yapmak zorunda kalmış olabilirler.

Anahtar kelimeler: COVID-19, yaşlı, malnütrisyon, fiziksel aktivite.

1. Introduction

Coronaviruses are a large family of viruses that usually cause mild to moderate upper respiratory tract illnesses. Seven types of human coronavirus are known. Three of them, Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), Middle East Respiratory Syndrome-Coronavirus (MERS-CoV), and Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), may cause more serious, even fatal diseases [1, 2]. The most recent coronavirus is named SARS CoV-2, which causes Coronavirus disease 2019 (COVID-19). COVID-19 is a respiratory disease triggered by the novel SARS-CoV-2 that has achieved global pandemic status over two years. This disease may cause mild to severe illness or death [3, 4]. The etiology and pathogenesis of SARS CoV-2 are not known. It has been reported that host cell entry is mediated by angiotensin-converting enzyme 2 (ACE2) [5], a protein expressed in human airway epithelia as well as lung parenchyma [6]. As a result, SARS CoV 2 is mainly transmitted through respiratory droplets and direct contact, making it highly contagious [7].

Among the most robust consensus related to the COVID-19 disease is that older people are the most vulnerable group within the population. Globally, life expectancy is getting longer; therefore, by 2050, the world population aged 60 years and older is expected to be totally two billion. Today, 125 million people are aged 80 years and older. Although COVID-19 influences all age groups, vigorous pathology, and mortality are highest in the older adults [8]. In our country, older adults were 7 million 953 thousand 555 people, and the proportion of the elderly population increased to 9.5% in 2020. According to the projections, it was predicted that the proportion of the older adults within the population would be 11% in 2025, 12.9% in 2030 [9].

The best advice for preventing the spread of the COVID-19 is staying at home and self-isolation [11]. The restrictions applied in our daily life due to the COVID-19 pandemic, have affected individuals' nutritional and eating habits, physical activity status, and social lives. COVID-19 has changed older adults' daily routines and dietary habits. Consumption of unhealthy diets during the COVID-19 pandemic has a negative impact on susceptibility to COVID-19 and recovery [8]. COVID-19 pandemic has significantly reduced social and physical activity, especially in the older adults [10]. In this age group, regular physical activity is correlated with a positive effect on psychological problems, like anxiety and depression, and metabolic diseases, like osteoporosis, sarcopenia, and metabolic syndrome [10]. Staying at home for a prolonged period may cause weight gain and induce social isolation [12].

Older adults were negatively affected due to the difficulties in reaching food due to the curfew [13]. Limited access and restrictions to markets and some economic problems to daily grocery shopping from supermarkets may reduce the consumption of fruits and vegetables in favour of highly processed ones and compromise maintaining a healthy and varied diet [14].

Reduced outdoor time and increased screen time were associated with higher adoption of unhealthy nutrition and sedentary behaviours, and these habits may have unintended medium- and long-term health repercussions. Reduced physical activity as a result of home isolation may have a variety of harmful cardio-metabolic and mental consequences in older adults. Lifestyle choices, such as dietary alterations, physical activity restrictions, and the impact of increasing indoor and screen time, are still understudied [12]. As a result, older adults are more prone than others to be affected by contemporary circumstances and constraints, perhaps experiencing lockdown and its emotional and physical health implications [15].

Therefore, this research aimed to evaluate the risk of malnutrition prevalence and changes in the nutritional habits, health, nutritional risks, and physical activity status of home dwelling older adults during the COVID 19. We hypothesized that: 1) the prevalence of malnutrition among older adults are high during COVID 19 pandemic, and 2) malnourished older adults have lower physical activity level, and 3) malnutrition is affected by physical fitness and activity level.

2. Materials and Methods

2.1. Study design and selection of participants

We conducted this cross-sectional study on 670 participants over 65 years. Data were collected by face-to-face survey between 15 February and 10 August 2021. This specific period was selected because it was the peak of the pandemic's "second wave" in our country (i.e., the period when, for the first time, the pandemic reached a peak in cases and deaths). We included individuals aged 65 years and older who have given informed consent.

The last variable, old age, was categorized into three subgroups as "younger old" (ages 65-75), "older-old" (ages 75 85), and "oldest old" (ages 85+) [16, 17]. There were only twenty-three older adults over 85 years; to maintain data quality, we divided them into two age subgroups.

The participants were selected by using simple random sampling method among home dwelling older adults population. We used the G-power software to calculate sample size (N) and power. The sample size was calculated based on the prevalence of malnutrition found in a relevant previous study, 5.8% [18], with a precision of 0.05 and a confidence level of 95% [19]. Demographic characteristics were collected, including age, gender, marital status, chronic illness, use of drugs, and general health information. "How was your nutritional status/health before the pandemic?" and "How is your nutritional/health status during the pandemic?" were asked to participants in order to evaluate their nutritional and health status before and during the pandemic period.

2.1.1. Mini Nutritional Assessment (MNA)

Mini Nutritional Assessment (MNA) is the most widely used and recommended research method for assessing malnutrition in the older adults. It has been specifically designed and adapted for the older adult population [20-22]. The full MNA form is composed of eighteen questions and four categories: anthropometric measurements (four questions), global assessment (six questions), dietary questions (six questions), and self-perception of health and nutrition (two questions). Individual questions have weighted scores. The full scale ranges from 0 to 30 and is interpreted as follows: well-nourished (>24 points), at risk of malnutrition (17-23.5 points), and malnourished (<17 points) [23].

Qualified healthcare professionals took anthropometric measurements such as body weight, height, calf, and mid upper arm circumferences and evaluated according to the World Health Organization (WHO) guidelines [24]. Body mass index equation [BMI=body weight (kg)/height^2 (m^2)] was used to estimate weight status including underweight (<23 kg/m^2), normal/overweight (23-29 kg/m^2), and obese (≥30 kg/m^2) [25].

2.1.2. Physical Fitness and Exercise Activity Levels of Older Adults Scale (PFES)

Physical Fitness and Exercise Activity Levels of Older Adults Scale (PFES)-Turkish version has 34-item with four subscales including physical fitness, perceived barriers, perceived motivations, and exercise frequency. The physical fitness subscale includes eight items, with minimum and maximum possible scores of 8 and 32. A higher score shows a lower physical fitness level; the perceived barriers subscale comprises ten items, with minimum and maximum possible scores of 10 and 40, respectively. A higher score indicates a higher number of perceived barriers; the perceived motivators subscale comprises eight items, with minimum and maximum possible scores of 8 and 32, respectively. A higher score shows fewer perceived motivators; the exercise frequency subscale includes eight items, with minimum and maximum possible scores of 7 and 28, respectively. The physical fitness perceived barriers and perceived motivators subscales are rated using a four-point Likert scale (1 = Strongly Agree, 2 = Agree, 3 = Disagree, 4 = Strongly Disagree). Exercise frequency subscales are ranked on a four-point Likert scale (1 = Never, 2 = Once a week, 3 = 2-3 times a week, 4 = Daily). Exercise frequency reveals how often the older adults participated in physical activities [26].

2.2. Statistical Analysis

All continuous data were tested using the Shapiro-Wilk test against a normal distribution [27]. Non normal distribution variables given as median; normal data were shown as mean (±SD). Comparisons of non-normally distributed continuous variables among the groups were performed using the Mann Whitney U test and Kruskal Wallis test. The chi-square test was used for comparisons of non-continuous variables. A p-value <0.05 was considered statistically significant. The data were analysed using SPSS 25 (IBM Corp).

3. Results

In this cross-sectional study, the mean age of older adults was found to be 70.66±5.83 years. Among 670 participants, 241 older adults were male, and 429 were female (36% and 64%). The mean age of older male adults was 70.64±5.2 years and 70.67±6.17 years for older female adults. Most of the participants were in the age range between 65 and 74 years (78.6%). Malnutrition prevalence were observed of 3.4% and a malnutrition risk of 59.5%.

Table 1 shows the distribution of socio-demographic characteristics of the older adults by nutritional status. The median age of malnourished older adults was higher than well-nourished and at risk of malnutrition older adults (p=0.008). The percentage of malnutrition risk was higher at both age groups (65-74 and 75-90 aged) and married older adults according to the MNA (p=0.001 and p=0.025, respectively).

The ratio of malnourished, at risk of malnutrition, and well-nourished older adults who had a chronic illness and used drugs were higher, and the difference was statistically significant (p=0.001 and p=0.006, respectively). Body mass index (BMI) values statistically significantly differed between older adults with malnourished, at risk of malnutrition, and well-nourished older adults (p=0.003).

As seen in Figure 1-B, health status significantly differed before and during the pandemic in older adults (p=0.001). However, in Figure 1-A, nutritional status was not varied before and during the pandemic in older adults (p=0.121). While the COVID-19 pandemic affected older adults' health status, their nutritional status was not altered significantly.

In Figure 2, total PFES and subgroups scores are seen. Higher scores represent lower physical fitness and exercise activity levels, and scores on the motivators subscale were good, while exercise frequency was high during the COVID-19 pandemic.

In the present study, the total scores of the older adults obtained from the PFES scale were moderate (73.65±10.45). They had moderate barriers (16.86±4.77), higher motivators (11.89±2.62), moderate physical fitness (18.15±5.71), and high exercise frequency (26.74±6.1) (Figure 2).

The MNA and PFES items according to different nutritional status are seen in Table 2. The prevalence of malnutrition was 10.5% in the home-dwelling older adults by MNA (Data not shown). Screening, evaluation, and total scores significantly differed between malnourished, at the risk of malnutrition, and well-nourished older adults (p=0.001). However, PFES total and subgroup scores are not statistically differed between older adults who have malnutrition, at the risk of malnutrition, and normal nutrition (p>0.05).

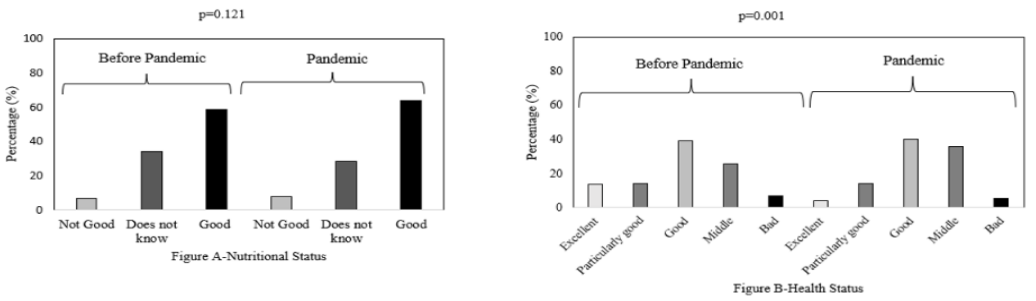

Figure 1 (A-B): Before pandemic and during pandemic nutritional status and health status

Table 1. Demographic Characteristics of Older Adults According to Nutritional Status

Demographic Characteristics	n	Malnourished (n=23)	At risk of malnutrition (n=399)	Well-nourished (n=248)	*p* value
Age (median, [IQR])	670	75.00, [11][a]	69.00, [8][b]	69.00, [7][b]	0.008‡
Age Group n (%)	670				
65-74	527	11 (2.1%)	314 (59.6%)	202 (38.3%)	0.001†
75-90	143	12 (8.4%)	85 (59.4%)	46 (32.2%)	
Marital Status n (%)	670				
Married	509	12 (2.4%)	306 (60.1%)	191 (37.5%)	0.025†
Single	161	11 (6.8%)	93 (57.8%)	57 (35.4%)	
Chronic İllness n (%)	670				
No	137	1 (0.7%)	66 (48.2%)	70 (51.1%)	0.001†
Yes	533	22 (4.1%)	333 (62.5%)	178 (33.4%)	
Drug Use n (%)	670				
No	189	2 (1.1%)	102 (54.0%)	85 (45.0%)	0.006†
Yes	481	21 (4.4%)	297 (61.7%)	163 (33.9%)	
Body weight (kg) (median, [IQR])	670	68.00 (30.00)[a]	73.00 (15.00)[a,b]	75.00 (13.00)[b]	0.028‡
Height (cm) (median, [IQR])	670	167.00 (14.00)	161.00 (10.00)	163.00 (13.00)	0.073‡
BMI (kg/m^2) (median, [IQR])	670	22.86 (8.86)[a]	27.34 (6.46)[b]	27.27 (4.85)[c]	0.003‡
<23 Underweight	91	19.55 (3.57)	21.95 (1.63)	21.83 (2.37)	0.169†
23-29.9 Normal/overweight	380	27.96 (5.49)	28.40 (5.52)	28.30 (4.80)	0.734†
>30 obese	199	33.27 (9.27)	32.69 (3.72)	32.46 (2.49)	0.874†

IQR: Interquartile range; ‡Kruskal Wallis Analysis (p<0.05); †Multiple Chi-Square Test (p<0.05); Numbers followed by different lower-case letters are statistically different p < 0.05 (Mann Whitney U test).

Table 2. Comparison of MNA and PFES Scores According to Nutritional Status

MNA characteristics, Median [IQR]	Malnourished n=23	At risk of malnutrition n=399	Well-nourished n=248	p-value[a]
MNA Items				
Screening	8.00±2.00[a]	12.00 ±1.00[b]	14.00±1.00[c]	0.001
Evaluation	6.50±2.50[a]	10.00±2.00[b]	12.00±1.50[c]	0.001
MNA Full Score	15.50±2.50[a]	21.50±2.50[b]	25.00±1.50[c]	0.001
PFES				
Factor 1: Motivators	12.00±4.00	12.00±3.00	12.00±3.00	0.754
Factor 2: Barriers	17.00±6.00	17.00±6.00	17.00±5.75	0.842
Factor 3: Physical fitness	17.00±10.00	18.00±8.00	17.00±8.00	0.978
Factor 4: Exercise frequency	27.00±10.00	27.00±8.00	25.00±8.00	0.256
Total PFES	75.00±14.00	75.00±9.00	73.00±8.75	0.315

MNA: Mini Nutritional Assessment; PFES: Physical Fitness and Exercise Activity Levels of The Older Adults' Scale; [a]Kruskal Wallis Analysis, p<0.05; Numbers followed by different lower-case letters are statistically different p < 0.05 (Mann Whitney U test).

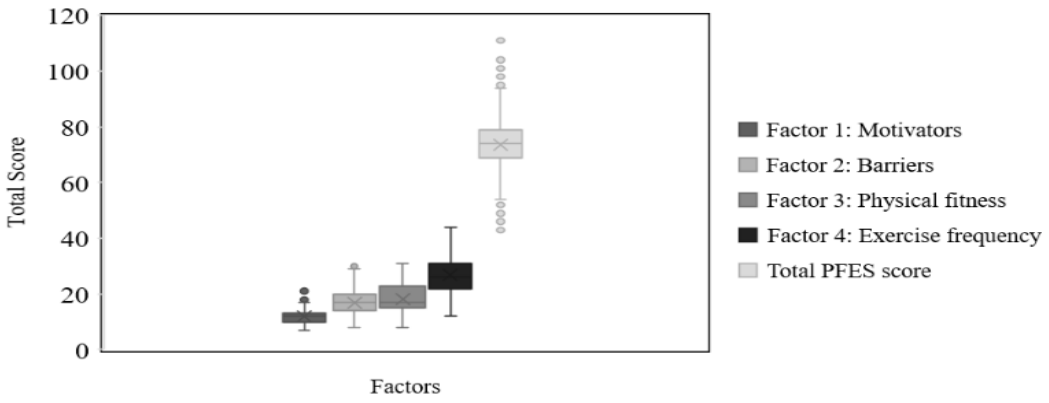

Figure 2. Physical Fitness and Exercise Activity Levels of Older Adults Scale (PFES)

4. Discussion

The major findings of this study were (1) malnutrition risk was higher at both age groups (65-74 and 75- 90 aged) (p=0.001), (2) marital status, presence of chronic illness, use of drug affected malnutrition status, (3) during COVID-19 pandemic while health status was affected, nutritional status and PFES were not.

The age-wise prevalence of malnutrition is shown in Table 1. According to Turkish Statistical Institution data for 2020, 63.8% of the older adults' population is between 65-74 years of age. Similarly, in our study, most of the older adults were in this group [28]. In the age of 65-74 years, well-nourished and at risk of malnutrition were higher; however, in the 75-90 years age group, malnourished older adults were higher. In Turkey, life expectancy for men and women is 76.4 and 80.7 years, respectively [29]. In this study, the participants' age distribution findings were similar to Turkey's population projection.

MNA is an appropriate screening and assessment tool for the older adults [30]. We found that 3.4% of the older adults were malnourished while 59.5% were at risk of malnutrition. Community-dwelling older adults' malnutrition prevalence was 2-8%, and the malnutrition risk ranged between 24-36% [31]. In our study, the percentage of malnutrition and the malnutrition risk occur parallel with the previous research in the literature [18]. However, some studies did not have similar outcomes because of the characteristic differences (inpatient clinics, rural provinces, and low income) [32, 33]. It is inappropriate to generalize about Turkey, as the study was conducted in two regions, Antalya and Izmir, with a higher gross domestic product (GDP) per capita than Turkey's average GDP per capita [34].

The BMI values for older adults in the range of 23.0 to 29.9 kg/m^2 are associated with optimal longevity [25, 35, 36]. In our study, most of the older adults (n=380) had BMI within this range. A meta-analysis by Winter et al. [36] indicated that, within the "normal BMI" category of 18-24.9 kg/m^2, mortality was lower at a BMI ≥23.0 kg/m^2. Furthermore, the Beijing multidimensional longitudinal study of aging (BLSA) represented a U-shaped BMI-Mortality curve with the lowest mortality at approximately 25 kg/m^2. Being underweight is associated with increased all-cause mortality, and keeping BMI stable contributes to reduced mortality [37]. Older adults' BMI level between 25.0-29.9 kg/m^2 which was classified as "overweight" is not linked with adverse mortality outcomes [38]. A meta-analysis of 97 studies (2.88 million individuals) showed that being overweight was associated with the lowest mortality across all age groups and older adults. These findings indicate that the protective effects of overweight on survival occur independently of age [35]. Therefore, we recommend that older adults with a BMI <23.0 kg/m^2 be urged to apply a diet pattern that includes nutrient- and calorie-dense foods and physical activity to improve their BMI gradually, ideally using endurance training to enhance muscle mass.

Maintaining nutritional status can contribute to reducing complications from comorbidities and COVID-19. Infected, at-risk, or recovered patients need adequate nutritional support because viral infections are associated with dietary deficiencies, and healthy eating is vital for all older people [39]. While health status was affected during the COVID-19 pandemic, nutritional status was not. In this study, malnourished older adults with poor health status increased from 4.3% to 10.5% however among well-nourished older adults, poor health status decreased from 23.4% to 18.4% due to the pandemic. The strict quarantine imposed this alteration for older adults. It was forbidden to go out for a long time for individuals over the age of 65 years. The limited permission to go out on the street during the COVID-19 pandemic provided older adults to go to the market and walk every day, especially to meet individual needs. When COVID-19 case peak values started to decrease, they were only allowed to leave between 10:00 and 14:00 o'clock. These limitations may make older adults prone to nutrient deficiencies because of difficult access to food. In addition, it was determined that older adults who did not have information (34.3%) about their general nutrition before the pandemic were interested in their nutrition (28.2%). In summary, older adults with malnutrition or at risk of malnutrition should have a dietary intervention to support sufficient dietary nutrient intake, sustain or increase body weight and/or enhance functional and clinical outcomes. Older adults did not have any nutritional problems before and during COVID-19. However, they stated that their health significantly worsened during the COVID-19 pandemic.

The PFES is a short, easily scored, reliable and valid tool for measuring physical activity in epidemiologic studies of older adults. Physical inactivity is one of the leading risk factors for non-communicable diseases (NCDs) and death worldwide. Although physical inactivity has been identified as a risk factor for the development of several chronic diseases, it is common in older adults residing in industrialized countries. It increases the risk of cancer, heart disease, stroke, and diabetes by 20–30%. The WHO estimated that physical inactivity causes four to five million deaths each year [40].

Although the total PFES (80.0±10.1), motivators (18.2±4.6), barriers scores were higher (32.03±6.1) than our study, physical fitness (16.3±3.8) and exercise frequency scores were lower (13.4±3.9) [26] than PFES score results in this study.

The demographic characteristics of the older adults may affect the PFES scores. For this reason, it may be expected that the motivation to exercise is higher, and the barriers to exercise are lower. At the same time, the older adults participating in the study had higher physical fitness and exercise frequency.

Total PFES and subgroups with higher scores had lower physical activity levels. Factor one, motivators such as education, treatment of co-morbid conditions, group exercising, safety, previous positive experiences were important variables to increase compliance to exercise. The factor one score is at the lowest limit. During mandatory pandemic quarantines, motivators for positive emotions decreased [41]. However, meeting vital needs obliges the older adults to act independently of motivation. Barriers such as poor health, unfavourable weather conditions, and fear of falling are significant obstacles to initiating and maintaining exercise behaviour. The factor 2 score is near the lowest level. It should be adequate to recognize motivators and barriers for older adults to begin exercising and evaluate their compliance. Factor 3 physical fitness score is at the average level. A Systematic Review and Meta-analysis of frailty and physical fitness in older adults showed that usual walking speed was the physical fitness variable being most strongly associated with frailty status, followed by aerobic capacity, maximum walking speed, lower body strength, and grip strength [42]. Factor 4 score is at the upper limit. The data obtained will guide the planning of interventions to increase physical activity frequency and improve quality of life.

In this study, the PFES high scores demonstrated that the COVID-19 pandemic during strict quarantine over older adults' physical activity was inevitable because of essential requirements. As we know, physical inactivity leads to reductions in lean muscle mass and strength. The reduction of muscle mass and strength to levels below proposed thresholds results in limitations in physical functioning and mobility and reduces the opportunity for independent living in later life. Despite the chronic disease, physical activity in older adults is related to delayed physical disability and the maintenance of independent living. The present study had some limitations. Firstly, cross-sectional design of the study does not determine causality. Secondly, it represents the geriatric population in only two high-income provinces, so it does not reflect data for the entire population. Of third, our results may have been biased in unknown ways since some of our data were based on personal statements. The strengths of our study are a large number of patients, multicentre, and including questions about nutritional and health status before and during the COVID 19 pandemic.

5. Conclusion and Implications

COVID-19 pandemic has an inevitable impact on the older adults; for instance, health status was affected. Malnutrition in old age has a severe effect on the health and social aspects of older adults. Dietitians play a key role in the management and treatment of malnutrition. Older adults should avoid malnutrition by applied dietary recommendations. Underweight (BMI<23 kg/m^2) older adults should consume nutrient-dense foods with sufficient energy regularly to increase lean body weight. Health professionals take into consideration daily energy and macro-micronutrient intake for malnourished older adults. Resistance (aerobic exercise, balance, and flexibility) exercise frequency and intensity are crucial for older adults to protect and sustain or increase lean body mass. Especially older adults who have malnutrition risk, should be strictly screened by healthcare professionals with appropriate nutrition screening tools.

6. Contribution to the Field

The COVID-19 pandemic has affected older adults. Focusing on older adults' nutritional status during pandemic is not a panacea, but it disproportionately helps minimize the number of severe effects on the health and social relations. In this context, healthcare professionals should screen nutritional status of the older adults.

Ethical Aspect of the Research

All procedures involving research study participants were approved by the Akdeniz University Faculty of Medicine Clinical Research Ethics Committee (2021 02-10, KAEK-124) and study permission (2021-02-01T16_24_22) from the T.R. Ministry of Health Scientific Research Platform.

Conflict of Interest

This article did not receive any financial fund. There is noconflict of interest regarding any person and / or institution.

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Authorship Contribution

Concept: SC, HKA, GS; **Design:** SC, HKA, GS; **Supervision:** SC, HKA, GS; **Funding:** GS, NSK, HKA; **Materials:** GS, NSK, HKA; **Data Collection/Processing:** GS, NSK, HKA; **Analysis /Interpretation:** SC, HKA, GS; **Literature Review:** SC, HKA, GS; **Manuscript Writing:** SC, HKA, GS; **Critical Review:** SC, HKA, GS.

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