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From The Editor In Chief

Yeşim Gökçe Kutsal

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CLINICAL FINDINGS AND PROGNOSIS OF HOSPITALIZED ELDERLY COVID-19 PATIENTS

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ABSTRACT

Background: SARS-CoV-2 has caused an outbreak all over the World. Age is the most important factor for mortality. However, it is not known exactly why SARS-CoV-2 infections are more severe and fatal in the elderly population. We examined the clinical course and the causes of increasing mortality in all hospitalized patients diagnosed with COVID-19 over 65 years of age.

Methods: Hospitalized elderly patients diagnosed with COVID-19 were examined in this retrospective observational study. The blood results, length of stay, comorbid diseases, admission symptoms, clinical results and demographic data of the patients were recorded. It was examined whether there was a significant difference between surviving and non-surviving patients in terms of comorbid diseases and symptoms. The effects of these parameters on the 30-day mortality alone were investigated.

Results: A total of 263 patients (125 males) were included in the study. Cough (53.2%) followed by dyspnea (35.7%) were the two most common symptoms. There was no statistically significant difference age or sex distribution between survivor and nonsurvivor patients. Patients with dyspnea had a significantly lower survival rate compared to patients who did not have dyspnea at presentation and patients who have chronic obstructive pulmonary disease and cerebrovascular disease were associated with a significantly increased risk of mortality Conclusions:

It has been shown that there is a significant increase in the risk of mortality in COVID-19 patients with chronic obstructive pulmonary disease and cerebrovascular diseases. Additionally, Dyspnea, as an admission symptom, were found to have an effect on mortality and clinical outcomes in our study.

Key words: Coronavirus Infections; Frail Elderly; Hospital Mortality; Dyspnea; Pulmonary Disease, Chronic Obstructive

INTRODUCTION

In December 2019, an outbreak of pneumonia and severe acute respiratory syndrome in Wuhan, China led to the identification of a novel coronavirus, SARS-CoV-2 (1). The disease, COVID-19, has been declared a global pandemic by the World Health Organization (WHO), and virus-related disease and death has spread rapidly around the world with serious consequences for public health (2).

The disease has a severe progression, and its mortality rate is higher in elderly patients (3,4). Age alone is by far the most important risk factor for COVID-19-related mortality (5). However, it is not known exactly why SARS-CoV-2 infections are more severe and fatal in the elderly population. Many hypotheses have been proposed to explain high mortality in patients over 65 years of age (5,6). There is a need for more studies describing the clinical course, response to treatment, and outcomes of elderly patients diagnosed with COVID-19.

COVID-19 patients of advanced age and with comorbidities have poor prognosis (3,4). We aimed to determine which factors in addition to these two affect the clinical course and mortality in patients over 65 years of age. In this retrospective observational study, the relationship between admission symptoms and/or comorbid diseases and mortality was investigated in patients over 65 years of age who were admitted to hospital through the emergency department.

MATERIALS AND METHODS

Our institution is a tertiary training and research hospital appointed as a pandemic hospital by the Republic of Turkey, Ministry of Health. The ethics committee of the hospital study site approved the study (48670771-514.10-208). Hospitalized patients over 65 years of age who were diagnosed with COVID-19 by polymerase chain reaction (PCR) at the time of admission were included in the study, and their records were retrospectively examined.

Patients over 65 years of age who had negative results at the time of admission that turned positive in repeated tests during their stay were also included in the study.

Those with incomplete data in their files, those not hospitalized after admission to the emergency department, and those with repeated negative PCR test results were excluded from the study. Complete blood count results, length of stay, comorbid diseases, admission symptoms, clinical results and demographic data of the patients diagnosed with COVID-19, obtained from the Hospital Information System, were recorded in patient information forms for analysis by emergency physicians.

Admission to the ward, admission to the intensive care unit, and 30-day mortality data were recorded by analyzing how hospital admissions ended. Both the Death Reporting System (OBS, http://www.obs.gov.tr) and patient files were checked for the death status and date when calculating the 30-day mortality. Patients were divided into two groups, mortality and surviving, according to their clinical outcomes. The effects of comorbid diseases and admission symptoms on mortality within a 30-day period were investigated.

Statistical Analysis

To summarize the data derived from the study, descriptive statistics were presented as mean ± standard deviation and median (interquartile range). Categorical variables were expressed as number and percentage. The Kolmogorov-Smirnov and Shapiro Wilks tests were used to check the normality of the numerical variables. Besides, visual methods such as skewness and kurtosis coefficients, histogram, Q-Q plot, and boxplot were also used in the evaluation of the distribution of the variables.

For the comparison of two independent groups, Independent Samples t test and Mann-Whitney U test were used for continuous variables in case of normal and non-normal distribution, respectively.

In comparisons related to patient admission, the Kruskall Wallis test was used when the variables were not normally distributed.

Pairwise comparisons in nonparametric tests were performed with the Dwass-Steel-Critchlow-Fligner test.

In the comparison of categorical variables, Pearson chi-square or Fisher's exact test was used (when the expected values were below 5). In RxC tables where the expected values were below 5, the Fisher Freeman Halton test was used.

Kaplan-Meier survival analysis and a Log Rank test were performed to determine the relationship between the presence of dyspnea and admission setting with survival rates.

The factors that have an influence on patient outcomes were evaluated with both univariate and multivariate Cox regression models. In selecting the parameters included in the multivariate model, the status of significance of the variables in the univariate models as well as the clinical relevance of the variables were taken into consideration. On the other hand, when independent variables showed strong correlation with each other, one of them was left out of the multivariate regression model.

Jamovi project (Version 1.2.22) and JASP (Version 0.13) were used to perform the statistical analyses. A p-value of <0.05 was considered statistically significant.

RESULTS

Demographics, baseline characteristics, and admission laboratory values

A total of 263 patients (125 males) were included in the study. The mean age of the patients was 75.4 ± 8.0 years. Eleven different symptoms were recorded for all patients, the most common of which was cough (53.2%). Dyspnea was the second most commonly encountered symptom (35.7%). The least commonly detected symptom was dysgeusia and loss of smell, and was present in only one patient. We grouped the most commonly seen symptoms (fever, cough, dyspnea, and myalgia-arthralgia) in one category, "most common four." The median number of symptoms was 2.0 [IQR: 0.0- 6.0]. The percentage of patients who had at least one of the "most common four" was 86.7% (n = 228). The most frequent comorbid disease among the patients was hypertension (54%), followed by diabetes mellitus (39.9%). Overall, 76.8% of the study population had at least one comorbid disease. The median number of comorbid diseases was 1.0 [IQR: 0.0- 5.0] in the whole group.

The majority of the study patients were admitted to a hospital ward (77.2%). In the end, while 205 patients (77.9%) were discharged from the hospital, 58 patients (22.1%) died. Median lengths of hospital stay were 12.0 [IQR: 1.0- 60.0] days and 9.0 [IQR: 1.0- 33.0] days in the general hospital ward and ICU, respectively.

Age and sex distribution, admission symptoms, comorbid conditions and baseline laboratory values of the entire study group are shown in Table 1.

Patient and laboratory characteristics according to admission setting

There was no statistically significant difference in terms of age and sex distribution between the patients who were admitted to ICU, to the ward, or who were transferred to ICU from the ward. The only symptom that showed a significant difference among the groups was dyspnea. It was present in 89.5% of patients in ICU, whereas 30.5% of ward patients had dyspnea (p < 0.001). Among ICU patients, dyspnea was the most common symptom. The second most frequent symptom was cough (31.6%, see Table 2). Cerebrovascular disease was significantly more prevalent in ICU patients compared with ward patients (p = 0.024). The number of comorbid conditions was significantly higher in the ICU patients and the patients who transferred to the ICU compared with the patients who were admitted to the ward (p = 0.016, see Table 2).

Table-1. Age and sex distribution, admission symptoms, comorbid conditions and baseline laboratory values of the entire study group.

	Mean ± SD / n (%)	Median [Min- Max]
Age (years)	75.4 ± 8.0	74.0 [65.0- 98.0]
Sex		
Male	125 (47.5)	
Female	138 (52.5)	
Admission symptoms		
Fever	77 (29.3)	
Cough	140 (53.2)	
Dyspnea	94 (35.7)	
Myalgia-arthralgia	79 (30.0)	
Anorexia	13 (4.9)	
Headache	11 (4.2)	
Diarrheae	9 (3.4)	
Nausea and vomiting	19 (7.2)	
Abdominal pain	4 (1.5)	
Dysgeusia and loss of smell	1 (0.4)	
Sore throat	6 (2.3)	
Comorbid conditions		
Hypertension	142 (54.0)	
Diabetes mellitus	105 (39.9)	
Maligancy	19 (7.2)	
Asthma	14 (5.3)	
Coronary artery disease	56 (21.3)	
Cerebrovascular diseases	20 (7.6)	
Chronic kidney disease	33 (12.5)	
Chronic liver disease	1 (0.4)	
Chronic obstructive lung disease	19 (7.2)	
Number of patients with at least one comorbid condition	202 (76.8)	
Number of symptoms	1.7 ± 1.0	2.0 [0.0- 6.0]
Number of comorbid conditions	1.6 ± 1.2	1.0 [0.0- 5.0]
Admission setting		
Ward	203 (77.2)	
Transfer from the ward to ICU	41 (15.6)	
Intensive care unit (ICU)	19 (7.2)	
Survival status		
Survival	205 (77.9)	
Death	58 (22.1)	
Length of hospital stay (days)	12.6 ± 7.7	12.0 [1.0- 60.0]

Length of ICU stay (days)	10.5 ± 8.1	9.0 [1.0- 33.0]
Laboratory Parameters		
WBC (10^3 /μL)	7.7 ± 4.4	6.7 [1.2- 45.5]
Hemoglobin (g/L)	120.6 ± 18.9	120.0 [48.0- 182.0]
Neutrophil count (10^3 /μL)	9.5 ± 58.5	5.0 [0.8- 952.0]
Lymphocyte count (10^3 /μL)	1.4 ± 2.1	1.2 [0.2- 31.9]
Platelet count (10^3 /μL)	202.7 ± 87.3	195.0 [28.0- 681.0]
Creatinine (mg/dL)	1.5 ± 1.8	1.0 [0.3- 18.7]
Lactate dehydrogenase (LDH) (U/L)	307.7 ± 210.4	277.0 [0.0- 2135.0]
D-dimer (ug/L)	2898.9 ± 8341.5	938.0 [0.0- 100000.0]
Procalcitonin (μg/L)	0.5 ± 2.0	0.0 [0.0- 23.0]
Lactate (mmol/L)	0.8 ± 1.2	0.0 [0.0- 6.8]
C-reactive protein (mg/L)	85.0 ± 80.1	66.9 [0.0- 513.8]
Glomerular filtration rate (mL/dk/1.73 m^2)	63.0 ± 33.0	62.0 [2.0- 226.7]

Descriptive statistics were expressed as mean ± standard deviation and median (IQR) for metric variables. Categorical variables were presented as number (%). P-values written in bold are statistically significant (p<0,05). IQR: Interquartile range

Mortality rate was significantly higher in ICU patients (94.7%) and patients who transferred to the ICU (85.4%) compared to ward patients (2.5%). The median length of hospital stay was significantly longer in patients who transferred to the ICU compared with the other two groups (p < 0.001).

Most of the laboratory values examined were comparable between ICU patients and patients transferred from ward to ICU. An exception was serum lactate level, which was significantly higher in ICU patients (Table 2). On the other hand, median lymphocyte counts, lactate dehydrogenase, and procalcitonin were not statistically different between ward patients and ICU patients. White blood cell and neutrophil counts, C-reactive protein, and d-dimer were significantly higher in ICU patients compared to ward patients. Ward patients had a significantly higher glomerular filtration rate (GFR) compared to ICU patients.

Patient and laboratory characteristics according to survival status

There was no statistically significant difference in mean age or sex distribution between survivor and nonsurvivor patients. Multivariate Cox regression indicated that a dyspnea is associated with increased 30-day mortality, and it is an independent predictor of long-term survival (p = 0.001). The number of symptoms were comparable between the two groups. On the other hand, the median number of comorbid conditions was significantly higher among death patients compared to surviving patients (p = 0.028). However, there was no difference in the frequency of any individual comorbid disease between the groups. The length of the hospital and ICU stay in the two groups was not statistically significant.

The median values of white blood cell count, neutrophil count, and C-reactive protein were significantly higher in the mortality group compared to the discharged group (p < 0.001), whereas the lymphocyte count and platelet count were significantly lower. Moreover, the median values of serum lactate dehydrogenase, lactate, and d-dimer were also significantly higher in the death patients compared to discharged patients. Table 3 summarizes the laboratory parameters and clinical characteristics in survivor and nonsurvivor patients.

Table-2. Comparison of mean age and sex distribution, admission symptoms, comorbid conditions and baseline laboratory values according to admission setting

	Admission setting			
	Ward (n=203)	From Ward to ICU (n=41)	ICU (n=19)	P-value
Age (median [IQR])	75.0 [69.0-81.0]	73.0 [67.0-78.0]	78.0 [71.0-80.5]	0.182**
Sex (%)				
Male	94 (46.3)	24 (58.5)	7 (36.8)	0.225*
Female	109 (53.7)	17 (41.5)	12 (63.2)	
Fever	59 (29.1)	15 (36.6)	3 (15.8)	0.255*
Cough	113 (55.7)	21 (51.2)	6 (31.6)	0.127*
Dyspnea	62 (30.5) [a]	15 (36.6) [a]	17 (89.5) [b]	**<0.001***
Myalgia-arthralgia	62 (30.5)	15 (36.6)	2 (10.5)	0.116*
Anorexia	9 (4.4)	4 (9.8)	0 (0.0)	0.272*
Headache	11 (5.4)	0 (0.0)	0 (0.0)	0.304*
Diarrheae	5 (2.5)	4 (9.8)	0 (0.0)	0.058*
Nausea and vomiting	14 (6.9)	5 (12.2)	0 (0.0)	0.25*
Abdominal pain	3 (1.5)	0 (0.0)	1 (5.3)	0.349*
Dysgeusia and loss of smell	1 (0.5)	0 (0.0)	0 (0.0)	0.999*
Sore throat	4 (2.0)	2 (4.9)	0 (0.0)	0.538*
Number of symptoms (median [IQR])	2.0 [1.0-2.0]	2.0 [1.0-3.0]	1.0 [1.0-2.0]	0.202**
Number of major 4 symptoms (median [IQR])	2.0 [1.0-2.0]	2.0 [1.0-2.0]	1.0 [1.0-2.0]	0.544**
Hypertension	107 (52.7)	26 (63.4)	9 (47.4)	0.380*
Diabetes mellitus	75 (36.9)	20 (48.8)	10 (52.6)	0.185*
Maligancy	14 (6.9)	4 (9.8)	1 (5.3)	0.829*
Asthma	12 (5.9)	1 (2.4)	1 (5.3)	0.788*
Coronary artery disease	38 (18.7)	11 (26.8)	7 (36.8)	0.121*
Cerebrovascular disease	11 (5.4) [a]	6 (14.6) [b]	3 (15.8) [a, b]	**0.024***
Chronic kidney disease	22 (10.8)	9 (22.0)	2 (10.5)	0.135*
Chronic liver disease	1 (0.5)	0 (0.0)	0 (0.0)	0.999*
Chronic obstructive lung disease	12 (5.9)	3 (7.3)	4 (21.1)	0.063*
Number of comorbid conditions	1.0 [1.0-2.0] [a]	2.0 [1.0-3.0] [b]	2.0 [1.0-3.0] [a, b]	**0.016***
Number of patients with at least one comorbid condition	153 (75.4)	34 (82.9)	15 (78.9)	0.607*
Survival status				
Discharge	198 (97.5) [a]	6 (14.6) [b]	1 (5.3) [b]	**<0.001***
Exitus	5 (2.5) [a]	35 (85.4) [b]	18 (94.7) [b]	
Length of hospital stay (median [IQR])	11.0 [7.0-14.0]	16.0 [11.0-23.0]	12.0 [5.5-14.5]	**<0.001***
Length of ICU stay (median [IQR])	NA [NA-NA]	9.0 [4.0-14.0]	9.0 [5.5-14.0]	0.519**
WBC (10^3 /μL)	6.5 [5.1-8.3] [a]	7.3 [5.9-10.2] [a, b]	9.2 [7.2-13.6] [b]	**<0.001***
Hemoglobin (g/L)	120.0 [108.0-133.0]	121.0 [98.0-132.0]	118.0 [104.5-133.0]	0.769**

Neutrophil count (10³ /µL)	4.7 [3.4-6.2] [a]	5.8 [4.3-8.9] [b]	7.3 [5.4-11.7] [b]	**<0.001****
Lymphocyte count (10³ /µL)	1.2 [0.9-1.7] [a]	0.9 [0.7-1.2] [b]	1.1 [0.7-1.7] [a, b]	**0.002****
Platelet count (10³ /µL)	198.0 [146.0-242.5]	182.0 [130.0-224.0]	220.0 [155.0-261.0]	0.448**
Creatinine (mg/dL)	0.9 [0.7-1.2] [a]	1.2 [1.0-2.4] [b]	1.4 [1.0-1.8] [b]	**<0.001****
Lactate dehydrogenase (LDH) (U/L)	256.0 [193.5-337.5] [a]	353.0 [268.0-529.0] [b]	430.0 [362.0-542.0] [a, b]	**<0.001****
D-dimer (ug/L)	865.0 [495.5-1670.0] [a]	1380.0 [840.0-2040.0] [b]	2720.0 [1300.0-3925.0] [c]	**<0.001****
Procalcitonin (µg/L)	0.0 [0.0-0.2] [a]	0.4 [0.2-0.8] [b]	0.3 [0.1-0.8] [a, b]	**<0.001****
Lactate (mmol/L)	0.0 [0.0-1.0] [a]	1.4 [0.0-1.8] [b]	2.5 [1.4-3.9] [c]	**<0.001****
C-reactive protein (mg/L)	52.7 [15.3-104.3] [a]	113.7 [67.1-170.9] [b]	115.5 [69.8-179.3] [b]	**<0.001****
Glomerular filtration rate (mL/dk/1.73 m²)	69.0 [48.0-85.0] [a]	55.0 [22.0-69.0] [b]	39.0 [29.5-57.0] [b]	**<0.001****

*The Pearson Chi-squared or Fisher Freeman Halton test was used. Descriptive statistics were expressed as number (%).
**The Kruskal Wallis test was used. Descriptive statistics were expressed as median [IQR]. P-values written in bold are statistically significant (p<0,05). IQR: Interquartile range
The comparisons which contain completely different letters are statistically different from each other.

Survival analysis

We performed survival analysis and constructed Kaplan Meier survival graphs based on different characteristics of the study population. Patients with dyspnea had a significantly lower survival rate compared to patients who did not have dyspnea at presentation (Figure 1).

ICU patients had the lowest survival rate. Compared with patients who were admitted to the ward, patients who were transferred from the ward to the ICU had a significantly shorter survival rate (Figure 2).

Cox regression analysis to determine the independent predictors of mortality

We performed Cox regression analysis to determine the independent predictors of mortality. We included significant variables from the univariate analysis in the multivariate analysis. However, we did not include variables which showed a significant and strong correlation with one another, so as not to weaken the effect of each other in the multivariate model.

Our Cox regression model revealed that the presence of chronic obstructive pulmonary disease (HR: 2.29 [IQR: 1.03-5.10], p = 0.043) and cerebrovas-cular disease (HR: 2.36 [IQR: 1.18-4.73], p = 0.016) were associated with a significantly increased risk of mortality. An increased white blood cell count and a GFR lower than 60 mL/min were also independent determinants of mortality. Although significant in the univariate analysis, the presence of dyspnea was not a significant predictor of the mortality in the multivariate model. Table-4 depicts the results of the univariate and multivariate Cox regression models.

DISCUSSION

The most common symptoms in our study were cough (53.7%) and dyspnea (35.7%). However, other studies reported fever as the primary symptom, and cough was reported as common (7,8). We found that although the incidence of symptoms such as cough, fatigue, fever, loss of appetite, muscle pain, and diarrhea did not vary significantly between death and surviving patients, dyspnea, chest tightness, and consciousness disorders were more frequently observed in death patients. These symptoms indicate that the majority of death patients were in critical or severe condition at the time of admission. Indeed, the onset of certain symptoms can guide doctors to identify patients at risk of poor outcomes (9). How-

Figure-1. Kaplan-Meier survival curves showing the comparison of the survival rates between the patients with and without dyspne within 30 days.
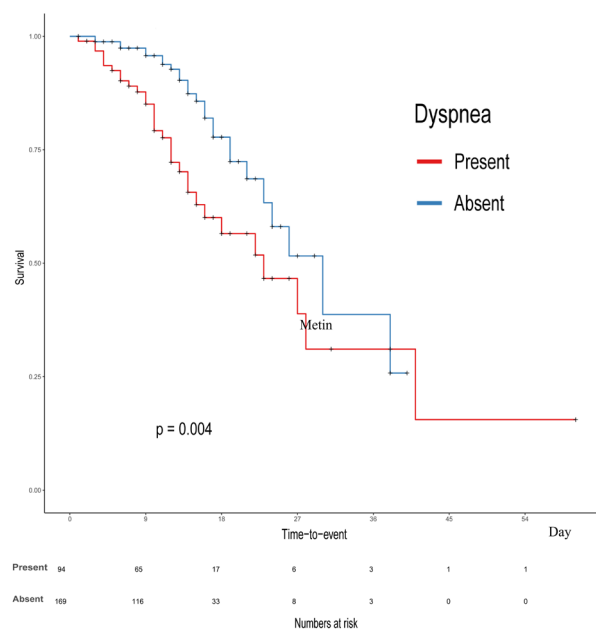
Figure-2. Kaplan-Meier survival curves showing the comparison of the survival rates between the patients who were admitted to the ICU, to the ward and transferred from ward to ICU.
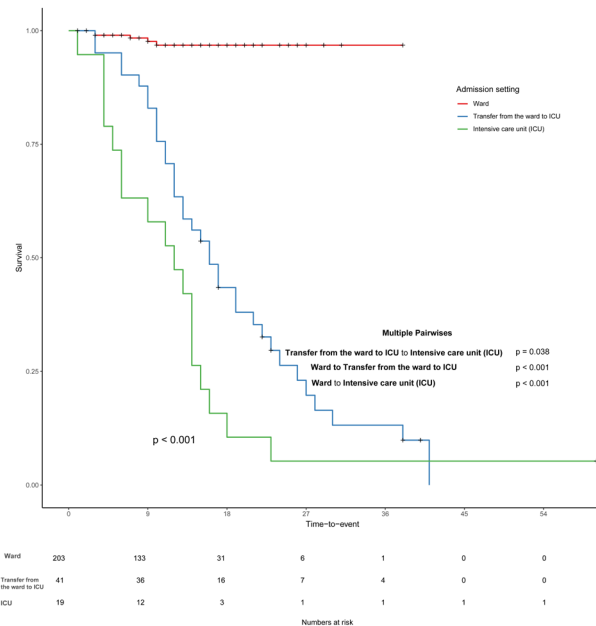
Table-3. Comparison of mean age and sex distribution, admission symptoms, comorbid conditions and baseline laboratory values between the patients who were survivor and nonsurvivor

	Survival status		
	Survivor (n=205)	Nonsurvivor (n=58)	P-value
Age	75.4 ± 8.1	75.4 ± 7.6	0.963[*]
Sex (%)			
Male	95 (46.3)	30 (51.7)	0.565[**]
Female	110 (53.7)	28 (48.3)	
Fever	61 (29.8)	16 (27.6)	0.875[**]
Cough	115 (56.1)	25 (43.1)	0.109[**]
Dyspnea	62 (30.2)	32 (55.2)	**0.001**[**]
Myalgia-arthralgia	64 (31.2)	15 (25.9)	0.533[**]
Anorexia	11 (5.4)	2 (3.4)	0.739[**]
Headache	11 (5.4)	0 (0.0)	0.129[**]
Diarrheae	5 (2.4)	4 (6.9)	0.111[**]
Nausea and vomiting	14 (6.8)	5 (8.6)	0.578[**]
Abdominal pain	3 (1.5)	1 (1.7)	0.999[**]
Dysgeusia and loss of smell	1 (0.5)	0 (0.0)	0.999[**]

Sore throat	5 (2.4)	1 (1.7)	0.999**
Number of symptoms (median [IQR])	2.0 [1.0-2.0]	1.5 [1.0-2.0]	0.815***
Number of major 4 symptoms (median [IQR])	2.0 [1.0-2.0]	1.0 [1.0-2.0]	0.911***
Hypertension	110 (53.7)	32 (55.2)	0.956**
Diabetes mellitus	79 (38.5)	26 (44.8)	0.477**
Maligancy	14 (6.8)	5 (8.6)	0.578**
Asthma	12 (5.9)	2 (3.4)	0.741**
Coronary artery disease	40 (19.5)	16 (27.6)	0.252**
Cerebrovascular disease	10 (4.9)	10 (17.2)	**0.004***
Chronic kidney disease	23 (11.2)	10 (17.2)	0.318**
Chronic liver disease	1 (0.5)	0 (0.0)	0.999**
Chronic obstructive lung disease	12 (5.9)	7 (12.1)	0.146**
Number of comorbid conditions	1.0 [1.0-2.0]	2.0 [1.0-3.0]	**0.028***
Number of patients with at least one comorbid condition	154 (75.1)	48 (82.8)	0.298**
Length of hospital stay (median [IQR])	11.0 [7.0-15.0]	12.0 [8.2-17.0]	0.323***
Length of ICU stay (median [IQR])	13.0 [4.0-27.0]	9.0 [5.0-14.0]	0.526***
WBC (10^3 /µL)	6.9 ± 3.1	10.5 ± 6.8	**<0.001***
Hemoglobin (g/L)	121.3 ± 17.2	117.9 ± 24.2	0.322*
Neutrophil count (10^3 /µL)	4.6 [3.4-6.2]	6.9 [5.3-10.3]	**<0.001***
Lymphocyte count (10^3 /µL)	1.2 [0.9-1.7]	0.9 [0.6-1.3]	**<0.001***
Platelet count (10^3 /µL)	197.0 [146.0-242.0]	192.5 [133.8-253.8]	0.87***
Creatinine (mg/dL)	0.9 [0.8-1.2]	1.3 [1.0-2.2]	**<0.001***
Lactate dehydrogenase (LDH) (U/L)	260.0 [195.0-340.0]	389.0 [282.5-530.5]	**<0.001***
D-dimer (ug/L)	874.0 [517.0-1680.0]	1480.0 [902.8-2795.0]	**<0.001***
Procalcitonin (µg/L)	0.0 [0.0-0.2]	0.3 [0.1-0.8]	**<0.001***
Lactate (mmol/L)	0.0 [0.0-1.1]	1.4 [0.0-2.1]	**<0.001***
C-reactive protein (mg/L)	52.3 [15.7-98.5]	121.9 [77.5-188.6]	**<0.001***
Glomerular filtration rate (mL/dk/1.73 m²)	68.0 [48.0-85.0]	49.0 [26.2-68.8]	**<0.001***

*Independent samples t-test was used. Descriptive statistics were expressed as mean ± standard deviation for metric variables.
**The Pearson Chi-squared or Fisher Exact test was used. Descriptive statistics were expressed as number (%).
***The Mann-Whitney U test was used. Descriptive statistics were expressed as median [IQR].
P-values written in bold are statistically significant (p<0,05). IQR: Interquartile range

ever, dyspnea in particular is probably a symptom of respiratory dysfunction and may reflect the severity of lung lesions caused by infection or inflammation (10). In our study, dyspnea was one of the most common symptoms and was the only symptom that showed a significant difference between ICU and ward patients as well as death and surviving patients. Dyspnea was found to be significantly higher in severe/critical patients compared to the other patients in several studies. It was suggested that this might be due to severe damage to the alveoli in the severe/critical group (11,12). However, similar to our study, gastrointestinal symptoms were rarely reported in other studies (13).

We found significant differences between survivor and nonsurvivor patients in terms of laboratory

Table-4. Univariate and multivariate Cox regression showing independent determinants of mortality

	Crude HR (95%CI)	Crude P-value	Adjusted HR (95%CI)	P-value
Dyspnea:	2.13 [1.26-3.59]	**0.005**		
COPD:	2.39 [1.07-5.31]	**0.033**	2.29 [1.03-5.10]	0.043
CVD:	2.11 [1.06-4.21]	**0.034**	2.36 [1.18-4.73]	**0.016**
Hypertension:	0.75 [0.44-1.27]	0.282		
Diabetes mellitus:	1.18 [0.70-2.00]	0.532		
White blood cell count	1.05 [1.02-1.07]	**< 0.001**	1.04 [1.02-1.07]	**0.002**
GFR: < 60 vs. ≥ 60 mL/minute	1.75 [1.02-3.00]	**0.041**	1.58 [0.90-2.76]	0.111
Serum Lactate	1.49 [1.27-1.74]	**< 0.001**		
C-Reactive protein	1.01 [1.01-1.01]	**< 0.001**		

COPD: Chronic obstructive pulmonary disease, CVD: Cerebrovascular diseases, GFR: Glomerular filtration rate, HR: Hazard ratio

findings. Leukocytosis of the patients was strongly associated with mortality. Nonsurvivor patients developed a statistically significant lymphopenia compared to surviving patients, but there was no statistically significant difference between ward and ICU patients in terms of lymphocyte counts. As shown in similar studies on lymphopenia, this suggests that cellular immunodeficiency is associated with poor prognosis. The degree of lymphocytopenia can reveal the severity of virus invasion or the state of antiviral immunity, thereby predicting the prognosis (9,10,14,15). As in similar studies, the absolute value of lymphocytes decreased in most patients in our study. A low lymphocyte value can be used as reference index in the diagnosis of COVID-19 (16).

The median values of neutrophil count and C-reactive protein were also significantly higher in death compared to surviving patients; however, the platelet count was significantly lower. Serum lactate dehydrogenase, lactate, and D-dimer values were also significantly higher in death patients. As mentioned, we determined that a GFR of less than 60 mL/min was an independent mortality predictor. Consistent with previous studies, our data suggest that GFR (a marker for renal failure) is a risk factor for

in-hospital mortality (17,18).

In our study, 76.8% of patients had at least one comorbid disease. The most common comorbidity was hypertension (54%), followed by diabetes mellitus (39.9%). In another study conducted in parallel with ours, the most common comorbidities reported were hypertension, diabetes mellitus, cardiovascular diseases, and cerebrovascular diseases (10). The number of comorbid conditions was significantly higher in ICU patients, and in patients transferred from ward to ICU after hospitalization, compared to ward patients. On the other hand, the median number of comorbid conditions was significantly higher in nonsurvivor patients compared to surviving patients. Comorbidities, especially cardiovascular diseases and chronic lung diseases, have been reported to be important in predicting in-hospital mortality in critical patients (19,20). Similar studies revealed that more patients had underlying diseases, especially hypertension, lung diseases and heart diseases in the mortality group. In addition, in parallel with our results, multiple comorbidities were detected in more patients in the mortality group (9,12).

These studies showed that the prevalence of chronic obstructive pulmonary disease (COPD) was

low in COVID-19 patients, but disease severity and risk of mortality were high in COPD patients. In other studies, the risk of severe COVID-19 was reported to be four times higher in patients previously diagnosed with COPD compared to those without COPD (21,22). In our study, COPD was found to increase the risk of mortality by approximately 2.2 times. We also found that the risk of mortality was increased by 2.3 times in the patients with cerebrovascular diseases. A combined analysis of other studies published to date show that, similar to our study, cerebrovascular diseases have been associated with a 2.5-fold increased likelihood of severe disease in patients with COVID-19 (23,24).

Limitations

First, we collected epidemiological data, and this carries a risk of recall bias in our study. Secondly, due to the retrospective nature of the study, all laboratory tests were not performed in all patients, including lactate dehydrogenase, D-dimer, procalcitonin, and lactate; therefore, the role of these parameters in predicting in-hospital mortality may be underestimated. Thirdly, with approximately 12 days of hospitalization before death, there was not enough information about the dynamic changes in laboratory variables of death patients. Further research is needed to gain a better understanding of the risk factors and consequences for COVID-19, which will help guide efforts to reduce mortality.

Conclusion

Dyspnea, as an admission symptom, as well as COPD and cerebrovascular diseases were found to have an effect on mortality and clinical outcomes in our study. Our results emphasize the importance of preventive measures in elderly patients with one of these two comorbidities and of providing close follow-up of these patients if they contract COVID-19. In addition, special attention should be paid to elderly patients presenting with dyspnea in terms of medical care.

Disclosure Statements

Authors state that there is no conflict of interest in this article.

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RESEARCH

EVALUATION OF THE MEASURES TAKEN IN NURSING HOMES OF THE ISTANBUL METROPOLITAN MUNICIPALITY DURING THE COVID-19 PANDEMIC

ABSTRACT

Introduction: This research investigates the effectiveness of measures taken against the COVID-19 pandemic in nursing homes under the responsibility of the Istanbul Metropolitan Municipality.

Materials and Method: Documents, decisions, and statistical data from the Istanbul Hospice gathered between March 1 and May 31.

Results: The average age of the nursing home residents was 70.2. Among them, 29.0% were capable of self-care, while 31.4% were fully dependent on others for care. Visitor restrictions, social function cancellations, fever and complaint follow-up, institutional disinfection, the use of personal protective equipment, placarding, new employee shifts, short stays and isolation areas, personnel services, employees and resident screening tests, cargo limitations, and psychologist-sociologist support were implemented in the home to help deal with the pandemic. In all, 14 of 930 employees tested positive for the virus when given a COVID-19 PCR test. A total of 104 bed-dependent residents received PCR screening tests, and none were positive for the virus. There were 23 deaths in total (3.3%). There were no definite COVID-19-related deaths. The probable case-related mortality rate was 0.5%.

Conclusion: Our research shows that the measures taken to address the COVID-19 pandemic in the nursing homes run by the Istanbul Hospice were timely and effective. Our data indicates that, if the finance and service structures of the nursing homes are met, and local authorities have control over the administrative organization, there will be no fatal outbreaks associated with COVID-19.

Keywords: Aged; Health; Infections

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INTRODUCTION

SARS-CoV-2 is a single-chain and enveloped RNA virus located in the beta coronavirus 2b strain. As of August 2020, 80% of the deaths in the United States has occurred in people aged 65 and over due to decrease in immune defense (1). In some countries, death rates in nursing homes have reached very high rates, such as 49–64% (2). As a result, adults who live in places such as nursing homes are the group at the greatest risk for both disease and mortality, in terms of COVID-19, due to their age, concomitant diseases, and the social conditions of their environment (1). One of the most important lessons learned from the COVID-19 pandemic is that fragile groups living in nursing homes have been negatively affected by their interactions with healthcare professionals and visitors (3). Preventive measures, in terms of contamination, are key for planning the operation of these units, in terms of pandemics. A proactive perspective is needed when dealing with an epidemic process, and there must be follow-up on all complaints by or about the employees serving the nursing home's residents, such as protocols for fever control and mask use, strict visitor restrictions, and the reduction of group activities (3).

As of 2017, Turkey was home to 10,266,623 people aged 60 years and over. Today, the number of people aged 65 or over accounts for 8.5% of the population (4), and there are still 7.5 million geriatric patients (5). As a fragile group facing other pandemics that may occur in the coming years, the situation of nursing home residents is and will remain critical. As of 2015, there were 28,433 (0.3%) people receiving public and private institutional care services and 12,299 (0.1%) people living in Ministry of Family and Social Policies (ASPB) nursing homes within the total population. According to 2016 data, Istanbul is considered an "adult province" as its population of those 65 and older is 6.35%. The city is home to 107 elderly care institutions (6). This article examines the measures taken against the COVID-19 pandemic in nursing homes under the responsibility of the Istanbul Metropolitan Municipality and discusses their efficacy.

METHOD

This research is based on documents found on the official web pages of the Istanbul Hospice Directorate (7) concerning the decisions and practices implemented in response to the COVID-19 pandemic between the dates of March 2 and May 19, 2020. The study also includes an analysis of statistical data from the Directorate.

Table 1. Directorate of Istanbul Hospice Housing Units

Name of Unit	Gender of Residents	Residents' Characteristics	Capacity
Güven	Female	Capable of self-care, but in need of partial care	124
Zümrüt	Male	Capable of self-care, and not in need of partial care	70
Sevgi	Male	In need of partial care	134
Şefkat	Female	Incapable of self-care and bedridden	144
Huzur	Male	Incapable of self-care and bedridden	180
Papatya	Female	Mental disability	64
Dolunay	Male	Mental disability	64
Çınar	Female	Diagnosed with dementia or Alzheimer's disease	55
Umut	Male	Diagnosed with dementia or Alzheimer's disease	40

Findings

Established in 1988 by the Istanbul Metropolitan Municipality, the Directorate of Istanbul Hospice facilities encompass 151,000 square meters, including 46,000 indoor square meters. It is Turkey's largest care and nursing home. It includes nine housing units (Table 1) (7).

All clothing and health needs of the hospice residents are met by the Metropolitan Municipality. The institution has physicians and health personnel available 24 hours a day, 7 days a week (7).

During the COVID-19 pandemic period, a total of 679 people were living in the nursing care housing units, which have a total bed capacity of 1,066. At that time, 387 (36.3%) beds were unused.

The average age of residents was 70.2, and the male to female ratio was 1.50. The average age among female residents was higher than among men (74.8 and 70.4, respectively).

The marital statuses of the 272 female residents were: 39.7% single, 32.7% widowed, 21%, divorced, and 6.6% married. The marital statuses of the 407 male residents were: 62.6% single, 24.0% divorced, 6.7% widowed, and 6.7% married. Residents' education levels are shown in Figure 1.

Figure 1. Residents' Education Status
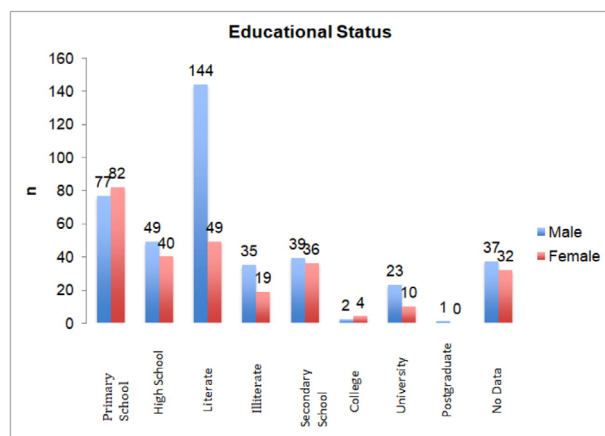
Only 197 (29%) of the 679 residents were in a position to perform self-care. Many people (N=269, 39.6%) were partially dependent, and 213 people (31.4%) were fully dependent on others for care. About one-third of residents, 232 people (34.1%), used assistive devices. The most commonly used assistive device was a wheelchair (50%). About half of the residents, 328 people (48.3%), have special dietary needs; 87 people (12.8%) were given food supplements, 47 people (6.9%) were fed via a Percutaneous Endoscopic Gastrostomy or nasogastric catheter. The staff fed food to 69 residents (10.1%).

Among the 679 residents, 586 people residing in the nine housing units had one or more of the following conditions: 302 had cardiovascular disease, 167 had Alzheimer's disease or dementia, 150 had chronic respiratory disease, 82 had a mental disability, 54 were diabetic, 30 had cancer, 12 had rheumatoid arthritis, and 11 had scoliosis (Table 2).

Table 2. Distribution of Concomitant Disease

Concomitant Disease	Detection Rate (%)
Cardiovascular disease	51.5
Alzheimer's disease or Dementia	28.4
Chronic respiratory disease	25.5
Mental disability	13.9
Diabetes	9.2
Cancer	5.1
Rheumatoid arthritis	2.0
Scoliosis	1.8

Roughly one quarter (N=154, 26.2%) of the residents were fully bedridden. Another 18 (3.0%) receive ongoing oxygen supportive therapy, 18 (3.0%) receive immunosuppressive therapy, and 2 (0.3%) needed dialysis treatments. Four people (0.6%) had undergone an amputation due to diabetes. One

fourth (N=161, 27.4%) were smokers, and 59 (10.0%) were obese.

There are 926 employees among the different branches of the Istanbul Hospice Directorate; 459 of them are caregivers, 153 are healthcare workers, 95 are office employees, 93 are transportation and logistics workers, 71 provide technical support, 54 are dining hall workers, and 1 is a lawyer. Employees in the care and health services departments account for 49.5% and 16.5% of all employees, respectively.

COVID-19 Pandemic Precautions

Since March 2, 2020, visiting hours, from 10:00–11:30 A.M. and 1:30–4:00 P.M. on weekdays, have been cancelled, and no visitors have been allowed into the facility. Similarly, all social events planned for residents both inside and outside the nursing home were cancelled. A complaint and fever tracking program was launched for the residents. Procedures related to the transfer of persons with problems requiring hospitalization during the pandemic were defined. The nursing home and all directorate facilities were periodically disinfected.

Beginning March 9, 2020, all personnel were required to wear gloves, masks, and disposable gowns, and they were required to serve residents while wearing this protective equipment. Hand sanitizers were placed at the buildings' entrances and on all floors of all buildings, for use by staff and residents. With the guidance of dietitians, foods that strengthen the immune system of the elderly patients, such as those with plenty of vitamin C, were increased, as was their fluid intake. The institution's employees were trained on pandemics, and posters featuring 14 rules for fighting the coronavirus were hung in the common areas (Figure 2).

As of March 11, 2020, residents were no longer allowed access to the service buildings of the directorate, and the directorate was completely closed to visitors. Restrictions were imposed on residents'

movements in and out of the institution, with all travel banned unless deemed absolutely necessary.

Authorities were notified of the "Measures Against the New Coronavirus" mandate, which was published by the Istanbul Metropolitan Municipality on March 16, 2020. Aside from those related to urgent health issues, the transfer of patients to external health institutions was banned. Some apartment blocks located in the directorate were identified as short-term observation areas.

Personal protective equipment shortages were resolved on March 18, 2020. WhatsApp groups were created among staff to ensure timely and speedy information flow regarding the new coronavirus. In accordance with the relevant regulations, new policies, were implemented, such as allowing elderly and sick patients' transport among facilities, suspending annual administrative leave for healthcare professionals, and ensuring all staff were provided with private transport by way of institutional service vehicles, instead of public transport.

On March 19, 2020, services to non-resident patients were discontinued for the outpatient clinic of the Health and Hygiene Department and the Physical Therapy Center.

COVID-19 PCR scans were conducted on 380 staff working in the nine housing units on April 8, 2020, and PCR-negative staff began working overnight in the institution for 18 subsequent days. Administrative and site personnel cafeterias were separated, to enable physical distancing. A special area where staff or residents awaiting transfer to a hospital could quarantine for 14 days upon their return to the institution, and an area for conducting COVID-19 PCR examinations, was designated. The practice of not purchasing food and drink from outside the institution was employed. A work program was created by the institution's psychologists and sociologists to support the morale and motivation of the staff and residents remaining at the institution.

Figure 2. A "14 Rules" Poster

On 25 April 2020, a second group of 250 staff working in nine housing units was screened for COVID-19 PCR, and PCR-negative staff began a 30-day shift at the institution. A diet revision was carried out for the month of Ramadan, to strengthen the immune systems of residents and staff.

On May 7, 2020, COVID-19 PCR screenings of 305 personnel working in the administrative building and in the field were conducted. Nursing home residents were forbidden entry to the administrative building, and vice versa. Collective fast-breaking feasts organized in past years to celebrate Ramadan were not held. Dining hall staff were also scheduled to serve overnight within the institution. Restrictions on cargo from outside the institution were imposed. Apart from the maintenance staff, all staff members began working with gloves, masks, and special overalls at all times.

COVID-19 PCR screenings of a third group of 250 staff working in the nine housing units were car-ried out on May 19, 2020, and PCR-negative staff began a 20-day shift (Figure 3).

Regarding employee safety during the COVID-19 pandemic, the following measures were implemented:

- Transfer of personnel using corporate vehicles during shift changes

- Identification and arranging of areas to serve the resting and other needs of the staff

- Personnel suspected of having COVID-19 were admitted to a hospital and placed on administrative leave

- Documentation of all institutional personnel, including fever tracking at the beginning and ends of shifts and three times during the work day

- Continuous use of masks in the institution

Figure 3. Timeline of Measures Taken
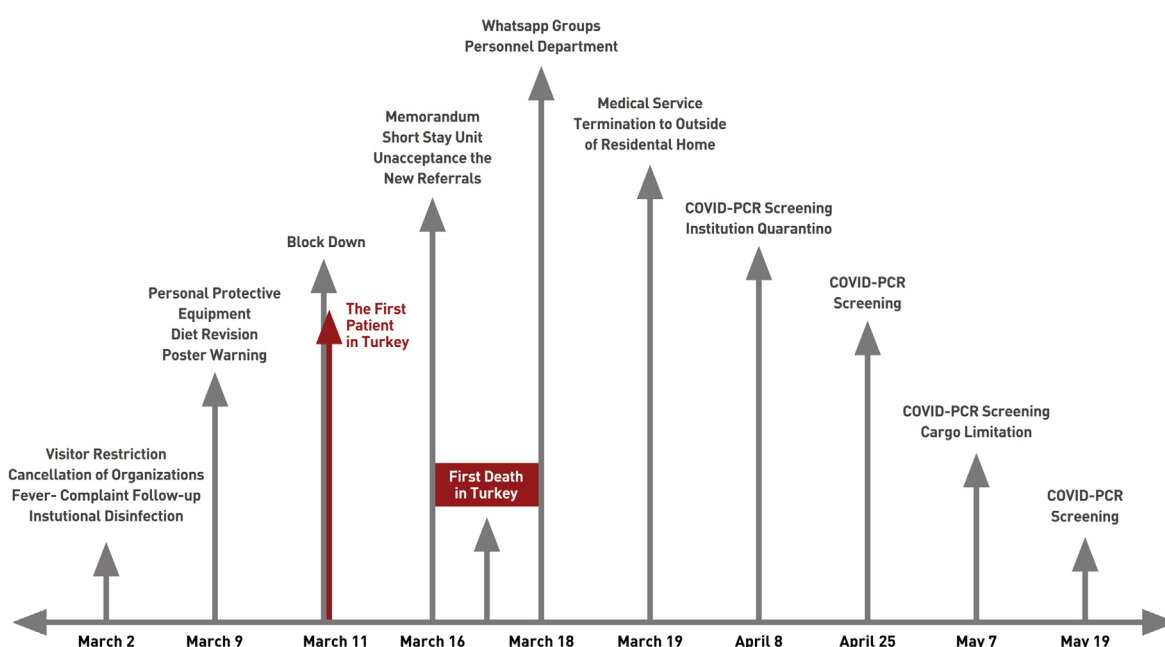
- Use of visors and gloves, in addition to masks, during contact with nursing home residents

- Use of double surgical masks, in addition to other protective clothing, for those personnel serving residents who are unable to handle self-care and/or who are bedridden

- Ending transitions between administrative and nursing homes

- Providing psychological and social workers' support to all staff

- Assurance of no contact with any suspected COVID-19 cases, even from outside the institution

During this period, 293 people among the institution's staff were tested for COVID-19 antibodies. Additionally, COVID-19 PCR tests were performed on 380 employees on April 8, 250 on April 25, 305 on May 7–8, 250 on May 19, and 331 on May 22, 2020. No positive cases were found as a result of the tests of these employees. However, during the shift changes when COVID-19 PCR tests conducted before employees began 18-, 20-, or 30-dayshifts, uncovered 14 positive cases. These individuals were not allowed to work. No symptoms suggesting COVID-19 were detected during the symptom monitoring and fever screening of residents. Despite the absence of symptoms and fever, 104 COVID-19 PCR tests were performed; all of them were found to be negative. Similarly, the test was negative in 43 residents who had to leave the institution during the pandemic due to their concomitant diseases. All of them were quarantined for 14 days after returning to the institution, and a COVID-19 PCR test was performed at the end of the quarantine.

In all, 23 (3.3%) of the nursing home residents died between March 1 and May 31, 2020. The loss of 16 (69.5%) of these 23 patients occurred in a private or public hospital. All COVID-19 PCR examinations performed at the institution and in the hospital were negative for all patients who died. However,

although the PCR results for of four patients were negative, clinical and radiological examinations were compatible with viral infection. According to the COVID-19 guide published by the Ministry of Health (8), although there was no death related to a "definitive case" in the nursing homes affiliated with the Istanbul Hospice Directorate, there were four deaths related to "possible cases" (0.5%).

DISCUSSION

This research indicates that the measures taken to deal with the COVID-19 pandemic in the nursing homes run by the Istanbul Hospice were timely and effective. Our data emphasize that widespread deaths in nursing homes due to the pandemic can be prevented by appropriate interventions.

The global level of the COVID-19 experience has highlighted facts the that the insufficient nature of personal protective equipment and the low number of tests for workers who care for the elderly in nursing homes are major problems (9). For this reason, ensuring the continuity of protective equipment consisting of a mask, face shield, apron, and gloves is recommended as the most important step for reducing the risk among nursing home residents (9). In addition, it is recommended that each institution create emergency patient transfer protocols for patients with suspected COVID-19, and that they establish observation and isolation units for these cases. For employees, specific training for COVID-19 and paid leave must be defined for use. Finally, it should be emphasized that special arrangements, such as the transfer of financial resources and tax reductions, should be provided to nursing homes (9). All of these suggestions were implemented in the nine housing units within the scope of the Istanbul Hospice. As of March 9, 2020, all personnel were provided with personal protective equipment; as of March 18, protective equipment shortages were taken care of; and beginning May 7, non-maintenance personnel were provided with protective equipment. Employee leave regulations were is-

sued on March 18. All of the needs of the nine housing units within the Istanbul Hospice were fully met by the Istanbul Metropolitan Municipality, which ensured that there would be no spending problems or limitations during this period. A lack of personnel, a challenge frequently identified in the literature, can lead to life-threatening risks, high employee turnover, supply shortages, and inadequate infection prevention and control measures; each of these was prevented at the facility in question (10). During this period, 459 employees provided care services to 679 nursing home residents. There was a ratio of one care worker per 1.47 nursing home residents.

A study evaluating the data from 56 nursing homes located in Istanbul reported that 54% had a specific plan for dealing with COVID-19; all of them had COVID-19 plans for staff and had imposed restrictions on visitors (11). We determined that 96% of the nursing homes participating in the research have implemented screening policies for visitors, and COVID-19 outbreak simulations have been performed in 29% of the facilities. One quarter (25%) of nursing homes have provided an alternative care area for hospitalized COVID-19 patients (11). Nursing homes under the direction of the Istanbul Hospice also had an independent COVID-19 plan. Plans were made for the employees, and visitor restrictions were in place before the first COVID-19 patient was identified in Turkey. On March 16, 2020, short-term care and observation areas were created within the institution as sites for providing for alternative care. However, no COVID-19 outbreak simulation was conducted within the institution.

In a study investigating nursing homes' equipment, 66% of institutions reported that they had access to the COVID-19 PCR test (11). However, 72% had experienced an equipment shortage, and 83% reported serious staffing shortages. Therefore, employees had to work long hours and assume responsibilities different from their typical duties (11). In Turkey, the COVID-19 PCR test is administered free of charge by the Ministry of Health or an au-

thorized laboratory. During the pandemic, 104 bedridden nursing home residents and staff were tested by the Provincial Health Directorate.

Since there was no shortage of personnel within the institution, employees were not allowed to work for long hours; this helped to prevent an increased risk of transmission to the residents by caregivers assuming a variety of responsibilities. However, considering that personnel outside the institution may unknowingly come into contact with a COVID-19 patient, employees of the institution were made to work overnight at the institution for 18-, 20-, or 30-day shifts. COVID-19 PCR tests were performed on employees before they entered the institution on shift change days. During this examination, 14 employees were found positive, and their entrance was prevented. A nursing home in Spain used the same protocol as that of the Istanbul Hospice Directorate. They continued providing their services while completely closed to the outside, and no COVID-19 cases were encountered within the institution (12).

The first nursing home COVID-19 outbreak in the United States was in a nursing home in Kirkland, Washington. During the outbreak, two-thirds of the nursing home residents and 47 employees became infected (13). High mortality rates have been reported in nursing homes in New York and Massachusetts. As of April 23, 2020, there were more than 10,700 coronavirus deaths in nursing homes in 35 states. This constitutes 23% of the deaths in the US, as of late April 2020 (13). Undoubtedly, elderly people living in nursing homes should be considered high-risk individuals, as they often share rooms and engage in communal living arrangements; these are the main factors that facilitate deadly outbreaks in nursing homes. At the same time, a significant portion of the people living in their own homes need help with activities of daily living. Research has reported that 64% of nursing home residents need help bathing, 57% require help with walking, 48% need dressing assistance, and 40% need help with toilet needs. These requests for help make

physical distancing impossible (13). In addition, dementia counteracts hand washing and physical distancing measures. Only 29% of the 679 residents in the institutions within the Istanbul Hospice were capable of handling all self-care needs. Nearly one third (N=213, 31.4%) of those residing in the institution were fully dependent on caregivers. Another third (N=232, 34.1%) used assistive devices, most often wheelchairs, and47 (6.9%) were fed through a PEG or nasogastric catheter. Staff fed 69 residents (10.1%).

Other physical conditions make it difficult, if not impossible, to reduce physical contact. More than one-fourth of residents (28.4%) in the nursing home have Alzheimer's disease or dementia, 13.9% have a mental disability, and their educational levels are low.

Apart from the problems outlined above, the average age of nursing home residents was 70.2; 51.5% of them have a cardiovascular disease, 25.5% have a chronic respiratory disease, and 9.2% are diabetic; these conditions mean that many patients are in high-risk groups. However, our research shows that, despite these problems and risks, mass deaths were avoidable in the nursing home, thanks to appropriate pandemic plans.

In their research, Abrams and colleagues reported that COVID-19 outbreaks experienced in nursing homes in the US were neither dependent on low or high Medicaid payments nor related to quality criteria, such as star ratings (14). In this study, it has been shown that there is a significant correlation associated with facility size, urban location, non-chain institution, and outbreaks. On the other hand, in this study is also noteworthy in that we have shown the probability of detecting COVID-19 in non-profit nursing homes is significantly lower than that in for-profit homes (14). In this context, the basis of nursing home outbreaks, which are evident in the US, was not medical-related, but rather due to the weakness of the Medicaid insurance system that finances long-term care services yet only provides

low payments, as opposed to a social security program that has a relatively higher payment capacity while providing short-term care services such as Medicare (15, 16). In other words, the root cause of the problem is financial, not medical. Medicaid-dependent care homes, which are mainly low reimbursement, have been unable to provide qualified services, cannot employ competent and sufficient personnel, and are located in poor neighborhoods. They are also at risk of closure at any time (15).

A similar situation has brought nursing homes in Spain to negative conclusions in terms of COVID-19. Although public health services are free in Spain, unlike the US, the public health system is designed as if there are no vulnerable groups living in units such as nursing homes. The political and social disregard for these groups has made it difficult for people living in nursing homes to be healthy and to gain access to health services. It has also subjected them to age-related discrimination (11). The main causes of the deadly COVID-19 epidemic in the nursing homes of Spain are that 71% of the 5,417 nursing homes are run by large business groups, the control mechanisms for public administration are insufficient due to privatization, and the staff working in those institutions that have been privatized due to acquisitions have insufficient training and are paid low wages (11). Because of these problems, private nursing homes were taken under public authority as a part of the state of emergency announced in Spain on March 14, 2020. It remains to be seen whether this change will reflect positively in the short term. The fact that the bodies of two nursing home residents in a public nursing home in the Usera district of Madrid remained unnoticed in their rooms for almost a day indicates that the transfer to public authority did not solve the problems in the short term (11). However, as in the Istanbul Hospice Directorate nursing homes, it is obvious that there will be no destructive lethal outbreaks associated with COVID-19 in nursing homes if the financial and service structures of these institutions are met in a

public manner, and if the managerial organization is capable of solving local problems and developing local collaborations, rather than waiting for a central public authority to act.

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RESEARCH

THE EFFECT OF FEAR OF COVID-19 AND SOCIAL ISOLATION ON THE FRAGILITY IN THE ELDERLY

ABSTRACT

Introduction: The most important matter on which a consensus is built about COVID-19 disease is that the elderly are one of the most vulnerable risk groups. In this study, we aimed to evaluate the impact of the COVID-19 pandemic on the fragility of the elderly.

Materials and Methods: The study is a cross-sectional study conducted at the end of the sixth month of the pandemic. Our study included 319 elderly individuals. The elderly individuals were reached at the primary level health centers. "FRAIL Frailty Scale" and "Coronavirus Fear Scale" were used in the evaluation.

Results: The results showed that 72.4% of the elderly population could not comply with the routine health checks and chronic complaints increased to 39.3% during social isolation. In the first six-month period of the pandemic, it was found that the prefrail and fragile elderly population increase by 4.7% and 6.6%, respectively. The fragility risk increased by 1.03 times (OR:1.001–1.007) as COVID-19 fear increased, while 2.2 times (OR:1.23–3.94) in those with diabetes, 1.88 times (OR:1.01–3.49) in those with cardiovascular diseases, and 2.15 times (OR:1.07-4.34) in those who postponed their routine health checks.

Conclusion: Early stage results of social isolation measures taken for the elderly within the scope of the pandemic indicated that fear of coronavirus infection increased fragility among the elderly. Elderly health evaluations should continue in the further stages of the pandemic.

Keywords: Pandemics; Frail Elderly; Social Isolation

INTRODUCTION

COVID-19, which broke out in November 2019 in Hubei City of China, caused by SARS-CoV-2 virus, has influenced the entire world (1). While 108.5 million people have been infected so far, 2.38 million people have died because of the infection (2). It is estimated that the fatality rate of the novel coronavirus disease is around 2–3%. According to the data of the "National Medical Commission" of China, 80% of the casualties are over 60 years of age and 75% has pre-existing medical issues (cardiovascular disease, diabetes, asthma, etc.). It is seen that the case fatality rate among the elderly is higher than the young, with 24.6% in the 65–74 age group and 47.7% in the over 75 years of age group (3). When the case fatality rates in elderly cases in Turkey are analyzed, a similar picture is observed: the fatality rate is 19.2% in men and 10.1% in women between 65 and 79 years of age; while it is 37.7% and 25.8% in men and women, respectively, among people aged 80 years and older (4). The most important matter on which a consensus is built about COVID-19 disease is that the elderly are one of the most vulnerable risk groups. In view of this, public authorities implement measures that address the needs of the elderly and try to increase their compliance through these measures. The elderly are expected to be more inclined to be isolated if need be and they comply with the preventive measures more easily than the young (5). Although social isolation seems beneficial in preventing the spread of the disease in elderly individuals, prolonging this process might have adverse psychological and physiological consequences. Fragility is a medical syndrome that increases dependency on another individual in daily life and/or death risk and is characterized by reduced physical function, resistance, and strength involving several factors and causes. Fragility in the elderly is regarded as a significant cause of morbidity and mortality. Although fragility has several adverse outcomes, it is a condition that can be prevented and remedied (6). We anticipate that prolonging social isolation, fear of getting sick, and postponing medical services will increase fragility among the elderly during the pandemic. The aim of this study was to evaluate how uninterrupted social isolation affected elderly individuals and how fear of coronavirus affected fragility levels at the sixth months of pandemics.

MATERIALS AND METHODS

This descriptive study was conducted in Adana Province, Turkey, in October 2020 (at the end of the sixth month of the pandemic). Approvals for the study obtained from the Turkish Ministry of Health and Çukurova University's Ethical Committee (decree number: 104). The study population consisted of people aged 65 years and older. According to the results of the pilot study conducted by taking 80% as power and 95% confidence interval as reference, the minimum number for the sample size for the analysis was calculated as 247 (r0=0.184, r1=0.350). A total of 319 people were included in the study. Convenience sampling was used as the sampling method. The elderly individuals were reached at the primary level health centers (i.e. family medicine centers, community health centers) of Çukurova University, Faculty of Medicine, Public Health Department's Practice and Research Areas in Adana city. Questionnaire forms were filled by face-to-face interviews. Informed consent was obtained from participants. While filling out the questionnaires, infection measures were taken into consideration like physical distancing, wearing of masks, and hand hygiene. The data collection form consisted of four parts: sociodemographic data, Mini Nutritional Assessment scale, FRAIL scale, and Fear of Coronavirus Scale. The socio-demographic form included questions about age, sex, place of residence, education, income, occupation, height, weight, presence of chronic diseases, smoking habit, number of medicines taken daily, number of people in the household, and process of adaptation to social isolation.

Mini Nutritional Assessment Scale Short Form (MNA-SF)

The validity and reliability of the MNA scale in our country was made by Sarıkaya D. in 2013. MNA-SF contains six items that show a high correlation with conventional nutritional assessment. In MNA-SF, scoring is done according to a change in the patient's appetite, any weight loss in the last 3 months, patient mobility, presence of psychological distress or acute disease in the last 3 months, presence of neuropsychological problems, and the patient's body mass index. When MNA-SF is used alone, the results are classified as adequate nutrition (11–14), at risk (7–11), and malnutrition (<7) (7).

Fear of COVID-19 Scale

This scale consists of a single dimension and comprises 7 items. The scale does not contain any reverse item. The total score obtained from all the scale items reflects the level of Coronavirus (COVID-19) fear that the individual experiences. The scores that can be obtained from the scale varies between 7 and 35. Higher scores obtained from the scale indicate a high level of Coronavirus fear (8). The validity and reliability of the scale were assessed by Bakioğlu et al. (9).

FRAIL Scale

The FRAIL scale was used to determine a patient's fragility state. A validity-reliability study of the Turkish FRAIL scale was conducted in 2017 by Muradi et al. This scale has 5 components: fatigue, resistance, ambulation, illness, and loss of weight. Each component is scored as 0 or 1. The total score varies between 0 and 5. Scores are evaluated as follows: 0 as normal; 1–2 as prefrail and 3–5 as frail (10). Fragility is evaluated in two sub-dimensions: the pre-pandemic period and the pandemic period (the end of the sixth month). The individuals were asked to evaluate the sub-dimensions before and at the sixth month of the pandemic.

Evaluation of the change in the fragility

The participants were asked to evaluate the sub-dimensions of the frailty scale once in the pre-pandemic period and later again at the end of sixth month after the start of the pandemic and the declaration of curfews (social isolation).

Fatigue: "Before the start of the pandemic, how much of the time during the past 4 weeks did you feel tired?" "After the start of the pandemic (now), how much of the time during the past 4 weeks did you feel tired?"

Resistance: "Before the start of the pandemic, by yourself and not using aids, did you have any difficulty walking up 10 steps without resting?" "After the start of the pandemic (now), by yourself and not using aids, do you have any difficulty walking up 10 steps without resting?

Ambulation: "Before the start of the pandemic, by yourself and not using aids, did you have any difficulty walking several hundreds of meters?" "After the start of the pandemic (now), by yourself and not using aids, do you have any difficulty walking several hundreds of meters?"

Illnesses: "Before the start of the pandemic, how many chronic ilnesses did you have?" "After the start of the pandemic (now), how many chronic ilnesses do you have?"

Loss of weight: "Before the start of the pandemic, how much did you weigh with your clothes on but without shoes?" "After the start of the pandemic (now), how much do you weigh with your clothes on but without shoes?" Percent change > 5 in weight was interpreted as frailty.

Total frailty scale score was calculated by summing the scores for each sub-dimension for both the pre-pandemic period and at the sixth month of the pandemic. The mathematical difference by subtracting the pre-pandemic period scores from the post-pandemic scores yielded the final score change, with positive scores interpreted as in-

crease, negative scores as decrease and zero as unchanged.

Evaluation of the social isolation

The compliance of elderly people during social isolation periods (curfews) and the changes that occurred during this period were asked (adapting to social isolation measures, exercising at home during the social isolation periods, attending routine health checks, falling at home, increase in chronic complaints, psychological distress, change in eating habits, onset or increase of amnesia).

Statistical Analysis

SPSS 22 software was used for the data analysis. Normal distribution was tested by the Kolmogorov–Smirnov test. Marginal homogeneity test, paired t-test, Wilcoxon test, and Binary logistic regression analysis were performed to analyse the data. Binary logistic regression analysis was performed to estimate the change in fragility and to evaluate the effect of independent variables on fragility risk. In regression analyzes, the dependent variable was the change in fragility. The reference category referred to the participants scored "normal" both pre-pandemic period and at sixth month of the pandemics. The risk category consisted of the participants that had scored "normal" before the pandemic, but switched to "prefragile" or "fragile" at the sixth month of the pandemics, i.e. the reference was "normal" score and the risk parameter was "prefragile" or "fragile". In effect size analyses, Cohen's d value (d) ≥1 indicated a very large effect, 0.8 a big effect, 0.5 a moderate effect, and 0.2 a small effect. $p < 0.05$ was considered significant.

RESULTS

The average age of the 319 elderly individuals who participated in our study was 71.66±6.17 (range: 65–95 years). The sociodemographic characteris-

tics of the study population are presented in Table 1. In the study population, 88.1% of the individuals reported presence of chronic diseases, with hypertension as the most frequent one. Malnutrition was found to be 6.3% in elderly individuals (Table 1).

When the change in frailty among elderly individuals between the pre-pandemic period and at the end of the first six months of the pandemic was analyzed, it was found that the number of elderly individuals in the "normal scored" group decreased by 11.4%, and consequently the increase in rate was 4.7% in the prefrail group and 6.6% in the frail group ($p<0.001$) (Table 2). The change in frailty was found not to differ significantly in relation to sex, age, income, malnutrition and smoking groups was analyzed, no significant difference was found ($p<0.05$).

The difference between pre-pandemic and pandemic fragility scores was found to be statistically significant ($p <0.001$). For the first six months of the pandemic, the effect of the pandemic on the fragility scores was found to be small with Cohen's d of 0.222 (Table 2).

The logistic regression model set was found to be significant (Omnibus test p = 0.006) for predicting the changes in the frailty group, including the presence of chronic diseases and the coronavirus fear score of the participants. The accuracy of the model was found to be 73.8% with Nagelkerke R square value of 0.094. The most contributing variable was determined as "having diabetes" with an R square value of 0.040. Practices like social isolation or curfews, intending to protect the elderly, were found to increase the risk of switching from the normal to the prefrail/frailty group at the sixth month of the pandemic by 2.2 times for DM patients and 1.88 times for those with cardiovascular disease. The increase in the scores of the coronavirus fear scale increased the risk of switching fom the normal to the prefrail/frailty by 1.03 times (Table 3).

The adaptation of elderly people to the process of curfews and the changes they experienced during this period are presented in Table 4. It was

Table 1. Sociodemographic characteristics and medical conditions of the individuals

Characteristics	n(%)
Sex (Male/female)	156(48.9) /163(51.1)
Age (65–74/75–84/85 and above)	231(72.4) / 75(23.5) / 13(4.1)
Education (illiterate/primary/elementary/high school/university)	47(14.7) /114(35.7) / 55(17.2) / 54(16.9) /49(15.4)
Income (2500 and lower/2501–5000/5001–7500/7501 TL and higher)	103(32.3) / 147(46.1) /47(14.7) /22(6.9)
Occupation (housewife/worker/officer/tradesmen-farmer)	126 (39.5) / 50(15.7) / 66(20.7) / 71 (22.3)
Current occupation (working/not working/housewife)	24(7.5) / 169(53.0) /126(39.5)
Chronic diseases (yes/no)	280(88.1) / 38(11.9)
Hypertension (HT)	187(66.5)
Diabetes mellitus (DM)	146(52.0)
Cardiovascular diseases (CVD)	104(37.1)
COPD	62(22.1)
Rheumatological diseases	43(15.3)
Malignancy	10(3.6)
Other	14(5.1)
Malnutrition (normal / at risk / malnutrition)	191(60.3) / 106(3.4) / 20 (6.3)
Smoking (yes / no / quit)	62(19.5) / 207(65.1) / 49(15.4)
Number of daily drug (0/1-3/4-7/8 and above)	37(11.8) / 128(40.8) / 123(39.2) / 26(8.3)

Table 2. Change in fragilty before and after the pandemic

Fragility group	Before the pandemic n (%)	At 6th month of the pandemic n (%)	Change (%)	p
Normal	137(43.4)	101(32.0)	-11.4	
Prefrail	125(39.6)	140(44.3)	4.7	**<0.001**
Fragile	54(17.1)	75(23.7)	6.6	
	X±S.D.	X±S.D.	Cohen's d	p
Fragility score	1.16±1.23	1.44±1.29	0.222	**<0.001**

Table 3. Logistic regression model for predicting the impact of pre-existing health problems and fear of Covid-19 on fragilty

Variables	B	p	O.R.	95% C.I.for O.R.	
				Lower	Upper
Fear of COVID-19	0.035	**0.042**	1.036	1.001	1.072
HT	0.430	0.176	1.537	0.824	2.867
DM	0.791	**0.007**	2.206	1.235	3.940
COPD	-0.045	0.898	0.956	0.476	1.917
Malignancy	0.295	0.686	1.343	0.322	5.601
CVD	0.634	**0.044**	1.885	1.016	3.499
Constant	-2.229	**<0.001**	0.108		

found that 77.1% of the participants were able to adapt to this process, 78.4% were physically inactive during this period as they were unable to exercise at home, 72.4% could not attend routine health checks, 60.7% experienced increase in their pre-existing complaints, 73.6% had psychological difficulties, 34.6% had a change in eating habits, and 17.9% experienced onset of amnesia or increase in it during curfews (Table 4).

Another logistic regression model set was found to be significant for predicting the effect of the adaptation of elderly people to the process of curfews and the changes they experienced during this period on the frailty scores (Omnibus test p<0.001). The independent variables of the model were exercis-

ing during the curfews, being able to attend routine health checks, change in eating habits, falling at home, change in existing complaints and onset of amnesia. The accuracy of the model was found to be 74.9% with Nagelkerke R square value of 0.118. Practices like social isolation or curfews, intending to protect the elderly, were found to increase the risk of switching from the normal to the prefrail/frailty group at the sixth month of the pandemic by 2.15 times for participants who could not attend their routine health checks because of the curfews and social isolation measures or postponed because of the fear of getting sick, 1.85 times for the elderly who changed their eating habits, and 1.97 times for the elderly with an increase in their pre-existing complaints (Table 5).

Table 4. Adaptation of elderly individuals to social isolation process

	Yes n (%)	No n (%)
Adaptation to social isolation measures	246 (77.1)	73 (22.9)
Exercising at home during social isolation	69 (21.6)	250 (78.4)
Compliance with routine health checks during social isolation	88 (27.6)	231 (72.4)
History of fall at home during social isolation	44 (13.8)	274 (86.2)
Increased chronic complaints during social isolation	125 (39.3)	193 (60.7)
Having psychological difficulty during social isolation	234 (73.6)	84 (26.4)
Change in nutritional habits during social isolation	111 (34.9)	207 (65.1)
Onset of or increase in amnesia during social isolation	57 (17.9)	261 (82.1)

Table 5. Logistic regression model for predicting the impact of adaptation to social isolation process on frailty

Variables				95% C.I.for O.R.	
	B	p	O.R.	Lower	Upper
Exercise	0.495	0.186	1.640	0.788	3.415
Health check	0.769	**0.031**	2.157	1.072	4.340
Fall at home	0.294	0.441	1.342	0.635	2.834
Complaints	0.680	**0.021**	1.974	1.108	3.516
Nutritional habits	0.617	**0.031**	1.854	1.059	3.244
Amnesia	0.046	0893	1.047	0.534	2.054
Constant	-1.299	**<0.001**	0.273		

DISCUSSION

The COVID-19 pandemic has compelled governments to make solid public health measures to minimize the impact of the disease. These initiatives include imposing curfew for the elderly as well as social distancing. The experts concur that the elderly are the most vulnerable group. In line with this, public authorities implemented measures to prevent infection and increase elderly individuals' compliance with such measures (11). Furthermore, epidemiologists emphasize that the most significant risk factor of mortality due to COVID-19 is age, and people over 65 are at higher risk (12).

This study evaluated the impact of the measures taken to reduce the spread of the disease among the elderly in the first 6 months of the pandemic on the fragility. It was found that 11.4% of the people who were in the normal group before the start of the pandemic switched to the prefrail (4.7%) and fragile (6.7%) groups at the first 6 months. In the first six months, the impact on frailty was small, but increased 1.03 times in parallel with the increase in the fear of coronavirus. When the chronic diseases that could increase the risk of frailty were examined, the risk of switching from the normal to the fragile group of the elderly with DM and CVD was found to be 2.2 and 1.88 times, respectively. In addition, the same risk increase was found to be 2.15 times in the elderly who postponed their health checks due to the pandemic, 1.85 times in those who changed their eating habits, and 1.97 times in the elderly people with increased complaints. As of now, studies on COVID-19 have consistently shown that older age and comorbidity are major risk factors for adverse outcomes and mortality. Not all older adults appear to be equally vulnerable to COVID-19 (12). Frail older adults have an increased vulnerability to such a stressor event; they tend to be more seriously affected by acute disease in general and they often do not regain their baseline level of health and independence, as compared with non-frail older adults of the same age group (13). In our study,

it was found that comorbid conditions such as DM and CVD increased the risk of frailty in the social isolation process.

Studies in the literature mostly focused on the clinical consequences of the COVID-19 disease of frailty. Indeed, frailty was only investigated in regards to its association with overall mortality, hospital infections, intensive care units admission rates, and disease phenotypes in the available studies (14). Studies have found that the risk of adverse clinical outcomes such as mortality and going to intensive care increased in frail elderly compared to normal elderly (15). There are not sufficient studies investigating the effect of social isolation measures taken during the pandemic process on elderly frailty. In a review about the effect of COVID-19 on the elderly Ilgili stated that extensive restriction processes such as social isolation taken since the early stages of the pandemic will have significant effects on elderly health (16). These have dimensions bringing isolation and pandemics are not merely biological phenomena they also affect society at a large. In many societies, also depending on the culture and common lifestyle, the elderly people are living alone, and loneliness is identified as a potential risk factor for cognitive disorders and depression (17). Similarly, in our study, the onset of or increase in amnesia were observed in 17.9% of the elderly during the social isolation process.

According to the literature, psychiatric history, consist of disaster-related trauma or pre-existing mental health problems, also necessitates close attention, and extra support during the pandemic (18). The fear of the pandemic is also suspected to have an increased psychological effect on the aged concerning their pre-existed awareness of their vulnerability. Similarly, in our study, the fear of coronavirus was found to increase frailty. The fear of death and the existential fear of losing the loved ones is also reported. The psychological impact of quarantine is accepted to be wide-ranging, substantial, and can be long-lasting (18). Butler et al. who in-

vestigated the impact of nutrition on COVID-19 susceptibility and its long-term results, reported that pandemic would affect all age groups, but especially the elderly, increased consumption of diets containing fat and highly-refined carbohydrates would increase the prevalence of obesity and DM, and consequently the risk of severe COVID-19 disease and its mortality would increase (19). In our study, it was found that the eating habits were found to be changed in 34.9% of the elderly and the risk of frailty to increase 1.8 times in those who had changed their eating habits.

While changes in diet are reported to increase the risk of severe disease by possible inflammatory mechanisms observed in DM or obesity, the results of our study showed that, as the change in diet increased the risk of frailty, could lead to the severe prognosis of the disease. Frailty and multi-morbidity are two related conditions in older adults. Most frail individuals are also multi-morbid, but fewer multi-morbid individuals also present frailty (20). Social isolation measures taken during the pandemic can contribute to this bilateral relationship. Social isolation may cause exacerbation of pre-existing diseases and increase in frailty, and the increase in frailty itself may cause exacerbation of comorbid situations. Our study has findings supporting this:

comorbid conditions such as DM and CVD were found to increase the risk of frailty. Increased frailty may not only lead to the worsening in the prognosis of comorbid diseases, but also make elderly people more vulnerable to COVID-19.

Being conducted in a single region and using non-probability sampling are the limitations of the study.

According to the results of this study, it was found that there was an increase in the number of frail elderly individuals at the end of the first six months of the pandemic. Comorbid conditions that increased the risk of frailty were found to be DM and CVD, as well as the fear of coronavirus, the change in eating habits during the social isolation due to the pandemic, and postponing routine health checks increased the risk of frailty. More studies are needed to investigate the effects of the pandemic and the social isolation measures taken on the frailty of the elderly. It may be recommended to conduct studies evaluating the long-term consequences of the pandemic and to make regulations regarding the conditions that could increase frailty in the elderly.

Conflict of Interest: the authors do not declare a conflict of interest.

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RESEARCH

THE CONS OF COVID-19 RESTRICTIONS ON PHYSICAL ACTIVITY IN THE ELDERLY; RESULTS OF AN ONLINE SURVEY

ABSTRACT

Introduction: The aim of this study was to evaluate the physical activity level of the elderly, physical activity barriers during the COVID-19 restrictions and the effects of the restrictions on well-being.

Materials and method: An online survey was used that included demographic characteristics, the Physical Activity Scale for the Elderly, Physical Activity Barriers Scale for the Elderly and questions about well-being. Stepwise logistic regression analysis was performed to examine the risk factors for physical inactivity.

Results: Of 131 respondents (mean age, 70.97±5.87 years), 82.4% stated that they were less physically active due to the restrictions. Mean physical activity score was 80.79±65.18 and the most common physical activity was household activities. Inactive elderly had more physical activity barriers (p=0.003). Risk factors for physical inactivity were age, medication, other occupants of the house and house type (Odds ratios were 1.13, 3.3, 3.25, 2.52 and 95% confidence intervals were 1.03-1.23, 1.36-8.05, 1.33-7.93, 1.05-6.06 respectively, p<0.05). Participants stated that they had gained weight, they felt more bored, anxious, angry, uneasy (47.3%, 78.6%, 75.6%, 54.2%, 74% of the participants respectively) since the curfews started.

Conclusion: During the restrictions, the level of physical activity of the elderly decreased. Risk factors for physical inactivity are older age, taking multiple medications, living with a caregiver and living in a home without a garden or terrace. Measures to increase the level of physical activity and decrease physical activity barriers should be taken into consideration for well-being during the restrictions.

Keywords: Aged; Exercise; Pandemics

INTRODUCTION

The World Health Organization (WHO) declared COVID-19 a pandemic in March 2020. As the elderly are at higher risk of a poor prognosis and mortality due to COVID-19 than younger and middle-aged people, many countries have taken special precautions for the elderly, including enforcing social isolation, staying at home and not meeting others (1).

Social isolation increases the risk of cardiovascular, autoimmune, neuro-cognitive and mental health problems in the elderly (1, 2). In addition to psychological problems related to stress in the isolation process, health is negatively affected due to the limited possibilities for physical activity (PA) (3).

Acute physical inactivity quickly disrupts metabolic and inflammatory homeostasis in adults and especially the elderly (4). It has been reported that exercise of moderate to vigorous intensity can increase immunity to viral infections, reduce the harmful effects of stress on immunity (5).

The WHO recommends at least 150 min of moderate intensity or 75 min of vigorous intensity PA per week (6). Poor health behaviours, such as not meeting this recommendation, might be central to the association between social isolation and psychological and physical health problems (7). Determining the factors associated with the application of the recommended PA level and PA barriers of the elderly during the COVID-19 restrictions could guide the development of measures to be taken during possible restriction periods later in the pandemic to apply PA approaches. Although a few studies have examined the effects of the restrictions on the PA level of adults (8, 9), there is a limited number of studies examining the elderly's PA levels and PA barriers, and the effects of the restrictions on their perceptions of well-being. The aim of this study was to investigate the PA levels and PA barriers of the elderly during the quarantine period, the factors affecting PA and perceptions about some parameters of well-being (e.g. anxiety, boredom, pain).

MATERIALS AND METHOD

Curfews for individuals aged ≥65 years started on 21 March 2020 in Turkey. On June 9, they were allowed to go out between 10.00 and 20.00 every day. This study was conducted between 3 and 9 June 2020. Approval for this study was granted by the Ankara Yıldırım Beyazıt University Ethics Board.

Volunteers aged ≥65 years were included in the study. The participants were recruited through snowball sampling using social media connections of the authors. An online survey was prepared to evaluate the PA levels, PA barriers and perceptions about some parameters of well-being of the elderly during the COVID-19 restrictions. The survey included an introduction section describing the aims of the survey and ethics information for the participants. It was sent to 10 elderly people who use smartphones in order to determine the difficulties that may be experienced in the comprehensibility, answering and submitting of the questions in the online survey. The difficulties they faced were learned by talking to these people by phone. After these difficulties were resolved, the work continued with the online survey, which was made very simple to answer and submit. The online link of the survey was sent to the participants via message or e-mail. Elderly individuals using social media filled out the questionnaire themselves. A survey link was sent to the relatives of the other elderly people and the elderly filled the survey with the help of their relatives. All participants marked an option stating that they voluntarily participated in the study before starting the survey.

In this survey, the sociodemographic characteristics of the participants were attained. In addition to the Physical Activity Scale for the Elderly and Physical Activity Barriers Scale for the Elderly questionnaires, questions were prepared by the authors to determine the effects of the COVID-19 period on PA and health perceptions. These questions were answered with "yes" or "no". There were also questions related to the physical activities that individuals did and could not do during the restrictions. A total of 65 questions were asked to the participants and the participants stated that 15-20 minutes was required to complete the online survey.

Outcome Measures

Physical Activity Scale for the Elderly

The Physical Activity Scale for the Elderly (PASE) is a self-reported questionnaire developed by Washburn et al. to evaluate the level of PA of elderly individuals (10). The PASE includes leisure time activities, household activities and work-related activities over a one-week period and may be applied by telephone, mail or in person. The leisure time activities section is scored based on weekly activity duration and empirically derived item weighting. The household activities section is scored based on participation (yes/no) and item weighting. The work-related activities section is scored based on participation (yes/no), weekly activity duration and item weighting. The total score is obtained from the sum of these section scores. The Turkish version of the questionnaire has been shown to be valid and reliable (11).

A binary PA variable (inactive or moderate/intense activity) was created to determine the factors affecting moderate/intense activity. Those with a PASE total score >90 were considered to be doing moderate and intense PA (12).

Physical Activity Barriers Scale for the Elderly

The Physical Activity Barriers Scale for the Elderly (PABS-E) is a valid and reliable scale developed by Demirdel et al. to evaluate PA barriers in the elderly. PABS-E contains 30 items about personal and environmental factors and factors related to daily routines. Each item is scored on a 3-point Likert-type scale (1=disagree, 2=undecided and 3=agree). The total score ranges from 30–90, with higher scores indicating more PA barriers (6).

Data Analysis

Data were analysed using SPSS for Windows version 20.0 software (IBM SPSS Inc., Armonk, NY, USA). Categorical variables were expressed as number and percentage, and continuous variables as mean and standard deviation values. The Mann Whitney-U test was used to compare the PABS-E scores of individuals with a PASE score below and above 90. Stepwise logistic regression analysis was performed to examine the factors affecting the risk of physical inactivity during the COVID-19 restrictions. Variables with p<0.2 in univariate analyses were included in the regression analysis. A 5% type-1 error level was used to infer statistical significance. A post-hoc power analysis was performed to show the adequacy of sample size. GPower 3.1.9.4 (Heinrich-Heine-Universität Düsseldorf) programme was used for determine the effect size and power analysis. Effect size and power was calculated for comparing PASE groups in terms of PABS-E scores. Power was also calculated for logistic regression analysis.

RESULTS

Evaluation was made of 131 elderly individuals with a mean age of 70.97 ± 5.87 years (range, 65–90 years). The descriptive characteristics of the participants are shown in Table 1.

The PASE and PABS-E scores of the participants are shown in Table 2. The items with the highest score in the personal factors sub-section of PABS-E were "I do not do physical activity because I get tired very quickly" and "I do not do it because I feel pain during physical activity" with 1.76 ± 0.94 points and 1.67 ± 0.9 points, respectively. The items with the highest score in the environmental factors sub-section were "I do not do physical activity because I am not in the habit of doing so" and "I do not do physical activity because group activities are not organised for the elderly" with 1.85 ± 0.96 points and 1.67 ± 0.91 points, respectively. The item with the highest score in the factors related to daily routines sub-section was "I do not do physical activity because I think I am active enough in my daily life" with 1.77 ± 0.89 points.

When the PA barriers of individuals with a PASE score of less than 90 and more than 90 were compared, a significant difference was found between personal factors, environmental factors and PABS-E total scores (p<0.05). In addition, the power and effect size of the study were found to be good (Table 3).

Risk factors for physical inactivity during the restrictions were determined as older age, taking multiple medications, living with caregivers and liv-

Table 1. Descriptive characteristics of elderly individuals (N=131)

Features	N	%
Gender		
Male/ Female	77/54	58.8/41.2
Chronic health conditions		
Diabetes mellitus/Hypertension/Heart disease/Pulmonary disease/Other	40/59/36/18/63	30.5/45/27.4/13.7/58
Medication		
Up to one medication/ Multiple medications	47/84	35.9/64.1
Walking aid		
Yes/No	22/109	16.8/83.2
People who lived together		
Alone at home or just with a spous/ At home with their children, spouse and children, or in a nursing home	77/54	58.8/41.2
House type		
House without garden or terrace/ House with garden or terrace	50/81	38.2/61.9
Setting		
Urban/ Rural	89/42	67.9/32.1
Education		
1-8 years/9+ years	65/66	49.6/50.4
Falls in 1 year		
Yes/No	32/99	24.4/75.6

Table 2. Physical Activity Scale for Elderly and Physical Activity Barriers Scale for Elderly scores (N=131)

	M±SD (Min-Max)
PASE Leisure time activities	26.61±37.21 (0-274.56)
PASE Household activities	48.53±42.01 (0-171)
PASE Work-related activities	5.64±25.16 (1-180)
PASE Total	80.79±65.18 (0-355.56)
PABS-E Personal factors	18.61±7.6 (0-36)
PABS-E Environmental factors	18.87±6.1 (0-36)
PABS-E Factors related daily routines	7.35±2.56 (0-15)
PABS-E Total	44.83±13.88 (30-81)

Data is presented as Mean±Standard deviation (minimum-maximum). PASE= Physical Activity Scale for Elderly; PABS-E= Physical Activity Barriers Scale for the Elderly.

ing in a home without a garden or terrace (Table 4). Power of detecting an odds ratio as 3.258 for living with caregivers was 0.795.

The effects of the restrictions on perceptions of some parameters of well-being can be seen in Table 5.

In response to the question "What physical activity or activities did you do regularly during the COVID-19 restrictions?", 26 people (19.8%) stated that they did not do any PA, and 62 (47.3%) stated that they used to walk. Some of those who reported previous walking stated that they walked inside the house, on the balcony, in the garden or on a walking band, while some stated that they walked outside on the permitted days. A total of 23 people (17.5%)

Table 3. Physical Activity Barriers Scale for Elderly (PABS-E) scores of active and inactive elderly

PABS-E Scores	PASE score <90 (n=85)	PASE score >90 (n=46)	p*	Effect size	Power
Personal factors	20.01±7.95	16.04±6.18	**0.003**	**0.556**	**0.840**
Environmental factors	19.92±6.35	16.91±5.12	**0.005**	**0.522**	**0.789**
Factors related Daily routines	7.27±2.23	7.50±3.11	0.693	0.085	0.074
Total	47.21±13.87	40.45±12.94	**0.003**	**0.504**	**0.761**

Data is presented as Mean±Standard deviation. *: Mann Whitney U test, PASE= Physical Activity Scale for Elderly; PABS-E= Physical Activity Barriers Scale for the Elderly.

stated that they did housework, 18 (13.7%) did garden work, 24 (18.3%) continued with pre-planned exercise programmes, 2 (1.5%) were involved in taking care of their grandchildren, 12 (9.1%) worked in a job and 10 (7.6%) performed prayers.

In answer to the question "What physical activity or activities did you do before but could not do due to COVID-19 restrictions?", 65 people (49.6%) stated that they could not walk outside. Of these people, some stated that they could not take long walks outside, walk in specific areas, or go shopping, to the mosque or to meet their friends. A total of 13 (9.9%) stated that they could not participate in the sports that they used to do regularly, including running, swimming, tennis and cycling.

DISCUSSION

The results of this study showed that the level of PA of the elderly during the COVID-19 restrictions was low, the COVID-19 restrictions were a barrier to PA and other frequently mentioned barriers were a lack of PA habits, rapidly becoming fatigued, pain, a lack of group activities and the idea of being sufficiently active in daily life. Older age, taking multiple medications, living with a caregiver and living in a home without a garden or terrace are the risk factors of physical inactivity during the restrictions. 78.6% of the participants reported feeling more bored, 75.6% of the participants reported feeling anxious, 54.2% of the participants reported feeling angry and 74% of the participants reported feeling uneasy since the COVID-19 restrictions started.

The total PASE score was found to be lower than in other studies that have evaluated PA level us-

ing PASE (10, 11). Of the participants in the current study, 82.4% reported that they were more active before the restrictions started. This confirms that COVID-19 restrictions reduced PA in individuals aged ≥65 years. A large-scale study in Asia, Africa and European countries has also proven that COVID-19 restrictions reduced the level of PA and increased sitting time (9).

Aktürk et al. stated that the most common physical activities in Turkish society were walking, light sports and exercises, gardening and light housework (12). In the current study, the highest score in the PASE sub-sections was in the household activities section. The reason for this may be the absence of leisure time activities that can be performed outdoors due to COVID-19 restrictions.

In a previous study of a similar population in Turkey, PABS-E was found to be 49.6 ± 14.3 (6). However, in the current study conducted during the COVID-19 restrictions, the PABS-E score was seen to have decreased. As the most important PA barriers during the COVID-19 restrictions were curfews and fear of contamination, it is to be expected that the PABS-E score would be lower because 76.3% of the participants stated that curfews prevented PA, and 61.8% stated that they did not do PA because they were afraid of the risk of infection. A negative relationship has been shown between PA barriers and PA level (6). The finding in the current study that active individuals had fewer PA barriers supports this relationship.

It has been stated that the most important PA barriers for people aged ≥60 years are insufficient guidance and a lack of role models (13). These fac-

Table 4. Logistic regression analysis predictors of physical inactivity in COVID-19 restriction period

		PASE score <90 (n=85)	PASE score >90 (n=46)	Univariate analysis p	Multivariate analysis Odds ratio (95% CI)	p
Age		72.2±6.6	68.8±3.2	<0.001*	1.130 (1.031–1.238)	0.009
Gender	Male	49 (63.6%)	28 (36.4%)	0.864		
	Female	36 (66.7%)	18 (33.3%)			
Chronic health conditions	Yes	76 (66.7%)	38 (33.3%)	0.404		
	No	9 (52.9%)	8 (47.1%)			
Pulmonary disease	Yes	15 (78.9%)	4 (21.1%)	0.259		
	No	70 (62.5%)	42 (37.5%)			
Diabetes Mellitus	Yes (reference category)	22 (55%)	18 (45%)	0.170*		
	No	63 (69.2%)	28 (30.8%)		2.226 (0.875–5.664)	0.093
Hypertension	Yes	39 (66.1%)	20 (33.9%)	0.936		
	No	46 (63.9%)	26 (36.1%)			
Heart disease	Yes	28 (77.8%)	8 (22.2%)	0.090*		
	No	57 (60%)	38 (40%)			
Other chronic health conditions	Yes	46 (74.2%)	16 (25.8%)	0.053*		
	No	39 (56.5%)	30 (43.5%)			
Medication	Multiple medications	62 (73.8%)	22 (26.2%)		3.309 (1.360–8.055)	0.008
	Up to one medication (reference category)	23 (48.9%)	24 (51.1%)	0.008*		
Walking aid	Yes	18 (81.8%)	4 (18.2%)	0.114*		
	No	67 (61.5%)	42 (38.5%)			
People who lived together	At home or nursing home with the caregiver	43 (79.6%)	11 (20.4%)		3.258 (1.338–7.931)	0.009
	Alone at home or just with a spouse (reference category)	42 (54.5%)	35 (45.5%)	0.006*		
House type	The house without garden or terrace	37 (74%)	13 (26%)		2.525 (1.052–6.064)	0.038
	The house with garden or terrace (reference category)	48 (59.3%)	33 (40.7%)	0.126*		
Setting	Urban	63 (70.8%)	26 (29.2%)	0.062*		
	Rural	22 (52.4%)	20 (47.6%)			
Education	1-8 years	45 (69.2%)	20 (30.8%)	0.395		
	9+ years	40 (60.6%)	26 (39.4%)			
Falls in 1 year	Yes	25 (78.1%)	7 (21.9%)	0.111*		
	No	60 (60.6%)	39 (39.4%)			

Data is presented as Mean±Standard deviation and n (%). *p<0.2; PASE= Physical Activity Scale for Elderly

Table 5. Physical activity and well-being perceptions of the elderly in the period of COVID-19 restrictions

	n	%
I was more physically active before the COVID-19 restrictions	108	82.4
Curfews prevent me from doing physical activity	100	76.3
I'm not doing physical activity because I'm afraid of the risk of COVID-19 contamination	81	61.8
COVID-19 restrictions adversely affect my existing diseases	70	53.4
My pain has increased since COVID-19 restrictions started	42	32.1
Stiffness in my joints increased since COVID-19 restrictions started	65	49.6
I have gained weight since the COVID-19 restrictions started	62	47.3
Boredom has increased since COVID-19 restrictions started	103	78.6
I feel more anxious since COVID-19 restrictions started	99	75.6
I feel more angry since COVID-19 restrictions started	71	54.2
I feel more uneasy since COVID-19 restrictions started	97	74
There are physical activity / activities that I did before but could not do due to COVID-19 restrictions	73	55.7

tors are important for gaining an exercise habit. It is common for physical inactivity or active behaviour not to become a routine or habit (14). One of the most commonly reported barriers in this study was habit. Exercise habits are related to demographic, cultural, environmental, socioeconomic and psychological factors (12, 15). It is important for the elderly in Turkish society to gain positive health behaviours such as exercise habits in order to be able to continue these habits during pandemics. Other barriers which were frequently stated in this study, such as feeling fatigued quickly, pain, a lack of organised group exercise activities and daily routines, have also been specified in studies conducted before the pandemic (16, 17). To overcome these barriers, exercise programmes that can be performed at home (and can therefore be applied during pandemics) can be organised to increase motivation. The programmes can be selected by considering the self-efficacy of individuals without exercise habits, and the type, frequency, intensity and duration of the exercises can be regulated to prevent fatigue and pain (18). Creating web-based classes for group exercises can be useful for increasing PA during pandemics.

Aktürk et al. reported depression, age, the presence of a caregiver and chronic illness as determinants of PASE score (12). Similarly, in the current study, factors that increase the risk of lower PA were found to be older age, taking multiple medications, living with a caregiver or living in a house without a garden or terrace. This also shows that the predictors of PA in Turkey under normal conditions and during the COVID-19 restrictions are similar. Only house type became more important during the restrictions because outdoor PA decreased.

Taking multiple medications can be linked to suffering from chronic diseases. The relationship between chronic diseases and PA has been shown in previous studies (10, 19). For those living as part of multigenerational families, younger family members undertake household chores. This can affect the PA levels of the elderly as they need to do very little work. Aktürk et al. also found that having home-help affects the level of PA (12).

It has been shown that the level of PA of adults decreased during the COVID-19 restrictions, and this decrease was associated with symptoms of depression, anxiety and stress (20). Walking and PA

have been associated with lower depression, anxiety and psychological stress, and higher subjective well-being. Green, outdoor and natural environments have been reported to be beneficial for mental health outcomes (21). In this context, one of the reasons why most of the participants in the current study reported feeling more bored, anxious, angry and uneasy may have been the restrictions on walking outdoors, which decreased PA. Decreased PA may not be the only reason for the impact on physical and mental health, but increased PA is known to improve symptoms of depression and anxiety (22, 23). In addition, regular exercise has been shown to be associated with less musculoskeletal pain and joint stiffness (24). Therefore, promoting regular PA during a pandemic could contribute to the reduction of problems such as pain, stiffness, boredom and anxiety, which the current study participants stated had increased during the restrictions. Although a wide range of physical activities can be done outdoors, the elderly should be encouraged to do PA at home to maintain physiological functions and reserves of the organ systems, reduce the negative mental and physical consequences of the COVID-19 restrictions and have a positive effect on the immune system (18).

This study was conducted in a period in which curfews for the elderly were strictly enforced. In this respect, it is important in terms of reflecting the social isolation and physical activity behaviors of the elderly in our country and being a guide for determining the physical activity interventions for the elderly in such periods. As the pandemic continues, the measures taken for the elderly will continue, so

vaccination is also important in increasing the physical activity level of the elderly. In this process, there are many publications suggesting the importance of physical activity for the elderly (3,14,18). However, research studies are limited due to the inability to come face to face. This study is the first study conducted online in our country with valid and reliable physical activity scales specific to the elderly during the restriction period. Furthermore, this is the first study examining factors affecting PA, PA barriers and parameters of well-being during the quarantine in Turkey. However, in this study, it was only possible to reach a limited number of elderly people because internet use is not universal among the elderly and the restrictions were relaxed shortly after the study started. However, the post-hoc power was found to be good. Although most of the participants (82.4%) reported that they were more active before the COVID-19 restrictions, the fact that the previous PA level could not be evaluated can be considered as a limitation of this study.

CONCLUSION

It should be taken into consideration that curfews, which are important in this context, affect the level of PA in the elderly. Attention should also be paid to mental and physical health problems that may result from decreased PA. Therefore, knowing the PA barriers and the factors affecting moderate to high intensity PA can be of guidance in terms of the approaches that can be applied to increase PA both under normal circumstances and in the event of future pandemics.

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IS POSTHERPETIC NEURALGIA AN INEVITABLE END IN ELDERLY CASES WITH HERPES ZOSTER? AN EVALUATION OF AGE-RELATED RISK FACTORS IN THE DEVELOPMENT OF POSTHERPETIC NEURALGIA

ABSTRACT

Introduction: The aim of this study is to evaluate the risk factors in the development of postherpetic neuralgia (PHN) in cases with herpes zoster (HZ) over 65 and under 65 years of age.

Methods: 90 cases with a diagnosis of HZ were divided into 2 groups as over 65 and under 65 years of age. 3 months after the onset of the rash, those with VAS score> 3 were considered as cases who developed PHN. The demographic and clinical data of the cases were compared statistically.

Results: In 90 HZ cases; the number of HZ cases over the age of 65 was 38 (42,2%), and the number of HZ cases under the age of 65 was 52 (57,7%). PHN developed in 53 (58.8%) of 90 HZ cases. While the initial VAS score (p <0.001) (p <0.001) and the presence of chronic disease (p=0,05) (p <0.001) were found significant in the development of PHN in both HZ cases above and under 65 years of age, antiviral intake in the first 72 hours (p> 0.05) (p>0,05) were not found significant. Also in the HZ cases over 65 years of age, the affected dermatome (p <0.05) and in the HZ cases under 65 years of age, gender (p=0,05) was found significant in the development of PHN.

Conclusion: Special protection, follow-up and treatment is needed to prevent the development of PHN in HZ cases over 65 years of age, especially those with sacral and trigeminal dermatomes and presence of chronic disease.

Keywords: Herpes Zoster; Neuralgia, Postherpetic; Risk Factors; Aged

INTRODUCTION

Primary infection with varicella-zoster virus (VZV) is clinically manifested as chickenpox in childhood or early adolescence. After infection, VZV settles in the dorsal root and cranial ganglia. (1) Herpes zoster (HZ) often emerges clinically several decades after the initial infection as a result of reactivation of VZV and spreads to the related cutaneous dermatome of the affected ganglion segment. It is characterized by a painful vesicular rash. (2) According to previous studies, the lifetime risk of developing HZ rate is 9–34%. (3) The most common complication of HZ is postherpetic neuralgia (PHN), which is continued symptoms beyond the healing of the rash. (4) The pain is unilateral and dermatomal, of moderate to severe intensity, and is described as a constant burning or stabbing sensation. Some individuals also experience allodynia. (5) Treatment can be difficult because of its resistance to analgesic drugs, and it can persist for months or even years. (6)

Most of the time, serological or virological tests are not used for the diagnosis of HZ. The diagnosis is predominantly based on the signs and symptoms. Viral culture and the direct immunofluorescence assay and, polymerase-chain-reaction techniques are useful for detecting varicella–zoster virus DNA in fluid and tissues. (7)

For the consistency and reliability of studies investigating risk factors in the development of PHN, time and pain intensity parameters should be clearly stated in the definition of PHN. Because the results of studies may be influenced by the definition. Persistent, refractive pain in the affected area at least three months after the onset of the rash is defined as PHN. In the definition of PHN, persistent pain includes the characteristics of being stubborn and continuous without interruption. (8)

There is a well-known lack of adequate randomized controlled trials on age differences in pain. In studies on pain prevalence, the age factor is generally ignored. The reason for this false thought is the idea that pain is a natural consequence of old age. (9)

In general, other risk factors have been compared in the studies to determine whether PHN developed. However, the geriatric HZ cases has not been studied within itself. The aim of this study is to evaluate the risk factors in the development of PHN in cases with HZ aged over 65 and under 65 years of age. Determining the risk factors for PHN may provide early advanced treatments before complications develop and also enable the regulation of vaccination policies.

MATERIALS AND METHODS

This retrospective randomized study was conducted at the Health Sciences University Bursa Yüksek İhtisas Training and Research Hospital. The study was approved by the Health Sciences University Bursa Yüksek İhtisas Training and Research Hospital Ethics Committee with protocol number 2011-KAEK-25 2020/09-07. Consent forms were obtained from all patients to be included in the study.

The diagnosis of HZ was made by the specialists of algology and neurology according to the clinical features and examination of cases. Cases with dermatomal rash which was typical unilateral (i.e. not crossed the midline), manifesting as a maculopapular rash on an erythematous base, than it turned into a vesicular-pustular appearance within 7-10 days and skin sensitivity by palpation were diagnosed with HZ. In some HZ cases, the prodromal phase is not followed by the development of rash; this is termedzoster sine herpete. (10) These patients were not included in this study.

The inclusion criteria for the study were : (1) HZ diagnosis confirmed by a physician; (2) applicants to the hospital within one week from the onset of the rash. The exclusion criteria for the study were : (1) Unable to describe pain symptoms due to dementia, aphasia, or mental retardation ; (2) zoster sine

herpete; (3) Lost to follow-up.

A total of 99 patients diagnosed with HZ were enrolled in the study. Data on age, gender, presence of chronic disease (malignancy, diabetes, hypertension, chronic lung, kidney, and liver disease), initial visual analog scale (VAS) score after the onset of the HZ rash, affected dermatome, and antiviral intake within the first 72 hours were recorded. The severity of initial pain was evaluated using a 10-point VAS from 0 (no pain) to 10 (worst pain you can imagine).

After the onset of the HZ rash, pregabalin (150 mg/day and increased by 150 mg/day up to 600 mg/day) treatment was prescribed for patients with VAS scores > 3, while those with VAS scores ≤ 3 were not treated. Apart from the pain treatment recommended by the algology clinic, the patients were not allowed to take any other analgesics except pregabalin. Three months after the onset of the rash, pain severity in the affected area was assessed with the VAS score and by asking patients whether it differed from the pain experienced in the area at the onset of HZ rash. (Table 1)

The cases were divided into 2 groups as over 65 and under 65 years of age. 3 months after the onset of the rash those with VAS score> 3 were considered as cases who developed PHN and VAS score ≤ 3 were considered as cases who did not developed PHN. The demographic and clinical data (age, gender, presence of chronic disease, initial VAS score after the onset of the HZ rash, affected dermatome, and antiviral intake within the first 72 hours) of the cases with and without PHN were compared statistically in both patients over 65 and under 65 years of age.

STATİSTİCAL ANALYSİS

Statistical analysis was performed using IBM SPSS software version 22.0. The Shapiro-Wilk test was used to determine if the data were suitable for normal distribution. In the comparison of the two in-dependent groups, the independent sample t-test was used for the data that conformed to normal distribution, and these data were given with the mean ± standard deviation. The Mann-Whitney U test was used for the data that was not suitable for normal distribution, and these data were given with median (minimum-maximum) values. The Wilcoxon test was used to compare the two dependent groups. Pearson's chi-square test and the Fisher-Freeman-Halton test were used to compare categorical variables, and these data were given with frequency (percent) values. The significance level was accepted as p=0.05.

RESULTS

The mean age of the 90 HZ cases was 58.8±16.1 years old. There were 48 (53.3%) females and 42 (46.7%) males. While the number of antiviral intake within the first 72 hours was 41 (45.6%), the number of those who did not take was not 49 (54.4%). The mean initial median VAS score was 7.5 (5/8), and it was 3.0 (0/6) after 3 months. The affected dermatomes were as follows: thoracic 53 (58.9%), lumbar 14 (15.6%), cervical 12 (13.3%), trigeminal 8 (8.9%), and sacral 3 (3.3%). (Table 1)

The variables affecting the VAS score in 90 HZ cases after three months are as follows: 1) age was found significant (p=0.004); 2) Gender was not found significant (p=0.349); 3) antiviral intake within the first 72 hours was not found significant (p=0.835); 4) mean initial VAS score was found significant (p<0.001); 5) affected dermatome was found significant (p=0.001); and 6) presence of chronic disease was found significant (p=0.048). (Table 1)

PHN developed in 53 (58.9%) of the 90 patients. In 53 cases with PHN, there were 29 (54.7%) cases over the age of 65 and 24 (%45,2%) cases under the age of 65. (Table 2)

Initial and 3 months after median VAS scores were 8/4 in cases over 65 years of age who devel-

Table 1. Demographic and clinical data of 90 herpes zosterpatients. Variables that affecting the VAS score after 3 months in all patients.

Variables		HZ Patients (n= 90)	p-volue
Age* (year)		**58.8±16.125**	**0.004**
VAS ¥ Initial After three month		7.5 (5/8) 3.0 (0/6)	<0,001
Gender #	Woman Man	48 (53.3) 42 (46.7)	0.349
Antiviral treatment #	Received Not received	41 (45.6) 49(54.44)	0.835
Affected dermatomes #	Servikal Torakal Lombal Sakral Trigeminal	12 (13.3) 53 (58.9) 14 (15.6) 3 (3.3) 8 (8.9)	0.024
Chronic disease #	Yes No	36 (40.0) 54 (60.0)	0.048

Datasare given as¥ values, * mean ± standard deviation,median (minimum / maximum) and#n (%)

oped PHN. İnitial and 3 months after median VAS scores were 8/4 in cases under 65 years of age who developed PHN. İnitial and 3 months after median VAS scores were 5/1 in cases over 65 years of age who did not develop PHN. İnitial and 3 months after median VAS scores were 5/1 in cases under 65 years of age who did not develop PHN. (Table 2)

The number of women/men; over the age of 65 who developed PHN was 18/11, under the age of 65 who developed PHN was 11/13, over the age of 65 who did not develop PHN was 5/4, and under the age of 65 who did not develop PHN was 14/14. (Table 2)

Number of cases who had / had not antivirals within the first 72 hours; over the age of 65 who developed PHN was 11/18, under the age of 65 who developed PHN was 12/12, over the age of 65 who did not develop PHN was 4/5, and under the age of 65 who did not develop PHN was 14/14. (Table 2)

The number of patients with chronic disease, over the age of 65 who developed PHN was 18, under the age of 65 who developed PHN was 6, over the age of 65 who did not develop PHN was 5, and under the age of 65 who did not develop PHN was 7. (Table 2)

The number of dermatomes affected in those over 65 years of age with PHN were thoracic 14, cervical 6, trigeminal 4, sacral 3, and lumbar 2. The number of dermatomes affected in those under 65 years of age with PHN were thoracic 14, trigeminal 4, cervical 3, lumbar 3. The number of dermatomes affected in those over 65 years of age without PHN were thoracic 8, lumbar 1. The number of dermatomes affected in those under 65 years of age without PHN were thoracic 17, lumbar 8, cervical 3. (Table 2)

In-group comparison of variables affecting VAS scores after 3 months in HZ cases with PHN were as follows: 1) initial median VAS score was foundsig-

Table 2. Demographic and clinical data of 90 herpes zoster cases divided into 4 groups according to age and develop-
ment of postherpetic neuralgia.

Variables	Over the age of 65 who developed PHN (n=29)	Over the age of 65 who did not develop PHN (n=9)	Under the age of 65 who developed PHN (n=24)	Under the age of 65 who did not develop PHN (n=28)
VAS $^¥$ Initial After 3 months	8 (8-8) 4 (4-5)	5 (5-6) 1 (0-2)	(8-8) (4-5)	(3.5-6.5) (0-2)
Gender $^#$ Woman Man	18 (62.0) 11 (38.0)	5 (56.0) 4 (44.0)	11 (46.0) 13 (54.0)	14 (50.0) 14 (50.0)
Antiviral treatment $^#$ Received Not received	11 (38.0) 18 (62.0)	4 (44.0) 5 (56.0)	12 (50.0) 12 (50.0)	14 (50.0) 14 (50.0)
Affected dermatomes$^#$ Torakal Servikal Lombal Trigeminal Sakral	14 (48.0) 6 (21.0) 2 (7.0) 4 (14.0) 3 (10.0)	8 (89.0) 0 (0) 1 (11.0) 0 (0) 0 (0)	14 (58.3) 3 (12.5) 3 (12.5) 4 (16.7) 0 (0)	17 (60.7) 3 (10.7) 8 (28.6) 0 (0) 0 (0)
Chronic disease $^#$ Yes No	18 (62.0) 11 (38.0)	5 (56.0) 4 (44.0)	6 (25.0) 18 (75.0)	7 (25.0) 21 (75.0)

Datasare given as¥ values, * mean ± standard deviation,median (minimum / maximum) and#n (%)

nificant in both cases over 65 and under 65 years of age (p <0.001), p <0.001); 2) gender was not found significant over 65 years of age, but, under 65 years of age, it was found borderline significant (p=0.349, (p=0.055); 3) over 65 years of age, the presence of chronic disease was found borderline significant (p=0.058), but ,under 65 years of age, it was found highly significant (p=0.001); 4) over 65 years of age, affected dermatome was found significant (p=0.024), but, under 65 years of age, it was not found significant (p=0.365); and 5) antiviral intake within the first 72 hours was not found significant in both cases over 65 and under 65 years of age (p=0.208, p=0.319). (Table 3-4)

DISCUSSION

HZ damages the nervous system. Although the specific mechanism that causes chronic pain has not been fully explained, it is believed that several pathophysiological mechanisms may contribute. One hypothesis is that in the acute phase, tissue damage and inflammation create nociceptive pain, and peripheral nerve damage creates neuropathic pain. Then, a progression from peripheral to central nervous system changes results in PHN. (11) Neuropathic pain is thought to be more closely related to progression to PHN. (12) There is increased neuronal excitability and alteration of pain perception caused by neural damage during HZ infection. (13)

The relative risk for development of PHN per 10-year increase ranges from 1.22 to 3.11, and 12.5% of patients with HZ are above 50 years of age. (14) Aging causes a decrease in cellular immunity, which makes it easier for the virus to reactivate and potentially lead to PHN. The presence of subclinical polyneuropathy in the elderly can cause PHN, even with mild viral damage. (15) In the current study,

Table 3. Comparison of variables affecting the VAS score after 3months in cases with postherpetic neuralgia.

Variables	Over the age of 65 who developed PHN (n=29)	p-value	Under the age of 65 who developed PHN (n=24)	p-value
VAS ¥ Initial	8	<0,001	8	<0,001
Gender # Woman Man	18 (62.0) 11 (38.0)	0.349	11 (46.0) 13 (54.0)	0.055
Antiviral treatment # Received Not received	11 (38.0) 18 (62.0)	0.208	12 (50.0) 12 (50.0)	0.319
Affected dermatomes# Servikal Torakal Lombal Sakral Trigeminal	6 (21.0) 14 (48.0) 2 (7.0) 4 (14.0) 3 (10.0)	0.024	3 (12.5) 14 (58.3) 3 (12.5) 4 (16.7)0 (0)	0.365
Chronic disease # Yes No	18 (62.0) 11 (38.0)	0.058	6 (25.0) 21 (75.0)	0.001

Datasare given as¥ values, * mean ± standard deviation,median (minimum / maximum) and#n (%)

Table 4. Summary of variables affecting the VAS score after 3 months in postherpetic neuralgia cases by p-value.

	Over the age of 65 andunder the age ofwho developed PHN	Over the age of 65 who developed PHN	Under the age of 65 who developed PHN
p > 0,05	*Gender *Antiviral treatment	*Gender *Antiviral treatment	*Antiviral treatment *Affected dermatome
p = 0,05 - 0,001	*Age *Presence of chronic disease *Affected dermatome	*Affected dermatome *Presence of chronic disease	*Gender *Presence of chronic disease
p < 0,001	*İnitial VAS score	*İnitial VAS score	*İnitial VAS score

while most of the HZ cases were under the age of 65 years, most of those who developed PHN were over 65 years old. Also in the current study, a strong relationship was found between age and development of PHN. Among the risk factors for PHN advanced age is associated with vaccination. These results suggest that vaccination may be important in preventing PHN in HZ cases over 65 years of age.

Many studies have found different results regarding the effect of gender on PHN development.

In most cases, female gender has been reported as a risk factor for the development of PHN. (16) This can be attributed to longer life expectancy among women and the greater likelihood of reporting pain. In the current study, male gender was found borderline significant in HZ cases under 65 years of age but not found significant in HZ cases over 65 years of age. These conflicting results may be due to heterogeneity between the studies.

Antiviral agents can inhibit the replication of

VZV in the acute phase and prevent nerve damage. While some studies support the view that antiviral agents decrease the incidence of PHN, others do not agree and only report that PHN severity and duration may be decreased. In a review of 1211 HZ patients, acyclovir was reported to be not superior to placebo in reducing the risk of PHN, so it was recommended that further studies should be conducted with other antivirals. (17) In the current study, antiviral (valacyclovir 1000 mg three times daily for seven days) intake within the first 72 hours was not found significant for the development of PHN in HZ cases over and under 65 years of age. It is important to emphasize that antiviral therapy does not completely prevent PHN. However, in this study, it was observed that 39.4% of HZ cases over 65 years old and 50.0% of patients under 65 years old received antiviral therapy within the first 72 hours. According to this result, it can be thought that receiving antiviral treatment in the first 72 hours in HZ cases over 65 years old is worse than in HZ cases under 65 years of age. Many reasons such as disregard HZ rashes and not using the recommended antiviral treatment may prevent the intake of antiviral treatment in the first 72 hours. It may be important to increase the awareness of new rashes and to control drug intake for HZ cases over the age of 65 years.

In this study, as in many others, pain severity was found a significant risk factor for PHN in HZ cases. In the acute phase of HZ, suppression of nerve stimulation at an early stage may reduce the development of PHN. Therefore, many studies have investigated the effect of pain therapy on the development of PHN with HZ patients. Antiepileptics, tricyclic antidepressants, and opioids might have an effect on the molecular changes that occur in peripheral nerves and in the central nervous system. (18) It has been reported that steroids and antidepressants were not preventative. (19) Also, the role of nonpharmacological treatments is unclear. (20) Electroacupuncture (21) and transcutaneous electrical nerve stimulation (22) were effective in resolving the rash, decreasing herpes-related pain, and even preventing PHN. Interventional procedures, such as sympathetic nerve blocks and intrathecal and epidural analgesia, aimed at inhibiting painful stimuli transmission and reducing inflammation in this area may prevent PHN. (23)

Various immunocompromised patient populations (patients with neoplastic diseases, organ transplant recipients, and those receiving immunosuppressive drugs), HIV-positive patients, and patients with diabetes have been shown to be at increased risk for HZ and PHN. (24,25) Concomitant diseases, multiple drug use, and decreased physiological reserve may make it difficult for some elderly patients to eliminate HZ without complications. Similarly, in this study, the presence of chronic disease was found an important risk factor for the development of PHN in both HZ cases over and under 65 years of age. However, this relationship between the presence of chronic disease and the development of PHN was more evident in HZ cases under 65 years of age.

Findings regarding the location of the rashes in this study were similar to those in many studies. HZ rashes were unilateral, did not cross the midline, and the most commonly affected dermatome was thoracic, followed by cervical, trigeminal, lumbar, and sacral dermatomes. A meta-analysis of 19 prospective studies showed significant increases in the risk of PHN with the ophthalmic division of trigeminal nerve involvement. (26) In the current study, while trigeminal and sacral dermatome involvement was found a risk factor for the development of PHN in HZ cases over 65 years old. But affected dermatome was not found a risk factor for the development of PHN in HZ cases under 65 years old. However, the reason for this may be that trigeminal and sacral dermatome involvement in the HZ cases over 65 years old was approximately two times more than in the HZ cases under 65 years old.

In conclusion, advanced age and presence of chronic disease is an important risk factors in the

development of PHN with HZ cases.PHN cannot be prevented completely with any treatment other than vaccination.Vaccination may be important in preventing PHN in HZ cases over 65 years of age especially with presence of chronic disease. However, earlier and advanced treatments that reduce central sensitization may be considered in the acute stage of HZ cases with severe initial pain. Risk factors for

the development of PHN in geriatric HZ cases indicate some differences compared to young and middle-aged HZ cases. Therefore, special protection, follow-up and treatment is needed to prevent the development of PHN in HZ cases over 65 years of age, especially those with sacral and trigeminal dermatomes and presence of chronic disease.

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THE EFFECT OF ELDER ABUSE ON PSYCHOLOGICAL RESILIENCE IN INDIVIDUALS 65 YEARS AND OLDER ADMITTED TO THE EMERGENCY DEPARTMENT

ABSTRACT

Introduction: Elder abuse is an important worldwide problem that increasingly occurs as the population ages and is often kept as a family secret. Emergency department workers play an important role in determining elder abuse and related issues. This study determines the effect of elder abuse on psychological resilience in individuals 65 years and older admitted to the emergency department.

Materials and Method: The study data were obtained from 214 elderly individuals via the Information Form, the Hwalek-Sengstock Elder Abuse Screening Test and the Brief Psychological Resilience Scale. Descriptive statistics, Mann-Whitney-U, Kruskal-Wallis and Spearman Rho Correlation analysis were used to evaluate the data.

Results: The senior's mean age was 74.76±6.45 and 51.4% were men. It was determined that 20.6% of the seniors had a history of abuse, most of the perpetrators were the spouse (38.6%) or siblings (29.6%), physical violence was most common (84.4%) and the violence continued for 1.9%. The Hwalek-Sengstock Elder Abuse Screening Test mean score was 2.41±1.75 (low), and it was determined that 36.0% of the seniors experienced abuse. The Brief Psychological Resilience Scale mean score was 18.83±6.77, which corresponds to a medium level. A significant negative relationship was evident between the Hwalek-Sengstock Elder Abuse Screening Test and Brief Psychological Resilience Scale scores ($r = -0.238$; $p = .000$).

Conclusion: Elder abuse is an important problem that requires screening and treatment in emergency departments. As abuse increases, psychological resilience decreases.

Key Words: Elder Abuse; Emergency Service, Hospital; Resilience, Psychological

INTRODUCTION

Elderly population growth is an increasing global situation due to advances in health technology and changing fertility rates. Between 2000 and 2050, the proportion of the world's population aged 60 years or over will double from about 11% to 22% (1). The proportion of the elderly in the total population was 5.7 % in Turkey in 2005 and is expected to be 17.6 by 2050 in total population (2).

An increase in the elderly population leads to an increase in elder abuse, a problem that has been present throughout history in every culture. Elder abuse is a multidimensional phenomenon that covers a variety of behaviours, events and conditions, and which was accepted as a form of domestic violence in the 1970s (3). The WHO defines elder abuse as 'any behavior that is a single or repeated action in any relationship that threatens or damages the health or well-being of the elderly person'. Elder abuse is classified as physical, sexual, material or psychological/emotional abuse and neglect (1,3,4). Elder abuse and neglect occur in many homes, and the abuser is generally a member of the family (89.7%) (4,5). Women, advanced age seniors and those with physical and mental health problems, high stress levels, dementia or cognitive problems, insufficient social support and a history of alcohol or substance abuse constitute high-risk groups for elder abuse (1,4). Elder abuse can lead to physical health problems, such as injuries, permanent injuries and poor health conditions, or psychological problems, such as anxiety, loneliness, loss of honour, trust, hope, depression, reduction in functional capacity and post-traumatic stress disorder. Dong et al. found that abuse is associated with the lowest level of psychological well-being in elder abuse victims. A study conducted in the United States monitored seniors for over 13 years and reported that elder abuse victims were twice as likely to die compared to seniors who did not report any abuse (4-6).

Psychological resilience describes an individual's abilities and resources to successfully cope with adverse situations and readjust to their normal lives (7,8). Psychological resilience in the elderly includes being able to cope with boredom, cope with problems and crises, and establish goal-oriented development (9).

In the global health system, 12%-24% of the cases coming to the emergency department are elderly individuals (10). Elder abuse is an increasingly prominent issue for emergency department personnel, as emergency services can be the first point of contact for an elderly person. The first interactions and interventions of emergency service personnel with elder abuse victims can positively affect healthcare outcomes (11). Most of the morbidity and mortality associated with elder abuse stems from a delay in recognition and response (6). Considering that elder abuse increases with ageing and will be an important problem in the near future, it is essential to conduct studies on and find solutions to this issue. However, the number of studies on elder abuse presenting in the emergency department is limited. Based on a lack of national (11) and international (1,6) studies involving elder abuse in emergency services, this study aims to determine the effect of elder abuse on psychological resilience in individuals 65 years and older visiting the emergency department.

METHODS

Type and Date of Study

The study was conducted as a cross-sectional analytical study between April 2018 and March 2019.

Study Questions

- What is the abuse rate of seniors aged 65 years and older visiting the emergency department?
- What factors affect the abuse of seniors aged 65 years and older visiting the emergency department?

- What effect does elder abuse have on the psychological resilience of individuals aged 65 years and older visiting the emergency department?

Study Population and Sample

Population

The study population comprised all patients aged 65 years and over who visited the emergency department.

Sample

For sample calculation, it was determined that 5,255 patients aged 65 and over visited the emergency department between March 2018 and March 2019. The sample size was calculated based on the 11% data obtained the frequency of elder abuse. The formula $n = Nt^2pq/d^2(N-1) + t^2pq$ was used for the calculation (12). Using sampling error of 0.05 in the calculation, we obtained a minimum sample number of 147. The patients to be sampled were selected using simple random sampling. A total of 233 individuals over the age of 65 years were interviewed, and the sample comprised 214 seniors (91.8%).

Data Collection Tools

Study data were collected using the general information form, the Hwalek-Sengstock Elder Abuse Screening Test (H-S/EAST) and the Brief Psychological Resilience Scale (BPRS).

General information form. The researchers created a questionnaire form comprising 16 questions to obtain demographic information, such as age, gender, marital status, place of growing up, economic status, social security and history of abuse of the participants (1,3,5,6).

Hwalek-Sengstock Elder Abuse Screening Test(H-S/EAST). The H-S/EAST is a two-point Likert-type scale consisting of 14 "yes" and "no" questions divided into three subdimensions: characteristics of the vulnerable elderly (3 items), violation of personal rights and direct abuse (5 items) and potential abuse (6 items). A score of 3 and over shows the presence of abuse, and a higher score indicates a higher potential risk of elder abuse. Ozmete carried out the Turkish liability and reliability study in 2016 and obtained a reliability coefficient of 0.81 (13). The current study also obtained a reliability coefficient of 0.81.

Brief Psychological Resilience Scale (BPRS). This scale was developed by Smith et al. in 2008 to measure individuals' self-recovery potential and psychological resilience. Dogan adapted the scale to create the Turkish version in 2013. This self-report measurement tool uses a five-point Likert-type scale ranging from 1 (not suitable at all) to 5 (completely suitable). Items 2, 4, and 6 are coded in reverse, but they must first be reversed in the scoring key. High scores indicate high psychological resilience and low scores indicate low psychological resilience (7). A score of 6-11 indicates low psychological resilience, 12-22 medium psychological resilience and 23-30 high psychological resilience (14). Dogan obtained a reliability coefficient of 0.83 (7), compared to 0.86 obtained in the current study.

Ethical Issues

Approval was obtained from the Ethics Committee on 14 March 2018 (No. 80576354-050-99/45). Additional approval was obtained from the chief physician of the hospital where the study was conducted on 29 March 2018 (No. 66093324-00.99-E.9860) and from the developers of the measurement tools used. Informed consent was obtained from the patients included in the study.

Data Evaluation

The data obtained in the study were evaluated using SPSS version 20.0. The Shapiro-Wilk normal distribution test was performed after data entry for statistical analysis. According to the test results, the data were not normally distributed. Descriptive statistical methods (mean, number and percentage), including the Mann-Whitney U to compare the means of two groups between the sociodemographic characteristics and scales, the Kruskal-Wal-

lis test to compare the differences between three and more independent means, and Spearman's Rho Correlation to evaluate the relationships between the H-S/EAST and the BPRS, were used in the statistical analyses. A p-value < .05 was considered statistically significant.

RESULTS

The sociodemographic characteristics of the participants revealed that their mean age was 74.76±6.45, 51.4% were men, 98.5% were born in the Eastern Anatolian Region of Turkey, 99.0% grew up there, 63.1% were married, 50.9% were illiterate, 52.3% lived with extended family, 86.0% had social security, 65.4% had a medium level economic status and 50.9% were the only individual in the family that was 65 years or older.

An examination of the participants' abuse history showed that 20.6% had a history of abuse and that 1.9% were still being subjected to it. Most of the seniors who experienced abuse (n = 44, 20.6%) stated that the abuser was the spouse (n = 17, 38.6%) or a sibling (n = 13, 29.5%). Elder abuse took place in the form of physical abuse (n = 38, 86.3%), emotional abuse (n = 18, 40.9%) and economic abuse (n = 4, 9.1%). The seniors' response to the abuse was not saying anything (n = 33, 75.0%), going to the police (n = 4, 9.1%), having the abuser apologise and making up (n = 2, 4.5%), severing relationships with the

abuser (n = 2, 4.5%), leaving home (n = 1, 2.3%) and striking back (n = 1, 2.3%).

The scale score distributions (Table 1) showed that the H-S/EAST mean score was 2.41±1.75 and that the elder abuse level was low. The BPRS mean score was 18.83±6.77, indicating a medium level of psychological resilience.

Of the participants, 36.0% obtained a score of 3 and above on the H-S/EAST, indicating that they had experienced abuse (Figure 1).

A comparison of the H-S/EAST scores according to the participants' sociodemographic characteristics (Table 2) showed that age, gender, marital status, educational level, social security and monthly income level did not create a statistically significant difference in abuse scores (p > .05). However, those living within the nuclear family had vulnerable el-

Figure 1. Elder abuse classification (n = 214).
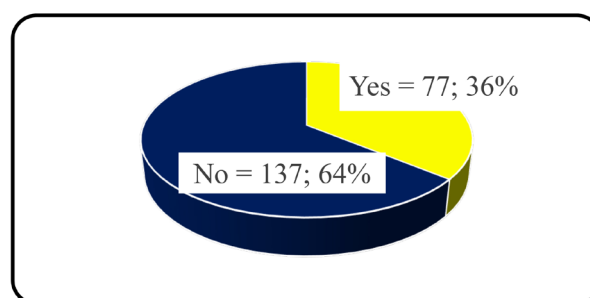
Table 1. Scale Score Distributions

Scales		Achievable Scores Min – Max Score	In This Study Min – Max Score	X ± SD
H-S/EAST	Characteristics of the Vulnerable Elderly	0-3	0-3	1.28 ± 0.71
	Violation of Personal Rights and Direct Abuse	0-5	0-4	0.54 ± 0.85
	Potential Abuse Situation	0-6	5-20	0.57 ± 0.90
	Total Score	0-14	0-10	2.41 ± 1.75
BPRS		6-30	6-30	18.74 ± 6.67

Table 2. Median H-S/EAST Scores According to the Participants' Sociodemographic Characteristics (n = 214)

SCALE / Individual Characteristics	Hwalek-Sengstock Elder Abuse Screening Test (H-S/EAST)							
	Characteristics of the Vulnerable Elderly		Violation of Personal Rights and Direct Abuse		Potential Abuse Situation		TOTAL	
	Mean Ranks	U; χ^2; p	Mean Ranks	U; χ^2; p	Mean Ranks	U; χ^2; p	Mean Ranks	U; χ^2; p
Age[a]	-0.085		0.090		0.125		0.048	
Gender								
• Female	106.53	U = -0.246 p = .805	111.76	U = -1.132 p = .258	114.42	U = -1.842 p = .066	113.86	U = -1.508 p = .131
• Male	108.42		103.47		100.96		101.49	
Marital Status								
• Married	106.96	U = -0.184 p = .854	104.61	U = -1.030 p = .303	103.51	U = -1.428 p = .153	103.74	U = -1.198 p = .231
• Widow	108.42		112.43		114.32		113.92	
Educational Level								
• Illiterate	105.13		110.11		108.17		109.08	
• Literate	92.24		108.06		106.94		96.81	
• Primary School	116.10	χ^2 = 6.684 p = .154	104.57	χ^2 = 1.341 p = .854	103.00	χ^2 = 4.156 p = .385	107.96	χ^2 = 2.594 p = .628
• High School	137.38		89.88		117.00		117.81	
• College/University	126.00		114.25		177.75		153.25	
Family type								
• Nuclear	119.35		98.62		100.71		106.56	
• Extended	97.42	χ^2 = 7.863 **p = .020**	112.20	χ^2 = 8.498 **p = .014**	111.33	χ^2 = 4.434 p = .109	105.83	χ^2 = 3.139 p = .208
• Broken	107.93		152.86		138.28		146.93	
Social Security								
• Yes	105.04	U = -1.587 p = .113	107.14	U = -0.246 p = .805	109.58	U = -1.409 p = .159	106.98	U = -0.312 p = .755
• No	122.57		109.73		94.75		110.67	
Monthly income level								
• Bad	123.00		114.40		118.17		125.33	
• Medium	105.49	χ^2 = 4.742 p = .093	106.25	χ^2 = 0.918 p = .632	104.59	χ^2 = 2.108 p = .349	103.80	χ^2 = 4.714 p = .095
• Good	95.97		103.92		106.25		100.30	
Presence of other family members aged 65 years and older, with whom they are living?								
• Yes	103.75	U= -0.961 p = .337	101.71	U= -1.551 p = .121	98.19	U= -2.503 **p = .012**	98.48	U= -2.160 **p = .031**
• No	111.11		113.07		116.47		116.19	

a Spearman correlation test is used here.

derly characteristics compared to those living within the extended family (p = .020), those living in broken families experienced more violation of personal rights and direct abuse compared to those living in a nuclear family (p = .014), and those living without another family member aged 65 years and older had higher potential abuse (p=0.012) subdimension and total abuse (p=0.031) median scores than those living with another family member of their own age.

A comparison of the seniors' abuse history according to H-S/EAST scores (Table 3) showed that the potential abuse (p=0.028) subdimension and total abuse (p=0.003) scores were higher in those with a history of abuse than in those without. In addition, the characteristics of the vulnerable elderly (p=0.034) subdimension, the violation of personal rights and direct abuse (p=0.028) subdimension and the total abuse (p=0.007) median scores were significantly higher in those who were currently subjected to abuse than in those who were not.

The examination of the relationships between the participant's H-S/EAST and BPRS scores (Table 4) showed evidence of a statistically significant negative relationship between abuse and psychological resilience (r=-0.248; $p < .01$).

DISCUSSION

Today, elder abuse is an important social and public health problem that threatens the health of the elderly. In the current study, 20.6% of the participating seniors had a history of abuse, 1.9% were still being subjected to it, and most of them were abused by their spouse (38.6%) or sibling (29.5%). The forms of abuse included physical abuse (86.3%), emotional abuse (40.9%) and economic abuse (9.1%), and most of the abuse victims (75.0%) did not say anything after being subjected to the abuse. According to Chokkanathan, the main perpetrators were spouses (28.0%), adult children (23.3%), mothers-in-law/grandchild (11.2%) or others (12.1%, mostly relatives/neighbours), and approximately 9% of the abuse victims did not mention their relationship with the perpetrator (15). Rosen et al. reported that the abuser was most frequently the victim's son (37%), husband (25%) or daughter (19%) (6), and Abdel Rahman and El Gaafary reported that 70% of the perpetrators were daughters-in-law, 59.1% were daughters or sons and 28% were spouses (16). As elder abuse is mostly a domestic violence phenomenon, it is often difficult to identify the abuser without obvious signs of physical injury, especially

Table 3. Median H-S/EAST Scores According to the Participants' Abuse History (n = 214)

SCALE / Abuse history	Hwalek-Sengstock Elder Abuse Screening Test (H-S/EAST)							
	Characteristics of the Vulnerable Elderly		Violation of Personal Rights and Direct Abuse		Potential Abuse Situation		TOTAL	
	Mean Ranks	U; χ^2; p	Mean Ranks	U; χ^2; p	Mean Ranks	U; χ^2; p	Mean Ranks	U; χ^2; p
Abuse history								
• Yes	119.32	U =-1.880 p = .060	116.42	U =-1.559 p = .119	120.91	U =-2.203 **p = .028**	129.06	U =-2.993 **p = .003**
• No	101.84		102.61		101.42		99.26	
Is the person still subjected to abuse?								
• Yes	62.75	U = -2.124 **p = .034**	62.25	U = -2.199 **p = .028**	58.50	U =-1.801 p = .072	70.13	U =-2.686 **p = .007**
• No	39.33		39.36		39.55		38.94	

Table 4. Relationships between H-S/EAST and BPRS Scores (n = 214)

	SCALES	H-S/EAST				BPRS
		Characteristics of the Vulnerable Elderly	Violation of Personal Rights and Direct Abuse	Potential Abuse Situation	Total Score	
H-S/EAST	Characteristics of the Vulnerable Elderly					
	Violation of Personal Rights and Direct Abuse	.023**				
	Potential Abuse Situation	.181**	.368**			
	Total Score	.632**	.606**	.742**		
BPRS		-.172*	-.198**	-.123**	-.248 **	

* $p < .05$ ** $p < .01$

in countries such as Turkey where violence has been made part of society by proverbs such as 'spare the rod and spoil the child', 'beating is a discipline from heaven' and 'don't let it out of this room'. The phenomenon of abuse is often kept secret between the victim and the perpetrator.

According to the distribution of scale scores used in the current study, the abuse level of the elderly was low and their psychological resilience was medium (Table 1). It is thought that the fear of isolation and the fear of being subjected to even more abuse if they say anything is effective in driving the senior's decision to hide the abuse from relatives.

The results showed that 36.0% of the participating seniors were subjected to abuse (Figure 1). Yon et al. (2019) reported in their meta-analysis research of individuals aged 60 and older that the elderly abuse rate in the last year was 14.1%. The forms of abuse were psychological abuse (11.8%), neglect (4.1%), economic abuse (3.8%), sexual abuse (2.2%) and physical abuse (1.9%) (17). Aslan and Erci reported in their study conducted in Malatya/Turkey with individuals aged 65 years and older that 26.8% of the seniors were subjected to physical abuse, 26.9% to economic abuse, 12.6% to sexual abuse

and 56.5% to neglect (18). Chokkanathan obtained an abuse rate of 8.3% in a study conducted in Singapore with seniors aged 60 years and older (15). In their study on elder abuse conducted in Portugal with individuals aged 60 years and older, Gil et al. reported that the overall prevalence of elder abuse for the previous 12 months was 15% and that economic and psychological abuse were the most frequent with 6.3% and sexual abuse was the least frequent with 0.2% (19). Finally, in their study conducted with individuals aged 60 years and older in West Nigeria, Cadmus and Owoaje found that elder abuse was present among 30% of the elderly and that the most common forms of abuse were physical abuse (14.6%), economic abuse (13.1%), psychological abuse (11.1%), neglect (1.2%) and sexual abuse (0.04%) (20). These differences in the prevalence of elder abuse may arise from differences in the conceptualisation of culture-specific abuse, in the tools used and the study methodology, and from differences in socio-economic levels.

The H-S/EAST score comparison according to the participants' sociodemographic characteristics (Table 2) showed that age, gender, marital status, educational level, social security and monthly in-

come level did not create a significant difference in abuse scores ($p > .05$). However, the characteristics of the vulnerable elderly were significantly associated with the family type ($p = .020$) and violation of personal rights ($p = .014$) subdimensions. In addition, the potential abuse ($p = .012$) subdimension and total abuse ($p = .031$) median scores of those not living with another 65 years and older family member were statistically higher than those who were. In the current study, those seniors living in nuclear families and those living in a broken family were more exposed to direct abuse. Participants with no other family member over the age of 65 years were at risk for abuse. The literature indicates that women (6,16, 18,19,20), those living alone (15), those living in a broken family/widows/divorcees/singles (16,18,21), those with a low education level (18-21) and those of advanced age (16,19,20) have an increased rate of exposure to elder abuse. However, Chokkanathan reported that age and gender do not have a significant effect on elder abuse (15).

In the current study, the H-S/EAST score comparison according to the history of abuse (Table 3) revealed that the median scores of abuse were significantly higher in those who had a history of abuse than those who did not and those who were still being exposed to it than those who were not. In the study of Chokkanathan, seniors with a family history of violence experience more abuse (15).

In the current study, as the abuse level increased, the psychological resilience significantly decreased (Table 4) ($r = -0.248$; $p < .01$). Exposure to abuse and violence, which reduces psychological resilience (8,15,16,21-24), is an external factor (25). Psychological resilience has a protective effect on mental health against the consequences of abuse, which suggests that the higher the resilience level of these individuals, the less anxiety, insufficiency, decreased self-esteem, depression and fatigue they experience.

This study contributes to the existing literature on abuse patterns in elder abuse and the relationship of abuse with psychological status. To our knowledge, this study is the first to investigate and define abuse in elderly patients admitted to the emergency department in our region.

This study has a variety of limitations. Firstly, cross-sectional structure of the study design will not allow us to determine the causative relationships. Secondly the fact that the elderly tend to hide the elderly abuse, have fear that they would be exposed to greater abuse if they told it, usually deny the abuse they are exposed to by their relatives and are ashamed of explaining it, makes it difficult to obtain the data. Thirdly the questionnaire is based on self-report. Although self-report questionnaires are a valuable method in psychological research, relying on such questionnaires alone is a limitation, because there is a potential for subjective prejudice. Prior to applying data collection tools to the elderly who were included in the study, no measurement tool showing whether they were cognitively healthy or not and evaluating their cognitive functions, was applied to them. The results in the study depend on the accuracy of the evaluation of data collection tools by the elderly who were included in the study and their responses to the questionnaire and scale items aimed at determining the abuse prevalence. Fourthly the city where the study was conducted only has two hospitals. The findings of the study were obtained from the elderly coming to the emergency service of only one hospital. Thus the results attained are limited to the data acquired from these people and can not be generalized to all elderly. On the other hand, unclear questions were explained to the elderly with lower cultural and educational level one by one in detail and they were made respond objectively. From this point of view, it is possible to consider this situation a strong aspect of the study in terms of the reliability of results.

CONCLUSIONS AND RECOMMENDATIONS

The findings determined that 36.0% of seniors experienced elder abuse and that psychological resilience significantly decreased as elder abuse levels increased. Emergency department workers are in an ideal position to identify and respond to individuals experiencing elder abuse. Awareness about a situation is the first step in stopping its progression. Training programmes and written protocols should be developed to enable emergency medical professionals to increase their knowledge about various forms of abuse, related problems and indicators, and effective response methods.

In addition, social welfare interventions at the national level and in line with cultural norms are required to correct this global problem and to increase psychological resilience.

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RESEARCH

THE RELATIONSHIP BETWEEN CHRONIC MUSCULOSKELETAL PAIN, QUALITY OF LIFE AND SARCOPENIA

ABSTRACT

Introduction: Musculoskeletal-pain and sarcopenia are common in elderly and negatively affect living. The objectives were:1-to evaluate the rate of sarcopenia and sarcopenia-related factors according to the European Working Group on Sarcopenia in Older-People-2-2019 algorithm, 2-to compare the rate of probable sarcopenia, sarcopenia parameters and quality of life according to both presence or absence of chronic musculoskeletal-pain and whether the pain is regional or generalized.

Materials and Method: A total of 249-patients were enrolled in this study. The variables: the demographic data, sarcopenia parameters (SARC-F-questionnaire, hand-grip strength, chair-stand test, gait speed), visual analogue scale-pain and quality of life (short-form-36). The patients were divided into two-groups according to presence and absence of chronic musculoskeletal-pain and the chronic pain was divided into three-groups: according to being generalized or regional (one and more than one-site).

Results: Probable sarcopenia was found in 21.6% of all patients, while 73.4% had chronic musculoskeletal-pain. The patients with chronic pain (28.4%) had a higher-rate of sarcopenia than patients without pain (3%)(p<0.001), and all the sarcopenia and quality of life parameters were statistically worse. The rate of sarcopenia, social-function, gait-speed, chair-stand test were found similar in three pain groups, visual analog scale-pain(p=0.001), the most of quality of life-parameters, SARC-F-score(p<0.001) and grip-strength(p=0.009) were significantly better in regional pain in one-site.

Conclusion: Female gender, age, diabetes, chronic obstructive pulmonary disease and hypertension were associated with sarcopenia. The rate of sarcopenia was found higher, the sarcopenia and quality of life parameters were worse in patients with musculoskeletal-pain. Although grip-strength and SARC-F-score were better in regional pain in one-site, the rate of sarcopenia was similar in pain groups according to being regional or generalized, and quality of life was worse in generalized pain.

Key Words: Chronic Pain; Sarcopenia; Quality of Life

INTRODUCTION

In recent years, the elderly population has been increasing both in Turkey and worldwide. The prevalence of chronic health problems and sarcopenia increase with global aging. Sarcopenia was initially described as age-related muscle mass loss; however, it was later redefined as a dysfunction of the skeletal muscles related with factors such as age, physical inactivity, and nutrition problems. Also, sarcopenia causes disability, morbimortality, and decreases the quality of life (1).

Diagnosing sarcopenia varies due to the different methodologies practiced worldwide. The European Working Group on Sarcopenia in Older People (EWGSOP) 2010 criteria reported a consensus approach (EWGSOP1) which identify sarcopenia based on the presence of low muscle strength or low physical performance in addition to low muscle mass (1). The EWGSOP1 was recently revised in 2019. The revised EWGSOP2 consensus described muscle strength as the key parameter of sarcopenia, with low muscle mass as a diagnostic confirmation of sarcopenia, and poor physical performance as an indication of severe sarcopenia. The EWGSOP2 algorithm recommends the first-line use of the SARC-F questionnaire to identify sarcopenia cases. If results were negative, patients were considered as no sarcopenia; whereas positive results indicate the assessment of muscle grip strength with the use of the grip strength and the chair stand test. If muscle strength were normal, patients were considered as no sarcopenia; but if it were low, sarcopenia probable was considered and muscle mass measurements would be needed to confirm diagnosis. In general, EWGSOP2 recommends that after a positive SARC-F questionnaire response, low muscle strength is sufficient to indicate the assessment of the causes and to start intervention in clinical practice. The first recommended test grip strength which is associated with strength loss of other body parts such as the arm and leg. The other recommended test includes the chair stand test which assesses both endurance and strength (2).

The results of prevalence studies on sarcopenia varied from 15 to 50%, which differed according to age, gender, geographic variables and diagnostic methodologies. Almost all of them were performed based on the EWGSOP1 criteria. The loss of muscle strength rises from 20 to 40% between the 6th and 7th decades (3). According to the EWGSOP1 criteria, the prevalence of sarcopenia reported by a Turkish study was 5.2% (4).

Apart from increased sarcopenia rate, chronic musculoskeletal problems also increase with age. In the literature, there are only a few studies on the relationship between chronic pain and sarcopenia or sarcopenia parameters, and their results are different and conflicting (5-7). To the best of our knowledge, this is the first study which evaluated the relationship between sarcopenia, chronic musculoskeletal pain and quality of life according to the EWGSOP2 algorithm.

The aims of this study were: 1- to evaluate the rate of probable sarcopenia and sarcopenia-related factors according to the European Working Group on Sarcopenia in Older People 2 algorithm, 2- to compare the rate of probable sarcopenia, sarcopenia parameters and quality of life according to both presence or absence of chronic musculoskeletal pain and whether the musculoskeletal pain is regional or generalized.

MATERIALS AND METHOD

This was a single centre, cross-sectional study carried out between July-August 2020. A total of 249 patients (181 females and 68 males) who were admitted to the physical medicine and rehabilitation clinic were enrolled into this study. Inclusion criteria was being 60 years or older. Patients with Alzheimer's disease, Parkinson's disease, cerebrovascular stroke and other neurological disorders, active cancer, acute/subacute pain, active infection, active arthritis, and impaired cognitive status, as well as

immobilised patients were excluded from the study.

A detailed anamnesis was carried out on age, gender, weight, height, educational status, working status, family status, the presence of concurrent diseases such as diabetes mellitus, hypertension, chronic obstructive pulmonary disease (COPD), cane usage and chronic musculoskeletal pain. Chronic musculoskeletal pain was defined as persistent pain lasting more than 3 months. Detailed musculoskeletal examinations were carried out by a physical medicine and rehabilitation specialist to identify the source of musculoskeletal pain. Patients with chronic musculoskeletal pain were divided into three groups; patients with musculoskeletal pain in one part of the musculoskeletal system were accepted as "regional pain in one site" (Group 1), patients with regional musculoskeletal pain in more than one site were accepted as "regional pain in more than one site" (Group 2). Patients with pain in four of five regions (left and right upper region, left and right lower region and axial region) was accepped as "generalized pain" (Group 3). Jaw, chest and abdominal pain are not accepted as generalized pain. The visual analogue scale (VAS) was used for measuring general body pain severity, which was assessed from 0 (no pain) to 10 (worst possible pain) (8).

Short Form 36 (SF-36) was used for quality of life assessment. With 36 items, it evaluates physical function, physical role, emotional role, energy, bodily pain, emotional wellbeing, general health, social function and health change. Each scale ranges from 0 (poor health) to 100 (perfect health) (9).

The SARC-F scale evaluates strength, ambulation, rising from a chair, stair climbing, and history of falls. A score lower than 4 was defined as normal. Low gait speed was defined as walking at ≤ 0.8 m/s (2). The chair stand test measures the time taken for 5 rounds of rising from the sitting position without using arms, and was defined as low when the time taken was > 15 s. Grip strength was measured with a hand-held dynamometer (Baseline, White Plains,

New York, USA), and the cut-off thresholds were 32 kg for males and 22 kg for females (10). Probable sarcopenia was defined according to the EWGSOP2 algorithm as having a low SARC-F score with low muscle strength (grip strength/chair stand test) (2).

Written informed consent was obtained from all patients. Ethics approval was received from the local ethics committee 12/05/20-38 (25403353-050.99-E.51559).

STATISTICAL ANALYSIS

The distribution of each continuous variable was tested for normality using the Shapiro-Wilk test. Non-normally distributed variables were compared using the Mann-Whitney U test and Kruskal-Wallis test ve Bonferroni Post hoc Test are expressed as median values (25%-75%). Categorical variables are expressed as frequencies and percentages, and were compared using the Chi-square test. The Spearman correlation coefficient was used as the correlation analysis (a coefficient of <0.1: negligible correlation, 0.1-0.39: weak correlation, 0.4-0.69: moderate correlation, 0.7-0.89: strong correlation, ≥0.9: very strong) (11). A p-value of < 0.05 was considered significant. All analyses were performed using the SPSS version 22.0 software (SPSS Inc., Chicago, IL, USA).

RESULTS

A total of 249 patients (181 females, 68 males) (mean age, 67.6 ± 6.34 years) were enrolled. Probable sarcopenia was identified in 54 (21.6%) patients. Age was found to be higher in probable sarcopenia patients than those without sarcopenia. Although the number of females was higher in both groups, significantly higher rates of probable sarcopenia were found in females than males. In patients without chronic diseases, frequency of probable sarcopenia was found to be significantly lower than in those with concurrent chronic diseases. In terms of distribution of chronic diseases, sarcopenia rate was

higher in patients with diabetes mellitus, COPD, hypertension and knee prosthesis. Among the probable sarcopenia patients, the rate of working patients was lower, while the rates of retired patients, those living with extended family, and cane usage were higher (Table 1).

Probable sarcopenia was found to be higher in females (25.9%) than in males (10.2%). (Table 1). Sarcopenia rate as well as all quality of life and sarcopenia parameters were found to be significantly different between females and males. In females, the VAS-pain score, SARC-F score, and the duration

Table 1. Comparison of demographic characteristics between sarcopenia probable and no sarcopenia patients

	No sarcopenia (n=195)	Sarcopenia probable (n=54)	p value
Age (median %25-%75)	66.0 (62.0-70.0)	69.5 (64.7-77.0)	<0.001
Gender (female/male) n (%)	134 (68%) / 61 (31%)	47 (87%) / 7 (12.9%)	0.008
Body Mass Index	29.6 (26.7-32.8)	29.5 (27.2-33.0)	0.853
Any other diseases n (%)	160 (82.0%) /35 (17.9%)	51 (94.4%) / 3 (5.5%)	0.025
DM	60 (30.7%)	26 (48.1%)	0.017
Cardiac Disease	38 (19.4%)	13(24.0)	0.460
COPD	21 (10.7%)	12 (22.2%)	0.028
Hipertansion	93 (47.6%)	37 (68.5%)	0.007
Thyroid disease	19 (9.7%)	3 (5.5%)	0.337
Knee prothesis	14 (7.1%)	9 (16.6%)	0.034
Low back surgery	12 (6.1%)	4 (7.4%)	0.740
Working status n (%)			
Working	10 (19.5%)	2 (3.7%)	0.039
Not working	102 (52.3%)	12 (22.2%)	
Retired	83 (42.5%)	40 (74.0%)	
Educational status n (%)			
Primary school and lower	167 (85.6%)	51 (94.4%)	0.148
High school	10 (5.1%)	0 (0%)	
University and higher	18 (9.2%)	3 (5.5%)	
Family status n (%)			
Alone	26 (13.3%)	7 (12.9%)	0.047
Nuclear family	133 (68.2%)	28 (51.8%)	
Extended family	36 (18.4%)	18 (33.3%)	
Cane usage n (%)	15 (7.6%)	20 (37.0%)	<0.001

(DM: Diabetes mellitus, COPD: Chronic obstuctive pulmonary disease)

of chair stand test were higher, while quality of life dimentions, gait speed, and grip strength were lower (Table 2).

All areas of quality of life (SF-36) significantly correlated with VAS-pain scores (weak to moderate correlation) and all sarcopenia parameters (with SARC-F: moderate to strong correlation, with gait speed, grip strength, chair stand test: weak to moderate correlation) (p<0.001), and VAS-pain scores significantly correlated with all sarcopenia parameters (with SARC-F: moderate correlation, with gait speed, grip strength and chair stand test: weak correlation) (p<0.001) (Table 3).

The average age was similar between the patients with (n=183) and without pain (n=66) (p=0.055). The rate of probable sarcopenia was significantly higher

in the patients with chronic pain than the patients without pain (p<0.001). Furthermore, all the short form-36 subgroups and the sarcopenia parameters were worse in the patients with chronic pain than the patients without pain (Table 4).

When the patients with chronic pain were evaluated according to having regional [in one (n=71) or more sites (n=67)] or generalized pain (n=45); the average age was found similar between them (p=0.227). The rate of probable sarcopenia, social function dimention of quality life, two of the sarcopenia paremeters (gait speed and chair stand test) was found similar between three groups. The comparison of group 1 and 2 showed that, VAS-pain (p=0.002), physical function (p=0.026), role physical (p=0.001), role emotional (p=0.017), ener-

Table 2. Comparison of sarcopenia and quality of life parameters according to gender

	Female median (%25-%75) (n=181)	Male median (%25-%75) (n=68)	p value
Age	66.0 (62.5-70.0)	67 (63-72)	0.357
SF-36 subgroups			
Physical function	50 (30-70)	80 (60-95)	<0.001
Role physical	50 (0-100)	100 (50-100)	<0.001
Role emotional	33.3 (0-66.7)	33.3 (66.7-100)	<0.001
Bodily pain	55 (32.5-77.5)	55 (25.4-73.7)	<0.001
Energy	40 (25-52.5)	60 (50-75)	<0.001
Emotional wellbeing	56 (40-72)	72 (56-80)	<0.001
General health	55 (35-70)	65 (55-75)	<0.001
Social function	100 (50-100)	100 (78.1-100)	0.003
Sarcopenia parameters			
SARC-F score	4 (2-5)	1 (0-4)	<0.001
Gait Speed	0.87 (0.71-1.0)	1.04 (0.9-1.24)	<0.001
Grip Strength	22 (18-24)	38 (32-44)	<0.001
Chair Stand Test	14 (13-18)	12 (10-14)	<0.001
VAS-pain	6 (5-8)	4 (0-6)	<0.001

Table 3. Correlations of sarcopenia parameters with both quality of life scores and visual analog scale scores

	Age	VAS-pain	SARC-F score	Gait speed	Grip strength	Chair stand test
Age	-	r=-0.096 p=0.140	r=0.169 p=0.008	r=-0.280 p<0.001	r=-0.143 p=0.030	r=0.097 p=0.239
VAS-pain	r=-0.096 p=0.140	-	r=0.426 p<0.001	r=-0.266 p<0.001	r=-0.267 p<0.001	r=0.302 p<0.001
SF – 36 subgroups						
Physical function	r=-0.173 p=0.006	r=-0.463 p<0.001	r=-0.805 p<0.001	r=0.556 p<0.001	r=0.523 p<0.001	r=-0.502 p<0.001
Role physical	r=-0.104 P=0.101	r=-0.430 p<0.001	r=-0.702 p<0.001	r=0.465 p<0.001	r=0.418 p<0.001	r=-0.449 p<0.001
Role emotional	r=-0.018 p=0.778	r=-0.416 p<0.001	r=-0.647 p<0.001	r=0.392 p<0.001	r=0.380 p<0.001	r=-0.339 p<0.001
Bodily pain	r=0.050 p=0.433	r=-0.588 p<0.001	r=-0.718 p<0.001	r=0.447 p<0.001	r=0.384 p<0.001	r=-0.466 p<0.001
Energy	r=0.137 p=0.031	r=-0.444 p<0.001	r=-0.632 p<0.001	r=0.447 p<0.001	r=0.461 p<0.001	r=-0.413 p<0.001
Emotional wellbeing	r=0.086 p=0.177	r=-0.377 p<0.001	r=-0.448 p<0.001	r=0.327 p<0.001	r=0.351 p<0.001	r=-0.314 p<0.001
General health	r=0.020 p=0.751	r=-0.422 p<0.001	r=-0.628 p<0.001	r=0.425 p<0.001	r=0.403 p<0.001	r=-0.436 p<0.001
Social function	r=-0.053 p=0.409	r=-0.314 p<0.001	r=-0.455 p<0.001	r=0.300 p<0.001	r=0.268 p<0.001	r=-0.340 p<0.001

(SF-36: Short Form-36)

gy (p=0.003) dimentions of quality of life was significantly better in group 1. And the comparison of group 1 and 3 showed that, VAS-pain (p=0.002) all of the qualiy of life dimentions except social function, grip strength (p=0.002) and SARC-F score (p=0.013) was significantly better in group 1. The comparison of group 2 and 3 showed that only two of the quality of life dimentions [emotional wellbeing (p=0.002) and bodily pain (p=0.009)] were better in group 2 (Table 5).

DISCUSSION

This study described both the rate of probable sarcopenia, the factors associated with sarcopenia and the relation between sarcopenia, chronic musculoskeletal pain and quality of life in an outpatient clinic using the EWGSOP2 recommended diagnostic algorithm. And found a strong relationship between probable sarcopenia, chronic musculoskeletal pain and poor quality of life.

Sarcopenia can be screened using dual X-ray absorptiometry, bioimpedance analysis, computerised tomography, and magnetic resonance imaging (2). These procedures require time for both patients and hospital personnel. By considering the economic costs as well, there is doubt that these tests add extra value to the diagnosis of sarcopenia. In clinical practice, EWGSOP2 suggests that the SARC-F

Table 4. The comparison of the quality of life, sarcopenia parameters and the rate of probable sarcopenia between patients with chronic pain and patients with no chronic pain

	Chronic pain (n=183) median (%25-%75)	No pain (n=66) median (%25-%75)	p value
SF-36 subgroups			
Physical function	50 (30-70)	85 (65-95)	p<0.001
Role physical	50 (0-75)	100 (75-100)	p<0.001
Role emotional	33.3 (0-66.7)	66.7 (66.7-100)	p<0.001
Bodily pain	45 (32.5-67.5)	100 (90-100)	p<0.001
Energy	40 (25-50)	60 (50-76.2)	p<0.001
Emotional wellbeing	56 (40-68)	76 (64-80)	p<0.001
General health	55 (35-65)	70 (60-80)	p<0.001
Social function	100 (50-100)	100 (87.5-100)	p<0.001
Sarcopenia parameters			
SARC-F score	4 (2-5)	1 (0-2)	p<0.001
Gait Speed	0.84 (0.70-1.0)	1.06 (0.96-1.25)	p<0.001
Grip Strength	22 (18-28)	30 (24-40)	p<0.001
Chair Stand Test	14 (12-18)	12 (9.6-14)	p<0.001
The rate of sarcopenia n (%)	52 (28.4%)	2 (3%)	p<0.001

(SF-36: Short Form-36)

questionnaire and muscle strength measurement are sufficient to indicate the assessment of causes of sarcopenia and the start of intervention.

In our study, patients with positive SARC-F questionnaire results and low muscle strength were described as probable sarcopenia and they accounted for 21.6% of all patients. Furthermore, sarcopenia was found to be associated with age, female gender, chronic diseases, and chronic musculoskeletal pain. In another study from Turkey, Erkoyun et al. investigated sarcopenia risk according to EWGSOP1, and reported a prevalence of having both low grip strength and low gait speed to be 30.1%. It was also reported that the risk of sarcopenia increases with age (12). Consistent with studies from other countries and Turkey (4,12), sarcopenia parameters correlated with age. Muscle mass loss is associated with decreased hormone levels, increased proinflammatory cytokines and reactive oxygen radicals with aging (13). Early detection of sarcopenia is important; resistance exercises, increased protein intake, vitamin D and omega 3 supplementations are recommended in elderly (14). In terms of quality of life, age only correlated with physical function and energy parameters, which are expected to decrease with age. However, other parameters did not correlate with age. Consistent with the results from previous studies (15), aging did not decrease quality of life, suggesting that it is possible to achieve long periods of good quality of life with physical activities such as walking (16).

Table 5. The comparison of the VAS-pain scores, quality of life, sarcopenia parameters and the rate of probable sarcopenia between the patients with regional pain in one site, the patients with regional pain in more than one site and the patients with generalized pain

Variables	Chronic pain (n=183) No pain			p value	Bonferroni Post hoc Test
	Group 1 Regional pain in one side (n=71) median (%25-%75)	Group 2 Regional pain in more than one side (n=67) median (%25-%75)	Group 3 Generalized Pain(n=45) median (%25-%75)		
VAS-pain	6 (5-8)	7 (6-8)	8 (6-8)	0.001	1-2: 0.002 1-3: 0.002
SF-36 subgroups					
Physical function	60 (45-80)	45 (25-60)	35 (15-62.5)	0.001	1-2: 0.026 1-3: 0.001
Role physical	50 (25-100)	25 (0-75)	25 (0-50)	<0.001	1-2: 0.001 1-3: <0.001
Role emotional	66.7 (33.3-66.7)	33.3 (0-66.7)	0 (0-33.3)	<0.001	1-2: 0.017 1-3: 0.001
Bodily pain	55 (32.5-67.5)	45 (32.5-67.5)	42.5 (22.5-55)	<0.001	1-3: <0.001 2-3: 0.009
Energy	45 (30-65)	40 (25-50)	25 (20-35)	<0.001	1-2: 0.003 1-3: <0.001
Emotional wellbeing	60 (40-76)	56 (44-72)	40 (28-60)	<0.001	1-3: <0.001 2-3: 0.002
General health	60 (50-70)	55 (35-70)	40 (25-50)	<0.001	1-3: 0.003
Social function	100 (50-100)	100 (50-100)	50 (25-100)	0.052	
The sarcopenia parameters					
SARC-F score	3 (1-5)	4 (3-6)	4 (3.5-6.5)	<0.001	1-3: 0.013
Gait Speed	0.9 (0.82-1.02)	0.82 (0.68-1)	0.77 (0.59-1.02)	0.065	
Grip Strength	24 (20-32)	22 (16-26)	20.5 (16-24.5)	0.009	1-3: 0.002
Chair Stand Test	13 (12-16)	15 (13-19)	14 (12-19.2)	0.459	
The rate of sarcopenia	15 (21.1%)	24 (35.8%)	13 (28.9%)	0.160	

(SF-36: Short Form-36, VAS-pain: Visual analog scale-pain)

In our study, both the rate of sarcopenia and quality of life were worse in females than males, with 25.9% of female but only 10.2% of males had probable sarcopenia. Although sex-adjusted prevalence varies between countries, sarcopenia and poor quality of life are generally higher in women. Similar to our study, the prevalence of sarcopenia was reported to be 33% in females and 10% in males in Spain, a Mediterranean country such as ours (17). Also a study in the US reported that quality of life was clearly lower in women, and explained that this could be due to sociodemographic and socioeconomic differences (18). All these results showed that women have higher risk of sarcopenia and lower quality of life. These consequences may be related to the place of women in society.

Similar to our study, previous studies have shown a synergistic relationship between chronic diseases and sarcopenia. It has been reported that the prevalence of sarcopenia in diabetic patients was 2-3 times higher than non-diabetics (19). Moreover, a decline in grip strength was reported in middle-aged Japanese-American men with diabetes and COPD (20). Similar results were reported in a prevalence study in Turkey, whereby diabetes and hypertension associated with sarcopenia (4).

In previous studies, socio-economic factors were not found to be associated with sarcopenia (21). In our study, retired patients were found to be at a higher risk for sarcopenia. Retirement may be associated with reduced physical activity, resulting in muscle strength decrease. Family type was also found to be associated with sarcopenia; however, no such association was found with education status. An extended family as a risk factor for sarcopenia was unexpected, but it is possible that patients who are unable to meet their own needs due to sarcopenia mostly require the care of an extended family.

In our study, all of the sarcopenia parameters were better and the sarcopenia rate was significantly higher in patients without chronic pain than those with chronic musculoskeletal pain. Although grip strength and SARC-F score were better in patients with regional pain in one site than patients with generalized pain, the rate of sarcopenia was similar between these groups. Chronic musculoskeletal pain was found to be associated with the higher rate of sarcopenia however being regional or generalized pain does not appear to be associated with high sarcopenia rate. Besides, the severity of pain correlated with SARC-F questionnaire and most of the quality of life parameters moderately. The prevalence of chronic musculoskeletal pain is approximately 50% in elderly people in the community (22), but was reported in 73.4% of all our patients. This rate is high, yet expected since the study was conducted in an outpatient clinic, not in the community. There are, however, conflicting results regarding the relationship between chronic pain and sarcopenia. Similar to our study, Zanin et al. found an association between sarcopenia and chronic pain in 79 institutionalised elderly women with positive SARC-F questionnaire results for sarcopenia (5). Likewise, Hicks et al. reported a relationship between higher low back pain severity and lower trunk muscle attenuation (6). In Japan, Tanishima et al. defined sarcopenia patients as being over 40 years old, having low grip strength, and/or low gait speed with low muscle mass according to the Asian Working Group for Sarcopenia, and low back pain prevalence was similar across the sarcopenia, pre-sarcopenia, and normal groups; but similar to our study, VAS-pain scores were found to be higher in the sarcopenia group (23). On the other hand, a study in Brazil reported no association between hand grip strength and chronic pain (24), and a Japanese study reported no association between appendicular muscle mass and back/low back pain (7). Chronic musculoskeletal problems have been reported to be associated with decreased activities of daily living and quality of life. As the intensity of pain increases with static contraction of muscles, the tendency for patients to protect the pain area increases. Prolonged periods without treatment would hence result in the

loss of muscle strength (25). In light of this, chronic musculoskeletal pain exacerbates sarcopenia progression by inhibiting physical activity.

Our study showed that quality of life was poor in patients with chronic musculoskeletal pain than without pain. Besides, patients with generalized pain had worse quality of life than patients with regional pain in one site. This is an expected result, the relation between pain and quality of life in elderly was reported in earlier studies (26).

There were several limitations in this present study; among them being that a definitive diagnosis of pain such as disc herniation, spinal stenosis, and osteoarthritis was not adopted. However, to the best of our knowledge, our study is the first to find the relationship between sarcopenia and chronic pain according to the EWGSOP2 algorithm. Our results can not be generalised to general population. Further studies are needed to investigate both sarcopenia prevalence in general population in Turkey and the relationship between sarcopenia and definite musculoskeletal conditions such as osteoarthritis.

Our study results showed that; the rate of probable sarcopenia was 21.6% of all patients, and also female gender, age, and chronic diseases, especially diabetes, COPD and hypertension, are associated with sarcopenia. The sarcopenia parameters and quality of life of the patients with chronic musculoskeletal pain were worse than patients without pain. Furthermore, the rate of probable sarcopenia was found higher in patients with chronic musculoskeletal pain than patients without pain. Although quality of life and some of the sarcopenia parameters of the patients with generalized pain were worse than patients with regional pain in one site, the rate of sarcopenia was similar between patients with generalized pain, regional pain in one site and more than one site. In conclusion, a strong relationship between sarcopenia, chronic musculoskeletal pain and poor quality of life was found. Also only age and gender were the non-preventable risk factors for sarcopenia, while chronic diseases and musculoskeletal pain were preventable. To prevent sarcopenia, early and effective treatment for chronic diseases and musculoskeletal problems represent an important target.

Conflict of Interest

All authors declare no conflict of interest.

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RESEARCH

IMMUNIZATION STATUS AND FACTORS AFFECTING INDIVIDUALS AGED 65 YEARS AND ABOVE WITH CHRONIC DISEASES WHO ARE REGISTERED WITH FAMILY PHYSICIANS IN BURDUR PROVINCE

ABSTRACT

Introduction: This study aimed to determine the factors affecting the immunization status of individuals aged ≥65 years with chronic diseases.

Materials and Methods: The population of the study consisted of 24,489 people aged 65 and over with a chronic disease registered to a family doctor in Burdur Province. In order to determine their immunization status, data were collected from 488 people after performing face-to-face interviews by calculating the sample size necessary for 50% prevalence, 5% margin of error, and 97% reliability. The dependent variable of the study was immunization, and socioeconomic status, immunization status, and sociodemographic features were independent variables.

Results: Among those who participated in our study, immunization rates were determined to be 32.8%, 2.7%, and 0.8% for seasonal influenza, pneumococcus, and herpes zoster, respectively. Approximately 34% of subjects had undergone at least one immunization. Factors such as having chronic obstructive pulmonary disorder, financial income, and visiting a family physician or receiving inpatient treatment within the last 3 months affect immunization status.

Conclusion: Immunization levels are insufficient in people aged ≥65 years with chronic diseases. The "Lifelong Immunization Program," which includes childhood immunizations as well as immunization of the elderly, should be developed and implemented by the Ministry of Health. In studies aiming to increase immunization rates, the awareness of physicians, especially family physicians, of old age immunization practices should be increased.

Key Words: Immunization; Aged; Family Physicians

INTRODUCTION

The world population is aging at an unprecedented rate, and it is expected that the proportion of individuals aged ≥60 years worldwide will increase from 12% to 22% between 2015 and 2050(1).

The susceptibility to infectious diseases is increased in people aged ≥65 years. According to 2016 World Health Organization (WHO) data, lower respiratory tract infections are the fourth most common cause of death among men and women (2).

The vaccine is effective in preventing complications and death. It reduces the hospitalization of adults by 50–60%, transfer of elderly people to the intensive care unit by 82%, and their mortality rate by 80% (3).

In the 2019 update of the Adult Immunization Guide of the Infectious Diseases and Clinical Microbiology Specialty Society of Turkey, it is recommended that pneumococcus, influenza, and herpes zoster (HZ) vaccines should be administered to elderly people (4).

Immunization rates in the elderly population vary by country. In 2015, immunization rates in the USA for the population aged ≥65 years were reported to be 73.5% for influenza, 63.6% for pneumococcus, and 34.2% for HZ (5). In Turkey, the influenza vaccination rate was found to be 15.8% in men and 13.0% in women aged ≥65 years, according to a study on chronic diseases and risk factor prevalence. The vaccination rate for pneumococcus was lower and found to be approximately 5% in both sexes (6).

Immunization levels and factors affecting vaccination should be determined, especially in elderly people with chronic diseases, in order to protect and develop the health of the elderly in our province, which has a high rate of elderly population. Therefore, the present study aimed to determine the factors affecting the immunization status of individuals aged ≥65 years with chronic diseases who are registered with a family physician.

MATERIALS AND METHODS

The population of the study consists of 24,489 individuals aged ≥65 years with chronic diseases who are registered with a family physician in Burdur province. The sample size necessary to determine the immunization status was found to be 462 based on 50% prevalence, 5% margin of error, and 97% reliability.

Since the AHBS (Family Physician Information System) was used in the selection of the sample, the number included in the sample was divided by the number of family physicians (FP; 82) who had a non-zero number of registered patients and who had registered patients aged ≥65 years to yield the number of the elderly to be taken from each FP; i.e., 469/82 = 5.6 patients. We decided to choose six people from each FP, and the total number of samples was 492. Six people were determined by randomization. While 488 (99.4%) were contacted, four elderly people could not be reached due to death.

Data collection form

The elderly people were asked about their sociodemographic and socioeconomic levels, knowledge about vaccines and whether they were vaccinated.

Data collection

The data were obtained using a face-to-face interview method from participants who provided verbal consent.

The vaccination status of the elderly with chronic diseases was taken as the dependent variable, and their socioeconomic and sociodemographic features and knowledge of vaccines were taken as independent variables.

The Burdur Mehmet Akif Ersoy University Clinical Trials Ethics Committee approved this study, and verbal informed consent was obtained from each patient.

Statistical evaluation was performed using SPSS version 15.0. (SPSS; IBM Corporation, New York, USA). The analysis of count data was performed using the chi square test; p<0.05 was considered statistically significant. Independent variables identified as statistically significant in the chi-square test were included in the logistic regression analysis.

RESULTS

Among the people aged ≥65 years who participated in our study, immunization rates were 32.8%, 2.7%, and 0.8% for seasonal influenza, pneumococcus, and HZ, respectively; the proportion of individuals to whom at least one vaccine had been administered was 34.0%. The awareness of vaccines was found to be similar to the rate of administration (Table 1).

Table 2 describes the effects of demographic and socioeconomic features, level of knowledge about vaccinations, chronic diseases, and healthcare service use status of the study participants on their level of receiving at least one of the following vaccines: influenza, pneumococcus, and HZ vaccines.

Independent variables with a statistically significant difference were included in the logistic regression analysis. Of these parameters affecting the immunization status of study participants, having

COPD, household income, and presenting to a family physician or receiving inpatient treatment within the last three months affected immunization status.

Of those who did not get vaccinated, 31.6% stated that they would not get vaccinated even if a doctor recommended it. The reasons for not getting vaccinated are presented in Table 4.

DISCUSSION

Among the participants of our study, immunization rates were 32.8%, 2.7%, and 0.8% for seasonal influenza, pneumococcus, and HZ, respectively; the rate of those who received at least one vaccine was 34.0%. Factors such as having COPD chronic disease, household income, and visiting a family physician or receiving inpatient treatment within the last 3 months affect immunization status.

Influenza vaccination rates in the elderly population vary by country. While the coverage rate recommended by the WHO for influenza vaccination in adults aged ≥60 years was 50% for 2006 and 75% for 2010, only a few countries achieved these goals. In South Korea, 75.8% of the population aged ≥65 years is vaccinated against influenza, while the rates are 70.9% in Australia, 71.5% in the USA, 70.8% in England, 68% in New Zealand, 60% in Canada, and 59% in Ireland (7).

Table 1. Vaccine knowledge and frequency of administration

Name of the vaccine	Number of participants who had heard about the vaccine	Number of participants who had not heard about the vaccine	Numberof participants who were vaccinated
Influenza	436 (89.3%)	52 (10.7%)	160 (32.8%)
Pneumococcus	149 (30.5%)	339 (69.5%)	13 (2.7%)
Herpeszoster	45 (9.2%)	443 (90.8%)	4 (0.8%)
Any of them	437 (89.5%)	51 (10.5%)	166 (34.0%)
Total			488 (100%)

Table 2. Effects of factors such as demographic and socioeconomic features, level of knowledge of vaccinations, chronic diseases, and healthcare use status of individuals aged ≥65 years on being vaccinated against influenza, pneumococcus or HZ

Independent variables		Vaccinated	Not vaccinated	Number (%)	P
		Number (%)	Number (%)		
Place of residence	Village/town	75 (30.6%)	170 (69.4%)	245 (100%)	0.05
	State/province	91 (37.4%)	152 (62.6%)	243 (100%)	
Age (years)	65–74	118 (34.9%)	220 (65.1%)	338 (100%)	0.302
	≥75	48 (32.0%)	102 (68.0%)	150 (100%)	
Sex	Female	95 (31.0%)	211 (69.0%)	306 (100%)	**0.045**
	Male	71 (39.0%)	111 (61.0%)	182 (100%)	
Information about vaccination has been given	Yes	166 (38.0%)	271 (62.0%)	437 (100%)	**0.000**
	No	0 (0%)	51 (100%)	51 (100%)	
Marital status	Single/Widowed	36 (26.9%)	98 (73.1%)	134 (100%)	**0.025**
	Married	130 (36.7%)	224 (63.3%)	354 (100%)	
Education status	Literate/illiterate	39 (25.8%)	112 (74.2%)	151 (100%)	**0.007**
	Elementary school and above	127 (37.7%)	210 (62.3%)	337 (100%)	
House of residence	Rental	11 (50.0%)	11 (50.0%)	22 (100%)	0.117
	Family home	155 (33.3%)	311 (66.7%)	466 (100%)	
Whom the patient lives with	Living alone	23 (27.1%)	62 (72.9%)	85 (100%)	0.140
	With spouse/child	143 (35.4%)	260 (64.6%)	403 (100%)	
Health insurance	Insured	166 (34.2%)	319 (65.8%)	485 (100%)	0.286
	Not insured	0 (0%)	3 (100%)	3 (100%)	
Household income	Insufficient	46 (34.6%)	87 (65.4%)	133 (100%)	**0.045**
	Barely sufficient	58 (28.4%)	146 (71.6%)	204 (100%)	
	Sufficient	62 (41.1%)	89 (58.9%)	151 (100%)	
Smoking status	Smoker	55 (39.6%)	84 (60.4%)	139 (100%)	0.06
	Non-smoker	111 (31.8%)	238 (68.2%)	349 (100%)	
Alcohol consumption	Drinker	2 (20.0%)	8 (80.0%)	10 (100%)	0.281
	Non-drinker	164 (34.3%)	314 (65.7%)	478 (100%)	

Immunization according to the type of chronic disease	HT	Yes	121 (37.5%)	202 (62.5%)	323 (100%)	**0.015**
		No	45 (27.3%)	120 (72.7%)	165 (100%)	
	Heart disease	Yes	71 (37.0%)	121 (63.0%)	192 (100%)	0.155
		No	95 (32.1%)	201 (67.9%)	296 (100%)	
	Stroke	Yes	9 (30.0%)	21 (70.0%)	30 (100%)	0.397
		No	157 (34.3%)	301 (65.7%)	458 (100%)	
	Cancer	Yes	9 (39.1%)	14 (60.9%)	23 (100%)	0.373
		No	157 (33.8%)	308 (66.2%)	465 (100%)	
	DM	Yes	68 (38.4%)	109 (61.6%)	177 (100%)	0.074
		No	98 (31.5%)	213 (68.5%)	311 (100%)	
	COPD	Yes	40 (49.4%)	41 (50.6%)	81 (100%)	**0.001**
		No	126 (31.0%)	281 (69.0%)	407 (100%)	
Immunization status by the medical institution where the patient was examined	Private hospital	Yes	18 (40.0%)	27 (60.0%)	45 (100%)	0.233
		No	148 (33.4%)	295 (66.6%)	443 (100%)	
	University hospital	Yes	19 (35.2%)	35 (64.8%)	54 (100%)	0.479
		No	147 (33.9%)	287 (66.1%)	434 (100%)	
	Public hospital	Yes	166 (34.4%)	317 (65.6%)	483 (100%)	0.124
		No	0 (0%)	5 (100%)	5 (100%)	
	Family practice center	Yes	123 (40.6%)	180 (59.4%)	303 (100%)	**0.000**
		No	42 (22.7%)	143 (77.3%)	185 (100%)	
Inpatient treatment status	Treated		23 (46.0%)	27 (54.0%)	50 (100%)	**0.044**
	No		143 (32.6%)	295 (67.4%)	438 (100%)	

Although many countries are included in the national adult vaccination program, the coverage rate of pneumococcal vaccination appears to be mostly low. While vaccination was applied at levels as high as 70% in England and 76% in Spain, it is observed that it remained at lower levels, such as 36% in Ireland and 18% in adults who are at high risk, 15–30% in Norway, 15% in people in Germany who are at high risk in 2014, and ~5% in France (8).

According to the Chronic Diseases and Risk Factors Survey in Turkey, the influenza immunization rate was found to be 15.8% in men and 13.0% in women aged ≥65 years. The vaccination rate for pneumococcus was lower and found to be approximately 5% in both sexes (6). In the present study, it was thought that the high influenza immunization rate was due to the fact that it was provided to the group with chronic disease. However, it was stated that social awareness of pneumococcal vaccine was insufficient.

The risk of HZ increases significantly with age, and it affects half of all people living up to the age of 85 years and causes long-term morbidity. In the USA, the immunization rate for HZ in adults aged ≥65 years was 14.5% between 2007 and 2013 (9). In Canada, the vaccination coverage rate was 8.4% between 2009 and 2013 (10).

In studies conducted among people with chronic diseases, the immunization rates vary by country. According to CDC data, pneumococcal immunization rate in the population aged ≥65 years with any chronic disease was 63.6% (3). In a study conducted in the USA with people aged ≥65 years with chronic

Table 3. Binary logistic regression analysis results including factors affecting immunization against influenza, pneumococcus and HZ in people aged ≥65 years with chronic diseases

Independent Variables		B	S.E.	Wald	Odds Ratio	95% Confidence Interval	P
Household income	Insufficient	0.444	0.221	4.027	**1.558**	1.010–2.404	0.045
	Sufficient				Reference		
COPD	No	0.787	0.263	8.932	**2.198**	1.311–3.683	0.003
	Yes				Reference		
Visited family physician in the last three months	No	0.607	0.226	7.226	**0.545**	0.350–0.848	0.007
	Yes				Reference		
Inpatient treatment in the last three months	No	0.694	0.333	4.353	**0.449**	0.260–0.959	0.037
	Yes				Reference		

diseases, the rate of vaccination against seasonal influenza was 68% and the rate of pneumococcal vaccination was 51% (11). In a study conducted with people with chronic diseases in Korea, immunization status for seasonal influenza was investigated; it was found to be 91.4% in patients with diabetes mellitus, 91.5% in patients with chronic kidney disease, and 85.7% in patients with asthma (12). In Turkey, these rates are much lower. Of the people aged ≥65 years in Mersin, 30.4% were vaccinated;

Table 4. Reasons for not being vaccinated despite the doctor's recommendation

Reason	Number (%)
I find it unnecessary	73 (47.4%)
I am afraid of its side effects	60 (39.0%)
I do not have any idea	14 (9.1%)
I take too many medications	7 (4.5%)

28.1% were vaccinated against influenza and 4.2% were vaccinated against pneumococcus. In a study conducted in Kars, the proportion of people aged ≥65 years who had received any one of the three vaccines—influenza, pneumococcal, and HZ vaccines—was 12.5%; this rate was 31.8% in chronic patients, respectively (13,14).

The immunization rates determined in the current study are lower than those of developed countries and similar to other studies conducted in Turkey. This may be because the growth of the elderly population started earlier in developed countries, and the relevant vaccination policies developed accordingly.

Immunization rates among COPD patients are higher than those among other chronic patient groups. In a multicenter study of COPD patients conducted in Turkey, the rate of influenza vaccination in the previous year was 37.9%, and the rate of at least one pneumococcal vaccination in a life-

time was 13.3% (15). Similarly, patients with COPD vaccinated more than participants who had other comorbidities (12,16). In the present study, the frequency of influenza and pneumococcus vaccination was higher in COPD patients.

In the present study, the immunization rates were observed to be higher among patients who had been hospitalized within the last three months. The presence of a history of hospitalization was also considered among the factors affecting influenza and pneumococcal vaccination in COPD patients by Özsu et al. (17).

In the present study, the immunization rate in the elderly with high household income was found to be higher, consistent with previous studies in the literature (11,18,19). Vaccination rates are higher in high-income western European countries than in middle/low income eastern European countries (20).

In the present study, the immunization rate was significantly higher in patients receiving healthcare services from family physicians than among those who were admitted to secondary public or private healthcare institutions. Many studies have found that the immunization rate is higher when the vaccination is recommended by doctors or healthcare providers, especially by family physicians, and that physicians play a key role in vaccination (7,11,16,21). After a one-day scientific training program for family physicians in the Denizli province the immunization rate increased by 47.9%, reaching 59.5% by the

end of the eighth month. This is a good example showing the influence of family physicians on vaccination (22).

The reasons why those who did not get vaccinated chose not to get vaccinated was found to be similar to the reasons indicated in the literature; 68.4% of those who did not get vaccinated stated that they would get vaccinated if recommended by the doctor (8,16,23).

In conclusion, immunization levels are insufficient in people aged ≥65 years with chronic diseases. The most and least known and administered vaccines are the influenza and HZ vaccines, respectively. The "Lifelong Immunization Program," which includes childhood immunizations, as well as immunization of the elderly, should be developed and implemented by the Ministry of Health. Immunization rates are high in countries that have such a program. Immunization services should be organized at the family practice level to communicate effectively with patients and provide regular healthcare. In studies aiming to increase immunization rates, the awareness of physicians, especially family physicians, of old age immunization practices should be increased.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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RESEARCH

CAN THE C-REACTIVE PROTEIN TO ALBUMIN RATIO PREDICT MORTALITY DUE TO HEMIARTHROPLASTY PERFORMED AFTER HIP FRACTURE IN THE ELDERLY POPULATION?

ABSTRACT

Introduction: Hip fractures are a vital mortality and morbidity problem in the elderly population. This study investigates the role of the c-reactive protein/albumin ratio in mortality after hip fractures.

Materials and Method: The records of 144 patients ages 65 years and older who underwent hemiarthroplasty for hip fractures between 2015 and 2018 were retrospectively analyzed. Patients' records included age, gender, fracture type, American Society of Anesthesiologists score, the time between fracture and surgery, the time between surgery and discharge, length of hospital stay, preexisting comorbidities, preoperative c-reactive protein and albumin levels, and mortality.

Results: The median age of the patients was 79 years (range: 65–101). Regarding sex, 89 patients (61.8%) were female, and 55 patients (38.2%) were male. Based on the univariate analysis, age, comorbidity ≥ 3, American Society of Anesthesiologists score ≥ 4, the time between fracture and surgery ≥ 2 days, the time between surgery and discharge ≥ 5 days, c-reactive protein ≥ 79 mg/L, albumin < 2.85 g/dL, and c-reactive protein/albumin ratio ≥ 29 were found to be risk factors for mortality. Based on the binary logistic regression analysis, age ≥ 85 years, comorbidity ≥ 3, and c-reactive protein/albumin ratio ≥ 29 were independent predictors of mortality.

Conclusion: C-reactive protein/albumin ratio ≥ 29 was a reliable indicator of mortality in elderly patients who underwent hemiarthroplasty for hip fractures. Additionally, being over the age of 85 and having three or more comorbidities was associated with an increased mortality risk.

Keywords: Hip Fractures; C - Reactive Protein; Aged

INTRODUCTION

Hip fractures are a major public health problem and can lead to disability, reduced quality of life, and increased mortality. In general, hip fractures affect around 1.5 million people per year worldwide (1). The number of hip fractures will increase as the elderly population increases around the world. The high incidence of hip fractures combined with high morbidity and mortality rates has turned this into a social and economic burden (2).

Risk factors related to mortality have been the subject of numerous studies (3-6). Many risk factors related to geriatric hip fractures may affect mortality, including age, sex, functional ability before the fracture, type of fracture, type of surgery, preexisting comorbidities, duration of hospitalization, low preoperative hemoglobin, and high American Society of Anesthesiologists (ASA) score (3). Due to the high morbidity and mortality of hip fractures, more work must be done to resolve this issue and reduce the socioeconomic burden it creates.

Some studies have emphasized the importance of high c-reactive protein (CRP) and low albumin levels in hip fractures (4-6). However, there is no consensus on this subject, and studies on the relationship between the CRP/albumin ratio (CAR) and mortality are limited. Thus, this study aims to investigate the role of CAR in mortality after hip fractures. This research also seeks to clarify other risk factors related to mortality due to hip fractures.

MATERIALS AND METHOD

This observational study retrospectively reviewed the records of 144 patients over the age of 65 years who underwent hemiarthroplasty for hip fractures at the Abdurrahman Yurtaslan Oncology Training and Research Hospital from January 2015 to January 2018. Patients under 65 years of age, who died during or prior to surgery, or whose records could not be

found were excluded from the study. Patients' age, sex, fracture type, ASA score, time between fracture and surgery (TFS), time between surgery and discharge (TSD), length of hospital stay, preexisting comorbidities, preoperative CRP and albumin levels, and mortality rates were recorded. Albumin value (g/dL) and CRP value (mg / L) measured in blood serum on day 0 after fracture were recorded.

Ethical approval was obtained from the ethics committee of our hospital to carry out this study. All procedures were done in accordance with the ethical standards of the institution's Human Experiment Committee and the Declaration of Helsinki. Informed consent was obtained from all participants or their family members.

STATISTICAL ANALYSES

Statistical analyses were done using SPSS for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). Qualitative variables were expressed as frequencies and percentages and quantitative variables as medians and interquartile ranges (IQRs). The conformity of numerical data to a normal distribution was assessed using the Kolmogorov- Smirnov test. The Mann–Whitney U test was used for comparative analyses of non-parametric variables between two independent groups, and the independent sample t-test was used for parametric variables. The chi-squared test and Fisher's exact test were used for comparative analyses of categorical variables between independent groups. To determine the optimum cut-off levels of pre-treatment albumin, CRP, CAR, TFS, and TSD, a receiver operating curve (ROC) analysis was done. Following the ROC analysis, the area under the curve (AUC) for the cut-off values as well as their sensitivity and specificity were determined. A binary logistic regression model was used to determine the independent predictors of mortality. All statistical analyses were two way, and the level of statistical significance was set at $p < 0.05$.

RESULTS

The median age of the 144 patients was 79 years (range: 65–101). Regarding sex, 89 patients (61.8%) were female, and 55 patients (38.2%) were male. The patients were divided into two groups survival and death for evaluation. Based on the univar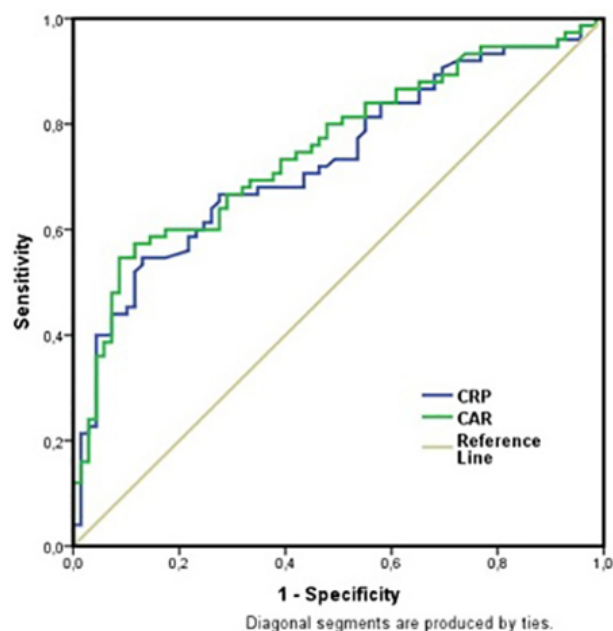iate analysis, age, comorbidity, ASA score, TFS, TSD, CRP, albumin, and CAR were associated with mortality. The death group had a higher rate of older patients (≥ 85 years), patients with comorbidities > 3, and ASA ≥ 4 compared to the survival group. In addition, the median TFS, TSD, CRP, and CAR levels of the death group were higher than the survival group. Fracture type and sex were not found to be associated with mortality (Table 1).

Table 1. Patient Characteristics

Characteristics	Survival (n = 69)	Death (n = 75)	Total (n = 144)	P
Gender, n (%)				
Female	46 (66.7)	43 (57.3)	89 (61.8)	0.249
Male	23 (33.3)	32 (42.7)	55 (38.2)	
Age, n (%)				
65–74	26 (37.7)	8 (10.7)	34 (23.6)	< 0.001
75–84	35 (50.7)	38 (50.7)	73 (50.7)	
≥ 85	8 (11.6)	29 (38.7)	37 (25.7)	
Comorbidity, n (%)				
< 3	59 (85.5)	8 (10.7)	67 (46.5)	< 0.001
≥ 3	10 (14.5)	67 (89.3)	77 (53.5)	
ASA, n (%)				
< 4	58 (84.1)	33 (44.0)	91 (63.2)	< 0.001
≥ 4	11 (15.9)	42 (56.0)	53 (36.8)	
Type of fracture, n (%)				
Neck	32 (46.4)	24 (32.0)	56 (38.9)	0.204
Intertrochanteric	36 (52.2)	50 (66.7)	86 (59.7)	
Subtrochanteric	1 (1.4)	1 (1.3)	2 (1.4)	
TFS, median (Q1–Q3)	1 (1–2)	2 (1–4)	1 (1–3)	0.036
TSD, median (Q1–Q3)	5 (4–6)	6 (4–11)	5 (4–9)	< 0.001
Albumin (g/dL), median (Q1–Q3)	2.8 (2.6–3.0)	2.6 (2.4–2.8)	2.7 (2.5–2.9)	< 0.001
CRP (mg/L), median (Q1–Q3)	79 (52–107)	121 (82–150)	98 (68–129)	< 0.001
CAR, median (Q1–Q3)	28.5 (19.0–38.8)	46.6 (31.7–56.7)	37.4 (23.7–49.5)	< 0.001

ASA: American Society of Anesthesiologists; TFS: time between fracture and surgery; TSD: time between surgery and discharge; CRP: c-reactive protein; CAR: CRP/albumin ratio.

Figure 1. ROC analysis of CRP and CAR

Diagonal segments are produced by ties.

3, and CAR ≥ 29 were independent predictors of mortality (Table 3).

DISCUSSION

Hip fractures in the elderly population continue to be one of the most important issues in the health system, especially in orthopedics. Efforts are underway to solve this public health problem and to reduce the socio-economic burden it creates (3). The main finding of our study is that patients with three or more comorbidities, those over the age of 84 years, and those with a CAR value of 29 and above had a higher mortality rate.

Based on the ROC analysis, the highest significant AUC value for the prediction of mortality was found for CAR (AUC = 0.752) followed by CRP (AUC = 0.731) (Figure 1). The AUC values obtained for TFS (0.597), TSD (0.677), and albumin (0.704) were also found to be statistically significant (Figures 2a-b; Table 2). The binary logistic regression analysis demonstrated that age ≥ 85 years, comorbidities ≥

Although the majority of research in the literature (7-11) recommends that hip fracture patients receive operations without delay to allow for early mobilization (thereby reducing mortality and morbidity), this topic remains controversial, and the effect of time between injury and surgery on mortality is debated. In a 2012 meta-analysis, Moja et al. (10) suggested that surgery should be performed within 2 days after fracture, and they reported more complications in delayed cases. Likewise, Anthony et al. (11) reported higher mortality in 4215 hip fracture patients with a surgical delay of more than 2 days. Similarly, in our study, a time between fracture and surgery of more than 2 days was associated with mortality rates. In addition, early fracture fixation

Table 2. ROC results

Parameter	Cut-off	AUC (95% CI)	Sensitivity (%)	Specificity (%)	P
TFS	2.00	0.597 (0.504–0.689)	55	58	0.046
TSD	5.00	0.677 (0.589–0.765)	75	49	< 0.001
Albumin	2.85	0.704 (0.619–0.789)	81	42	< 0.001
CRP	86.00	0.731 (0.649–0.813)	73	52	< 0.001
CAR	29.00	0.752 (0.672–0.831)	80	51	< 0.001

ROC: receiver operating curve; AUC: area under curve; CI: confidence interval; TFS: time between fracture and surgery; TSD: time between surgery and discharge; CRP: c-reactive protein; CAR: CRP/albumin ratio.

Figure 2. a: ROC analysis of the time between fracture and surgery, and time between surgery and discharge,
b: ROC analysis of Albumin
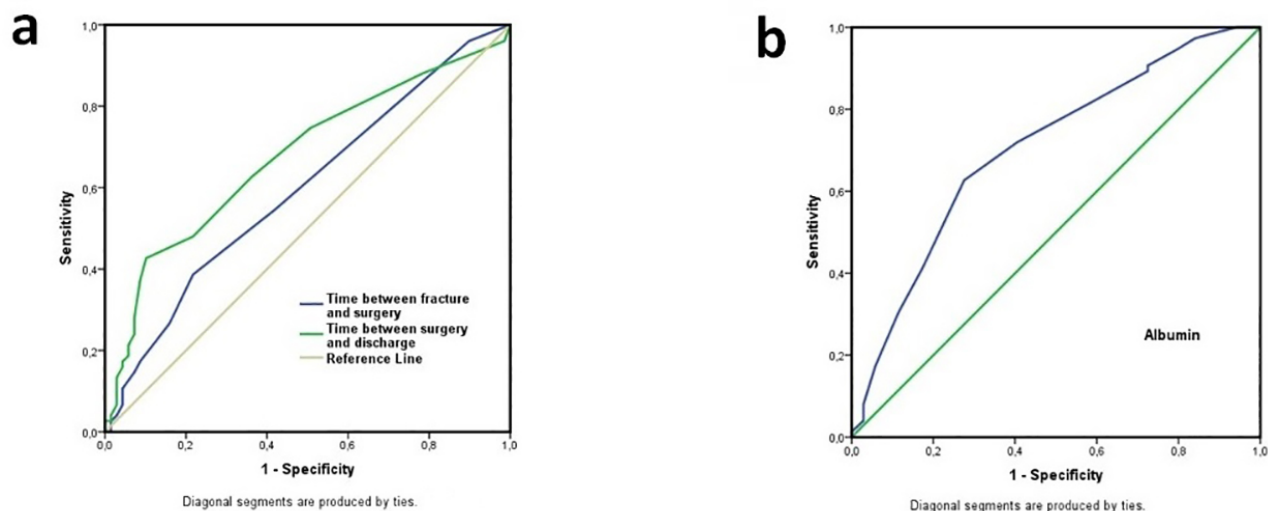
and mobilization of these patients decreases the economic burden by reducing the overall length of stay and thus the total cost of treatment (12).

CRP is a positive acute phase reactant that increases in the event of trauma, infection, or inflammation. Albumin, in contrast, is a negative acute phase reactant that decreases as a result of trauma, infection, or inflammation (13). Kim et al. (5) found a correlation for preoperative high CRP and preoperative low albumin levels with mortality in patients operated on for hip fractures. In their prospective study, Fakler et al. (14) showed that CRP is an independent predictive factor for mortality in hip fractures. Laulund et al. (15) demonstrated that low preoperative albumin levels are a prognostic factor for mortality. Capkin et al. (4) found that high CAR values are significantly correlated with mortality. In our study, while CAR was significant in the multivariate analysis, neither albumin alone nor CRP alone were significant. Thus, we propose that these values be evaluated together. High CRP and low serum albumin levels indicate impaired nutrition and provide information about the general condition of the pa-

tient. Therefore, we think that high CAR values are associated with mortality.

Hu et al. (16) found an association for advanced age and high ASA score with mortality. Smith et al. (17) showed that patients over 85 years of age had a higher rate of mortality. Zuckerman et al. (18) showed that advanced age and high ASA score are predictive factors for mortality. Similarly, in our study, patients over the age of 85 and those with an ASA score of 4 or higher had a higher rate of mortality.

Jiang et al. (19) found a positive correlation between the number of comorbidities and mortality in patients operated on for hip fractures. Likewise, Zuckerman et al. (18) showed that comorbidity is a predictive factor for mortality. Panula et al. (20) found no relationship between hip fracture type and mortality in the elderly population. While there was no relationship between fracture type and mortality in our study, having three or more comorbidities was found to be a predictive factor for mortality.

Hip fractures are associated with increased mortality: 12% to 17% of patients with a hip fracture die

Table 3. Independent predictors of mortality

Parameter	OR (95% CI)	P
Age		
65–74	Reference	
75–84	3.40 (0.83–13.92)	0.089
≥ 85	11.52 (1.86–71.23)	**0.009**
Comorbidity		
< 3	Reference	
≥ 3	42.58 (10.46–173.23)	**< 0.001**
ASA		
< 4	Reference	
≥ 4	0.53 (0.13–2.14)	0.373
Albumin (g/dL)		
< 2.85	Reference	
≥ 2.85	0.47 (0.14 – 1.61)	0.230
CRP (mg/L)		
< 86	Reference	
≥ 86	0.16 (0.01–1.69)	0.128
CAR		
< 29	Reference	
≥ 29	17.88 (1.45–219.80)	**0.024**
TFS		
≤ 2	Reference	
> 2	1.38 (0.40–4.78)	0.607
TSD		
≤ 5	Reference	
> 5	2.47 (0.80–7.66)	0.117

OR: odds ratio; CI: confidence interval; ASA: American Society of Anesthesiologists; CRP: c-reactive protein; CAR: CRP/albumin ratio; TFS: time between fracture and surgery; TSD: time between surgery and discharge.

within the first year, and the long-term increased risk of death is twofold (21). In Kim et al.'s (5) study, 1-year mortality was found to be 14%. Capkin et al. (4) found a 1-year mortality rate of 22%. In parallel with these results, the 1-year mortality rate of our study was 21.5%.

Women experience 80% of all hip fractures, and the average age at the time of fracture is 80 years (7). Almost all patients who experience a hip fracture are older than 65 years of age (7). Capkin et al.'s (4) study of hip fractures showed that the average age of the patients was 78 years, and 58% of the pa-

tients were female. Similarly, the average age of the 144 patients examined in this study was 79 years, and 61.8% of the patients were women.

Limitations

This study has some limitations. First of all, it was a single-center retrospective study. In addition, although the population was statistically sufficient, the number of patients was still small. However, this study is valuable because of the categorization of numerous variables and their relationship with mortality.

CONCLUSION

Hip fractures in the elderly population are one of the most important health issues today. A CAR ≥ 29 in patients who underwent hemiarthroplasty for hip fractures was a strong indicator for mortality. In addition, being over the age of 85 and having three or more comorbidities was associated with an increased mortality risk.

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THE EFFECT OF NUTRITIONAL STATUS ON LONG-TERM MORTALITY IN VERY ELDERLY PATIENTS WITH ST SEGMENT ELEVATION MYOCARDIAL INFARCTION

ABSTRACT

Introduction: This study aimed to evaluate the predictive role of the Geriatric Nutrition Risk Index in long-term mortality of very elderly patients with ST-segment elevation myocardial infarction and to compare it with the other known objective nutritional indices, namely the Prognostic Nutritional Index and Controlling Nutritional Status.

Materials and Methods: A total of 212 eligible patients, aged 80 years or older, who were hospitalized with a diagnosis of ST-segment elevation myocardial infarction and underwent primary percutaneous coronary intervention were included in the study. Baseline patient characteristics, echocardiographic assessments, laboratory findings, and nutritional indices were assessed.

Results: During the median follow-up period of 34 months, 60 (28.3%) all-cause mortalities were identified, and event-free cumulative rates were 46.3%, 81.4%, and 90.1% for Geriatric Nutrition Risk Index <100.5, 100.5–112.6, and >112.6, respectively (log-rank test, p < 0.0001). Receiver operating characteristic curve comparison analysis revealed that the Geriatric Nutrition Risk Index was a better predictor than the Controlling Nutritional Status, Prognostic Nutritional Index, Body Mass Index, and serum albumin (p < 0.001 for each pairwise comparison of Receiver operating characteristic curves).

Conclusion: It is important to evaluate malnutrition that is known to be associated with mortality in very elderly patients with ST-segment elevation myocardial infarction, who are more fragile than young people, and Geriatric Nutrition Risk Index -a simple and easy-to-calculate index- can be a guide in this regard.

Keywords: Nutritional Status; Mortality; Myocardial Infarction; Aged

INTRODUCTION

ST-segment elevation myocardial infarction (STEMI) is one of the leading causes of death worldwide, with in-hospital mortality ranging between 4% and 12% and 1-year mortality 10%(1, 2). It has been shown that the mortality rate of elderly patients with STEMI is significantly higher than that of young patients because of their comorbidities and delayed diagnosis of myocardial infarction(3, 4). In addition, a higher proportion of elderly patients is anticipated to present with STEMI because of aging, so special consideration should be given to the risk assessment and care of these patients.

Malnutrition is a common problem affecting the elderly population and has been shown to be associated with worse clinical outcomes in patients with cancer, heart failure, and stable coronary artery disease (CAD)(5-7). To evaluate nutritional status, some indices have been developed, including the Prognostic Nutritional Index (PNI), Controlling Nutritional Status (CONUT), and Geriatric Nutrition Risk Index (GNRI)(8-10). Of these, CONUT and PNI have been shown to be related to prognosis in patients with acute coronary syndrome (ACS)(11, 12). Although GNRI has been validated by previous studies to assess the nutritional status of patients and predict adverse outcomes, there are limited data available in the literature on the predictive value of GNRI in patients with ACS and its comparison with other scores(7, 13).

This study aimed to evaluate the predictive role of GNRI in long-term mortality of very elderly patients with STEMI and to compare it with the other known objective nutritional indices, namely PNI and CONUT.

MATERIALS AND METHODS

Study population

This study was conducted retrospectively by analyzing 293 patients, aged 80 years or older, who were hospitalized with a diagnosis of STEMI and underwent primary percutaneous coronary intervention (PCI) between January 2016 and December 2018 in the cardiology departments. Exclusion criteria included active inflammatory and neoplastic disease (8), end-stage renal and liver disease (6), failed primary PCI (7), and pretreatment with fibrinolytic drugs (2). A total of 58 patients who had missing laboratory or file data were excluded, and 212 patients were eligible for the analysis. In-hospital follow-up data were obtained from hospital file records, and post-discharge follow-up data were obtained by contacting the patients or their relatives. For patients who could not be reached, information was obtained from the National Statistical Institute and Birth Records Registry to determine if they were dead. The study protocol was reviewed and approved by the Ethics Committee of University in accordance with the Declaration of Helsinki.

Data collection and definitions

The patients' baseline clinical data, demographic data, and detailed biochemical markers—measured within 24 hours of admission—were recorded from patient files. Their height and weight were obtained from patient care forms. Detailed echocardiographic assessments were executed 24–48 hours after primary PCI, and the left ventricular ejection fraction (LVEF) values were calculated by the modified Simpson technique. The estimated glomerular filtration rate (eGFR) was calculated from the serum creatinine levels taken on admission by the Modification of Diet in Renal Disease Study equation.

Definition and calculation of nutritional scores

Body Mass Index (BMI) was obtained for each patient by dividing the body weight (kg) by the square of the height (m^2). GNRI was calculated as follows: GNRI = 14.89 × Serum albumin (g/dL) + 41.7 × Body weight/ideal body weight, and ideal body weight

= (Height [cm] − 100) − (Height [cm] − 150)/4 for men and (Height [cm] − 100) − (Height [cm] − 150)/2 for women(10). Subsequently, the GNRI values were divided into tertiles. CONUT (=Serum albumin [g/dL] + Total lymphocyte count [per mL] + Total cholesterol [mg/dL]) and PNI (=10 × Serum albumin [g/dL] + 0.005 × Total lymphocyte count [per mL]) were calculated as previously described(9, 14).

Statistical analysis

Data analysis was performed using SPSS Statistics (v.22.0; SPSS Inc., Chicago, IL, USA). Continuous variables were presented as mean ± standard deviation, and categorical variables were presented as numbers and percentages. The Kolmogorov–Smirnov test was used to evaluate the distribution of continuous variables. If the variables had a normal distribution, they were presented as mean ± standard deviation; if they did not have a normal distribution, they were presented as the median (interquartile range). Categorical variables were compared using a Chi-squared test or the Fisher exact test. The Student $t$test or Mann–Whitney U-test were used to compare the continuous variables. A two-tailed p-value of <0.05 was considered statistically significant. Univariate and multivariate Cox proportional hazard analyses were performed to identify the predictors of mortality. The Kaplan–Meier method was used to obtain the association between GNRI and all-cause mortality at follow-up. A receiver operating characteristic (ROC) curve was used to determine the best cutoff value for PNRI to predict all-cause mortality. Multicollinearity between GNRI and its components (albumin and BMI) was assessed by Eigenvalue and Condition Index. Linearity was tested by interacting with the logarithmic transformation of each parameter itself. To compare the area-under-the-curve (AUC) values of nutritional scores, ROC curve comparison analysis was performed using the DeLong method.

RESULTS

Of the 212 eligible patients with STEMI who underwent primary PCI, with the mean age 86 ± 5 years, 18.2% were females, and the mean GNRI was 108 ± 14. There was no significant difference between tertiles in terms of diabetes mellitus, hypertension, dyslipidemia, smoking status, and family history of CAD. The hemodynamic parameters and rates of patients with Killip class >1 on admission were also not significantly different between the groups. The patients on the lowest GNRI levels had lower baseline levels of serum albumin, total cholesterol, and triglycerides—as well as lower eGFR and higher C-reactive protein (CRP) levels—on admission. When the other nutritional indices—PNI and CONUT—were evaluated, they were found to be in parallel with GNRI, and they increased as GNRI increased **(Table 1)**.

Multivariate Cox regression analyses revealed that systolic blood pressure (SBP) (hazard ratio [HR]: 0.992, 95% confidence interval [CI]: 0.985–0.999, p = 0.031), eGFR (HR: 0.983, 95% CI: 0.970–0.996, p = 0.010), LVEF (HR: 0.906, 95% CI: 0.869–0.944, p < 0.001), and GNRI (HR: 0.968, 95% CI: 0.945–0.992, p = 0.008) were related with all-cause mortality **(Table 2)**. Albumin and BMI were not included in the Cox regression analysis because of collinearity, which was observed between BMI, albumin, and GNRI.

During the median follow-up period of 34 months (interquartile range: 11–41 months), 60 (28.3%) all-cause mortalities were identified, of which 23 (10.8%) were in-hospital. The Kaplan–Meier analysis was performed to evaluate cumulative survival rates **(Fig. 1)**. During the follow-up, event-free cumulative rates were 46.3%, 81.4%, and 90.1% for GNRI <100.5, 100.5–112.6, and >112.6, respectively (log-rank test, p < 0.0001).

ROC curve analysis revealed that the optimal cut-off value of GNRI for all-cause mortality was 99.4, with 63.3% sensitivity and 82.2% specificity

Table 1. The baseline characteristics and laboratory results of all patients and patients classified in accordance with tertiles of GNRI

	All patients (n: 212)		Patients with GNRI < 100.5 (n: 70)		Patients with GNRI 100.5-112,6 (n: 71)		Patients with GNRI > 112.6 (n: 71)		p value
Age, years	86	±5	87	±5	86	±4	85	±5	0.046
Female gender, n (%)	96	(45.3)	27	(38.6)	31	(43.7)	38	(53.5)	0.195
Diabetes mellitus, n (%)	65	(30.7)	22	(31.4)	24	(33.8)	19	(26.8)	0.655
Hypertension, n (%)	130	(61.3)	44	(62.9)	43	(60.6)	43	(60.6)	0.950
Dyslipidemia, n (%)	71	(33.5)	23	(32.9)	24	(33.8)	24	(33.8)	0.991
Smoking, n (%)	45	(21.2)	16	(22.9)	16	(22.5)	13	(18.3)	0.764
Family history of CAD, n (%)	33	(15.6)	7	(10.0)	13	(18.3)	13	(18.3)	0.295
Killip > 1 on admission, n (%)	51	(24.1)	20	(28.6)	18	(25.4)	13	(18.3)	0.348
Systolic blood pressure, mmHg	137	±39	134	±42	137	±40	141	±36	0.551
Heart rate, bpm	79	±19	77	±21	81	±18	78	±17	0.365
White blood cell count, $10^3/\mu L$	11.6	±4.0	12.4	±4.6	10.8	±3.5	11.7	±3.8	0.072
Lymphocyte count, $10^3/\mu L$	1.3	(1.0-2.0)	1.2	(1.0-1.9)	1.4	(1.0-1.9)	1.5	(1.1-2.1)	0.361
Hemoglobin, g/dL	12.4	±1.8	12.0	±1.9	12.7	±1.8	12.6	±1.6	0.028
eGFR, ml/min	71.3	±26.6	64.4	±26.0	75.3	±27.0	74.0	±25.6	0.029
C-Reactive protein, mg/dL	13.6	(7.9-21.2)	16.9	(10.2-32.5)	12.1	(7.1-20.0)	13.3	(7.4-16.7)	<0.001
Serum albumin, g/dL	3.48	±0.44	3.22	±0.38	3.52	±0.35	3.69	±0.44	<0.001
Total cholesterol, mg/dL	170	±45	160	±44	172	±44	179	46	0.038
LDL, mg/dL	110	±39	104	±40	109	±40	116	±38	0.206
HDL, mg/dL	41	±14	38	±12	42	±14	42	±17	0.138
Triglycerides, mg/dL	106	±61	90	±39	110	±50	117	±84	0.030
LVEF, %	45	±9	43	±10	45	±8	46	±8	0.060
BMI, kg/m^2	29.0	±5.4	25.1	±2.7	28.9	±3.5	34.2	±5.5	<0.001
PNI score	34.8	±4.4	32.2	±3.8	35.2	±3.6	36.9	±4.4	<0.001
CONUT score	175	±45	164	±44	177	±44	185	±46	0.033
GNRI score	108	±14	93	±6	107	±4	123	±8	<0.001
In hospital death, n (%)	23	(10.8)	13	(18.6)	6	(8.5)	4	(5.6)	0.034
Long-term death, n (%)	37	(19.6)	26	(45.6)	8	(12.3)	3	(4.5)	<0.001
Total death, n (%)	60	(28.3)	39	(55.7)	14	(19.7)	7	(9.9)	<0.001

Abbreviations: GNRI; Geriatric Nutritional Risk Index, CAD; coronary artery disease, eGFR; estimated glomerular filtration rate, LDL; low density lipoprotein, HDL; high density lipoprotein, LVEF; left ventricular ejection fraction, PNI; prognostic nutritional index, CONUT; controlling nutritional status.

(AUC: 0.791, 95% CI: 0.708–0.859, $p < 0.001$). ROC curve comparison analysis was performed to compare nutritional scores, as well as serum albumin and BMI. GNRI was found to be a better predictor than CONUT (AUC: 0.603, 95% CI: 0.510–0.690), PNI (AUC: 0.618, 95% CI: 0.526–0.704), BMI (AUC: 0.616, 95% CI: 0.524–0.702), and serum albumin (AUC: 0.624, 95% CI: 0.532–0.710; $p < 0.001$ for each pairwise comparison of ROC curves) **(Fig. 2)**.

DISCUSSION

This study evaluated the predictive value of GNRI in long-term mortality in patients, aged 80 years or older, with STEMI and the comparison of nutritional indices among themselves. Consequently, low GNRI was an independent predictor of long-term mortality and was superior to the other nutritional indices, namely BMI, PNI, and CONUT, in this age group.

Table 2. Univariable and multivariable Cox regression analysis for the prediction of total mortality

	Univariable analysis		Multivariable analysis	
	p value	HR (95% CI)	p value	HR (95% CI)
Systolic blood pressure	<0.001	0.986(0.979 -0.994)	0.031	0.992(0.985 -0.999)
Estimated glomerular filtration rate	<0.001	0.963(0.951 -0.976)	0.010	0.983(0.970 -0.996)
Left ventricular ejection fraction	<0.001	0.880(0.848 –0.913)	<0.001	0.906(0.869 –0.944)
GNRI	<0.001	0.928(0.906 -0.952)	0.008	0.968(0.945 -0.992)

All clinically relevant parameters were included in the model. **Abbreviations**: GNRI; Geriatric Nutritional Risk Index

Figure 1. Kaplan Meier survival analysis of long-term mortality in patients classified in accordance with tertiles of Geriatric Nutrition Risk Index
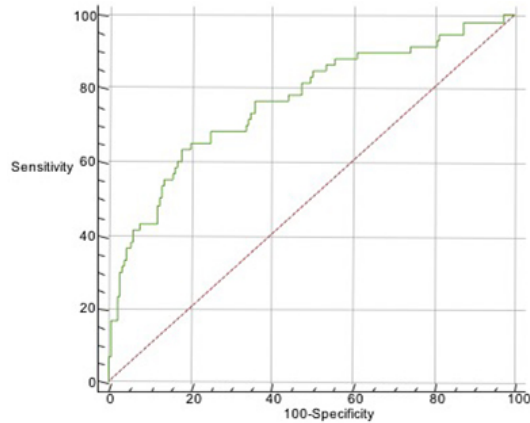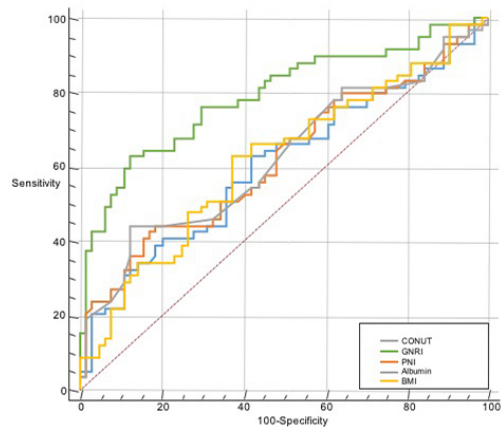

Figure 2. ROC curve comparison analysis of the nutritional scores and also serum albumin and Body Mass Index

Malnutrition is one of the reasons leading to worse outcomes in the elderly population, and the aging process itself is a cause for malnutrition, so the evaluation of nutritional status in elderly patients seems important. Basically, it has been demonstrated that serum albumin and BMI can be used to assess nutritional status. Low serum albumin and BMI have been associated with worse clinical outcomes, including mortality in patients with ACS(12, 15). In the present study, serum albumin and BMI were evaluated, and in parallel with the literature, they were significantly lower in patients with low GNRI. The relationship of low albumin and BMI with mortality may be related to the change in cardiometabolic demands and priorities in ACS. Because cardiometabolic demands are increased because of the activation of neurohormonal and inflammatory pathways in ACS, patients with low BMI who have low physiological reserves and fat stores may not be able to overcome these catabolic changes(16). Infection, heart failure, and other cardiac reasons may require hospitalization after discharge in patients with low BMI, which also leads to additional weight loss and, as a result, increases long-term mortality. Similarly, serum albumin is a widely used marker to assess nutritional status, and its level decreases as a result of malnutrition. Besides, it is a negative acute-phase reactant, and its decrease in an inflammatory state such as ACS may have had an additive effect and was significantly lower in patients with malnutrition. In addition, CRP is an inflammatory marker, and its increased level has been shown to be a predictor for worse clinical outcomes in patients with ACS(17). In accordance with the literature, we found higher CRP levels in patients with low GNRI. According to this result, it can be speculated that malnutrition aggregates the inflammatory state.

In the Cox regression analysis to predict total mortality, SBP, eGFR, and LVEF were found to be independent predictors, and this result is consistent with the literature(18, 19). In addition, we found that GNRI was an independent predictor of mortality in

very old patients with STEMI. The assessment of nutritional status involves the process of obtaining, verifying, and interpreting the data needed to discover nutritional problems and their causes and importance(20). To ensure a structured assessment and documentation of nutritional status, it is important to identify which nutritional assessment tool is appropriate for use in that group. The prognostic value of PNI in predicting poor prognosis, including mortality, has been tested in patients with STEMI, and PNI has been found to be an independent predictor of mortality(11, 21). In another study, patients with severe CONUT—not those with severe PNI—had the highest event rate for all-cause mortality in patients with STEMI(12). In these studies, GNRI has not been tested, and patient groups were younger than the patients in the present study because the mean age of patients was between 58 and 65 years in the aforementioned studies. Therefore, considering that nutritional problems increase with age, it can be said that data on the evaluation and importance of this in the population, aged 80 years and older, with STEMI are limited. In the present study, we found that GNRI predicts mortality and is superior to PNI and CONUT in very elderly patients.

GNRI was specifically designed to assess the nutritional status of elderly patients and predict malnutrition-related complications, and its validity and reliability have been better studied in hospitalized elderly patients than in those with STEMI(7, 10, 22-24). In the present study, we found that low GNRI was an independent predictor of mortality and was superior to BMI, PNI, and CONUT in very old patients with STEMI. Recently, the Mini-Nutritional Short Form (MNA-SF) was used to evaluate the nutritional status of elderly patients with ACS, and it was found to be a useful predictor for all-cause mortalities(25). Although we did not evaluate the effectiveness of MNA-SF in the present study, it was found that GNRI was more appropriate than MNA-SF in assessing nutritional status and identifying nutritional complications in hospitalized elderly

patients(23). Moreover, using GNRI to evaluate malnutrition is a less time-consuming and easy tool that requires fewer medical staff.

Malnutrition is associated with mortality not only in hospitalized elderly patients but also in the normal population hospitalized with ACS. Moreover, albumin is used in addition to BMI in the calculation of GNRI, and albumin is both a negative acute-phase reactant and a marker of malnutrition. Depending on all this, it may have had an additive effect on GNRI being a strong predictor of mortality in elderly patients with STEMI.

As a conclusion, the number of elderly patients with STEMI is increasing because of aging, and it is important to evaluate these patients more meticulously and objectively. As malnutrition is a known predictor of mortality, it may be important to evaluate it with a simple, cost-effective, and easily calculated index.

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THE EFFECT OF THE POSITIVE PSYCHOLOGY INTERACTION GROUP PROGRAM ON ANGER AND HOPE IN ELDERLY INDIVIDUALS

ABSTRACT

Introduction: With the rapidly aging global population, successful and healthy aging have become important issues. The aim of this study was to examine the effect of the Positive Psychology Interaction Group Program on the anger and hope levels of elderly individuals.

Materials and Method: An experimental design with pretest-posttest control groups was used with the Positive Psychology Interaction Group Program as the independent variable, and anger and hope levels of the elderly as the dependent variables. The sample comprised 32 elderly individuals living in Darülaceze in Istanbul. Face-to-face interviews using the Sociodemographic Information Form were used to gather the participants' sociodemographic information. Hope and anger levels were evaluated using the Continuous Hope Scale (SAS) and the State Trait Anger Scale, respectively. A five-week (10 sessions) Positive Psychology Interaction Group Program, which was prepared by the researchers based on the positive psychology approach, was applied only to the experimental group. Paired sample t-tests and Person's correlation coefficient analyses were conducted to analyze the data. Multiple linear regression analysis was used to determine the effect of the program on the hope and anger levels of the elderly.

Results: Statistically significant differences were found between the post-test scores of the experimental and control groups (p<.05). The applied Positive Psychology Interaction Group Program increased the hope levels of the elderly individuals participating in the experimental group and decreased their anger levels.

Conclusion: These findings are important for building positive psychology-focused practice in experimental research to improve the lives of elderly people.

Keywords: Anger; Aged; Hope; Psychology, Positive

INTRODUCTION

The increasing elderly population around the world has caused a demographic transformation. Aging is on the agenda of health and social policies and has become a global topic of discussion (1). This social change has brought about a new social structure. New concepts, such as healthy aging, active aging, successful aging, and aging in place have recently emerged (2).

Old age is a natural process in which health and social problems are more common than in other age groups. This period, which is the last phase of life, not only affects all areas of an individual's life, but also causes psychological changes (3-4). Elderly individuals today tend to live more socially active lives (5). Therefore, it is important to develop interventions that can sustain the talents and resources of the elderly and prevent or delay physical, cognitive, and emotional decline (6).

In recent years, positive psychology (PP), which has focused on human happiness and well-being, has stimulated hope in individuals with features such as making human life meaningful, increasing enjoyment of life, and working with skills and capacities instead of psychopathology (7-8). In this context, the Positive Psychology Interaction Group Program has been implemented with an expectation of positive effects on the emotional states of elderly individuals, and to develop positive self-perception, life satisfaction, effective communication, and stress coping skills. Studies have reported that PP-focused practices increase individuals' psychological well-being, life satisfaction, and positive affect (6,9).

Hope, which is one of the most important emotions in a person's life journey, is defined as "the emotional belief of individuals about the possibility of positive results about events and situations in their life." Hope plays an important role in human mental health. It prevents the psychological breakdown of the person against life difficulties by giving meaning to life. Joy, happiness, and reduced fear and stress help individuals improve their decision-making power and social participation. Hope contributes to a happier life by generating positive thinking, talent, and courage (10). Charles Richard Snyder, working on Forgiveness and Hope Theory, is one of the founders of PP. Synder considers hope to be a cognitive ability. Snyder's theory consists of three main components: goals (approaching life with purpose), path (finding different ways to achieve life goals) and means (changeable motivation to achieve life goals). In other words, with hope, an individual has a purpose, believes that there are ways to achieve that purpose, and that they can walk on these paths (11).

Recently, nearly no experimental studies have been conducted on the effect of PP on anger and hope in elderly people. To fill this gap in extant literature, the present study aimed to examine the effect of the Positive Psychology Interaction Group Program on the anger and hope levels of elderly individuals. The program aimed to develop positive self-perception, life satisfaction, effective communication, stress coping skills, and socialization in the elderly.

MATERIALS AND METHOD

Sample

The sample comprised 32 individuals aged 65 years and above living in Darülaceze, an institution affiliated with the Ministry of Family, Labor and Social Services. The exclusion criteria were as follows: dementia and delirium, permanent psychiatric disorder with continuing treatment, and inability to read and answer the scales. Those who met the inclusion criteria and gave written consent to participate were randomly placed in the experimental (n=16) and control (n=16) groups.

Measurement Instruments

All measurement tools were administered both before (pre-test) and after (post-test) the implementa-

tion of the program.

The Sociodemographic Information Form prepared by the researchers was filled using face-to-face interviews. It included information such as gender, age, marital status, number of children, physical/mental illness, and employment status.

Trait Hope Scale (THS) was developed by Snyder et al. (11) and adapted to Turkish by Tarhan and Bacanlı (12) The scale consists of 12 items and two sub-dimensions. The sub-dimensions named "The Pathway" and "Agency" are measured with four items each. The Cronbach's alpha coefficient of the scale was .837 and the KMO value was .862. Higher scores indicate higher levels of trait hope.

State-Trait Anger Scale (STAS) was developed by Spielberger et al. (13) and adapted to Turkish by Ozer (14) The scale uses a four-point Likert rating. It comprises 34 items and includes Trait Anger (10 items) and Anger Expression Style (24 items) sub-scales. The Anger Expression Style subscale comprises three sub-scales: Controlled Anger (anger/control, 8 items), Externalized Anger-Out (anger/external, 8 items), and Internalized Anger (anger/internal, 8 items). The total score ranges from 24–96. Cronbach's alpha values are: .79 (Trait Anger), .84 (Controlled Anger), .78 (Expressed Anger), and .62 (Suppressed Anger) (15).

Data Analysis

The statistical analyses were performed using the SPSS version 25.0. The data were first examined for normality. All scales showed normal distribution in the control of Kurtosis-Skewness values with the values on all scales and subscales ranging from -2 to +2. A 95% level of confidence was used. Paired sample t-tests were used to compare the two parametric groups. The relationships between the scales were tested using Pearson's correlation analysis. Multiple linear regression analysis was used to determine the effect of the independent variable on the dependent variables.

Positive Psychology Interaction Group Program

This program was derived by using PP resources in the literature (16-20). The experimental group attended the research program twice a week, with a total of 10 sessions of 50 minutes each. Together with the group members, the rules of the interaction group were determined, and decisions were made about continuity, confidentiality, and practices. The program consists of five stages:

1. Awareness Study on Positive Psychology, Active Aging, and Quality of Life (2 Sessions). It aims at improving the elderly individuals' knowledge of the physical, emotional, cognitive, and social changes brought about by the aging process, and to enable them to acquire the necessary knowledge and skills to improve their quality of life and lead a more active and independent life.

2. Self-Recognition, Awareness, Self-Compassion, and Empathy (2 Sessions). It aims to enable the participants to discover their strengths and develop their application skills in daily life. The sessions aim at improving integration of emotions that are difficult to accept.

3. Developing Stress Management Strategies and Anger Management (2 Sessions). The aims of this phase are to enable group members to accept their judgments that cause negative emotions and to reduce the negative impact of events through positive reevaluation. Interactions aimed at enabling participants to develop awareness of situations that reveal anger in them and their subsequent reactions. Activities included asking the group members to think about the last moment they were angry and remember how they felt.

4. Communication Skills and Relationship Management (2 Sessions). It aims to improve participants' awareness about effective listening, empathic approach, developing satisfactory relationships, and being thankful and accepting. Additionally, it aims to develop individuals' skills to recognize their emotions and to express them verbally and non-verbally.

5. Values and Life Satisfaction (2 Sessions). The participants learned how to recognize their feelings in the here and now, reveal positive emotions in their daily experiences, maintain pleasant moments, and develop feelings of gratitude. The group members shared their thoughts about the acceptance of their judgments, their painful emotions, and the appro-priateness of the decisions made by them towards their life goals.

RESULTS

As seen in Table 1, 37.5% of the research group were 65–69 years old, 62.5% were 70–80 years old; 25.0%

Table 1. Descriptive Statistics of Sample Demographics

		Research Group		Comparison Group	
		f	%	f	%
Age	65-69	6	37.5	13	81.3
	70-80	10	62.5	3	18.8
	Total	16	100.0	16	100.0
Gender	Female	4	25.0	6	37.5
	Male	12	75.0	10	62.5
	Total	16	100.0	16	100.0
Neighborhood	Nursing home	16	100.0	16	100.0
Places lived while growing up	Village	3	18.8	3	18.8
	City	13	81.3	12	75.0
	Town	0	0.0	1	6.3
	Total	16	100.0	16	100.0
Marital status	Single	9	56.3	10	62.5
	Married	2	12.5	0	0.0
	Divorced	1	6.3	5	31.3
	Widowed	4	25.0	1	6.3
	Total	16	100.0	16	100.0
Education	Literate	1	6.3	1	6.3
	Primary School	10	62.5	12	75.0
	High school	5	31.3	2	12.5
	Total	16	100.0	15	93.8
Employment	Unemployed	7	43.8	9	56.3
	Employed	2	12.5	0	0
	Retired	6	37.5	3	18.8
	Total	15	93.8	12	75.0
Missing		1	6.3	4	25.0
Total		16	100.0	16	100.0
Cigarette smoking	Yes	3	18.8	7	43.8
	No	12	75.0	9	56.3
	Total	15	93.8	16	100.0
Missing		1	6.3	14	87.5
Total		16	100.0	16	100.0

were women; 100.0% lived in a nursing home; 18.8% grew up in the village, 81.3% grew up in the city; 56.3% were single, 12.5% were married, 6.3% were divorced, 25.0% were widowed; 6.3% were literate, 62.5% were primary school graduates, 31.3% were high school graduates; 43.8% were unemployed, 12.5% were working, 37.5% were retired; 18.8% were smokers, 75.0% were non-smokers.

81.3% of the comparison group were 65–69 years old, 18.8% were between 70–80 years old; 37.5% were women; 100.0% lived in a nursing home; 62.5% were single, 31.3% were divorced; 6.3% were literate, 75.0% were primary school graduates, 12.5% were high school graduates; 56.3% were un-employed, 18.8% were retired; 43.8% were smokers, 56.3% were non-smokers.

Based on the findings, the average score on the Inner Anger sub-dimension is 2.01 (SD=0.64), the average on the External Anger sub-dimension is 1.77 (SD=0.63), and the average on the Anger Control sub-dimension is 3.14 (SD=0.65). Additionally, the average scores on Trait Hope scale, Agency subscale, and Pathway scale are 6.19 (SD=1.29), 5.91 (SD=1.67), and 6.47 (SD=1.39), respectively. The results there was no significant difference between the pre- and post-test scores of the research group on the Internal Anger sub-dimension (p>0.05).

As can be seen from Table 2, there was a significant difference between the pre- and post-test scores of the research group on the External Anger sub-dimension (p<.05). The pre-test score was higher than the post-test score. In contrast, no significant difference was found between the pre- and post-test scores of the comparison group on the External Anger sub-dimension (p>0.05).

In Table 3, the difference between the pre- and post-test scores of the research group on the Anger Control sub-dimension was found as significant (p<.05). The average post-test score on the Anger Control sub-dimension was significantly higher than the average pretest score. In contrast, there was no significant difference between the pre- and post-test scores of the comparison group on the Anger Control sub-dimension (p>0.05).

As can be seen from Table 4, the pre-test and post-test scores of the research group on the Trait Hope Scale differed significantly (p<.05). The average post-test score was higher than the average pretest score. In contrast, there was no significant difference between the pre- and post-test scores of the comparison group on the Trait Hope Scale (p>0.05).

As can be seen from Table 5, the difference between the pre- and post-test scores of the research

Table 2. Results of Paired Sample t-test between the Pre-Test and Post-Test Averages of External Anger Sub-Scales

		Mean	N	SD	SE	t	df	p
Research Group	**Pre-test**	1.9252	16	0.72437	0.18109	2.253	15	0.040
	Post-test	1.4453	16	0.29215	0.07304			
Comparison Group	**Pre-test**	1.7813	16	0.63819	0.15955	-1.168	15	0.261
	Post-test	1.9375	16	0.70267	0.17567			

Standard Deviation (SD), Standard Error (SE)

Table 3. Results of Paired Sample t-test between the Pre-Test and Post-Test Averages of the Anger Control Sub-Dimension

		Mean	N	SD	SE	t	df	p
Research Group	Pre-test	2.8817	16	0.67558	0.16890	-2.388	15	0.031
	Post-test	3.2813	16	0.47544	0.11886			
Comparison Group	Pre-test	3.1250	16	0.69821	0.17455	-0.877	15	0.395
	Post-test	3.2734	16	0.69405	0.17351			

Standard Deviation (SD), Standard Error (SE)

Table 4. Results of Paired Sample t-test between the Pre-test and Post-test Averages of the Trait Hope Scale

		Mean	N	SD	SE	t	df	p
Research Group	Pre-test	6.2500	16	1.19111	0.29778	-2.351	15	0.033
	Post-test	7.0625	16	0.55715	0.13929			
Comparison Group	Pre-test	5.6823	16	1.51259	0.37815	-0.188	15	0.853
	Post-test	5.7708	16	1.30650	0.32663			

Standard Deviation (SD), Standard Error (SE)

Table 5. Paired Sample t-test between the Pre-Test and Post-Test Averages of the Agency Subscale

		Mean	N	SD	SE	t	df	p
Research Group	Pre-test	6.3594	16	1.19013	0.29753	-2.687	15	0.017
	Post-test	7.1719	16	0.70545	0.17636			
Comparison Group	Pre-test	6.0990	16	1.80078	0.45019	-0.383	15	0.707
	Post-test	6.2448	16	1.48899	0.37225			

Standard Deviation (SD), Standard Error (SE)

group on the Agency sub-dimension was significant (p<.05). The average post-test score was higher than the average pre-test scores. On the other hand, there was no significant difference between the pre- and post-test scores of the comparison group on the Agency sub-dimension (p>0.05). Additionally, there was a significant difference between the pre- and post-test scores of the research group on the Pathway sub-dimension (p>0.05). In contrast, there was no significant difference between the pre- and post-test averages of the comparison group on the Pathway sub-dimension (p>0.05).

DISCUSSION

In this study, the effect of the Positive Psychology Interaction Group Program, designed for elderly individuals, on the anger and hope levels of the elderly was examined. As the levels of hope and anger in the elderly are important factors affecting their quality of life, many studies have been conducted on this subject (21-24). The results demonstrated a statistically significant increase in hope levels and a decrease in anger levels in the elderly individuals participating in the Positive Psychology Interaction Group Program compared to those who did not participate in this program.

The first finding of this study is that there was a significant increase in the hope level and its sub-components (Alternative Thought/Agency) in the intervention group as compared to the control group. Previous studies have reported inconsistent results in terms of the hope levels of the elderly. Antoine et al. (21) implemented a six-week multi-dimensional PP intervention. In their study to determine the effects on process variables, including anxiety, depression, psychological distress, awareness, and emotion regulation, it was determined that trait anxiety, depressive symptoms, and psychological distress levels significantly decreased in the intervention group as compared to the control group.

Positive psychology interventions have been ex-perimentally tested in many studies, but only a few studies have addressed the effects of such practices in older participants. One such study by Proyer et al. (25) (2014) examined the long-term effects of PP and placebo-controlled interventions on well-being and depression in individuals aged 50–79 years. It was found that PP interventions caused an increase in the happiness level of the participants and de-creased depressive symptoms. Another systematic review supporting these findings reports that PP interventions have positive effects on elderly health (4) Further, a randomized controlled study by Wu and Koo (24) on 103 elderly patients with mild to moderate dementia showed that hope, life satis-faction, and mental well-being can be significantly improved with a 6-week mental recall intervention.

Further, it was found that the difference between the mean scores of Anger Control and External An-ger in the research group was statistically signifi-cant. There was a significant increase in the Anger Control level of the intervention group compared to the control group, and a statistically significant decrease in the level of External Anger (p<.05). In a study evaluating the effects of PP interventions on emotions and emotion regulation changes with a six-week self-help program, it was found that compared to the control group, participants in the intervention group showed significant improve-ments from pre-test to post-test in variables such as anxiety, depression, and psychological distress (21). Emotion regulation strategies greatly affect people's responses to life events and their self-con-trol. PP interventions are effective in developing conscious cognitive coping strategies (23). In this context, PP interventions are thought to have an enhancer function in anger control and expressing emotions.

Positive psychology interventions allow individu-als to fully express their potential by helping them develop coping strategies, flexibility, optimism, emotion regulation, and self-efficacy (6). The skills acquired in the domains of life satisfaction, hap-

piness, positive emotions, coping with stress, and gratitude provide an advantage for the educational and clinical environment (4,6).

Dickens (18) analyzed the effects of gratitude interventions by synthesizing the findings of 38 studies and using meta-analytical techniques. The results showed that gratitude interventions can lead to improvements in a wide range of outcomes, including happiness. In another study in which the Positive Awareness Program (PMP) was applied, welfare criteria such as gratitude, self-compassion, self-efficacy, meaning, and autonomy were tested. The post-test measurements of the participants in the experimental condition showed significant improvements in all dependent variables compared to the pre-test results, and the post-test results were also found to be significantly higher than in the control group (19). These positive results showed that PP interventions are effective in increasing well-being and other positive variables.

Walsh et al. (20), who examined the effect of PP applications on mental health through a systematic review, reported that PP application was proposed as a flexible model that can be applied to different patient groups as well as other treatment groups. More research is needed to determine whether PP application is acceptable and applicable for use in different patient groups and settings.

CONCLUSION AND RECOMMENDATIONS

Despite the promising results of this study, which should be considered as a pilot study, the study has some limitations. The first limitation is the lack of follow-up evaluations. Second, the study was conducted only with elderly individuals living in an institution and in a specific area. Finally, considering that the participants consisted of only literate and educated people, the data obtained within the scope of the research are limited to the qualities measured by the scales used. In line with the literature, the positive changes in the intervention group in which PP studies were applied show that elderly individuals allow themselves to evaluate their psychological resources.

Compliance with ethical standards

All procedures performed in this study complied with the ethical standards of the national research committee and the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards.

Conflict of Interest

The authors have no conflicts of interest to disclose.

Informed Consent

Informed consent was obtained from all participants.

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HEALTH SCIENCE STUDENTS' PERCEPTIONS AND AWARENESS OF ELDER ABUSE AND NEGLECT

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ABSTRACT

Introduction: Healthcare professionals have a key role in detecting and reporting elderly abuse and neglect, which is becoming more widespread due to the increase in the elderly population. However, there are very few studies evaluating the perception and understanding of students studying in health science branches about elderly abuse and neglect.

Materials and Method: This descriptive cross-sectional research was conducted with 385 students who were studying in the departments of nutrition and dietetics, physiotherapy and rehabilitation, and nursing. The questionnaire form, which was prepared by the researchers based on the relevant literature, has been used with the aim of collecting data for this study.

Results: Although the majority of the students (92.7%) have indicated that they were aware of the concept of elderly abuse and neglect, it was observed that the students couldn't define the concept of elderly abuse either comprehensively or clearly. It was determined in our study that the type of abuse mostly known by these students was physical abuse, and thus their knowledge about abuse was insufficient. It was observed that the number of students who receive education about this concept was higher in the nursing department when compared to the other departments (p<0.05).

Conclusion: This study indicates that the students who are studying in health sciences do not receive adequate education for gaining awareness about the concept of elderly abuse and neglect.

Keywords: Students; Aged; Elder Abuse

INTRODUCTION

Elder abuse is a global problem that is gaining recognition due to its severe impact on the aging population in recent years (1). Several measures have been identified that families, institutions, and society can take to recognize and prevent elder abuse and neglect. These measures include training healthcare professionals about abuse and violence against the elderly and improving their service delivery capabilities (2). Today, it is well-known that healthcare professionals' ability to identify and respond appropriately to suspected cases of elder abuse and neglect is essential in improving the protection of older adults (3). However, previous studies indicate that healthcare professionals do not have sufficient knowledge about elder abuse and neglect, and thus they are not aware of the related laws and regulations (4,5).

All healthcare professionals are responsible for addressing elder abuse and neglect. Departments of nursing, nutrition and dietetics, and physiotherapy and rehabilitation are among these professions. When the undergraduate education programs in Turkey were examined, it was found that various departments of health professionals included sections on elder care and geriatric services. These students are candidates to serve the aging society (6,7).

It is not known whether the topic of elder abuse and neglect is included in the content of these education programs. Previous studies have reported that healthcare professionals do not take appropriate actions in response to abuse as they lack the necessary training to identify and report such cases (5,8,9). Thus, it is essential that undergraduate education programs provide healthcare professionals with the knowledge and skills to identify and respond appropriately to cases of elder abuse and neglect (8). Especially considering the change in age demographics in Turkey, the recognition and prevention of elder abuse must be prioritized to achieve the country's

health goals and future needs. Thus, this study was performed with the aim of investigating health science students' perceptions and awareness of elder abuse and neglect.

MATERIALS AND METHODS

1. Design

This is a descriptive study with the aim to investigate perceptions and awareness of elder abuse and neglect by health science students.

2. Procedures and participants

The study was conducted with students who were studying at Gazi University, Faculty of Health Sciences, during the 2015–2016 academic year. The research population comprised of students studying in the department of nursing (948 students), physiotherapy and rehabilitation (396 students), and nutrition and dietetics (316 students). The data were collected by means of a questionnaire completed by 385 students who voluntarily participated in the study after its purpose was explained.

The sample consisted of 316 students. The mean age of students was 20.10 ± 1.64 years; 85.5 % of them were female, 37.7% were first-year, 37.9% second-year, 19.2% third-year and 5.2% fourth-year students. A total of 48.6% of students were in the nursing department, 38.4% in the nutrition and dietetics department, and 13.0% in the physiotherapy and rehabilitation department. In the sample group, 48.6% reported that they had never lived with an elderly individual, 42.1% had previously lived with an elderly person, 9.4% were currently living with an elder (Table 1).

3. Data Collection Tools

A questionnaire based on the literature was prepared by the researchers as the data collection tool (1,5,8,9). The questionnaire comprised two sections: the first section included 15 questions about sociodemographic characteristics (such as

Table 1. Characteristics of Students (n = 385)

Identifying Characteristics	Number	%
Age $\overline{x}$ ± SD: 20.10± 1.64 **Min:18** **Max:30**		
18-21	327	84.9
22-25	52	13.5
26 and over	6	1.6
Sex		
Female	329	85.5
Male	56	14.5
Department		
Nursing	187	48.6
Nutrition and Dietetics	148	38.4
Physiotherapy and Rehabilitation	50	13.0
Year Level		
First year	145	37.7
Second year	146	37.9
Third year	74	19.2
Fourth year	20	5.2
Living with an older person		
Previously lived	162	42.1
Currently living	36	9.4
Never lived	187	48.6

age, gender, and university year level), and the second section included 20 statements related to types of elder abuse and neglect, and 12 questions asking students whether or not they were familiar with concepts of abuse and neglect, which were designed to evaluate students' knowledge and awareness. Some of the questions in the second part were prepared as close-ended questions, and some of them were prepared as options. The students were asked questions with an answer of two options: "*The status of previously receiving education on elder abuse and neglect*" (received and hadn't received), "*The status of previously having encountered an elderly individual who was exposed to abuse and negligence*" (encountered and hadn't encountered) and "*The state of knowing the concept of abuse and neglect*" (aware

and unaware). While evaluating the knowledge of the students regarding the concept of abuse and neglect, they were asked to choose from the expressions defining the concepts of elderly abuse and neglect and it was stated to them that they could select more than one option. In addition, the participants were given some statements about the types of abuse and were asked to write down which concept of abuse or negligence these statements correspond to. The percentage of correct or incorrect answers given to these statements was evaluated. It was stated to the students that they could give more than one answer to the questions about "*The source from which they obtained information about the concept of abuse and neglect and the type of elderly abuse encountered*" and "*The type of elderly abuse encountered*".

Students who were willing to participate in the study were given the questionnaire during a class session. The researchers were present to explain any questions that the students did not understand. The questionnaire took 10 to 15 minutes to complete, and the completed questionnaires were collected after the end of the class.

4. Data Analysis

The SPSS 17.0 package software was used to analyze the data obtained in the research. Number and percentile and Chi-square and Fisher's exact tests were used in the evaluation of the data. Chi-square testing was used to compare education status in terms of department and year level with students' knowledge of elder abuse and neglect; p values<0.05 were considered statistically significant.

RESULTS

Of the students who participated, 92.7% stated they were aware of the concept of elder abuse and neglect. However, it was determined that the majority of the students (63.6%) were not able to define the concept of elder abuse comprehensively or clearly. These students defined abuse as "*Behaving in an undesired way/misbehaving towards an individual.*" On the other hand, 48.2% of the students defined neglect as "*Not taking care of an individual sufficiently.*" Only 6% of the students (n=23) stated that they had previously received education/training on the concepts of abuse and neglect, and the majority of the students (82.1%) stated that the source of their knowledge about these concepts was television. Meanwhile, 81.6% of the students stated they had previously seen an elderly individual who was exposed to abuse and neglect, and more than half of the students (56.3%) stated that they had seen cases where elders had been abused physically (Table 2).

The option selected most frequently by students for the physical type of abuse was "*Slapping, hitting,*

kicking, pushing an elder or the use of force by someone who takes care of the elder or is trusted by the elder" (97.7%). The option most frequently selected by students for the type of psychological abuse was "*Humiliating, insulting the elderly by someone who takes care of the elderly or is trusted by the elderly*" (96.9%)**.** The option most frequently selected by students for the type of economic abuse was "*Stealing money or property in a legal or illegal way from the elderly by someone who takes care of the elderly or who is trusted by the elderly*" (93.2%). The option most frequently selected by students for the type of sexual abuse was "*Taking photos with explicit sexual content of the elderly without his/her consent*" (91.4%). The option most frequently selected by students with regard to neglect was "*Not taking care of the elderly intentionally or unintentionally, leaving him/her alone for a long time*" (75.6%) (not shown here due to restricted number tables).

The majority of the students (n = 362, 94%) had not received any formal education about elder abuse and neglect (Table 2). A statistically significant difference was found between students from different departments within the university in terms of whether they had received any formal education on elder abuse and neglect in their program (p<0.05). Students from the nursing department had a higher rate of having received education/training on this subject compared to students from nutrition and dietetics and physiotherapy and rehabilitation departments (respectively; 10.2%, 2.0%, 2.0%). There was also a significant difference in terms of receiving education on elder abuse and neglect according to the year level of students; it was determined that this education was provided mostly in their second year (p <0.05) (Table 3).

DISCUSSION

Elder abuse is a complex phenomenon encompassing a wide range of harms that directly

Table 2. Students' Knowledge and Experience Related to Elder Abuse and Neglect (n=385)

Receiving education previously on elder abuse and neglect	n	%
Received	23	6.0
Haven't received	362	94.0
Knowledge of the concept of elder abuse		
Aware	357	92.7
Unaware	28	7.3
†Definition of the concept of abuse (n = 357)		
Behaving in an undesired way/misbehaving towards an individual	227	63.6
Behaving unjustly towards an individual by ignoring his/her fundamental rights and freedoms	113	31.6
Causing damage to an individual by using force against him/her	38	10.6
Excluding someone/showing no interest in an individual	10	2.8
†Definition of the concept of negligence (n = 357)		
Not taking care of an individual sufficiently	172	48.2
Not satisfying the needs of an individual	150	42.0
Depriving an individual of his/her rights	18	5.1
Not providing necessary assistance to an individual	9	2.5
Causing damage to an individual	6	1.7
†The source with respect to concepts of abuse and negligence (n:357)		
Television	293	82.1
Books/newspapers	185	51.8
Internet	166	46.5
School education	113	31.7
Internship practice	32	9.0
Friend/family/neighbors	19	5.3
Having encountered an elderly individual who was exposed to abuse and negligence		
Encountered	71	18.4
Haven't encountered	314	81.6
†Type of elderly abuse encountered (n = 71)		
Physical	40	56.3
Psychological	30	42.3
Economic	27	38.0
Neglect	27	38.0
Sexual	12	16.9

†Multiple responses were permitted.

Table 3. Receiving Education on Elder Abuse and Neglect According to Department and Year Level (n = 385)

Departments	Those who received training		Those who did not receive training	
	Number	%	Number	%
Nursing	19	10.2	168	89.8
Nutrition and Dietetics	3	2.0	145	98.2
Physiotherapy and Rehabilitation	1	2.0	49	98.0
Fisher's Exact Test (x2)= 10.798, p:0.04				
Year level				
First year	4	2.8	141	97.2
Second year	12	8.2	134	91.8
Third year	1	1.4	73	98.6
Fourth year	6	30	14	70.0

Fisher's Exact Test (x2)= 19.297,p:0.00

affect the lives of older people. Although elder abuse has been well documented in the literature, there has been little consensus on a clear definition (10,11).

Although the majority of the students in our study indicated that they were familiar with the concept of elder abuse and neglect, they were not able to provide a clear definition. Nearly half of the students described the concept from a single perspective, such as physical or economic abuse. The Centers for Disease Control and Prevention (CDC) defines elder abuse as an intentional act, or failure to act, by a caregiver or another person in a relationship involving an expectation of trust that causes or creates a risk of harm to an older person (12). This includes psychological, physical, financial/material and sexual abuse, as well as intentional or unintentional neglect. (13). However, none of the students were able to provide a clear and comprehensive definition of the concept.

Many studies have identified the barriers and difficulties that health professionals face in identifying and reporting cases of elder abuse (4,10,11,14,15). Therefore, it is important for healthcare students to recognize the signs and types of elder abuse and neglect. In our study, it was determined that the type of abuse best known by the students is physical abuse; thus, their knowledge about detecting abuse was insufficient. Like our study, a study conducted by Lo et al. (2010) established that most first and third year nursing students were familiar with physical abuse, but their understanding of elder neglect was insufficient (8). Interest in studies that evaluate the knowledge, attitudes, or awareness of healthcare professionals with respect to elder abuse and neglect has increased in recent years. However, there are few studies focusing on students' or professionals' knowledge, awareness, and understanding of elder abuse and neglect. Furthermore, there aren't many studies on the reasons for the underreporting of elder abuse and neglect (11,16,17). For this reason, students who will eventually work in the field of healthcare must receive an education and training that will provide them with sufficient knowledge and capabilities in this field. This study revealed that the majority of the students had not received an adequate education on elder abuse and neglect.

Elder abuse prevention and intervention is a multidimensional subject that requires interdisciplinary collaboration. However, previous

studies have found that healthcare professionals are not sufficiently prepared on the subject and they require education and practice (15,16,18). The fact that only 6% of the students participating in our study had received education at school on elder abuse supports these conclusions. In addition, most of the students had been informed about elder abuse and neglect only by means of television, books/newspapers, and the Internet. Technology may provide information on physical abuse, which is the most easily identified type of abuse. However, it should be noted that the information obtained from non-scientific sources may not always be reliable.

In the present study, a significant majority of the students stated that they had never encountered an elderly individual who had been exposed to abuse and neglect, and very few students (6%) stated that they had received any education about elder abuse. Several studies in the literature reported findings consistent with our study (8,9,19,20). All studies have shown that education is essential to increase healthcare students' knowledge and awareness about elder abuse and the recognition of elder abuse.

The present study revealed a statistically significant difference between students in different departments in terms of having received any education about elder abuse and neglect. The number of students who had received education on this subject was higher in the nursing department when compared to other departments (p <0.05). When the education program of departments of nutrition and dietetics and physiotherapy and rehabilitation in Turkey are examined, it is considered that elder care is addressed as part of professional knowledge but not covered comprehensively, especially in terms of elderly abuse according to nursing. Moreover, approaches to elder abuse may differ according to professional orientation such as professional position, education, values, and experience (18). For this reason, the knowledge level of students may differ.

In the present study, it was determined that fourth year students had received more education on elder abuse and neglect compared to students in earlier years (p <0.05). In a similar study conducted with pharmacy students, 60% of fourth year students had received education on elder abuse and neglect (21). The higher a student's year level, the more likely it was that they had received education on elder abuse and neglect, and correspondingly, they had greater knowledge of the subject. However, when we examine the levels of education received, it is evident that the levels are not at the desired level.

CONCLUSION

In our study, although the majority of the students indicated that they were familiar with the concept of elder abuse and neglect, the students were not able to define the concept comprehensively and clearly, and they described elder abuse from a single perspective; thus, it is concluded that the knowledge level of the students is not sufficient. Moreover, when the students' educational programs were analyzed, it was observed that only a few physical therapy and dietitian students had received any education about elder abuse, and even though nursing students had received more education on elder abuse, their knowledge was still not at the desired level. Based on these conclusions, raising awareness and increasing knowledge about elder abuse and neglect should be ensured by including practical and detailed courses on elder abuse in the education programs for these professional groups as they are very likely to work with elderly populations in their future careers.

ETHICAL DIMENSION OF THE RESEARCH

Necessary permissions were obtained from Gazi University, Faculty of Health Sciences and Gazi University Ethical Committee to perform this study. Consent was received from the students who

agreed to participate in this study to protect their rights; they were informed of the purpose of the study and were reminded that they had the right to refuse to participate or to withdraw from the study at any time.

LIMITATIONS OF THE STUDY

One strength of our study is that it is the first study on elderly abuse and neglect conducted with physiotherapy, dietetic, and nursing students; since these are professions that are very likely to work with elderly populations. A limitation of this study is that it was performed at a single center, and therefore, it is not possible to generalize our results. The study is limited to the data obtained from students who were attending school on the dates when the data collection tools were applied and from students who agreed to participate in the study.

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CONFLICTS OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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