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THE RELATIONSHIP BETWEEN FUNCTIONAL LEVEL, PHYSICAL ACTIVITY LEVEL, DEPRESSION AND QUALITY OF LIFE IN GERIATRIC INDIVIDUALS DURING THE COVID-19 PANDEMIC PERIOD

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Abstract:
Objective: This study aims to have information about the functional levels, physical activity levels, depression levels, and quality of life of geriatric individuals in the restrictions experienced during the pandemic period and to examine the relationship between these variables. **Materials and Methods:** In this cross-sectional study, a total of 116 participants whose ages ranged from 65 to 87 years (overall sample: M = 72.44, SD = 5.75) were recruited via a snowball sampling strategy to answer to an online questionnaire. The four instruments used were The Functional Independence Measurement scale, Geriatric Depression Scale, The International Physical Activity Questionnaire-Short Form, The World Health Organization Quality of Life Module for the Elderly. **Results:** A significant regression model, $F(3/110) = 23.16$, $p < 0.001$, and 37% of the variance in the dependent variable ($R2$ adjusted = 0.37) explained by the independent variables. Accordingly, level of functional independence positively and significantly predicts quality of life, $\beta = 0.44$, $t(110) = 5.43$, $p < 0.0001$, $pr2 = 0.21$. Physical activity level positively and significantly predicts quality of life, $\beta=0.2$, $t(110)=2.48$, $p = 0.015$, $pr2 = 0.05$. Depression negatively and significantly predicts quality of life, $\beta = -0.2$, $t(110) = -2.56$, $p = 0.012$, $pr2 = 0.06$. **Conclusion:** Physical activity and functional independence levels significantly affect the quality of life positively, and depression affects the quality of life significantly negatively.

Keywords: depression, geriatrics, quality of life

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1. Introduction

The COVID-19 disease in the world was first reported in December 2019 and has spread to many countries of the world. The World Health Organization (WHO) declared on March 11, 2020, that COVID-19 disease is a global pandemic. During the COVID-19 period, geriatric individuals were the group that faced the most significant challenges, not only in physical but also in mental and social dimensions. It is essential to consider the well-being of geriatric individuals as a whole because the general health status is affected by the quality of activities of daily living rather than medical problems (1).

Physical activity is defined as body movements produced by skeletal muscles that lead to energy expenditure. Physical activity is significant for geriatric individuals to maintain their level of independence, physical and mental health, and well-being (2,3). Various studies have shown that physical activity can prevent symptoms of psychological disorders such as depression and anxiety. People who do more physical activity have a better health-related quality of life (3). Therefore, a healthy psychological state and quality of life can be expected by maintaining physical activity in geriatric individuals (3,4).

The coronavirus disease (COVID-19) has led to mandatory restrictions in our country, as in many countries. Geriatric individuals are one of the groups that are most affected physically and emotionally by forced restraints (3). Independence levels of geriatric individuals in activities of daily living, physical activity levels changing with restrictions, depression levels, and quality of life are critical health-related variables. A detailed investigation of changes in physical activity behaviors in geriatric individuals and identification of factors associated with physical activity changes during the COVID-19 pandemic can inform public health policies that promote well-being and quality of life in scenarios of public health restrictions (2,3). This study aims to have information about the functional levels, physical activity levels, depression levels, and quality of life of geriatric individuals in the restrictions experienced during the pandemic period and to examine the relationship between these variables.

2. Materials and Methods

The study was conducted between January 2021 and April 2021, with 116 participants aged 65 and over. Participants were reached through different social networks (eg, WhatsApp, Twitter, Instagram, and Facebook) with the snowball sampling strategy. The Snowball sampling method is a technique that is very effective in communicating with participants from different places and has a higher response rate than other strategies. Due to the risk of face-to-face meetings due to COVID-19, the problems to be experienced in filling out the online questionnaires for the age group planned to be studied were taken into account, and the questionnaires were filled by telephone. All cases were informed about the study, and evaluation forms were kept anonymous. Participants were informed

that they had the right to withdraw from the study at any time since participation was voluntary.

The ethical permission was obtained from the Ondokuz Mayıs University Social And Human Sciences Ethics Committee (Date: 01/29/2021/ No: 2021/95), and assessments were carried out according to the Declaration of Helsinki.

Criteria for inclusion in the study: being able to live independently in a home environment, understanding the question read, not having a perception and communication problem, and being over 65. Criteria not included in the study; mental retardation, a cognitive impairment that may affect communication and perception, etc. dementia, Alzheimer's.

2.1. Main outcome variable

Sociodemographic data includes participants' gender, marital status, age, body mass index, education, occupation, dominant hand, number of children, smoking, background and family history, smoking, alcohol, drug use, assistive device use, and living environment.

Functional Independence Measurment (FIM) was used to evaluate the functional level. FIM is an assessment tool used to assess the functional status of the patient. FIM is divided into two areas: Motor and Cognitive. It consists of 13 items in the motor area and 5 items in the cognitive area, with 18 items. Each item in the FIM is scored on a 7-point Likert scale, and the score indicates the amount of help required to realize each item. 1 = indicates that the activities are done completely dependently 7 = indicates that the activities are done independently by the individual. Evaluations are based on performance rather than capacity and can be obtained through observation, patient interviews, telephone interviews, or medical records. The total score ranges from 18 to 126, where 18 points represent the individual's complete dependency and 126 points represent the individual's full independence. Sub-scale scores for the Motor and Cognitive domains can also be calculated (5).

Physical activity level was evaluated with the International Physical Activity Level Questionnaire Short Form. The International Physical Activity Questionnaire Short form consists of 7 questions. It provides information on time spent walking, moderate and vigorous activities, and time spent sitting. Calculation of the total score of the short form includes the sum of the duration (minutes) and frequency (days) of walking, moderate-intensity activity, and vigorous activity. The energy required for activities is calculated with the MET-minute score. Standard MET values have been established for these activities. Sitting 1.5 MET, Walking 3.3 MET, Moderate Intensity Physical Activity 4.0 MET, Vigorous Physical Activity 8.0 MET. By using these values, daily and weekly physical activity level is calculated (6).

Depression level was evaluated with Geriatric Depression Scale. This scale was developed by Yesevage et al. (1983), and a validity and reliability study (test-retest consistency, r = 0.77; internal consistency = 0.92) was conducted by Ertan in the Turkish population. The Geriatric Depression Scale is prepared to consist of 30 questions based

on self-reports that the elderly can easily mark and can be answered as "yes" or "no". In the scale scoring, 1 point is given for each response in favor of depression and 0 point is given for the other answer, and the total score is accepted as the depression score. Scoring of the scale was made as 0-10 points of "no depression", 11 points of "possible depression", and 14 and above points of "definite depression". When 14 is taken as the threshold value for Geriatric Depression Scale scores, its specificity approaches 100% (7).

The World Health Organization Quality of Life Module for the Elderly (WHOQOL-OLD) was used to assess the quality of life. Turkish validity and reliability study of the WHOQOL-OLD Quality of Life scale developed by the World Health Organization Eser et al. (2004). The scale consists of 24 Likert-type items and six subscales/areas. Sensory functions, autonomy, past, present and future activities, social participation, death and dying, and intimacy. The five-point Likert scale is 1: none, 2: very little, 3: moderately, 4: a lot, and 5: extremely. The lowest possible score for each question is 1, and the highest possible score is 5. The Chronbach alpha values calculated for reliability were found to be 0.48 for Sensory Functions, 0.78 for Autonomy, 0.76 for Past, Present, and Future Activities, 0.81 for Social Participation, 0.88 for Death, and Dying, and 0.88 for Intimacy. For the broad-scale structure, the alpha value, which is the reliability coefficient, was determined as 0.69 (8).

As a reference, in the power analysis made in line with the expectations and the information obtained from the literature; Assuming that the effect size of the relationship between the variables to be examined could be at a low level (r=0.25), it was calculated that 80% power could be obtained at the 95% confidence level when at least 95 people were included in the study.

2.2. Statistical Analysis

The data will be analyzed with the SPSS package program. Continuous variables will be given as mean ± standard deviation and categorical variables as numbers and percentages. The relationships between continuous variables analyzed with Spearman or Pearson correlation analyzes, and multiple regression models were used to explore the factors associated with dependent variables.

3. Results

3.1. Descriptive Statistics

Table 1 and 2 provides descriptive statistics and correlations of variables examined in the study. There is a significant negative relationship between sensory abilities, sub-parameters of quality of life, transfer and displacement, sub-parameters of functional independence level, and death and dying and depression, which are sub-parameters of quality of life, in the restrictions during the pandemic period (r=-0.008, r=-0.012, r=, respectively). -0.017).

Table 1: Socio-demographic characteristics of the study sample

Sociodemographic variable		**Female (n=66)**	**Male (n=50)**	**Total (n=116)**
		M±SD	**M±SD**	**M±SD**
Age (years)		73.3±5.58	71±5.82	72.31±5.78
Height (cm)		157.82±6.13	171.5±6.52	163.72±9.26
Weight (kg)		71.66±11.82	82.9±11.53	76.5±12.92
BMI (kg/m²)		28.80±4.64	28.19±3.60	28.54±4.22
Number of falls in the last 1 year				
Smoking		2.15±7.84	5.6±14.81	3.64±11.45
Resume	*			
Sex		**Female n(%)**	**Male n(%)**	**Total n(%)**
Social security	No	6(9.1)	0	6(5.2)
	Green card	10(15.2)	3(6)	13(11.2)
	SSI	50(75.8)	47(94)	97(83.6)
Educational status	Illiterate	10(15.2)	2(4)	12(10.3)
	Literate	13(19.7)	4(8)	17(14.7)
	Primary school	3451.5)	12(24)	46(39.7)
	Middle school	0	6(12)	6(5.2)
	High school	6(9.1)	5(10)	11(9.5)
	University and above	3(4.5)	21(42)	24(20.7)
Job	Retired	36(54.5)	47(94)	83(71.6)
	Worker	0	3(6)	3(2.6)
	Housewife	30(45.5)	0	30(25.9)
Assistive device use	Yes	11(16.7)	6(12)	17(14.7)
	No	55(83.3)	44(88)	99(85.3)
Marital status	Maried	26(39.4)	40(80)	66(56.9)
	Single	5(7.6)	0	5(4.3)
	Widow	35(53)	10(20)	45(38.8)
Living place	With spouse	27(40.9)	41(82)	68(58.6)
	With their children	14(21.2)	3(6)	17(14.7)
	Alone	25(37.9)	6(12)	31(26.7)
State of being covid	Yes	6(9.1)	2(4)	8(6.9)
	No	60(90.9)	48(96)	108(93.1)

Table 2: Inter correlation matrix for the variables examined in the study

Variables		M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Physical Activity Level		2342.77	2684.43	-	0.367**	0.334**	0.109	0.299 **	0.246**	0.221*	0.411**	-0.105	0.351**	0.096	0.262**	0.192*	0.277**	0.028	0.268**
Functional Independence Scale	Functional Independence Scale Total Score	113.10	18.86	0.367**	-	0.865**	0.615**	0.775**	0.713**	0.727**	0.819**	-0.306**	0.593**	0.048	0.502**	0.500**	0.29**	-0.140	0.521**
	Functional Independence Scale Self Care	37.16	8.29	0.334**	0.865**	-	0.584**	0.784**	0.532**	0.703**	0.682**	-0.272**	0.574**	-0.063	0.571**	0.524**	0.527**	-0.241**	0.531**
	Functional Scale Of Independence Sphincter Control	13.0	2.21	0.109	0.615**	0.584**	-	0.615**	0.356**	0.577**	0.578**	-0.199*	0.421**	-0.086	0.454**	0.421**	0.421**	-0.199*	0.297**
	Functional Independence Scale Transfers	19.39	3.12	0.299**	0.775**	0.784**	0.615**	-	0.553**	0.737**	0.690**	-0.219*	0.587**	-0.008	0.564**	0.577**	0.447**	-0.227*	0.469**
	Functional Independence Scale Locomotion	12.47	1.98	0.246**	0.713**	0.532**	0.356**	0.553**	-	0.451**	0.505**	-0.177	0.413**	-0.012	0.336**	0.328**	0.251**	0.042	0.359**
	Functional Independence Scale Communication	12.86	2.11	0.221*	0.727**	0.703**	0.577**	0.737**	0.451**	-	0.729**	-0.321**	0.587**	0.063	0.520**	0.574**	0.440**	-0.242**	0.473**
	Functional Independence Scale Socıal Cognition	18.57	3.63	0.411**	0.819**	0.682**	0.578**	0.690**	0.505**	0.729**	-	-0.241**	0.600**	0.127	0.443**	0.502**	0.390**	-0.101	0.497**
	Geriatric Depression Score	9.40	5.40	-0.105	-0.306**	-0.272**	-0.199*	-0.219*	-0.177	-0.321**	-0.241**	-	-0.372**	-0.093	-0.416**	-0.366**	-0.230*	-0.017	-0.183*
WHOQOL-OLD	WHOQOL-OLD-Total	58.32	11.34	0.351**	0.593**	0.574**	0.421**	0.587**	0.413**	0.587**	0.600**	-0.372**	-	0.346**	0.711**	0.817**	0.597**	0.128	0.707**
	WHOQOL-OLD Sensory-Abilities	60.29	22.11	0.096	0.048	-0.063	-0.086	-0.008	-0.012	0.063	0.127	-0.093	0.346**	-	-0.105	0.028	-0.122	0.234*	0.164
	WHOQOL-OLD Autonomy	61.48	21.24	0.262**	0.502**	0.571**	0.454**	0.564**	0.336**	0.520**	0.443**	-0.416**	0.711**	-0.105	-	0.671**	0.630**	-0.280**	0.500**
	WHOQOL-OLD Past-Present-and-Future-Activities	60.88	18.78	0.192*	0.500**	0.524**	0.421**	0.577**	0.328**	0.574**	0.502**	-0.366**	0.817**	0.028	0.671**	-	0.563**	-0.073	0.588**
	WHOQOL-OLD Social-Participation	54.42	17.31	0.277**	0.429**	0.527**	0.421**	0.447**	0.251**	0.440**	0.390**	-0.230*	0.597**	-0.122	0.630**	0.563**	-	-0.261**	0.399**
	WHOQOL-OLD Death-and-Dying	50.49	22.74	0.028	-0.140	-0.241**	-0.199*	-0.227*	0.042	-0.242**	-0.101	-0.017	0.128	0.234*	-0.280**	-0.073	-0.261**	-	-0.067
	WHOQOL-OLD Intimacy	62.39	18.02	0.268**	0.521**	0.531**	0.297**	0.469**	0.359**	0.473**	0.497**	-0.183*	0.707**	0.164	0.500**	0.588**	0.399**	-0.067	-

N = 116, alphas on diagonal (for multi-item measures). *p < 0.05; **p < 0.01.

There is a positive and significant relationship between sensory abilities, sub-parameters of quality of life, functional independence level, death and dying, sub-parameters of quality of life, and displacement, sub-parameters of physical activity level and functional independence level (r=0.048, r=0.028, r=0.042, respectively).

3.2. Hypothesis Testing

Multivariate linear regression analysis was performed to predict the quality of life variable by using the variables of functional independence, physical activity, and depression (Table 3).

Table 3: Multiple regression analysis results for quality of life

Variables	Unstandardized		Bootstrapping BCa 95%CI		Standardized		R^2	F
	B	SE_B	Lower limit	Upper limit	β	t		
(Constant)	54.37	5.46	43.55	65.18		9.96	0.39	23.17
Functional Independence	0.24	0.04	0.15	0.33	0.44	5.43		
Physical Activity	0.001	0.01	0.0001	0.001	0.2	2.48		
Depression	-0.39	0.15	-0.69	-0.09	-0.2	-2.56		

$p<0.05$.

As a result of the analysis, it was found that a significant regression model, F (3/110) = 23.16, $p < 0.001$, and 37% of the variance in the dependent variable (R2 adjusted = 0.37) explained by the independent variables. Accordingly, level of functional independence positively and significantly predicts quality of life, $\beta = 0.44$, $t(110) = 5.43$, $p < 0.0001$, pr2 = 0.21. Physical activity level positively and significantly predicts quality of life, $\beta=0.2$, $t(110) = 2.48$, $p = 0.015$, pr2 = 0.05. Depression negatively and significantly predicts quality of life, $\beta = -0.2$, $t(110) = -2.56$, $p = 0.012$, pr2 = 0.06.

4. Discussion

In this study, the possible effects of physical activity, functional independence level, and depression, which are expected to decrease in this age group due to the curfew applied for individuals over the age of 65, on the quality of life in the COVID-19 pandemic were investigated. A multiple regression model was created using the variables of physical activity, functional independence, and depression to indicate the level of quality of life. The regression analysis found some significant relationships between physical activity, functional independence, depression, and quality of life.

Physical activity and functional independence levels significantly affect the quality of life positively, and depression affects the quality of life significantly negatively. It is a known fact that physical activity reduces depression and improves the quality of life.

Felipe et al., whose meta-analysis included 49 studies, determined that physical activity was protective against depression symptoms regardless of age and gender (9). In

different systematic reviews, it has been shown that exercise reduces the symptoms of depression and contributes to pharmacotherapy and psychotherapy (10-12). Therefore, it is not wrong to expect an increase in depression and a decrease in quality of life due to decreased physical activity, and social restrictions during the COVID-19 pandemic. The fact that decreased physical activity is associated with reduced quality of life in our study also supports this view.

Studies show that physical activity is associated with a decrease in depression and an increase in quality of life in geriatric individuals. An et al. evaluated the physical activity and quality of life of the participants, who were divided into groups of young, middle-aged, and older adults. An increase in life satisfaction and happiness was found with an increase in physical activity, and this increase was more in the geriatric group (13). Another study found a significant relationship between physical activity and quality of life in the older working-age population(14).In addition, two different community-based studies conducted in Brazil found that physical activity positively affects the quality of life and reduces depression in the elderly (15,16). This study found a significant correlation between physical activity, functional independence, depression level, and quality of life. The level of physical activity in elderly individuals affects their quality of life.

The COVID-19 virus has infected millions of people and caused morbidity and mortality, negatively affecting economies, societies, and countries. The COVID-19 pandemic has negatively affected individuals' lives through social restrictions and isolation precautions also without infecting them.

It has been shown in some studies that both the concerns caused by the potential risks of the virus in the elderly and the quarantine precautions taken to prevent virus transmission adversely affect the quality of life (1-3). This study observed that physical activity and functional independence decreased, and the levels of depression increased in elderly individuals due to quarantine precautions.

This study has some limitations. The most important limitation of this study is that it is cross-sectional. Therefore, it is insufficient in terms of establishing a cause-effect relationship. In addition, we think that the lack of physical illness history of the participants may affect the study results. In future studies, participants could be asked about their pre-pandemic levels of physical activity, functional independence, and depression.

5. Conclusion

The observed and considered effects of COVID-19 are usually conditions associated with direct virus infection. On the other hand, the quarantine precautions implemented due to the anxiety and fear caused by the virus in the communities also negatively affected the elderly. This study determined that the level of physical activity, functional independence, and depression in elderly individuals were effective in quality of life. As a result, restrictions introduced to reduce morbidity and mortality cause an increase in

depression and a decrease in physical activity and functional independence in the elderly. This situation negatively affects the quality of life in geriatric individuals. This situation should be considered for possible future quarantines, and should take appropriate precautions for the elderly.

Conflict of İnterest Statement

The authors declared no conflicts of interest.

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