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Physical Activity Levels of Geriatric Individuals with Diabetes: A Descriptive Research

Diyabetli Geriatrik Bireylerin Fiziksel Aktivite Düzeyleri: Tanımlayıcı Araştırma

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This study was presented as an oral presentation at the 6th International New York Conference on Emerging Trends in Interdisciplinary Research and Applications, April 3-5, 2022, Manhattan, New York City, USA.

ABSTRACT Objective: This descriptive study was conducted to determine the physical activity levels of geriatric individuals diagnosed with diabetes. **Material and Methods:** This research data was collected with 105 geriatric diabetic patients who applied to the Family Health Center between September 2020 and June 2021. The data of the study were collected by Questionnaire and International Physical Activity Survey (IPAQ). In the evaluation of IPAQ, the criterion was that each activity was performed for at least 10 minutes at a time, and a score as "MET-minute/week" was obtained by multiplying it with the Metabolic Equivalent of Task value (multiples of oxygen consumption at rest). Then physical activity levels; They were classified as physically inactive (<600 MET-min/week), low physical activity level (600-3000 MET-min/week) and sufficient physical activity level (>3000 MET-min/week). **Results:** It was determined that the mean IPAQ score of the patients was 473.7±617.8 and 74.2% were not physically active. Those who are female, 75 years or older, illiterate, know what can happen if they do not comply with treatment, comply with medical nutrition treatment, meet with a diabetes nurse, exercise regularly, know the importance of physical activity in diabetes treatment, and do physical activity in accordance with diabetes treatment and as recommended, IPAQ score average was found to be higher ($p<0.05$). **Conclusion:** According to the results of this research, it was determined that the physical activity levels of diabetic geriatric individuals were insufficient.

Keywords: Diabetes; geriatrics; physical activity; quality of life; nursing

ÖZET Amaç: Tanımlayıcı tipteki bu çalışma, diyabet tanısı alan geriatrik bireylerin fiziksel aktivite düzeylerini belirlemek amacıyla yapıldı. **Gereç ve Yöntemler:** Bu araştırmanın verileri Eylül 2020-Haziran 2021 tarihleri arasında Aile Sağlığı Merkezine başvuran 105 geriatrik diyabet hastası ile görüşülerek toplanmıştır. Verilerin toplanmasında soru formu ve Uluslararası Fiziksel Aktivite Araştırması (UFAA) kısa formundan yararlanılmıştır. UFAA değerlendirmesinde, her aktivitenin bir defada en az 10 dk yapılması kriteri alınmış ve Metabolik Eşdeğer Görev değeri (oksijen katları) ile çarpılarak "MET-dk/hafta" skoru elde edilmiştir. Daha sonra fiziksel aktivite düzeyleri; fiziksel olarak aktif olmayan (<600 MET-dk/hafta), düşük fiziksel aktivite düzeyi (600-3000 MET-dk/hafta) ve yeterli fiziksel aktivite düzeyi (>3000 MET-dk/hafta) olarak sınıflandırıldı. **Bulgular:** Yaşlı bireylerin ortalama UFAA skorunun 473,7±617,8 olduğu ve %74,2'sinin fiziksel olarak aktif olmadığı belirlendi. Kadın, 75 yaş ve üzeri, okuma-yazma bilmeyen, tedaviye uymazlarsa ne olabileceğini bilen, tıbbi beslenme tedavisine uymayan, diyabet hemşiresi ile görüşen, düzenli egzersiz yapan, diyabet tedavisinde fiziksel aktivitenin önemini bilen, diyabet tedavisine uygun ve önerildiği şekilde fiziksel aktivite yapan bireylerin UFAA puan ortalamasının daha yüksek olduğu görüldü ($p<0,05$). **Sonuç:** Bu araştırmanın sonuçlarına göre diyabetik geriatrik bireylerin fiziksel aktivite düzeylerinin yetersiz olduğu belirlendi.

Anahtar Kelimeler: Diyabet; geriatri; fiziksel aktivite; yaşam kalitesi; hemşirelik

Extended life expectancy has significantly increased the incidence of chronic diseases in our country and in the world. Diabetes, one of the most prominent of these, is a chronic disease that can be seen in all age groups. It progresses with complications, can cause organ damage if not treated well, can

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significantly reduce the quality of life, and has a high treatment and cost.[1] According to International Diabetes Federation (IDF) 2019 data, while the number of individuals with diabetes mellitus in the world was 463 million in 2019, this number is expected to increase by 51% and reach 700 million in 2045. Türkiye has the highest prevalence rate among European countries with an 11.1% prevalence rate. According to IDF 2019 diabetes atlas data, there are 6.6 million individuals with diabetes mellitus in our country, but this number is expected to reach 10 million in 2045. In addition, according to IDF 2045 estimates, Türkiye is predicted to be one of the top 10 countries with the highest number of individuals with diabetes mellitus in the world in 2045.[2] Similarly, in the study of the Turkish Society of Cardiology on the prevalence of diabetes, the rate of diabetes was 26.1% in the 60-69 age group, 25.8% in the 70-79 age group, and 16.7% in the 80-year-old and older group. It is thought that impaired glucose tolerance and undiagnosed cases in the geriatric group would increase this rate even further.[3] This rapid increase in geriatric individuals with diabetes may be associated with decreased insulin secretion as a result of physiological changes, rapid weight gain due to physical inactivity with the emergence of insulin resistance, obesity and drugs.[4] For this reason, it is critical to include diet and exercise programs in geriatric individuals with diabetes, in addition to good diabetes diagnosis and treatment management for regulating blood sugar. Especially since regular exercise helps to preserve muscle mass, provides glucose and blood pressure control, improves lipid profile, and reduces insulin resistance and risk of coronary artery disease.[5] Physical activity provides different intensity energy expenditure in the muscles and joints, provides weight loss with activities that accelerate the heart and respiration, alongside diet, and contributes to blood sugar control in many geriatric diabetics without pharmacological treatment.[6-8] However, the physical weakness experienced by individuals in old age causes inadequacies in meeting many basic needs.[9] Especially in Turkish society, old age is defined as the "insufficiency process", but the care of elderly individuals with chronic diseases is usually undertaken by their own family members because of the traditions.[10] This makes the physical activity level of elderly individuals even more limited.

Physical activity, which is one of the cornerstones of diabetes treatment, also prevents the formation of different diseases that occur with diabetes. A study reports that physical activity increases life expectancy by reducing the risk of cardiovascular diseases.[11] Much as it is emphasized that the safe and effective activity for geriatric individuals, in general, is walking; blood glucose should be measured before and after physical activity.[8] In the literature, it is emphasized that the risk of diabetes decreases by 60% with diet and physical activity in individuals with impaired glucose tolerance, while in geriatric individuals with type 1 diabetes, physical activity decreases the need for insulin and increases its effectiveness.[12] In addition, it has been reported that walking increases the muscle density of the individual while reducing the postprandial blood glucose level, ketonemia and hyperlipidemia, thus positively affecting the cardiovascular system.[13] In this respect, it should not be forgotten that nurses, who are part of a multidisciplinary team in preventing the development of diabetes and its complications in elderly diabetic patients and providing glycemic control, also hfave an important role in maintaining physical activity.[14,15]

MATERIAL AND METHODS

TYPE, LOCATION, POPULATION, AND SAMPLE OF THE STUDY

This descriptive study was conducted to determine the physical activity level of 105 geriatric individuals who were registered to Family Medicine Units, diagnosed with diabetes by a physician, and applied to the due to different health problems between September 2020 and June 2021. Patients who were registered to the relevant Family Medicine Units with a diagnosis of diabetes, over 65 years of age, able to communicate, and volunteered to participate were included in the study. The patients had a score of at least 24 on the Standardized Mini Mental Test (SMMT) and the Standardized Mini Mental Test for The Uneducated (SMMT-E).[16]

DATA COLLECTION TOOLS

The data of the study were collected with the Questionnaire created by the researchers and IPAQ.

Questionnaire: This form, developed in line with the literature, includes patients' sociodemographic characteristics, physical activity levels, and disease-related questions.[16]

Standardized Mini Mental Test and Standardized Mini Mental Test for the Uneducated: Standardized Mini Mental Test and the SMMT-E test -developed for the illiterate, are two frequently used screening tests to evaluate cognitive disorders. SMMT was developed by Folstein et al. in 1975 and its validity and reliability were done by Güngen et al.[16,17] It consists of 19 questions and is evaluated over 30 points. The test evaluates the orientation, registration memory, attention and calculation, recall, and language skills of the patients. For the Turkish population, the threshold value, sensitivity, and specificity were determined to be 23/24, 0.91, and 0.95 respectively. SMMT-E was developed by Ertan et al. in 1999 to be applied to uneducated individuals.[18] It has a total of five sections and 19 questions and is evaluated over 30 points. The validity and reliability of the SMMT-E for the Turkish population were done by Babacan-Yıldız et al. in 2016.[19] In this test, 20-23 points are evaluated as "mild", 10-19 as "moderate", 0-9 as "severe", and 24-30 points as "no cognitive impairment".[16,17] The Cronbach alpha value of the scale is 0.89.

International Physical Activity Questionnaire: The validity and reliability of the questionnaire were done by Öztürk, which consists of a total of seven questions.[16] The first and second questions inquire about vigorous activity, the third and fourth questions about moderate-vigorous activity, the fifth and sixth questions about walking, and the seventh question about the time spent sitting by the individual. The calculation is made based on the criteria that each activity should be done for at least 10 minutes at a time; By multiplying the minute, day and MET value, a value in the form of "MET-minutes/week" is obtained. Physical activity levels are classified according to MET value as "physically inactive" (<600 MET-min/week), "low physical activity level" (600-3000 MET-min/week), and "sufficient physical activity level" (>3000 MET-min/week).[20] The Cronbach alpha value of the scale is 0,69.

DATA COLLECTION

Geriatric patients with diabetes who met the inclusion criteria and applied to the Family Medicine Units for different health problems (getting a prescription, upper respiratory tract infection, etc.) were interviewed, informed about the aim of the study, and gave their consent. Then, data collection forms were applied by the researcher.

EVALUATION OF DATA

Frequency was used to evaluate some characteristics of geriatric individuals with diabetes, conditions that may affect diabetes management, hypoglycemia-hyperglycemia and physical activity levels. Along with these parameters, since the data set did not show a normal distribution when comparing the mean physical activity score, the data was evaluated with Mann-Whitney U and Kruskal-Walls tests. Pearson chi-square, Mann-Whitney U and Kruskal-Walls tests. $p<0.05$ was considered statistically significant.

LIMITATIONS OF THE STUDY

The most important limitation of this study is that the physical activity levels of the patients were evaluated using a physical activity questionnaire solely based on their own statements.

ETHICAL DIMENSION OF THIS RESEARCH

This research was conducted in accordance with the principles of the Declaration of Helsinki, and written and verbal consent was obtained from the Gaziantep University Clinical Research Ethics Committee (Ethics committee no: 2020/291), Gaziantep Provincial Health Directorate and the patients participating in the study.

RESULTS

FINDINGS OF SOME CHARACTERISTICS OF THE PATIENTS AND AVERAGE PHYSICAL ACTIVITY SCORE

Of the patients with a mean age of 72±5.6, 38.10% were in the 65-69 age range, 46.67% were male,

46.67% were literate, and 30.48% have been diagnosed with diabetes for six to ten years. 70.48% of them were treated with oral antidiabetic drugs and diet, and 53.33% of them had different chronic diseases.

It was determined that geriatric individuals aged 75 and over, women, and illiterate had lower physical activity mean scores and this was statistically significant ($p<0.05$). In addition, there was no statistically significant relationship between the duration of diabetes diagnosis and the presence of other chronic diseases and the mean physical activity score ($p>0.05$) (Table 1).

TABLE 1: Comparison of sociodemographical and disease-related characteristics and physical activity scores of geriatric individuals with diabetes.

	n (%)	$\bar{X}$±SD	Z/X^2	p value
Age group ($\bar{X}$±SD=72.0±5.69)				
65-69	40 (38.10)	586.6±741.1	6.197	0.045*
70-74	37 (35.24)	447.5±462.5		
75 and above	28 (26.66)	346.8±596.0		
Gender				
Male	49 (46.67)	688.8±730.0	-3.738	0.000*
Female	56 (53.33)	285.4±423.5		
Education				
Illiterate	49 (46.67)	368±546.2	9.782	0.021*
Literate	19 (18.10)	394.4±470.1		
Primary school graduate	33 (31.43)	666.7±756.8		
High school graduate	4 (3.8)	551.7±620.3		
Diabetes diagnosis time (years)				
5 or less	28 (26.67)	433.5±399.6	1.953	0.582
6-10	32 (30.48)	537.2±562.7		
11-15	30 (28.57)	496.5±871.8		
16 or above	15 (14.28)	367.4±475.9		
Treatment method				
Only diet	1 (0.95)	102±-	2.757	0.599
Oad+insulin	5 (4.76)	762.4±735.1		
Insulin	5 (4.76)	494.6±640.6		
Only OAD	79 (75.24)	485.6±647.5		
All of	15 (14.29)	334±419.3		
Another chronic disease				
Yes	56 (53.33)	460.6±645.0	0.001	0.977
No	49 (46.67)	488.6±591.5		
Total	**105 (100.0)**	**473.7±617.8**		

*More than one option is possible; SD: Standard deviation; OAD: Oral Antidiabetic; Z: Mann-Whitney U test; X^2: Kruskal-Wallis test.

FINDINGS OF SOME CONDITIONS THAT MAY AFFECT PATIENTS' DIABETES MANAGEMENT AND PHYSICAL ACTIVITY SCORE AVERAGE

86.67% of geriatric individuals with diabetes were instructed about diabetes, 81.90% followed the treatment, 30.48% knew what would happen if they did not comply with their treatment, and 30.48% went to a health institution for diabetes control when they were sick. 97.14% of the patients did not have low blood sugar frequently, and 56.19% of them did not have high blood sugar frequently.

There is no statistically significant difference between the individuals receiving instruction about diabetes and the physical activity questionnaire mean score according to their low and high blood sugar levels. However, there is a statistically significant difference between compliance with the treatment and medical nutrition therapy, knowing what would happen if the treatment is not complied with, and meeting with the diabetes nurse and the physical activity questionnaire mean score ($p<0.05$) (Table 2).

FINDINGS REGARDING THE PHYSICAL ACTIVITY STATUS AND AVERAGE PHYSICAL ACTIVITY SCORES OF THE PATIENTS

61.9% of the patients exercised regularly, 58.1% knew the importance of physical activity in the treatment of diabetes, 38.1% had difficulty in doing physical activity, and 45.71% did the physical activity in accordance with diabetes treatment and as recommended.

There is a statistically significant relationship between physical activity questionnaire mean scores and regular exercise, knowing the importance of physical activity in diabetes treatment, and performing physical activity in accordance with diabetes treatment and recommended ($p<0.05$) (Table 3).

CLASSIFICATION OF PATIENTS' PHYSICAL ACTIVITY SCORE AVERAGE

The physical activity questionnaire mean score of the individuals was 473.7±617.8. 74.29% of the patients were determined to be not physically active (Table 4).

TABLE 2: Comparison of some conditions that may affect diabetes management and physical activity scores of patients.

	n (%)	$\bar{X}$±SD	Z/X²	p value
Getting an education about diabetes				
Yes	91 (86.67)	442.2±484.4	-0.198	0.843
No	14 (13.33)	678±1173.7		
Complying with the treatment				
Yes	86 (81.90)	484.4±532.9	-2.122	0.034*
No	18 (17.10)	425.2±928.1		
Knowing what would happen if not complied with the treatment				
Yes	32 (30.48)	663.1±778.2	-2.684	0.007*
No	73 (69.52)	390.6±517.4		
Complying with the medical nutrition treatment				
Yes	84 (80)	549±655.9	13.241	0.000*
No	21 (20)	172.3±283.4		
Meeting with the dietician (n=84)				
Yes	4 (4.76)	631.5±851.8	-0.032	0.975
No	80 (95.24)	544.9±651.2		
Meeting with the diabetes nurse (n=84)				
Yes	33 (39.29)	632±518.6	-2.392	0.017*
No	51 (60.71)	495.3±731.1		
Frequency of going to the health facility for diabetes control				
When sick	32 (30.48)	368.2±549.9	8.963	0.111
Once a month	11 (10.48)	438.2±218.8		
Once in 2 months	13 (12.38)	546.6±426.8		
Once in 6 months	18 (17.14)	660.3±958.5		
Once a year	30 (28.57)	471.3±608.9		
Never	1 (0.95)	0±		
Frequent drops in blood glucose				
Yes	3 (2.86)	372.5±298.9	-0.23118	0.817
No	102 (97.14)	476.6±625.3		
Frequent rises in blood glucose				
Yes	46 (43.81)	527.5±778	-0.265	0.791
No	59 (56.19)	431.7±459		
Total	**105 (100.0)**	**473.7±617.8**		

*p<0.05; SD: Standard deviation; Z: Mann-Whitney U test; X2: Kruskal-Wallis test.

DISCUSSION

Regular physical activity improves the life quality of patients, contributes to the development of healthy aging individuals physically, mentally, and socially, and has an important role in preventing chronic diseases.[21] In the literature, the importance of regular physical activity in preventing diabetes complications and providing glycemic control is emphasized, and it is reported that physical activity prevents the occurrence of diseases and has a therapeutic effect.[22,23] However, in the literature review, it was seen that the number of studies examining the physical activity status of individuals with diabetes in Türkiye is limited. Therefore, the physical activity levels of geriatric individuals with diabetes were evaluated and the importance and effect of physical activity in diabetes management were emphasized.

Inadequate physical activity, especially with increasing age, disrupts glucose homeostasis and increases the morbidity and mortality rate of patients with chronic diseases.[24] Therefore, it is emphasized

TABLE 3: Comparison of physical activity status and physical activity scores of geriatric ındividuals with diabetes.

	n(%)	X̄±SD	Z	p value
Doing regular exercise				
Yes	65 (61.90)	713.6±679.7	-7.607	0.000*
No	40 (38.10)	83.7±88.6		
Knowing the importance of physical activity in diabetes treatment				
Yes	61 (58.10)	742.3±692.4	-3.543	0.000*
No	44 (41.90)	101.3±99.8		
Disrupting physical activity				
Yes	50 (47.62)	118±117.2	-7.487	0.000*
No	55 (52.38)	797±706.5		
Having difficulties/challenges doing the physical activities				
Yes	40 (38.10)	178±408.8	-5.790	0.000*
No	65 (61.90)	655.6±655.9		
Performing physical activity per diabetes treatment and as recommended				
Yes	48 (45.71)	787.7±559.4	-7.297	0.000*
No	57 (54.29)	209.2±539		
Total	**105 (100.0)**	**473.7±617.8**		

*p<0.05. SD: Standard deviation; Z: Mann-Whitney U test.

TABLE 4: Classification of average physical activity scores of geriatric individuals with diabetes.

Physical Activity Level	n (%)	X̄±SD
Physically inactive	78 (74.29)	191.1±163.4
Low physical activity level	26 (24.76)	1184.7±475.5
Sufficient physical activity level	1 (0.095)	4026±0.0
Total	**105 (100.0)**	**473.7±617.8**

SD: Standard deviation.

that an increase in the level of physical activity can prevent insulin resistance and type 2 diabetes.[25] Another study reports that a better response was obtained in the prevention of type 2 diabetes in physically active geriatric individuals, and the risk of hypertension decreases with increasing age.[21] In addition, the information obtained indicates that glucose metabolism, which is impaired as a result of aging, can be improved by increasing the level of physical activity in patients aged 60-85 years.[26] Similarly, it has been found that glucose uptake and glycogen synthesis in muscle increase with regular exercises in adult individuals with or without a family history of insulin resistance.[27] These results show that regular physical activity prevents the development of type 2 diabetes in high-risk individuals.[28] In this study, the physical activity level of those aged 75 and over, women and illiterate people was found to be lower. Moreover shows that geriatric individuals with diabetes received instruction about diabetes and the majority adapted to diabetes treatment in line with the information they received. Of those who comply with diabetes treatment in line with the information they received, 86.67% had been instructed about diabetes, and 58.1% knew the importance of physical activity in diabetes treatment. The rate of exercise of those who had been instructed about diabetes was found to be higher than those who did not receive any instruction. The study conducted by Aktaş reports that 62.50% of individuals with diabetes received training on exercise.[29] Studies conducted with individuals diagnosed with diabetes determine that the frequency of physical activity in individuals with diabetes varies between 26-45%, and although the importance of physical activity in the treatment of diabetes is known, individuals with diabetes do less physical activity than healthy individuals.[30] This study determined that 74.29% of geriatric individuals with diabetes were not physically active, and similarly, it was found in the literature that the majority of geriatric individuals were not physically active.[31] These results show that physical activity, which is very important in diabetes management, is not sufficient in

geriatric individuals. As is known, diabetes nurses have great responsibilities in diabetes management, which requires a multidisciplinary approach. It is very valuable for nurses to follow up and evaluate geriatric individuals with diabetes in terms of diabetes management and complications regularly, in collaboration with the team, to direct them to relevant specialists and departments, and to show a holistic approach to individuals by fulfilling their instructional and caregiver roles.

CONCLUSION

This study was carried out to determine the physical activity levels of geriatric individuals diagnosed with diabetes. The physical activity questionnaire mean score of geriatric individuals was found to be 473.7±617.8 and 74.29% of them were found to be not physically active. In addition, men aged 65-69 who know what can happen when they do not comply with the treatment, follow the medical nutrition therapy, see the diabetes nurse, do regular exercise, know the importance of physical activity in the treatment of diabetes, and do physical activity in accordance with the diabetes treatment and as recommended were determined to have higher physical activity mean scores. In line with these results, it is recommended to regularly monitor and evaluate physical activity levels in geriatric diabetic patients, to include physical activity in diabetes management, and to individually support the patients.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Gülen Kavak, Özlem Ovayolu, Sibel Serçe;* ***Design:*** *Gülen Kavak, Özlem Ovayolu, Sibel Serçe;* ***Control/Supervision:*** *Gülen Kavak, Özlem Ovayolu, Sibel Serçe;* ***Data Collection and/or Processing:*** *Gülen Kavak;* ***Analysis and/or Interpretation:*** *Gülen Kavak, Özlem Ovayolu, Sibel Serçe;* ***Literature Review:*** *Gülen Kavak, Özlem Ovayolu, Sibel Serçe;* ***Writing the Article:*** *Gülen Kavak, Özlem Ovayolu, Sibel Serçe;* ***Critical Review:*** *Gülen Kavak, Özlem Ovayolu, Sibel Serçe;* ***References and Fundings:*** *Gülen Kavak, Özlem Ovayolu, Sibel Serçe;* ***Materials:*** *Gülen Kavak, Özlem Ovayolu, Sibel Serçe.*

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