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Investigation of Balance, Kinesiophobia, and Mobility in Older Adults Exposed to Polypharmacy

Polifarmasisi Olan Yaşlı Bireylerde Denge, Kinezyofobi ve Mobilitenin İncelenmesi

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ABSTRACT

Aim: Older adults often face significant issues related to functionality, balance, and fall risk. This study aimed to investigate balance, kinesiophobia, and mobility in older adults exposed to polypharmacy.

Material and Methods: This cross-sectional study included a total of 75 individuals aged 65 years and over who were exposed to polypharmacy and presented to a university hospital between November 2023 and March 2024, and with a standardized mini-mental test (SMMT) score of 25 and above. Data were collected using the patient introduction and medication use questionnaire, the Berg balance scale (BBS), the Tampa kinesiophobia scale (TKS), and the timed up and go (TUG) test.

Results: Individuals who completed the TUG test within 0-1414 seconds exhibited higher BBS scores when compared to those who completed the test in more than 14 seconds (p=0.001), while the TKS scores were lower (p=0.001). Furthermore, it was observed that individuals with a history of falls had higher TKS (p=0.001) and TUG test (p=0.001) scores than those without a history of falls. Additionally, the number of chronic diseases showed a negative correlation with BBS scores (r_s=-0.319, p=0.005), while exhibiting a positive correlation with TKS scores (r_s=0.263, p=0.023) and TUG test (r_s=0.316, p=0.006) durations.

Conclusion: The findings of the study indicate that polypharmacy has a deleterious effect on balance and mobility in older adults. It is imperative to evaluate the suitability of the prescribed medications and to take into account the patient's current medications prior to the initiation of new medications.

Keywords: Balance; kinesiophobia; mobility; older adults; polypharmacy.

ÖZ

Amaç: Yaşlı yetişkinler sıklıkla fonksiyonel bozukluklar, denge ve düşme riskiyle ilgili önemli problemlerle karşı karşıya kalmaktadır. Bu çalışmanın amacı, polifarmasisi olan yaşlı bireylerde denge, kinezyofobi ve mobilitenin araştırılmasıdır.

Gereç ve Yöntemler: Bu kesitsel çalışmaya, polifarmasisi olan ve Kasım 2023 ve Mart 2024 tarihleri arasında bir üniversite hastanesine başvuran ve standart mini mental test (SMMT) puanı 25 ve üzeri olan 65 yaş ve üzeri toplam 75 kişi dahil edildi. Veriler hasta tanıtımı ve ilaç kullanımı anketi, Berg denge ölçeği (BDÖ), Tampa kinezyofobi ölçeği (TKÖ) ve zamanlı kalk ve yürü (ZKY) testi kullanılarak toplandı.

Bulgular: ZKY testini 0-14 saniye içinde tamamlayan kişiler, testi 14 saniyeden daha uzun sürede tamamlayanlara kıyasla daha yüksek BDÖ puanlarına sahipti (p=0,001), bu grupta TKÖ puanları ise daha düşüktü (p=0,001). Ayrıca, düşme öyküsü olan bireylerin düşme öyküsü olmayanlara kıyasla daha yüksek TKÖ (p=0,001) ve daha yüksek ZKY testi (p=0,001) puanlarına sahip olduğu görüldü. Ek olarak, kronik hastalık sayısı BDÖ puanları ile negatif korelasyon (r_s=-0,319; p=0,005) gösterirken, TKÖ puanları (r_s=0,263; p=0,023) ve ZKY testi süreleri (r_s=0,316; p=0,006) ile pozitif korelasyon gösterdi.

Sonuç: Çalışmanın bulguları, yaşlı bireylerde polifarmasinin denge ve mobilite üzerine olumsuz etkileri olduğunu göstermiştir. Yeni bir tedavi protokolü oluşturulmadan önce reçete edilen ilaçların endikasyon uygunluğunun değerlendirilmesi ve hastanın düzenli kullandığı ilaçların da dikkate alınması oldukça önemlidir.

Anahtar kelimeler: Denge; kinezyofobi; mobilite; yaşlı bireyler; polifarmasi.

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INTRODUCTION

According to the World Health Organization (WHO), polypharmacy is defined as the concurrent administration of multiple medications. Despite the absence of a universally accepted definition in the literature, polypharmacy is generally considered to signify the routine use of at least five pharmaceutical agents (1). A comprehensive review of the relevant literature reveals significant variations in the prevalence of polypharmacy, contingent on factors such as age group, the definition of polypharmacy, and regional differences. The Survey of Health, Ageing and Retirement in Europe (SHARE) was conducted across 17 European countries and Israel (2). The study defined polypharmacy as the use of 5 or more drugs and reported a prevalence of polypharmacy ranging from 26.3% to 39.9% in the population aged 65 and over. The study indicated that the countries with the lowest prevalence of polypharmacy were Switzerland (26.3%) and Slovenia (28.1%), while the highest prevalence was observed in Israel (37.5%) and the Czech Republic (39.9%). In addition, a meta-analysis reported that the global prevalence of polypharmacy was 32.1% (3). In a study conducted in 2020, the prevalence of polypharmacy in the population aged 65 and over in Türkiye was determined as 56.7% (4). A substantial body of research has established a direct correlation between the prevalence of polypharmacy and age (5), along with an escalated risk of adverse drug events, morbidity, hospitalization, and mortality (6).

The prevalence of multiple diseases in older adults frequently necessitates the administration of pharmaceutical agents in combination (5). The biological aging process affects the pharmacokinetic and pharmacodynamic changes of drugs in older adults, potentially reducing the benefit/risk ratio of some drugs (7). Therefore, older adults exhibit a heightened sensitivity to the therapeutic and adverse effects of medications. In numerous cases, pharmaceutical treatments can prove to be deleterious to patients, often causing more harm than good (8). To minimize the incidence and side effects of polypharmacy drug regimens, a single agent/drug should be prescribed instead of more than one drug, if possible, in the treatment of a single condition. The use of pharmaceutical agents is contingent upon clinical indication, with a lower initial dosage administered in conjunction with subsequent escalation as deemed necessary. If the drug has no clinical indication, the drug taken should be discontinued (9). Polypharmacy causes some negative clinical symptoms such as falling, loss of strength, sleep problems, fatigue, decreased functionality, and confusion in older adults, and these symptoms can be misinterpreted as manifestations of the natural aging process, potentially leading to inaccurate diagnoses and treatment plans (10).

In addition to the numerous factors that undergo change with the progression of aging, the ability to maintain balance is also subject to alteration (11). These changes are also the reason for the increase in the possibility of functional dependence and falls in older adults (10). Increasing age, history of falling, limitation of movement, and decreased lower extremity muscle strength are other important risk factors for falling. Kinesiophobia, also referred to as the fear of movement, is characterized by the avoidance of movement due to chronic pain or pain following a fall. As older adults age, they are prone to developing a fear of movement, particularly in regard to falling again. This fear can lead to a restriction in their activities (12). The aforementioned factors contribute to a decline in muscle mass among older adults, primarily due to inactivity in daily life. This decline is associated with an elevated risk of falls and the development of kinesiophobia (13). In accordance with this objective, the investigation focused on assessing balance, kinesiophobia, and mobility in older adults exposed to polypharmacy. The following research questions were identified: i) What are the balance levels of older adults exposed to polypharmacy? ii) What are the kinesiophobia levels of older adults exposed to polypharmacy? iii) What are the mobility levels of older adults exposed to polypharmacy?, and iv) What is the relationship between polypharmacy and certain sociodemographic characteristics, and the Berg balance scale (BBS), Tampa kinesiophobia scale (TKS), and timed up and go (TUG) test scores in older adults?

MATERIAL AND METHODS

Study Design and Sample

This cross-sectional study was conducted to determine balance, kinesiophobia, and mobility in older adults exposed to polypharmacy and to examine the relationship between these variables. The study group consists of individuals aged 65 years and over who were exposed to polypharmacy and presented to Mersin University Hospital between November 2023 and March 2024. Based on the study by Sofulu and Karadakovan (9), it was found that the minimum sample size should be 70 individuals when the calculation was made in the E-Picos program with 80% power and α=0.05.

In the first stage, one-on-one interviews were conducted with older adults who presented to the Physical Therapy and Rehabilitation clinic on an outpatient basis. Then, the standardized mini-mental test (SMMT) was administered to patients who met the inclusion criteria. Those with a test score of 25 and above, and who consented to participate in the study, were recruited (14,15). Then, the patient introduction and drug use questionnaire (PIDUQ), the BBS, and the TKS were administered by the researcher using the face-to-face interview technique. Following the completion of the form and scales, which required approximately 30 minutes, the TUG test was administered.

Inclusion and Exclusion Criteria

The inclusion criteria for this study were as follows: individuals who were 65 years of age or older, who used five or more medications (exposed to polypharmacy), who can communicate verbally, who had a SMMT score of 25 points and above (14,15), who can walk independently, and who agreed to participate in the study.

Individuals with a history of severe neurologic or psychiatric diseases such as Alzheimer's disease, previous stroke, severe visual or auditory loss affecting balance, uncontrolled metabolic or cardiovascular disorders, or recovering from an acute illness were excluded.

Data Collection Forms

The research data were collected through face-to-face interviews, utilizing the PIDUQ, BBS, and TKS scales. Additionally, the TUG test was administered to evaluate the mobility of the participants. The participants commenced and completed the test according to the

instructions provided by the researcher. The utilization of a walking aid was permitted during the test.

Patient Introduction and Drug Use Questionnaire (PIDUQ)

This form, prepared by the researchers after reviewing the literature, contains a total of 19 items, including 9 items on the sociodemographic characteristics (age, gender, marital status, educational status, income level, profession, health insurance, the person living with, and fall history) and 10 items on health status and drug use (9).

Berg Balance Scale (BBS)

The scale was developed by Berg et al. (16) in 1989, and its Turkish validity and reliability study was conducted by Sahin et al. (17). It is a 14-item scale that is scored from 0 to 4 by noting the patient's performance on each item. In this context, the point of zero is assigned to patients who demonstrate no participation in any activity, while the point of four is allocated to patients who exhibit independent engagement in an activity. The scale's score range is from 0 to 56 (16). While the Cronbach's alpha value in the Turkish validity and reliability study was 0.96 (17), the Cronbach's alpha value for this study was 0.94.

Timed Up and Go (TUG) Test

The scale was developed by Podsiadlo and Richardson (18) in 1991, and its Turkish validity and reliability study was conducted by Aslankhani et al. (19). The Cronbach's alpha value of the scale was found to be 0.98. In this study, the Cronbach's alpha value was found to be 0.85. To evaluate an individual's mobility, the timed standing and walking test utilizes a 43-centimeter high standard chair that is devoid of armrests. During the course of the experiment, the subject was instructed to assume a seated position with their back against the backrest, to stand up at the onset of the designated period, to walk a distance of 3 m, and to return to the seated position, and the total time was recorded. A duration of 14 seconds or more indicates a high risk of falling (11).

Tampa Kinesiophobia Scale (TKS)

The scale was developed by Vlaeyen et al. (20) in 1995 to assess fear of movement. Its Turkish validity and reliability study was conducted by Tunca Yılmaz et al. (21) in 2011. The Cronbach's alpha value of this scale was 0.86. In this study, this value was found to be 0.82. The instrument under consideration is a 4-point Likert-type statistical tool with adequate validation and reliability in the context of the Turkish population, consisting of 17 questions developed to ascertain the extent of fear regarding movement or the potential for re-injury. The scale ranges from 17 to 68 points (21).

Statistical Analysis

Statistical analysis was performed using the IBM SPSS v.22 software. Descriptive statistics were presented as percentages, means, and standard deviations. The Kolmogorov-Smirnov normality test was performed. In pairwise comparisons, the Mann-Whitney U test was applied. The relationships between scales and other variables were evaluated using Spearman's correlation analysis. The low, moderate, and severe levels in the correlation analyses are based on Cohen (22). A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

To conduct the study, ethical approval was obtained from the Non-Invasive Clinical Research Ethics Committee at Mersin University (18.10.2023, 689). Also, written and verbal informed consent was obtained from the participants. Moreover, institutional authorization was obtained prior to the commencement of the study on November 6, 2023. Permission to utilize the scales was obtained from academics who conducted Turkish validity and reliability studies for all scales used in the study.

RESULTS

Of the 75 participants included, 45 (60%) were aged between 65 and 70 years, 39 (52%) were female, 36 (48%) were married, 18 (24%) were primary school graduates, 41 (54.7%) were retired, and 34 (45.3%) had less income than expenses. Of the participants, 70 (93.3%) had health insurance, 40 (53.3%) lived alone at home, and 52 (69.3%) had a history of falling (Table 1).

When the characteristics of the individuals regarding health status and drug use were examined, it was determined that 62 (82.7%) participants had chronic diseases. When examined according to the number of chronic diseases, it was found that 38 (50.7%) had only one chronic disease. The majority of the individuals sought medical attention when they had complaints, did not use over-the-counter drugs, did not change the dose of the drug except for the doctor's recommendation, and did not stop self-medication. It was determined that 59 (78.7%) received help from family members while using medication (Table 2).

The assessment of balance was conducted through the BBS, yielding a mean score of 41.73±14.27 (range, 6-56). Kinesiophobia levels were evaluated using the TSK, with a mean score of 35.42±14.43 (range, 16-64). Functional mobility was measured using the TUG test, with a mean time of 20.33±12.89 (range, 6-60) seconds (Table 3).

The study's findings, as indicated by the TUG test and BBS score comparison, revealed a discrepancy in BBS scores between older adults who completed the test in 0-14 seconds and required more than 14 seconds (p=0.001). The BBS score was elevated in older adults who exhibited a walking duration of 0-14 seconds, as compared to those of demonstrated a walking duration exceeding 14 seconds. Similarly, a disparity in TKS scores was evident between older adults who completed the task within 0-14 seconds and required more than 14 seconds (p=0.001). The TKS score was found to be lower in those who completed the task within 0-14 seconds than in those who required more than 14 seconds.

A statistically significant difference was found in BBS scores between those who used assistive devices and those who did not (p=0.001). The BBS score of older adults who used assistive devices while walking was found to be lower than that of older adults who did not use assistive devices. When the results of the TSK were examined, no significant difference was found between those who used assistive devices and those who did not (p=0.087). A discrepancy was identified in the duration of the TUG test, contingent on the utilization of assistive equipment (p=0.001). Older adults who utilized an assistive device exhibited a prolonged walking time, while those who did not employ an assistive device demonstrated a reduced walking time.

In terms of the fall history of older adults, a significant difference was observed in BBS scores (p=0.001). Those with a history of falling had lower BBS scores than those without a history of falling. There was also a significant

difference in TKS scores between older adults with and without a fall history (p=0.001). Those with a history of falling had a higher TKS score, while those without a history of falling had a lower TKS score. In addition, there was a significant difference in the duration of the TUG test in relation to the history of falling (p=0.001). The walking time of the adults with a history of falling was higher than those without a history of falling (Table 4).

The results of the correlation test indicate the presence of a negative moderate correlation between the BBS score and the number of chronic diseases (r_s=-0.319, p=0.005). In addition, a negative high-level correlation was identified between the BBS and TKS scores (r_s=-0.688, p=0.001), and BBS and TUG duration (r_s=-0.659, p=0.001). This finding suggests that as the number of chronic diseases and kinesiophobia level increases, balance performance decreases in older adults. There were also low and moderate positive correlations between the number of chronic diseases and the TKS score (r_s=0.263, p=0.023) and TUG test duration (r_s=0.316, p=0.006), respectively. This suggests a positive correlation between the presence of chronic diseases and individuals' fear of movement and reduced walking time. Furthermore, a significant positive high-level correlation was identified between TKS score and TUG test duration (r_s=0.636, p=0.001). This relationship indicates that individuals with high levels of kinesiophobia exhibit prolonged walking times and diminished physical mobility.

Table 1. Sociodemographic characteristics of individuals

Characteristics	**(n=75)**
Age, n (%)	
65-70 years	45 (60.0)
71-75 years	15 (20.0)
76-80 years	2 (2.7)
81+ years	13 (17.3)
Gender, n (%)	
Female	39 (52.0)
Male	36 (48.0)
Marital Status, n (%)	
Single	21 (28.0)
Widows	18 (24.0)
Married	36 (48.0)
Education Status, n (%)	
Illiterate	16 (21.3)
Literate	8 (10.7)
Primary School	18 (24.0)
Secondary School	12 (16.0)
High School	12 (16.0)
University	9 (12.0)
Income Level, n (%)	
Income is less than expenses	34 (45.3)
Income is equal to expenses	29 (38.7)
Income is more than expenses	12 (16.0)
Profession, n (%)	
Housewife	18 (24.0)
Worker	4 (5.3)
Retired	41 (54.7)
Other	12 (16.0)
The Person Lives With, n (%)	
Alone	40 (53.3)
Spouse	17 (22.7)
Spouse and Child	16 (21.3)
Child	2 (2.7)
Health Insurance, n (%)	70 (93.3)
Fall History, n (%)	52 (69.3)

Table 2. Health status and drug use of individuals

Characteristics	**(n=75)**
Presence of chronic disease, n (%)	62 (82.7)
Number of chronic diseases, n (%)	
None	13 (17.3)
One chronic disease	38 (50.7)
Two chronic diseases	16 (21.3)
Three chronic diseases	8 (10.7)
Regular doctor check-ups, n (%)	
Yes	31 (41.3)
No	7 (9.3)
When there is a complaint	37 (49.4)
Pay attention to whether the medication is used on an empty or a full stomach, n (%)	72 (96.0)
Changing the dose without the doctor's recommendation, n (%)	11 (14.7)
Use of non-prescription medications, n (%)	22 (29.3)
Not paying attention to the time of use, n (%)	27 (36.0)
Self-discontinuation of medication, n (%)	23 (30.7)
Non-prescription drug use, n (%)	26 (34.7)
Assistance from family members in using medication, n (%)	59 (78.7)

DISCUSSION

The objective of this study was to examine the impact of polypharmacy status on balance, kinesiophobia, and mobility in older adults. The findings revealed a moderate inverse relationship between balance and kinesiophobia, as well as the TUG test and the number of chronic diseases. The findings of the study indicated a moderate correlation

Table 3. Descriptive statistics of the Berg balance scale, Tampa kinesiophobia scale, and timed up and go test

Scale	**Mean±SD [min-max]**
Berg Balance Scale	41.73±14.27 [6-56]
Tampa Kinesiophobia Scale	35.43±14.44 [16-64]
Timed Up and Go Test	20.33±12.89 [6-60]

SD: standard deviation

Table 4. Comparison of walking time, fall history, and assistive device use based on BBS, TKS, and TUG

	TUG Test Period		**p**
	0-14 seconds (n=30)	**>14 seconds (n=45)**	
BBS	52 (46-55) [40-56]	39 (24-50) [6-56]	**0.001**
TKS	25 (19-35) [17-49]	44 (27-52) [16-64]	**0.001**

	Use of Walking Aids		**p**
	Yes (n=24)	**No (n=51)**	
BBS	28 (13-48) [6-55]	49 (42-54) [26-56]	**0.001**
TKS	42 (26-53) [16-60]	28 (20-46) [17-64]	0.087
TUG	24 (15-42) [11-60]	15 (10-22) [6-40]	**0.001**

	History of Fall		**p**
	Yes (n=52)	**No (n=23)**	
BBS	42 (30-51) [6-56]	53 (46-55) [7-56]	**0.001**
TKS	43 (26-50) [16-64]	22 (18-40) [17-57]	**0.001**
TUG	20 (14-26) [6-60]	11 (8-17) [6-30]	**0.001**

BBS: Berg balance scale, TKS: Tampa kinesiophobia scale, TUG: timed up and go, descriptive statistics were presented as median (25^{th}-75^{th} percentile) [min-max]

between balance and the number of chronic diseases, kinesiophobia, and the TUG test. Furthermore, a high level of direct proportional relationship was identified between kinesiophobia and TUG test results.

The number of subjects with a history of falls in the study was almost twice the number of subjects without a history of falls. Furthermore, older adults who utilized walking aids demonstrated enhanced balance. The presence of polypharmacy, defined as the concurrent use of multiple medications, has been demonstrated to be associated with elevated risk of fall in older adults even after controlling for confounding variables such as age, disability status, medication types, and the presence of comorbidity (23). A cohort study of 3,090 older adults in the USA revealed a positive correlation between polypharmacy and impaired balance. The study's findings suggest a potential link between the use of multiple medications and an increased risk of balance impairment in older adults (24). A study of 100 volunteers aged 65 and over revealed a positive correlation between the use of three to four medications per day and an increased risk of balance disorder in older adults (25). It is stated that each drug added to the treatment in older adults causes an increase in the risk of falling (26). A negative linear relationship was reported between the number of drugs used and balance (10). Furthermore, as individuals age, the prevalence of chronic diseases that necessitate multiple drug intake rises, and their treatment often requires prolonged use of medications (27,28). In this study, similar to the literature, it was found that the balance decreases as the number of chronic diseases increases. A moderate negative relationship was identified between these two parameters. A study was conducted to examine the relationship between polypharmacy and falls in a sample of 7,983 individuals aged 55 and over in the Netherlands. The results of the study indicated a direct proportional relationship between the number of medications used daily and the risk of falling. Furthermore, an observed trend indicates a direct correlation between the heightened risk of falling and the increased utilization of walking aids (23). In a study in Türkiye, it was concluded that balance decreases as the number of drugs used increases (10). Polypharmacy, balance, and gait disorders play an important role in falling (29). In a study in which the frequency of balance disorder and falls was examined using the BBS, the incidence of balance disorder in older adults was found to be 32% (25). In the present study, the prevalence of balance disorder was found to be 69.3%, which aligns with the findings reported in the extant literature concerning similar sample groups (10,23,24).

In the present study, an investigation was conducted to ascertain the relationship between kinesiophobia in older adults and walking duration. The findings revealed a positive correlation between kinesiophobia scores and walking time among the older adult population. Additionally, a significant increase in kinesiophobia scores was observed among older adults with a history of falling. In Turkish society, particularly among older adults over the age of 75, the fear of movement and subsequent avoidance behaviors stemming from the fear of falling may have emerged as a coping mechanism (30). In a study conducted in Türkiye, the effect of kinesiophobia on physical activity, balance, and fear of falling in patients with Parkinson's disease was examined, and according to the results of the study, those with high kinesiophobia scores were found to have lower physical activity levels, poor balance, and higher fear of falling (31). Similar results were obtained in this study, in which balance and kinesiophobia were measured with similar scales. A high degree of kinesiophobia was found in a study examining the relationship between physical activity, kinesiophobia, and fear of falling in older adults with chronic pain in Türkiye (32). A study conducted in the United Kingdom discovered that long-term concerns regarding falls in older adults were associated with impaired mobility and balance (33). Kinesiophobia is a serious problem that causes various levels of disability, activity participation problems, fall anxiety, loss of balance, and loss of self-confidence, thus negatively affecting their quality of life (28). Kinesiophobia has been demonstrated to exert a deleterious effect on balance, mobility, and quality of life, which has the potential to impede an individual's social participation (31). This situation, which has been shown to have a negative impact on the psychosocial well-being of older adults, has been linked to an increased risk of depression (34).

All of the older adults in this study used 5 or more drugs, and more than half of them had at least one chronic disease. Comorbid conditions are among the most important causes of immobility and falls (35,36). In addition, the number of older adults in this study with no history of falls was extremely low. This observation has led to the proposition of a theoretical framework in which the development of kinesiophobia stems from an individual's fear of falling again. In order to prevent further falls, older adults utilize walking aids, reduce their walking speed, or limit their daily activities. The development of kinesiophobia can have negative effects on the balance and level of functional independence in older adults. The utilization of walking aids exhibited a conspicuously low frequency in the present study, a phenomenon that may be attributed to the fact that over half of the participants were between the ages of 65 and 70. Furthermore, factors such as the rise in the average age, the use of multiple medications, and the presence of chronic diseases can potentially lead to adverse alterations in these parameters over time.

In this study, it was found that older adults who used assistive devices while walking and had a history of falling completed the TUG test in a longer time. The capacity to promptly and safely rise from a seated position, while maintaining balance, is a crucial component of the TUG score, a measure used to assess the quality of daily life and the level of independence in older adults. A study was conducted in Türkiye to compare older adults who were exposed to polypharmacy with those who were not. The results of the study indicated that the former group exhibited slower physical performance, walking speed, and sitting speed on a chair compared to the latter group. In the same study, there was no noteworthy connection between polypharmacy and the long-term TUG test. This study adopted a modified version of the TUG test, with the assessment being conducted over a duration of 20 seconds (37). In another investigation, lower TUG scores were calculated with an increase in the number of drugs used (38). In another study, a directly proportional

relationship was found between the number of drugs used per day and the TUG score (39). Some comorbidities require the use of more than five drugs, and this treatment plan requires an increase in the number of drugs determined (40). These research results confirm the linear connection between the number of drugs and the impaired balance (10,41), and the results of the present study support this information. In the present study, 32% of the older adults had at least two chronic diseases. The observed direct proportional relationship between the number of chronic diseases in this study and TUG may be explained by the possibility that multiple drug use may be caused by more than one existing chronic disease. The discrepancy in findings across studies evaluating the association of TUG with falls or polypharmacy may be attributable to variations in study groups and the absence of standardized definitions.

The primary virtue of this inquiry lies in its dearth of antecedent research that has examined the association between balance, kinesiophobia, and mobility in older adults exposed to polypharmacy through a holistic lens. A review of extant literature indicates an absence of studies that have examined polypharmacy in conjunction with kinesiophobia. This study is subject to several limitations. Firstly, it was conducted with older adults admitted to a tertiary outpatient clinic. Therefore, the findings cannot be generalized to the all older adult population. Moreover, the definition of polypharmacy that has been employed may also be a limitation. Although the number that has been selected to define polypharmacy is the most widely accepted one, limiting the concept of polypharmacy to the number of drugs alone may be a superficial approach. It is imperative to consider that older adults, who demonstrate a higher propensity for utilizing over-the-counter medications, may experience adverse consequences even in cases where their medication intake remains low. Consequently, incorporating drug names or categories rather than merely the quantity of medications administered may enhance the study's efficacy.

CONCLUSION

The present study examined the effects of polypharmacy on balance, kinesiophobia, and mobility in older adults. The findings indicated an inverse relationship between balance and kinesiophobia, walking time and number of chronic diseases. However, a direct proportionality between balance and the number of chronic diseases, kinesiophobia, and walking time was identified. Furthermore, a positive correlation was identified between kinesiophobia and walking time. Consequently, it can be posited that the implementation of long-term, large-scale studies may prove instrumental in elucidating the multifaceted relationship of polypharmacy in terms of cause and effect.

Ethics Committee Approval: The study was approved by the Non-invasive Clinical Research Ethics Committee at Mersin University (18.10.2023, 689)

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