ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

DOI: 10.5336/healthsci.2023-100512

# The Effect of Balance Function on the Activities of Daily Living in the Elderly

## Yaşlılarda Denge Fonksiyonunun Günlük Yaşam Aktiviteleri Üzerine Etkisi

Sevim GÜLER[a], Erdoğan ÖZ[b]

[a]Adıyaman Traninig and Research Hospital, Clinic of Ophthalmology, Adıyaman, Türkiye
[b]Adıyaman Provincial Health Directorate, Adıyaman, Türkiye

**ABSTRACT Objective:** The present was carried out to determine the effect of balance on the activities of daily living in the elderly. **Material and Methods:** The study was conducted descriptively with 353 volunteer patients aged 65 and over who applied to family health centers No. 2 and No. 8 in Adıyaman Center between December 2022 and February 2023 and who met the inclusion criteria for the study. Data were collected with the "Personal Information Form", "Berg Balance Scale" and "Lawton and Brody Instrumental Activities of Daily Living (IADL) Scale". In addition to descriptive analyses, Mann-Whitney U, Kruskall-Wallis and Spearman Correlation tests, and Linear regression analysis were applied to the predictiveness of the scales. **Results:** The patients' Berg Balance Scale (BBS), IADL scale mean score (respectively, 42.7±7.7; 6.5±1.4) and men's BBS and IADL Scale mean scores are significantly higher than women's scores ($p<0.001$). It was determined that the BBS scores of those who are single and who live alone, the scores of those who have chronic diseases, those who do not have chronic diseases, those who do not exercise, and those who use assistive devices and continuous drugs are significantly lower. According to the multiple regression analysis, It has been observed that there is a relationship between the BBS and IADL in elderly individuals and that these averages are significantly affected positively (BBS score IADL ($\beta=2.416$, $p<0.001$) and IADL Scale score BBS ($\beta=0.081$, $p<0.001$). **Conclusion:** It was determined that elderly individuals have a low risk of balance disorders, their independence levels in IADL are good, and many variables affect balance function.

**Keywords:** Balance function; elderly; instrumental activities of daily living; risk of fall



The World Health Organization defined individuals aged 65 and over as elderly.[1] In 2021, 9.8% of the world's population comprises elderly people. It has been determined that this ratio will increase to 25.6% in 2080.[2] This increase brings us the necessity of dealing with the problems experienced in old age.

**Correspondence:** Sevim GÜLER
Adıyaman Traninig and Research Hospital, Clinic of Ophthalmology, Adıyaman, Türkiye
**E-mail:** sdegerguler@gmail.com

Peer review under responsibility of Turkiye Klinikleri Journal of Health Sciences.

***Received:*** 28 Nov 2023 ***Received in revised form:*** 26 Mar 2024 ***Accepted:*** 27 Apr 2024 ***Available online:*** 13 May 2024

One of these problems is functional loss, such as balance problems in the elderly.[3-5] Balance function is one of the indicators of physical competence or performance and contributes to mobility and independence in old age.[6-7] Factors such as increasing aging, fear of falls, depression, place of residence, being a female, having a stroke, diabetes, drug group use, non-specific low back pain, and disability affect balance performance in the elderly.[8] The ability to control balance during activities of daily living (ADL) in the aging process is impaired as a result of anatomical and physiological changes and inadequacies in the coordination of neuromuscular forces that control walking and upright posture by the central nervous system in elderly individuals.[5,9] Deficiencies in the sensory systems, cognitive systems, and musculoskeletal systems of elderly individuals cause a decrease in the ability to control balance during ADL in the aging process, physical activity level, and performance.[3,4,7,9-11] With the deterioration of the balance function, inadequacies can be seen in meeting the basic self-care needs of the elderly, such as bathing, wearing clothes, moving, excretion, and nutrition.[12] This situation experienced by elderly individuals leads to impaired independence in daily living activities; they lose their independence, and their quality of life levels also decrease.[3,4,9]

Studies examining balance functions and daily living activities are limited. In this study, we aim to explore the intricate connections between socio-demographic characteristics, balance functions, and daily living activities among elderly individuals. Our primary hypotheses include the existence of significant differences in both balance functions and levels of daily living activities based on various socio-demographic factors. Furthermore, we anticipate a positive influence of balance function on the independence levels observed in daily living activities. Lastly, our investigation seeks to unveil the relationship between the balance functions of elderly individuals and the extent of their engagement in routine daily activities. Through this comprehensive examination, we aspire to contribute valuable insights to the understanding of the interplay between these crucial aspects in the lives of the elderly.

## MATERIAL AND METHODS

### RESEARCH DESIGN

The present study is executed within the requirements of descriptive and correlational research design which is one of the quantitative research types.

### POPULATION AND SAMPLE

This research was conducted in the 2nd and 8th Family Health Centers in Adıyaman City, Türkiye, between December 2022 and February 2023. The study population was 3400 elderly individuals registered in these Family Health Centers. The sample size of the study was statistically significant in order to find the expectation that a p=0.36 effect size would occur in the instrumental activities of daily living (IADL) mean score of the elderly patients, using the power analysis and the population-specific (n=3400) sample calculation, and according to the formulation $[n=DEFF^{*}Np(1-p)]/[(d2/Z21-\alpha/2^{*}(N-1)+p^{*}(1-p)]$ the sample was determined to be at least 345 in the 95% confidence interval. Inclusion criteria were determined for the elderly registered in family health centers as being open to communication, not having cognitive problems, pain, and dizziness, and being 65 years or older. A list of individuals who met the research criteria was created, and individuals with odd numbers order were included in the sample with the systematic sampling method. The sample group consisted of 353 elderly individuals who volunteered to participate in the research.

### DATA COLLECTION TOOLS

The data of the study were collected using the "Personal Information Form", "Berg Balance Scale (BBS)" and "IADL".

### PERSONAL INFORMATION FORM

The researchers devised a questionnaire comprising 16 questions based on the existing literature review. These questions encompass descriptive details about elderly patients, including information about chronic illnesses that might impact their balance function and daily activity levels. The chronic diseases in focus include diabetes mellitus, hypertension, heart and kidney failure, chronic obstructive pulmonary disease,

hypothyroid and hyperthyroid conditions, rheumatoid arthritis, and osteoporosis. The questionnaire also delves into inquiries regarding their capacity for walking, running, and engaging in both active and passive exercises.[10,13-16]

### BBS

BBS is frequently used in studies.[17] The validity and reliability of the scale in Turkish were established by Şahin et al.[18] The BBS assesses the ability of elderly individuals to maintain and maintain balance controls while performing their functional activities, their capacity to change positions during postural changes, and their level of dependency or independence. The increase in the scores obtained from the scale indicates that the balance of the individuals' levels increases and the risk of falls decreases.[17,18] The Chronbach alpha value of the Turkish version of the scale is 0.98.[18] The Cronbach alpha value of the scale in this research is 0.88.

### LAWTON AND BRODY IADL SCALE

The index was developed by Lawton and Brody.[19] The Turkish validity and reliability were tested by Işık et al.[16] The IADL **S**cale determines individuals' levels of dependence and independence in instrumental daily living activities. Cronbach's alpha value of the IADL **S**cale is 0.84 in the Turkish version.[16] The Cronbach alpha value of the IADL **S**cale in this study is 0.86.

### STATISTICAL ANALYSIS OF THE DATA

The data were analysed in 22 SPSS package programs (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL). Descriptive data such as number, percentage, average, and standard deviation values were calculated. The Kolmogorov-Smirnov test evaluated the conformity of continuous variables to normal distribution. Mann-Whitney U test compared paired samples, and the Kruskal-Wallis test compared more than two variables. The Spearman correlation test was used to examine the relationship between continuous variables. Linear Regression analysis was applied to determine the predictors of BBS and IADL. While creating the model, the Enter method was used, and those with a significant relationship in the correlation test were included in the model. The statistical significance level in the analysis was accepted as $p<0.05$

### ETHICS

In order to conduct the research, Institutional permission (E-13389845-799) was obtained from the Adıyaman University Non-Interventional Clinical Research Ethics Committee (date: 15 November 2022; no: 2022/8-5) and the Provincial Health Directorate. Individuals participating in the study were informed about the research and the research survey, and their verbal and written consent was obtained. Permission to use the scales was obtained from the authors. Written permission was obtained from the authors who made the Turkish validity and reliability tests for the use of the scales in the research. The research was conducted in accordance with the Declaration of Helsinki.

## RESULTS

The mean age of participants was 71.5±5.6 years (ranging from 65 to 95 years), with 62.3% being male. Regarding education, 49.3% of the participants were illiterate/literate. The majority, 88.7% were married, and 62.9% reported a moderate income. Additionally, 55% live with their spouse, 32.6% reside with both spouse and children, while 12.5% live alone. A significant portion of the participants, 89.2%, have a chronic disease, and 40.6% have had these conditions for 11 years or more. Hearing loss was reported by 30% of the participants, while 76.8% experienced vision loss and 81.6% noted muscle-joint strength loss. Interestingly, 59.5% engage in regular exercise. Furthermore, our study indicates that 78.2% of patients use assistive devices. Specific details include 83% using prosthetic teeth, 52.9% wearing eyeglasses, 4.7% utilizing walking sticks, and 4.3% using earphones. The continuous use of medication was prevalent, with 89.2% of the elderly relying on drugs. The daily consumption of four or more drugs was reported by the majority. The average body mass index (BMI) among participants was 28.3±4.5 (Table 1).

In the study, it was observed that men's mean scores for BBS ($p<0.001$) and IADL ($p<0.001$) were significantly higher than those of women. Addition-

**TABLE 1:** Distribution of the patients by socio-demographic and disease characteristics.

| Variables | X̄±SD | n | % |
|---|---|---|---|
| Age (years) | 71.5±5.6 | | |
| Body mass index | 28.3±4.5 | | |
| Gender | Female | 133 | 37.7 |
| | Male | 220 | 62.3 |
| Education | Illiterate/literate | 174 | 49.3 |
| | Primary school | 129 | 36.5 |
| | High school or higher | 50 | 14.2 |
| Marital status | Single | 40 | 11.3 |
| | Married | 313 | 88.7 |
| Income | Low | 57 | 16.1 |
| | Moderate | 222 | 62.9 |
| | Good | 74 | 21.0 |
| Cohabitation | Spouse | 194 | 55.0 |
| | Spouse and children | 115 | 32.6 |
| | Alone | 44 | 12.5 |
| Chronic illness | Present | 315 | 89.2 |
| | Absent | 38 | 10.8 |
| Duration of the chronic disease | 1-5 years | 89 | 28.3 |
| | 6-10 years | 98 | 31.1 |
| | ≥11 years | 128 | 40.6 |
| Hearing loss | Present | 106 | 30.0 |
| | Absent | 247 | 70.0 |
| Vision loss | Present | 271 | 76.8 |
| | Absent | 82 | 23.2 |
| Muscle/joint strength loss | Present | 288 | 81.6 |
| | Absent | 65 | 18.4 |
| Exercise | Present | 210 | 59.5 |
| | Absent | 143 | 40.5 |
| Assistive device | Present | 276 | 78.2 |
| | Absent | 77 | 21.8 |
| Used assistive device* | Prosthetic tooth | 229 | 83.0 |
| | Eyeglasses | 146 | 52.9 |
| | Walking stick | 13 | 4.7 |
| | Earphones | 12 | 4.3 |
| Continuous use of drugs | Present | 315 | 89.2 |
| | Absent | 38 | 10.8 |
| Number of drugs used daily | <4 | 158 | 50.2 |
| | ≥4 | 157 | 49.8 |

*Some participants use more than one assistive device; SD: Standard deviation.

ally, singles' mean BBS score (p=0.007) was significantly lower than married individuals. A significant disparity in BBS mean scores (p=0.002) was noted among people living together, attributable to the difference between those living alone and the other two groups. This discrepancy underscores a significant variation in BBS mean scores (p=0.002) for individuals living together, primarily due to distinctions between those living alone and the other two groups.

Individuals with chronic diseases exhibited significantly lower mean scores in both BBS (p<0.001) and IADL (p<0.001) compared to those without chronic diseases. Furthermore, individuals with hearing loss demonstrated significantly lower mean scores in both BBS (p<0.001) and IADL (p=0.002) than their counterparts without hearing loss. Similarly, individuals with vision loss had a significantly lower BBS mean score than those without (p=0.045).

Those experiencing muscle/joint strength loss displayed significantly lower mean scores in both BBS (p<0.001) and IADL (p<0.001) compared to those without such loss. Conversely, individuals who engaged in regular exercise exhibited significantly higher mean scores in both BBS (p<0.001) and IADL (p<0.001) compared to non-exercisers.

Among users of assistive devices, the mean BBS score was significantly lower (p=0.008) than that of non-users. However, individuals wearing eyeglasses had significantly higher mean scores in both BBS (p<0.001) and IADL (p<0.001) compared to non-wearers.

Users of prosthetic teeth displayed significantly lower mean scores in both BBS (p=0.042) and IADL (p=0.006) compared to non-users, while walking stick users had significantly lower mean scores in both BBS (p<0.001) and IADL (p<0.001) compared to those who did not use a walking stick.

Individuals continuously using drugs exhibited significantly lower mean scores in both BBS (p<0.001) and IADL (p<0.001) compared to non-drug users. Additionally, those with a daily drug use of <4 demonstrated a significantly higher mean BBS score than those with a daily drug use of ≥4 (p=0.002) (Table 2).

The patients' BBS mean score demonstrated a weak positive correlation with the IADL total score (r=0.492). Furthermore, a very weak negative correlation was identified between the BBS mean score and age, along with a negative, weakly significant correlation with BMI and the duration of chronic disease (r=-0.294, p=0.000; r=-0.161, p=0.000; r=-0.161, p=0.000).

**TABLE 2:** Comparison of all characteristics of the patients and mean and total scores of the scales (n=353).

| | | BBS | | IADL | |
|---|---|---|---|---|---|
| **Variables** | | **X̄±SD** | **p value** | **X̄±SD** | **p value** |
| Gender | Female | 39.1±7.5 | <0.001* | 6.0±1.4 | <0.001* |
| | Male | 44.9±7.0 | | 6.9±1.3 | |
| Marital status | Single | 39.9±7.8 | 0.007* | 6.5±1.4 | 0.604* |
| | Married | 43.1±7.6 | | 6.5±1.4 | |
| Cohabitation | Spouse | 43.5±7.4[a] | 0.002** | 6.7±1.3 | 0.138** |
| | Spouse and children | 42.6±8.3[a] | | 6.4±1.4 | |
| | Alone | 39.8±6.9[b] | 6.2±1.8 | | |
| Chronic disease | Present | 42.2±7.9 | <0.001* | 6.4±1.5 | <0.001* |
| | Absent | 47.2±4.1 | | 7.3±.6 | |
| Hearing loss | Present | 40.2±8.4 | <0.001* | 6.1±1.8 | 0.002* |
| | Absent | 43.8±7.1 | | 6.7±1.2 | |
| Vision loss | Present | 42.5±7.4 | 0.045* | 6.5±1.5 | 0.637* |
| | Absent | 43.5±8.8 | | 6.6±1.4 | |
| Muscle/joint strength loss | Present | 41.7±7.6 | <0.001* | 6.4±1.5 | 0.003* |
| | Absent | 47.2±6.8 | | 7.0±1.0 | |
| Exercise status | Present | 45.7±5.3 | <0.001* | 6.9±1.1 | <0.001* |
| | Absent | 38.4±8.7 | | 6.0±1.6 | |
| Assistive device | Present | 42.3±7.6 | 0.008* | 6.5±1.5 | 0.221* |
| | Absent | 44.3±8.1 | | 6.8±1.1 | |
| Eyeglasses | Present | 44.1±6.3 | <0.001* | 6.9±1.2 | <0.001* |
| | Absent | 40.3±8.3 | | 6.0±1.7 | |
| Prosthetic teeth | Present | 42.0±7.6 | 0.042* | 6.4±1.5 | 0.006* |
| | Absent | 44.0±7.1 | | 6.9±1.4 | |
| Earphones | Present | 43.3±6.2 | 0.684* | 6.9±1.1 | 0.343* |
| | Absent | 42.3±7.6 | | 6.4±1.5 | |
| Walking stick | Present | 31.2±8.9 | <0.001* | 4.9±2.4 | 0.006* |
| | Absent | 42.9±7.1 | | 6.5±1.4 | |
| Continuous use of drugs | Present | 42.2±7.9 | <0.001* | 6.4±1.5 | <0.001* |
| | Absent | 47.2±4.1 | | 7.3±.6 | |
| Number of drugs used daily | <4 | 43.5±7.3 | 0.002* | 6.6±1.3 | 0.076* |
| | ≥4 | 40.9±8.3 | | 6.3±1.6 | |
| Total score of the scale | | 42.7±7.7 | | 6.5±1.4 | |

*Mann-Whitney U test; **Kruskal-Wallis analysis; BBS: Berg Balance Scale; IADL: Instrumental activities of daily living; SD: Standard deviation.



Regarding socio-demographic factors, it was observed that the BBS mean score exhibited a weak positive correlation with education and a fragile yet significant relationship with perceived income (r=0.460, p=0.000; r=226, p=0.000).

Regarding the IADL mean score, a positive correlation was found with education and income, respectively (r=0.490, p=0.000; r=0.248, p=0.000). Conversely, a negative significant correlation was noted between the IADL mean score and age and the duration of chronic disease, respectively (r=-0.166, p=0.002; r=-0.154, p=0.006) (Table 3).

The results of the multiple linear regression analysis indicate that the BBS mean score is predicted by the IADL mean score (β=2.416, p<0.001), age (β=-0.260, p<0.001), BMI (β=-0.211, p=0.008), and education (β=1.618, p=0.006). Furthermore, the BBS (β=0.081, p<0.001) and education (β=0.476, p<0.001) are predictors of the IADL mean score (Table 4).

## DISCUSSION

The aging process, although showing individual variations, commonly leads to impairments in balance

**TABLE 3:** Correlations of the patients' BBS and IADL Scale mean scores* (n=353).

| Variables | | BBS Mean score | IADL Mean score |
|---|---|---|---|
| IADL | r value | 0.492** | |
| | p value | 0.000 | |
| Age | r value | -0.294** | -0.166* |
| | p value | 0.000 | 0.002 |
| BMI | r value | -0.161* | 0.001 |
| | p value | 0.002 | 0.978 |
| Duration of the chronic disease | r value | -0.166* | -0.154* |
| | p value | 0.003 | 0.006 |
| Education | r value | 0.461** | 0.490** |
| | p value | 0.000 | 0.000 |
| Income | r value | 0.226** | 0.248** |
| | p value | 0.000 | 0.000 |

*p<0.05; **p<0.001; BBS: Berg Balance Scale; IADL: Instrumental activities of daily living; BMI: Body mass index. Spearman correlation analysis was applied.

function due to numerous health problems in the elderly.[15] The findings of this study, conducted to examine the impact of balance on daily life activities in the elderly, have been discussed in the light of relevant literature.

In the study, the BBS and IADL scores of elderly men were significantly higher compared to women (Table 2). Consistent with our study, many studies indicate that women have crucially lower balance function, so lower BBS and IADL scores than men (p<0.05).[4,13,20,21,23,25] This situation can be explained by the fact that elderly women have longer life spans than men and, accordingly, a higher risk of developing chronic diseases that cause disability, less muscle mass, and bone diseases such as osteoporosis and osteoarthritis due to essential hormonal reasons with aging, more fragile bone structure, and a higher incidence of depression. In addition, the fact that women exercise less than men may be one of the factors that cause them to be more dependent. However, unlike the present study, some studies argue that gender is not a significant variable in balance disorder.[4,15]

A study indicated the relationship between marital status and balance in elderly individuals, with married elderly having higher balance levels and a lower risk of falling.[26] Similarly to the results of this study, our study found that elderly individuals who are single and living alone had significantly lower BBS scores compared to those who are married. On the other hand, some studies have determined that there is no significant difference in the balance scores of elderly individuals living alone compared to those who are married.[15,27]

The present study found that those with chronic illnesses had significantly lower BBS and IADL scores compared to those without chronic illnesses (Table 2). Many studies similar to the present study have shown that elderly individuals with multiple

**TABLE 4:** Linear regression analysis of the factors associated with the BBS and IADL.

| | β | SE | Standard β | t value | p value |
|---|---|---|---|---|---|
| IADL | 2.416 | 0.275 | 0.450 | 8.782 | **<0.001** |
| Age | -0.260 | 0.064 | -0.191 | -4.075 | **<0.001** |
| BMI | -0.211 | 0.079 | -0.124 | -2.689 | **0.008** |
| Duration of the chronic disease | -0.284 | 0.436 | -0.030 | -0.652 | 0.515 |
| Education | 1.618 | 0.589 | 0.147 | 2.748 | **0.006** |
| Income | 0.081 | 0.625 | 0.006 | 0.130 | 0.897 |
| BBS ($R^2$=0.387; F=34.025; p<0.001) | | | | | |
| | **β** | **SE** | **Standard β** | **t value** | **p value** |
| BBS | 0.081 | 0.009 | 0.432 | 8.496 | **<0.001** |
| Age | -0.020 | 0.012 | -0.078 | -1.643 | 0.101 |
| Duration of the chronic disease | -0.077 | 0.080 | -0.043 | -0.965 | 0.335 |
| Education | 0.476 | 0.107 | 0.232 | 4.458 | **<0.001** |
| Income | 0.134 | 0.116 | 0.056 | 1.155 | 0.249 |
| IADL ($R^2$=0.382; F=39.895; p<0.001) | | | | | |

SE: Standard error; IADL: Instrumental activities of daily living; BMI: Body mass index; BBS: Berg Balance Scale.

chronic diseases had significantly lower basic and IADL scores.[13,15,18,28]

The present study observed that individuals who exercise had higher BBS and IADL scores (Table 2). Similar to the present study, studies examining the effects of various exercises on elderly individuals have determined that the elderly group who exercised showed significant improvements in functional abilities of balance, walking, and walking speed, and there was a decrease in the risk of falling.[4,15,29-32] In conclusion, for the elderly to have better postural balance and mobility levels, it is necessary to support them in engaging in regular walking and physical activity.

In the study, elderly individuals who used assistive devices had significantly lower BBS scores (Table 2). Similarly, many studies have reported that the use of assistive devices negatively affects the balance function of the elderly.[14,33] A study by Sayar et al. stated that elderly individuals who used walking aids fell significantly more often, while another study found that almost all those who used assistive walking devices were at serious risk of falling, and nearly half had severe balance disorders.[23,34] However, in contrast to these studies, a study conducted by Gümüş et al. found the use of assistive devices did not affect balance impairment.[27]

Another result obtained from the study was that individuals who use medication ceaselessly had significantly lower BBS and IADL scores, and those with a daily medication use of <4 had a BBS score crucially higher than those with a daily medication use of ≥4 (Table 2). Supporting the present study, a study found that elderly individuals who take multiple medications due to various chronic diseases are significantly negatively affected by their IADL.[22] Another study found a significant relationship between the balance scores of elderly individuals taking ≥3 medications daily, with an increase in the number of medications taken leading to a negative impact on balance function and thus increasing the risk of falls. Nakagawa et al. also found that the daily number of medications taken was identified as an independent risk factor.[4] A study by Kızılkaya and Saka found that the balance, fall, and functional independence of elderly individuals taking multiple medications were negatively affected.[35] It is necessary to reduce and not prescribe drugs that affect the balance system of elderly individuals and are highly associated with the risk of falling, or if their use is mandatory, to inform the elderly and those who live with them or are responsible for their care to be cautious.[36] However, unlike our findings and these studies, Gümüş et al. reported that the number of drugs used ceaselessly did not significantly affect the balance function.[27]

The study found a relationship between BBS and IADL among elderly individuals, and these averages had a significantly positive effect (Table 3). Many studies have revealed results similar to those of the present study. While Nakagawa et al.'s study identified a significant positive correlation between the balance and the ability to perform IADL among elderly individuals, another study found that 63.2% of the elderly individuals went out to the market, neighborhood bazaar, mosque, coffeehouse, or park by walking, indicating that those without balance issues were able to perform IADL.[4] Similarly, Mortazavi et al.'s study determined that the independence in performing IADL among the elderly who had fallen decreased, whereas the majority of those who maintained balance and did not fall were independent in performing IADL.[22]

The study also determined a significant negative correlation between BBS and age, BMI and duration of chronic illness among the elderly (Table 3). In agreement with our study, a study found an increase in the frequency of balance disorders in older adults with advanced age, high BMI, and ≥four chronic diseases, and a strong negative relationship between these variables and BBS.[23] Supporting our study's finding of an adverse effect between BBS and age, another study determined that there was a significant negative relationship between age and BBS scores, with the progression of age leading to impairment of balance function and an increased risk of falling.[27] This situation can be explained by the impairment of balance function with advancing age, the reduction of cognitive functions, the decrease in sensory inputs and motor responses, and the disruption of the adaptation of systems responsible for postural balance.[4]

The study observed a significant negative correlation between IADL and age (Table 3). Similarly to the present study, many studies in the literature found a significant relationship between age and IADL, concluding that as age increases, the independence of the elderly in performing all IADL decreases.[4,22,28,37]

The study also observed a significant negative correlation between IADL and the duration of chronic illness (Table 3). A study found a substantial relationship between IADL and the presence of chronic illnesses, with elderly individuals having chronic diseases experiencing deficiencies in activities such as getting in and out of bed, eating, dressing, and walking.[22] Similarly, it was determined that the elderly with multiple chronic diseases, along with hearing, vision, and musculoskeletal strength losses, had a significant relationship with these independent variables and IADL.[22] Another study mentioned that chronic diseases, hearing loss, and vision loss significantly negatively affect basic daily living activities.[38] These studies support the results of our study. Therefore, it is necessary to identify chronic illness conditions in elderly individuals and create appropriate interventions and plans to prevent or reduce risk factors and, by this, to apply treatment and care.[38]

## CONCLUSION AND RECOMMENDATIONS

In the study, BBS and IADL scores of women, singles, those living alone, those with chronic diseases, those who do not exercise, and those who use assistive devices or continuously use drugs were significantly lower. It was also determined that there is a relationship between the BBS mean score and the IADL mean score in elderly individuals, and these mean scores are positively and significantly affected. As the balance function decreases, the independence of elderly individuals in performing ADL is also adversely affected.

Nurses have an essential role in determining the disability levels of elderly individuals, preserving their existing balance functions, and thus increasing their quality of life. Community health nurses should follow this fragile patient group closely, especially in primary care. For this reason, it is possible to suggest that nurses should question the balance function and levels of performing the ADL of elderly individuals and prepare a holistic nursing care plan in line with the nursing process, cooperate with a multidisciplinary team, and provide programmed training on physical activity.


### *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:*** *Sevim Güler, Erdoğan Öz;* ***Design:*** *Sevim Güler, Erdoğan Öz;* ***Control/Supervision:*** *Sevim Güler, Erdoğan Öz;* ***Data Collection and/or Processing:*** *Sevim Güler;* ***Analysis and/or Interpretation:*** *Sevim Güler, Erdoğan Öz;* ***Literature Review:*** *Sevim Güler;* ***Writing the Article:*** *Sevim Güler;* ***Critical Review:*** *Sevim Güler, Erdoğan Öz;* ***References and Fundings:*** *Sevim Güler, Erdoğan Öz.*

## REFERENCES


1. World Health Organization [Internet]. © 2024 WHO [Cited: January 23, 2023]. Ageing and Health. Available from: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health
2. Türkiye İstatistik Kurumu (TUIK). İstatistiklerle yaşlılar, 2021. [Erişim tarihi: 08 Ocak 2023] Erişim linki: https://data.tuik.gov.tr/Bulten/Index?p=Istatistiklerle-Yaslilar-2021-45636. Accessed
3. Şahin Onat Ş, Özişler Z, Köklü K. Osteoporotik yaşlılarda denge bozukluğu [Balance disorders in the osteoporotic elderly]. Türk Osteoporoz Dergisi. 2013;19:87-9. doi: 10.4274/tod.76376.
4. Nakagawa HB, Ferraresi JR, Prata MG, Scheicher ME. Postural balance and functional independence of elderly people according to gender and age: cross-sectional study. Sao Paulo Med J. 2017;135(3):260-5. PMID: 28746661; PMCID: PMC10019839.
5. Thomas E, Battaglia G, Patti A, Brusa J, Leonardi V, Palma A, et al. Physical activity programs for balance and fall prevention in elderly: a systematic review. Medicine (Baltimore). 2019;98(27):e16218. PMID: 31277132; PMCID: PMC6635278.
6. Hall KS, Cohen HJ, Pieper CF, Fillenbaum GG, Kraus WE, Huffman KM, et al. Physical performance across the adult life span: correlates with age and physical activity. J Gerontol A Biol Sci Med Sci. 2017;72(4):572-8. PMID: 27356977; PMCID: PMC6075535.
7. Awais M, Chiari L, Ihlen EAF, Helbostad JL, Palmerini L. Physical activity classification for elderly people in free-living conditions. IEEE J Biomed Health Inform. 2019;23(1):197-207. PMID: 29994291.
8. Güneş Gencer GY, İpek L, Kara DS, Uzun F, Çetin SY. Türkiye'de yaşlılarda düşme ve denge ile ilgili yapılmış çalışmaların incelenmesi [Investigation of studies on falling and balance in the elderly in Turkey]. Elderly Issues Research Journal (EIRJ). 2021;14(2):70-83. https://dergipark.org.tr/tr/download/article-file/2128966
9. Dunsky A. The effect of balance and coordination exercises on quality of life in older adults: a mini-review. Front Aging Neurosci. 2019;11:318. PMID: 31803048; PMCID: PMC6873344.
10. Dawe RJ, Leurgans SE, Yang J, Bennett JM, Hausdorff JM, Lim AS, et al. Association between quantitative gait and balance measures and total daily physical activity in community-dwelling older adults. J Gerontol A Biol Sci Med Sci. 2018;73(5):636-42. PMID: 28957994; PMCID: PMC5905609.
11. Şahin S, Cankurtaran M. Geriatrik sendromlar [Geriatrics syndromes]. Ege Tıp Dergisi. 2010;49(3):31-7. http://egetipdergisi.com.tr/tr/download/article-file/350445.
12. Özkan Pehlivanoğlu EF, Özkan MU, Balcıoğlu H, Bilge U, Ünlüoğlu İ. Yaşlılar için Katz Günlük Yaşam Aktiviteleri Ölçeği'nin Türkçe' ye uyarlanması ve güvenilirliği [Adjustment and reliability of Katz daily life activity measures for elderly in Turkish]. Ankara Med J. 2018;18(2):219-23. doi: 1017098/amj.435264.
13. Şahin A, Tekin O, Cebeci S, Işık B, Özkara A, Kahveci R, et al. Factors affecting daily instrumental activities of the elderly. Turkish Journal of Medical Sciences. 2015;45(6):1353-9. https://journals.tubitak.gov.tr/medical/vol45/iss6/26/
14. Yümin ET, Şimşek TT, Sertel M, Öztürk A, Yümin M. The effect of functional mobility and balance on health-related quality of life (HRQoL) among elderly people living at home and those living in nursing home. Arch Gerontol Geriatr. 2011;52(3):e180-4. PMID: 21167611.
15. Değer TB, Saraç ZF, Savaş ES, Akçiçek SF. The relationship of balance disorders with falling, the effect of health problems, and social life on postural balance in the elderly living in a district in Turkey. Geriatrics (Basel). 2019;4(2):37. PMID: 31108836; PMCID: PMC6630729.
16. Işık EI, Yılmaz S, Uysal I, Basar S. Adaptation of the lawton ınstrumental activities of daily living scale to turkish: validity and reliability study. Ann Geriatr Med Res. 2020;24(1):35-40. PMID: 32743320; PMCID: PMC7370782.
17. Berg K, Wood Dauphinée S, Williams JI, Gayton D. Measuring balance in the elderly: perliminary development of an instrument. Physiother Canada. 1989;41(6):304-11. https://www.utpjournals.press/doi/abs/10.3138/ptc.41.6.304
18. Şahin F, Yilmaz F, Ozmaden A, Kotevolu N, Sahin T, Kuran B. Reliability and validity of the Turkish version of the Berg Balance Scale. J Geriatr Phys Ther. 2008;31(1):32-7. PMID: 18489806.
19. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist. 1969;9(3):179-86. PMID: 5349366.
20. Koyuncu G, Tuna F, Yavuz S, Kabayel DD, Koyuncu M, Özdemir H, et al. The last station before fracture: assessment of falling and loss of balance in elderly. Turk J Phys Med Rehab 2017;63(1):14-22 doi: 10.5606/tftrd.2017.90757
21. Ulus Y, Akyol Y, Tander B, Durmuş D, Bilgici A, Kuru Ö. The relationship between fear of falling and balance in community-dwelling older people. Turkish Journal of Geriatrics. 2013;16(3):260-5. https://geriatri.dergisi.org/uploads/pdf/pdf_TJG_745.pdf
22. Mortazavi H, Tabatabaeicheh M, Taherpour M, Masoumi M. The relationship between activities of daily living, falls and fear of falling in older adults: a crosssectional study. Bangladesh J Medical Sci. 2021;20(2):420-5. doi.10.3329/bjms.v20i2.51559.
23. Sayar S, Köse B, Yılmaz R, Hayta D, Gözlemeci BN, Karaömer E. Yaşlılarda düşme sıklığı ve düşmeyi etkileyen faktörler: tanımlayıcı çalışma [Frequency of falls in the elderly and factors affecting falls: a descriptive study]. Türkiye Klinikleri Gerontoloji Dergisi. 2022;1(1):1-8. https://www.turkiyeklinikleri.com/article/en-yaslilarda-dusme-sikligi-ve-dusmeyi-etkileyen-faktorler-tanimlayici-calisma-99846.html
24. Yörük S. Balıkesir Devlet Hastanesi Dahiliye Kliniğinde yatan yaşlılarda düşme korkusu ve etkileyen faktörlerin incelenmesi [Evaluation of the fear of falling and the effective factors in old people staying in Balıkesir State Hospital Internal Medicine Service]. Adnan Menderes Üniversitesi Tıp Fakültesi Dergisi. 2012;13(2):25-9. http://adudspace.adu.edu.tr:8080/xmlui/bitstream/handle/11607/1964/25-29.pdf?sequence=1&isAllowed=y
25. Rosa TE, Benício MH, Latorre Mdo R, Ramos LR. Fatores determinantes da capacidade funcional entre idosos [Determinant factors of functional status among the elderly]. Rev Saude Publica. 2003;37(1):40-8. Portuguese. PMID: 12488919.
26. Çakar E, Durmuş O, Dinçer Ü, Kıralp MZ, Cerit Soydan F. The effect of marital status on health quality and fall risk of elderly people. Turkish Journal of Geriatrics. 2011;14(4):331-6. https://geriatri.dergisi.org/abstract.php?id=610
27. Gümüş E, İsmail Arslan İ, Tekin O, Fidancı İ, Eren ŞÜ, Dilbe S, et al. Kendi evi ve huzurevinde yaşayan yaşlılarda, denge ve yürüme skorları ile düşme riskinin karşılaştırılması [Comparison of the falling risk with balance and walking scores in old people living in their own houses or in nursing homes]. Ankara Medical Journal. 2017;(2):102-10. https://dergipark.org.tr/en/pub/amj/issue/29961/284275
28. Kim IH. Age and gender differences in the relation of chronic diseases to activity of daily living (ADL) disability for elderly South Koreans: based on representative data. J Prev Med Public Health. 2011;44(1):32-40. PMID: 21483221.
29. Naczk M, Marszalek S, Naczk A. Inertial training improves strength, balance, and gait speed in elderly nursing home residents. Clin Interv Aging. 2020;15:177-84. PMID: 32103920; PMCID: PMC7012216.
30. Fahlström G, Kamwendo K, Forsberg J, Bodin L. Fall prevention by nursing assistants among community-living elderly people. A randomised controlled trial. Scand J Caring Sci. 2018;32(2):575-85. PMID: 28851132.

31. Weening-Dijksterhuis E, de Greef MH, Scherder EJ, Slaets JP, van der Schans CP. Frail institutionalized older persons: a comprehensive review on physical exercise, physical fitness, activities of daily living, and quality-of-life. Am J Phys Med Rehabil. 2011;90(2):156-68. PMID: 20881587.

32. Macedo DO, Freitas LM, Scheicher M. Preensao palmar e mobilidade funcional em idosos com diferentes niveis de atividade fisica [Handgrip and functional mobility in elderly with different levels of physical activity]. Fisioterapia e Pesquisa. 2014;21(2):151-5. https://www.scielo.br/j/fp/a/XRzxKVqZ4xg77V76S8xDH8Q/?lang=en

33. Şahin Onat Ş, Ünsal Delialioğlu S, Özel S. Geriatrik popülasyonda dengenin fonksiyonel durum ve yaşam kalitesi ile ilişkisi [The relationship of balance between functional status and quality of life in the geriatric population]. Türkiye Fiziksel Tıp ve Rehabilitasyon Dergisi. 2014;60:147-54. doi: 10.5152/tftrd.2014.67366.

34. Gemalmaz A, Dişçigil G, Başak O. Evaluation of the balance and gait status in nursing home residents. Turkish Journal of Geriatrics. 2004;7:41-4. https://geriatri.dergisi.org/abstract.php?id=197

35. Kızılkaya N, Saka S. Geriatrik bireylerde polifarmasi ve kardiyak risk faktörlerinin denge, düşme ve fonksiyonel bağımsızlığa etkisinin incelenmesi [Investigation of the effects of polypharmacy and cardiac risk factors on balance, falling and functional independence in geriatric individuals]. Journal of Health Sciences. 2022;31(2):198-203. https://dergipark.org.tr/tr/download/article-file/1964308

36. Levine SA, Barry PP. Geriatric patients. In: Noble J, Grenee HL, Wendly L, Modest G, eds. Textbook of Primary Care Medicine. 3rd ed. Missouri: Mosby; 2001. p.71-88.

37. Dunlop DD, Song J, Arnston EK, Semanik PA, Lee J, Chang RW, et al. Sedentary time in US older adults associated with disability in activities of daily living independent of physical activity. J Phys Act Health. 2015;12(1):93-101. PMID: 24510000; PMCID: PMC4153790.

38. Hosseini SR, Moslehi A, Hamidian SM, Taghian SA. The relation between chronic diseases and disability in elderly of Amirkola. Salmand. 2014;9(2):1-11. https://www.researchgate.net/publication/273680131