ORIGINAL RESEARCH

The Fear of Falls in the Older People Living in Nursing Home and the Factors Associated with Falls

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Abstract

Objective: This descriptive and correlational study was conducted to determine the prevalence of falls, fear of falling, and risk factors for falling in older adults living in nursing homes.

Materials and Methods: The population of the study was composed of older adults living in a nursing home located in the Central Anatolian Region. No sampling calculation was made in the study. All the older adults living in the institution were intended to be reached. The data of the study were collected using introductory information form, fall behavioral scale for older people, standardized mini-mental state examination (MMSE), timed up and go test (TUG), and Tinetti Balance and Gait Assessment (TBGA).

Results: The average age of the older adults included in the study was 77.5±8.8 and 44.2% of them were female. It was determined that the participants fell 1.9±1.08 times on average and 75.2% had the fear of falls. The changes in MMSE score accounted for 16.9% of the fear of falls and the number of falls in older adults (F=11.001; p<0.001; R2=0.169) and the changes in TBGA accounted for 15.8% of the fear of falls and the number of falls of the older adults (F=10.166; p<0.001; R2=0.158).

Conclusion: It was determined that the fear of falls and the number of falls were high in the older adults living in the institution. It was concluded that TUG, TBGA and MMSE were significant determinants in explaining the correlation between the fear of falls and the number of falls.

Keywords: Aging, older age, nursing home, falls, fear of falls

Introduction

It has been stated that according to the foresight of the World Health Organization approximately 1.2 million people will be at the age of 60 and over in 2025 and 80% of the elderly population to reach 2 million in 2050 would live in developing countries (1). It is estimated that the rate of the elderly population aged 65 and over, which was 8.8% in 2019, would reach 17.6% in 2050 in Turkey. Due to the traditional/cultural structure, elderly individuals in Turkey can live with their families or stay in nursing homes affiliated to the Republic of Turkey Ministry of Family and Social Services (ASHB), where the elderly with low income levels are cared for free of charge. Approximately 13,000 elderly individuals stay in nursing homes affiliated with ASHB (2). The increase in the elderly population brings some physical, psychological and social problems together with the ageing process.

Falls are the leading cause of injuries and death that is commonly seen in older people (3). It has been determined that one-third of the older adults the age of 65 and over experience falls at least once a year. It was determined in previous studies that fall risk increased with increasing age (4-7). It has been reported in the population-based prospective studies that the yearly fall rate in the elderly is 30-60%, the older adults have a fear of

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falls and recurrent falls have been observed in almost half of those who have fallen (6-8). It has been stated that 50% of the older adults who receive institutional care fall at least once a year, recurrent falls have been observed in 40% of them and the prevalence of falls in the institutional environment is three times greater than the prevalence of falls in the society (9). The prevalence of falls was found to be 34% in a study conducted in nursing homes in Turkey (10).

Falls in the elderly cause many outcomes ranging from simple treatable health problems to life threats. According to a study conducted in the USA, 10% of the older adults who fall apply to emergency services and 6% of them are hospitalized due to that reason (6). Also, the expenses of the treatment directly performed due to falls are on averagely 5% of the total health expenditures (6). These results indicate the importance of determining falls in older adults and the fall prevention/protection programs. As a matter of fact, protection from falls is among the national priorities of many countries (11). WHO is focused on raising fall awareness in society, identifying fall risks, and developing evidence-based fall prevention programs suitable for cultures and strategies including policy determination in order to prevent falls in older adults.

Studies have revealed that the determination of falls and fall prevention programs will decrease the incidence of falls by 6-33% (6,11-14). Maintaining the quality of life of the older adults, providing an active life for them, and protecting and promoting their health are among the main purposes for the older adults living in society and institutions. For this reason; it is important to determine the prevalence of falls, fear of falling, and fall risk factors in older adults living in nursing homes.

Materials and Methods

This descriptive and correlational study was conducted to determine the prevalence of falls, fear of falling, and risk factors for falling in older adults living in nursing homes. The research was carried out in a nursing home affiliated with the Ministry of Family and Social Policies in a province in the Central Anatolia Region. There is only one central nursing home in this province. The study was conducted in this nursing home. In this nursing home, no screening has been done about the physical characteristics of the elderly and their risk of falling before.

The population of the study was composed of older adults living in a nursing home located in the Central Anatolian Region. No sampling calculation was made in the study. All the older adults living in the institution were intended to be reached. The older adults who met the inclusion criteria and agreed to participate in the study were included in the study between January and June 2019. Between these dates, 127 older adults stayed in the nursing home. The study was completed with 113 participants who met the criteria and agreed to participate.

Inclusion Criteria

- The older adults aged 65 and over, who

- were able to communicate,

- had no physical walking problem,

- Those who did not make any changes in the medications used by the elderly person during the study were included in the study.

Exclusion Criteria

- Had hearing impairment, dementia, delirium

- Had deformity preventing walking and had used assistive devices for walking.

Data Collection

The data of the study were collected using introductory information form, fall behavioral scale for older people (FaB), standardized mini-mental state examination (MMSE), timed up and go test (TUG), and Tinetti balance and gait assessment (TBGA).

Introductory information form is composed of 10 questions including socio-demographic characteristics, health-disease characteristics and falls a history of the older adults (number of falls in the recent year, place of falls, reasons for falls etc.).

FaB was developed by Clemson et al. (15) in English and its Turkish reliability and validity study was conducted by Ekşi Uymaz and Nahcivan (16). It is a 4-point Likert scale including 30 items and 10 subscales. Possible minimum and maximum scores to be obtained from the overall scale and its subscales get a point between one and four and while high scores indicate the safe/protective behaviours related to falls, low scores indicate risky behaviours. According to the results of the reliability and validity study of the scale in its original language, Cronbach's Alpha coefficient is 0.84 (17).

MMSE; the reliability and validity study of the test, whose standardized version was performed by Molloy and Standish (17), was conducted by Güngen et al. (18). The test was developed to perform the short-term cognitive assessment in older adults, especially in the examination of delirium or dementia. While the minimum score on the scale is "0", its maximum score is "30". Zero-twelve points are assessed as "severe", 13-22 points as "moderate" 23-24 points as "mild" "cognitive disorder" and 25-30 points are assessed as "no cognitive disorder" (18).

TUG was applied to assess the functional capacities of the cases. A standard chair is used for the test. Firstly, patients are asked to sit in a chair. Then, they are asked to stand up and walk with regular steps at a 3-meter distance, the length of which was determined in advance, and turn back and sit on the chair at the end of 3 meters. The walking time of the patients during the test is determined with a stopwatch in seconds (19).

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TBGA was developed by Tinetti (20) under the name of performance-oriented assessment of mobility problems in elderly patients to perform the assessment for patients with high fall risk and its Turkish validity and reliability study was conducted by Ağırcan (21). TBGA assesses balance and gait under 2 main titles: The first 9 questions are related to balance and the following 7 questions are related to gait. As a result of the assessment performed by observation, a total score of 18 points and below indicates high fall risk, 19-24 points indicate moderate fall risk, and 24 points and above indicate low fall risk (21).

The information form and the scales were filled out by the researchers using the face-to-face interview method and measurements. The materials needed to collect data were obtained by the researchers and they were placed in a suitable room in the nursing home. The older adults who agreed to participate in the study were assessed in this room during the time scheduled for them. The interviews were carried out between 10:00-12:00 and 14:00-15:00. Privacy was paid attention and the older adults were individually interviewed. In data collection, 2 interviews were performed with an elderly person and each interview lasted for 25 minutes.

Statistics

Data were analyzed using statistical packaged software IBM SPSS Statistics Version 25.0 (IBM Corp., Armonk, New York, USA). Participants' demographics and clinical characteristics were summarized using either means and standard deviations, or frequencies and percentages as appropriate. Comparisons of baseline characteristics between fallers and non-fallers were made using One-Way ANOVA or non-parametric Mann-Whitney U tests as deemed appropriate. Multiple linear regression analysis assumptions are based on the relevant literature (15-17). In the normal distribution of numerical variance data, the Shapiro-Wilk normality test was used. According to this test (statistic =0.992; df =126; p=0.731) residuals are normally distributed. The data show homoscedasticity relative to the scatter plot. According to the normal P-P Plot of Regression and Scotter plot of Regression tests, linearity was achieved. Since the Durbin-Watson =1.883 value obtained from the study is between 1.5 and 2.5, there is no autocorrelation. Tolerance values are above 0.2 and VIF values are less than 10, so there is no multicollinearity. Multiple linear regression analysis was performed to determine the effects of age, and sex on the fall scores. For the model statistics in the regression analysis tables; F, p, and adjusted R^2 values, as well as the t statistics and p-values of beta coefficients, are given. The descriptive statistics were expressed in units (n) and percentages (%). The statistical significance level was accepted as p<0.05.

Ethical Considerations

Ethical Committee Approval from the Ethical Committee of Erciyes University Social and Human Sciences and institutional permission from the nursing home were obtained (2011, KAEK-80). Also, the older adults included in the study were informed and their written and verbal consent was received.

Results

The average age of the older adults included in the study was 77.5±8.8 and 44.2% of them were female. It was determined that the participants fell 1.9±1.08 times on average and 75.2% had the fear of falls (Table 1).

It was determined that 41.6% of the older adults fell at least once in the recent year, 31% of them fell while walking in and out of the building, and they fell mostly due to loss of balance and tripping (Table 2).

The difference in MMSE score accounted for 16.9% of the fear of falls and the number of falls in older adults (F=11.001; p<0.001; R^2=0.169) and the difference in TBGA accounted for 15.8% of the fear of falls and the number of falls of the older adults (F=10.166; p<0.001; R^2=0.158). The decrease in MMSE (β-3.617 and -1.655) and TBGA (β-4.107 and -1.428) scores increased the fear of falls and the number of falls (p<0.001). The difference in TUG score accounted for 10.5% of the fear of falls and the number of falls in older adults (F=6.195; p=0.003; R^2=0.105). It was determined that the number of falls and fear of falls increased as the TUG score increased (β-4.124 and 1.708) (Table 3).

Discussion

This study was conducted to determine the prevalence of falls, fear of falling, and risk factors for falling in older adults living in nursing homes. This study is important in terms of contributing to the literature and drawing attention as it was conducted in a developing region having no data on the falls in the older adults living in the institution. Although the differences in the region where the studies have been conducted, race and the healthcare system have varied the results, it has been observed that the number of falls and the rate of deaths due to falls increases consistently. Especially the older adults living in the institution are at risk (22,23). It is quite important to determine the falls in people over the age of 65 in these regions, raise awareness, conduct fall prevention studies, assess the older adults based on falls, gait, balance, fear of falls and the associated factors and draw the attention of the healthcare professionals in terms of public health applications.

Many people notice a decrease in their mobility as a result of ageing. Multiple chronic diseases and deficiencies are responsible for this decrease and they make older adults prone

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Table 1. Demographics, cognitive and physical characteristics of the participants				
Characteristics	Full sample n=113	Fallers n=47	Non-fallers n=66	p-value
Age (years), mean ± SD	77.5±8.8	79.7±8.4	76.0±8.7	0.026
Gender (female; n, %)	50, (44.2)	29, (61.7)	21, (31.8)	<0.001
Educational status (Primary education and below; n, %)	105, (92.9)	45, (95.7)	60, (90.9)	0.27
Number of chronic diseases, mean ± SD	2.1±0.9	2.4±1.0	1.9±0.8	0.020
Number of drugs used, mean ± SD	4.0±2.3	4.1±2.4	3.9±2.3	0.67
Period of living in the institution (more than 3 years; n, %)	45, (39.8)	16, (34.0)	29, (43.9)	0.19
Participating in social activities in the institution (unwilling; n, %)	87, (77.0)	32,(68.1)	55, (83.3)	0.04
Fear of falls (people with fear n, %)	85, (75.2)	43, (91.5)	42, (63.6)	<0.001
FaB scale, mean ± SD	2.6±0.4	2.9±0.3	2.5±0.4	<0.001
TUG, second mean ± SD	17.9±9.2	20.6±10.6	15.9±7.6	0.007
TBGA, score mean ± SD	18.9±6.8	16.6±6.0	20.5±6.9	0.001
MMSE, score mean ± SD	16.4±6.8	14.1±5.9	18.1±6.9	0.002

One-Way ANOVA or non-parametric Mann-Whitney U test was applied when appropriate. FaB scale fall behavioral scale for older people, TUG: The timed up and go, TBGA: Tinetti balance and gait assessment, MMSE: Mini-mental state examination, SD: Standard deviation

Table 2. History, characteristics, and fear of falls		
	n	%
	n	%
Falls in the recent year		
Yes	47	(41.6)
No	66	(58.4)
Number of falls in the recent year		
Once	21	(18.6)
Twice	14	(12.4)
Three times	5	(4.4)
Four times and more	7	(6.2)
Place of falls*		
While walking in and out of the building	35	(31.0)
While getting up from bed	10	(8.8)
While getting up from a chair	4	(3.5)
While having a bath/in the toilet	11	(9.7)
While climbing up/coming downstairs	9	(8.0)
Reasons for falls*		
Tripping	16	(14.2)
Slipping	15	(13.3)
Loss of balance	17	(15.0)
Dizziness	16	(14.2)
Faint	2	(1.8)
Not remembering/not sure	9	(8.0)

*Marked more than once

to falls (20). Fall is responsible for two-thirds of all deaths due to unintentional injuries. In WHO 2018 report, it has been reported that age, gender and the status of living in a nursing home/care centre are the important risk factors for falls (23). Fall risk is higher for the older adults living in nursing homes and elderly care centres because there may be limitations different from the environment where the older adults are familiar (24). In a study conducted in China, the prevalence of falls in older adults was 19.3% and the prevalence of repeated falls was 4.75% (14). In other studies in the literature, it was found that the fall rate of the older adults living in nursing homes was higher compared to the older adults living in a home environment (25-27). It was determined in this study that older adults fell 1.9±1.08 times on average and 41.6% of them fell at least once in the recent year. It was determined in this study that the prevalence of falls increased with increasing age. Likewise, it was stated in the previous studies that the prevalence of falls increased with increasing age (5,28). The fact that more risk factors for falls in older adults (29-31) and the severity of these risk factors increases with increasing age is thought to increase the possibility of falls and, as a result, increase the falls prevalence with increasing age. It is known that gender is an important factor for falls together with age. It has been reported in the studies that women experience falls more compared to men and the female gender is a risk factor for falls (5,28). It was found in this study that the fall risk was higher in women, which is compatible with the literature.

The difference between this study and the fall studies in the literature is that falls in the older adults living in the institution

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were assessed in a multi-directional manner, these assessments were associated with the number of falls/fear of falls, and it was aimed to emphasize that the fear of falls is as important as falls itself. Falls are an important health problem causing fear and anxiety, leading to loss of independence and affecting quality of life negatively for older adults (32). Fear of falls is estimated to be experienced by many older adults and it has been reported that the prevalence of fear of falls is not known exactly. Fear of falls causes limitation of movement in older adults or leads the older adults to fail to move (33,34). This fear causes physical and cognitive weakness in older adults and results in recurrent falls in them. Thus, fear of falls causes weakness, weakness causes the limitation of movement and falls, and falls causes fear again and these cause a vicious circle. It has been reported in the studies that fear of falls causes significant differences in the emotional and behavioural areas of individuals, the reduces physical ability and social interaction, and causes less participation in social activities (35,36). It was determined in this study that 75.2% of the older adults had a fear of falls and 41.6% fell at least once in a recent year, and 68% of these people were unwilling to participate in social activities. This result suggests that most older adults who have experienced falls have the fear of falls and they limit their lives due to this fear.

In the multiple linear regression model established in this study, the correlation between the number of falls and fear of falls was explained using MMSE, TUG and TBGA. TBGA and TUG are the tests that also provide an opinion about the performance during daily life activities such as standing up, walking, returning and sitting as well as balance and being used commonly in assessing balance. In a previous meta-analysis performed, TUG score between the ages of 60-99 has been reported to be 9.4 seconds on average. In another study, it was determined that the correlation between TUG score and falls was significant and this score was higher than 15 seconds, which increased falls 3 times more (37-40). According to the logistic regression analysis results of another study, it was reported that high TUG scores increased fall risk approximately two times (41). It was determined that the mean TUG in the older adults in this study was similar to the literature. Also, it was found in the multiple linear regression analysis that a decrease of one unit in TUG score caused an increase of 4.1 units in fear of falls and an increase of 1.7 units in the number of falls. It was determined that there was a negative correlation between TBGA mean score and fear of falls and the number of falls and the decrease in TBGA caused an increase in fear of falls and the number of falls. It was determined that there was a negative correlation between MMSE mean scores and fear of falls and the number of falls and the decrease of MMSE caused an increase in fear of falls and the number of falls. In a study conducted; elderly individuals had a moderate to high risk of falling according to TBGA. Higher MMSE score was found to be an independent variable for reduced risk of falling (42). In another study, MMSE and TBGA were examined in hospitalized elderly individuals and multifactorial regression analysis was performed. Participants had a significantly worse overall health performance with an increased risk of falling (43). These results demonstrate that TUG, TBGA and MMSE, which are important indicators of balance and daily life activities, are significant determinants in the number of falls and fear of falls.

Conclusion

Consequently, it was determined that the fear of falls and the number of falls were high in the older adults living in the institution. It was concluded that TUG, TBGA and MMSE were significant determinants in explaining the correlation between the fear of falls and the number of falls. It may be recommended in the service planning for the prevention of the falls of the older adults living in nursing homes that the assessment of their fear of falls is performed as well as performing regular fall assessments for them. Also, conducting studies with large sample groups in which different methods can explain the effect of TBGA and MMSE on the fear of falls and the number of falls may be useful.

Ethics

Ethics Committee Approval: Ethical Committee Approval from the Ethical Committee of Erciyes University Social and Human Sciences and institutional permission from the nursing home were obtained (2011, KAEK-80).

Informed Consent: Informed and their written and verbal consent was received.

Peer-review: Externally peer-reviewed.

Table 3. Multiple linear regression analysis									
	MMSE			TUG			TBGA		
	β	t	p	β	t	p	β	t	p
Fear of falls	-3.617	-0.231	0.012	4.124	2.062	0.042	-4.107	-2.858	0.005
Number of falls	-1.655	-0.286	0.002	1.708	2.236	0.027	-1.428	-2.645	0.009
Model statistics	F=11.001; p<0.001; R²=0.169			F=6.195; p=0.003; R²=0.105			F=10.166; p<0.001; R²=0.158		
* Adjusted for age and gender. MMSE: Mini-mental state examination, TUG: The timed up and go, TBGA: Tinetti balance and gait assessment									

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Authorship Contributions

Concept: B.Ö., Ö.C., N.Ş., S.A., Design: B.Ö., Ö.C., N.Ş., N.U., S.A., Data Collection or Processing: B.Ö., Ö.C., N.Ş., N.U., Analysis or Interpretation: B.Ö., Ö.C., N.Ş., N.U., Literature Search: B.Ö., Ö.C., N.U., Writing: B.Ö., Ö.C., N.Ş., N.U., S.A.

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References

1. World Health Organization. World Report on Ageing and Health. Luxemburg: WHO Library Cataloguing-in-Publication Data, 2015.

2. Aile ve Sosyal Politikalar Bakanlığı (ASPB). Türkiye'de Yaşlılara Yönelik Hizmetler, Kurumsal Yaşlı Bakımı ve Kurumsal Yaşlı Bakımında İllerin Durumu. Ertem Basım Yayın Ankara, 2020.

3. Rubenstein LZ. Falls in older people: epidemiology, risk factors and strategies for prevention. Age Ageing 2006;35(Suppl 2):ii37-ii41.

4. Bıyıklı K, Nahcivan NÖ. Huzurevinde yaşayan bir grup yaşlıda düşme ile ilişkili faktörler: Demografik özellikler, sağlık sorunları ve kullanılan ilaçlar. Sağlık ve Toplum 2007;17:95-108.

5. Gillespie LD, Robertson MC, Gillespie WJ, Lamb SE, Gates S, Cumming RG, Rowe BH. Interventions for preventing falls in older people living in the community. Cochrane Database Syst Rev 2009;2:CD007146.

6. Peel NM, Kassulke DJ, McClure RJ. Population based study of hospitalised fall related injuries in older people. Injury Prevention 2002;8:280-283.

7. Tinetti ME, Gordon C, Sogolow E, Lapin P, Bradley EH. Fall-risk evaluation and management: challenges in adopting geriatric care practices. Gerontologist 2006;46:717-725.

8. Stevens JA, Olson S. Reducing falls and resulting hip fractures among older women. Home Care Provid 2000;5:134-139; quiz 140-1.

9. Van Doorn, C, Gruber-Baldini AL, Zimmerman S, Hebel JR, Port CL, Baumgarten M, Quinn CC, Taler G, May C, Magaziner J; Epidemiology of Dementia in Nursing Homes Research Group. Epidemiology of Dementia in Nursing Homes Research Group. Dementia as a risk factor for falls and fall injuries among nursing home residents. J Am Geriatr Soc 2003;51:1213-1218.

10. Kırımlı E. Huzurevinde Kalan Yaşlılarda Düşme Sıklığı ve Buna Etki Eden Nedenler. Marmara Üniversitesi. Uzmanlık Tezi. İstanbul, 2002.

11. Tiedemann A. The development of a validated falls risk assessment for use in clinical practice. Sydney, Australia: University of New South Wales 2006.

12. Huang TT, Acton GJ. Ways to maintain independence among Taiwanese elderly adults with hip fractures: a qualitative study. Geriatr Nurs 2009;30:28-35.

13. Beğer T, Yavuzer H. Yaşlılık ve Yaşlılık Epidemiyolojisi. Klinik Gelişim 2012;25:1-3.

14. Chu LW, Chi I, Chiu AYY. Incidence and Predictors of Falls in the Chinese Elderly. Ann Acad Med Singap 2005;34:60-72.

15. Clemson L, Cumming RG, Heard R. The development of an assessment to evaluate behavioral factors associated with falling. Ben J Occup Ther 2003;57:380-388.

16. Ekşi Uymaz P, Nahcivan N. Reliability and Validity of Fall Behavioral Scale for Older People. FNJN 2013;21:22-32.

17. Molloy DW, Standish TIM. A guide to the standardized mini mental state examination. Int Psychogeriatr 1997;9(Suppl 1):87-94.

18. Güngen C, Ertan T, Eker E, Yaşar R, Engin F. Standardize Mini Mental Test'in Türk Toplumunda Hafif Demans Tanısında Geçerlik ve Güvenilirliği. Türk Psikiyatri Dergisi 2002;13:273-281.

19. Steffen T, Hacker T, Mollinger L. Age-and gender-related test performance in community-dwelling elderly people: Six-Minute Walk Test, Berg Balance Scale, Timed Up & Go Test, and gait speeds. Phys Ther 2002;82:128-137.

20. Tinetti ME. Performance-Oriented Assessment of Mobility Problems in Elderly Patients. JAGS 1986;34:119-126.

21. Ağırcan D. Validity and reliability of Turkish version of Tinetti balance and gait assassment. Pamukkale University Institute of Health Sciences 2009.

22. Burns E, Kakara R. Deaths from falls among persons aged ≥65 years -United States, 2007-2016. MMWR Morb Mortal Wkly Rep 2018;67:509-514.

23. Türkiye İstatistik Kurumu, 2018, Erişim adresi: http://www.tuik.gov.tr/PreHaberBultenleri.do?id =24644 (Erişim tarihi: 23.11.2018).

24. Lilley, JM, Arie T, Chilvers CED. Accidents involving older people: a review of the literature. Age Ageing 1995;24:347-367.

25. Şencan İ, Canbal M, Tekin O, Işık B. Halk sağlığı sorunu olarak yaşlılık dönemi düşmeleri. Yeni Tıp Dergisi 2011;28:79-82.

26. Günel MK, Meric A, Kırdı N, Cavlak U. Evaluation of elderly living at home and rest house. Turkish Journal of Geriatrics 2001;4:106-112.

27. Gillespie L, Handoll H. Prevention of falls and fall-related injuries in older people. Inj Prev 2009;15:354-355.

28. Markle-Reid M, Browne G, Gafni A, Roberts J, Weir R, Thabane L, Miles M, Vaitonis V, Hecimovich C, Baxter P, Henderson S. The effects and costs of a multifactorial and interdisciplinary team approach to falls prevention for older home care clients 'at risk' for falling: a randomized controlled trial. Can J Aging 2010;29:139-161.

29. Mayo-Wilson E, Grant S, Burton J, Parsons A, Underhill K, Montgomery P. Preventive home visits for mortality, morbidity, and institutionalization in older adults: a systematic Review and meta-analysis. PLoS One 2014;9:e89257.

30. Luck T, Motzek T, Luppa M, Matschinger H, Fleischer S, Sesselmann Y, Roling G, Beutner K, König HH, Behrens J, Riedel-Heller SG. Effectiveness of preventive home visits in reducing the risk of falls in old age: a randomized controlled trial. Clin Interv Aging 2013;8:697-702.

31. Dorresteijn TA, Zijlstra GR, Delbaere K, van Rossum E, Vlaeyen JW, Kempen GI. Evaluating an in-home multicomponent cognitive behavioural programme to manage concerns about falls and associated activity avoidance in frail community-dwelling older people: Design of a randomised control trial. BMC Health Serv Res 2011;11:228.

32. Akdeniz M, Yaman A, Kılıç S. Aile hekimliğinde önlenebilen sorunlar: Yaşlılarda düşmeler. Gero Fam 2010;1:117-132.

33. Erdem M, Emel FH. Mobility levels and fear of falling in the elderly. Journal of Anatolia Nursing and Health Sciences 2004;7:1-10.

34. Usta Yeşilbalkan Ö, Karadakovan A. Narlıdere Dinlenme ve Bakımevinde yaşayan yaşlı bireylerdeki düşme sıklığı ve düşmeyi etkileyen faktörler. Türk Geriatri Dergisi 2005;8:72-77.

35. Kara B, Yıldırım Y, Genç A, Ekizler S. Assessment of home environment and life satisfactionin geriatrics and relation to fear of falling. Fizyoter Rehabil 2009;20:190-200.

36. Amer MS, Abdellah AF, Elsayed ES. Fear of falls among nursing homes residents and community dwelling elderly. The Egyptian Journal of Hospital Medicine 2018;73:6785-6788.

37. Bohannon RW. Reference values for the five-repetition sit-to-stand test: a descriptive meta-analysis of data from elders. Percept Mot Skills 2006;103:215-222.

38. Terzi B, Terzi H. Factors Associated with Recurrent Falls in Geriatric Patients. J PMR Sci 2013;16:96-101.

39. Gürler H, Özkan Tuncay F, Kars Fertelli T. The Determination of Perceived Risk Factors and The Level of Knowledge for Falls in Elderly Individuals Who Lives in a Nursing Home. Van Tıp Derg 2019;26:315-323.

40. Buckinx F, Croisier JL, Reginster JY, Lenaerts C, Brunois T, Rygaert X, Petermans J, Bruyère O. Prediction of the Incidence of Falls and Deaths Among Elderly Nursing Home Residents: The SENIOR Study. J Am Med Dir Assoc 2018;19:18-24.

41. Uz Tunçay S, Özdinçler AR, Erdinçler DS. Geriatrik Hastalarda Düşme Risk Faktörlerinin Günlük Yaşam Aktiviteleri ve Yaşam Kalitelerine Etkisi. Türk Geriatri Dergisi 2011;14:245-252.

42. Efendioglu EM, Cigiloglu A, Ozturk ZA. The role of comprehensive geriatric assessment in predicting fall risk. Ir J Med Sci 2022.

43. Seń M, Jakubowska L, Lintowska A, Karniej P, Grabowska B, Jankowska-Polańska B. Risk of Falls in Patients Aged Over 65 in the Context of the Treatment Facility. In: Pokorski, M. (eds) Integrative Clinical Research. Advances in Experimental Medicine and Biology (2021), vol 1375. Springer, Cham.