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ASSESSMENT OF THE RISK FOR FALLS IN ELDERLY PEOPLE WITH MODERATE MENTAL DISABILITY AND WITHOUT MENTAL DISABILITY

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Abstract. *Falls are common in the elderly and have influence on mortality, morbidity, loss of functional capacity and institutionalization. Preventive strategies to reduced fall risk include: assessing and reassessing fall risk, visually marking high-risk patients, talking to the patient about their level of fall risk, and educating patients, family members, and staff about preventive interventions. The main goal of the research is to assess the risk of falling in elderly people with moderate mental retardation and elderly people without mental retardation. The prospective study included 60 male respondents, selected using the method of purposive sampling, who reside in the Home for People with Disabilities Prijedor and the Home for the Elderly Prijedor. The Timed Up and Go test was used to assess functional mobility and the risk of falling, and it was observed that the majority of respondents (53.3%) were at high risk of falling, and no statistically significant difference was observed (t= -0.461; p=0.173). In order to assess dynamic balance in simple task, a modified Functional Reach Test was used, in which persons with moderate mental retardation maintained stability up to 69.67 cm on average, and persons without mental retardation 67.93 cm (t=0.737; p=0.071). During the assessment of static postural and balance control , none of the subjects was able to perform Single Leg Stance (t= -0.220; p=0.619). No statistically significant differences were obtained in the groups of respondents with mental disability and without mental disability, and it is concluded that the presence of moderate mental disability does not increase the risk of falling in the third age.*

Key words*: elderly people, falls, mental retardation*

Introduction

The World Health Organization (WHO) defines a fall as an event that occurs as a result of an unintentional resting on the ground with an inability to rise (WHO, 2019). In hospitalized patients, a fall is defined as an unexpected and unintentional

descent to the floor or another lower surface, which is not caused by syncope or a strong external force [1].

Falls are common among older adults and impact mortality, morbidity, loss of functional capacity, and institutionalization [2]. Unintentional injuries are the fifth leading cause of death in older adults (following cardiovascular diseases, malignancies, stroke, and respiratory diseases), with falls accounting for two-thirds of these deaths. In the United States, more than three-quarters of fall-related deaths occur among 13% of the population aged over 65, indicating that it is primarily a geriatric syndrome [3]. A fall rate of 44% was found over the course of one year, with a single fall recorded in 25% of cases, and recurrent falls (two or more) in 19% [4]. Fall-related morbidity doubles with each decade of age: 50/100,000 for those up to 65 years old, 150/100,000 up to 75 years old, and 525/100,000 for individuals over 85 years old [5].

Falls can have several possible consequences. These range from emotional distress to serious physical injuries. Falls can diminish the quality of life primarily due to the fear of falling again. Recurrent falls prolong hospitalization, increase the risk of unplanned readmission, and, due to the need for long-term care, also increase resource utilization (financial costs). Half of adults who suffer a hip fracture as a result of a fall are unable to return home or regain the functional level they had before the injury [6].

The main objective of the study is to assess the risk of falling and the frequency of falls in older adults with mild cognitive impairment and older adults without cognitive impairment.

Material and methods

The study was conducted as a prospective study, which included 60 male participants aged over 65 years, divided into two groups, selected by purposive sampling. The first group consisted of 30 residents of the Public Institution for People with Disabilities in Prijedor, and the second group consisted of 30 residents of the Public Institution for Older Adults in Prijedor.

The inclusion criteria for the study were orientation in time, space, and toward persons, which was assessed based on medical documentation, and voluntary consent to participate in the study. Additionally, in the first group of participants, the criterion was confirmed mild cognitive impairment.

The exclusion criteria for the study were disorientation, inability to establish cooperation, confirmed mild cognitive impairment, and severe or profound cognitive impairment. To assess orientation in time, space, and toward persons, as well as the diagnosis of mild cognitive impairment, medical documentation from the institutions was used.

Before the study began, consent was obtained from the directors and ethical committees of the institutions. For participants with mild cognitive impairment, consent was obtained from their guardians. The study was conducted from June 26, 2023, to July 5, 2023.

During the study, a sociodemographic questionnaire was used, which was created specifically for this study and contains 16 questions related to the characteristics of

the participants and two questions for the identification of depression (the "two-question" screening test). In the sociodemographic questionnaire, 16 questions were of a closed type, and two were open-ended. Three tests were used to assess postural balance: the Timed Up and Go test (Expanded version), the Modified Functional Reach test, and the One-Leg Stance test. The risk of falling was assessed using the Timed Up and Go test. The risk was evaluated based on the time taken to complete the test: <10 seconds – low risk, 10-20 seconds – moderate risk, 21-30 seconds – high risk, and > 30 seconds – very high risk of falling. The Modified Functional Reach Test assesses how far an individual is able to extend their arms in front of their body without losing postural balance, i.e., without moving their feet or falling. The participant is instructed to lean forward from a standing vertical position as far as possible, while maintaining postural balance, holding onto a board and pushing it forward with both hands. This test evaluates the ability to shift the center of body mass within the limits of stability. The distance covered is measured in centimeters. Each participant repeats the test three times, and the best result is recorded. The One-Leg Stance test evaluates the participant's static postural balance. The subject is asked to stand on one leg with their arms relaxed at their sides for as long as they can (the maximum time is 26.9 seconds for participants aged 60-69 years, and 18.3 seconds for participants aged 70-79 years). They are instructed to stand still and relax on one leg. Participants' both legs are tested, first with their eyes open, and then with their eyes closed. Three attempts are allowed, and the best time is recorded. Data analysis was performed using the SPSS software statistical package, version 26. The χ^2 (chi-square) test was used for statistical analysis, and the Student's t-test was used to test intergroup differences. The usual significance level for differences was set at $p < 0.05$.

Research results

A total of 60 male participants took part in the study, with 30 residents from the Public Institution for People with Disabilities in Prijedor and 30 residents from the Public Institution for Older Adults in Prijedor. Of these, 53 participants belonged to the group of older adults, and 7 participants belonged to the group of elderly adults. The average age of the participants was 69.4 years. No statistically significant difference was found in the frequency of falls between the examined groups ($\chi^2 = 3.270$; $p = 0.071$), as shown in Table 1. The majority of participants (51.7%) had experienced a fall in the last 12 months. Falls were more frequent in individuals with mild cognitive impairment (31.7%) compared to participants without cognitive impairment (20.0%).

Table 1. Fall Frequency

Have you had any falls in the last 12 months?					
Answer	Mild Cognitive Impairment (%)	No Cognitive Impairment (%)	Total (%)	X^2	p
Yes	19 (31.7)	12 (20.0)	31 (51.7)	3.270	0.071
No	11 (18.3)	18 (30.0)	29 (48.3)		

Table 2 shows the association between falls and vision and hearing problems. Although a large percentage of participants have vision problems, falls were not more frequent in this group. A higher percentage of participants who did not have vision problems had falls in the past 12 months (23.3%), but falls were more frequent among participants with hearing problems (16.7%). No statistically significant difference was observed between the groups.

Table 2. Association of Falls with Vision and Hearing Problems

		Have you had any falls in the last 12 months?				
	Anwer	**Yes (%)**	**No (%)**	**Total (%)**	**X^2**	**p**
Vision	Yes	12 (20.0)	14 (23.3)	26 (43.3)	0.558	0.455
Problems	No	19 (31.7)	15 (25.0)	34 (56.7)		
Hearing	Yes	10 (16.7)	9 (15.0)	19 (31.7)	0.100	0.919
Problems	No	21 (35.0)	20 (33.3)	41 (68.3)		

The time to complete the test was measured in seconds, with the average time for individuals with mild cognitive impairment being 21.7 seconds, while for individuals without cognitive impairment it was 22.2 seconds. The majority of participants (53.3%) were at high risk of falling, and using the Student's t-test to assess intergroup differences, no statistically significant difference was found (t = -0.461; p = 0.173) (Table 3).'

Table 3. Timed up and go test

	Timed up and go test		
Fall Risk	Mild Cognitive Impairment (%)	No Cognitive Impairment (%)	Total (%)
Low (<10 seconds)	0 (0.0)	0 (0.0)	0 (0.0)
Moderate(10-20 sec)	14 (23.3)	14 (23.3)	28 (46.7)
High (21-30 sec)	16 (26.7)	16 (26.7)	32 (53.3)
Very high (<30 sek)	0 (0.0)	0 (0.0)	0 (0.0)
AS*	21.70	22.20	
SD	3.76	4.60	
t-test	-0.461		
p	0.173		

*AS= arithmetic mean

To assess postural balance, the Modified Functional Reach Test was used. Individuals with mild cognitive impairment maintained stability on average up to 69.67 cm, while individuals without cognitive impairment maintained stability up to 67.93 cm. Testing of intergroup differences did not reveal statistically significant differences (Table 4).

Table 4. Modified Functional Reach Test

	Modified Functional Reach Test	
	Mild Cognitive Impairment (%)	No Cognitive Impairment (%)
N	30 (50.0%)	30 (50.0%)

AS*	69.67		67.93
SD	10.62		7.30
t-test		0.737	
p		0.071	

* AS= arithmetic mean

When assessing static postural balance, none of the participants were able to perform the one-leg stance test. The test was completed in 26.9 seconds by participants aged 60 to 69 years, and 18.3 seconds by participants aged 70 to 79 years. On average, individuals with cognitive impairment were able to stand on one leg for 4.20 seconds, while individuals without cognitive impairment stood for an average of 4.47 seconds. No statistically significant difference was observed between the groups ($t = -0.220$; $p = 0.619$), as shown in Table 5.

Table 5. One-Leg Stance Test

One-Leg Stance Test			
	Mild Cognitive Impairment (%)		No Cognitive Impairment (%)
N	30 (50.0%)		30 (50.0%)
Min	0		0
Max	18		14
AS*	4.20		4.47
SD	4.74		4.64
t-test		-0.220	
p		0.619	

* AS= arithmetic mean

Discussion

Falls in older adults represent a global public health problem. The incidence of falls and the severity of complications resulting from falls increase after the age of sixty. Falls are attributed to risk factors that lead to falling. Worldwide, the proportion of the population over the age of 80 was 14% in 2013, and it is expected to rise to 19% by 2050. If this percentage of the elderly population is reached, by 2050 there will be approximately 392 million people aged 80 and older on the planet [7].

For the purposes of this study, a total of 60 male participants were involved, of whom 30 were residents of the Public Institution for People with Disabilities in Prijedor, diagnosed with mild cognitive impairment, and 30 were residents of the Public Institution for Older Adults in Prijedor, without a diagnosis of cognitive impairment. A total of 53 participants belonged to the group of older adults, and 7 participants belonged to the group of elderly adults. The average age of the participants was 69.4 years.

Nursing homes for older adults have changed dramatically over the past few decades. These changes have been driven by regulations and consumer demands. Compared to nursing homes from past decades, today's facilities are highly regulated, high-quality, and sophisticated institutions for the care and treatment of older adults who have serious physical health problems or mental impairments. Typically, these

patients do not require full-time hospital care but need assistance with medications, dressing, mobility, and meal preparation. Care and residential facilities are important because they provide a positive quality of life for people who are aging or have physical and mental conditions [8].

A fall of a patient in a hospital or nursing home is considered an adverse event and is one of the indicators of patient safety and a quality indicator in the accreditation system. Approximately one-third of falls result in some form of injury of the patient, directly contributing to the reduction of healthcare quality along with various psychosocial and physical difficulties. For this reason, fall prevention is the responsibility of all healthcare workers, especially nurses and medical technicians. According to the World Health Organization (WHO), about 28-35% of individuals over the age of 65 experience a fall each year, and the frequency of falls increases with age. Among those over 70 years old, the fall rate increases to 32-42% [9]. This study found that 51.7% of participants had experienced a fall in the previous 12 months. Falls were more frequent among individuals with mild cognitive impairment (31.7%) compared to those without cognitive impairment (20%), but no statistically significant difference was observed between the groups. The results of our study are positively correlated with a study conducted in Serbia in 2014, where 55% of participants had experienced a fall [10].

Today, there are a number of tests available to assess the risk of falls, which are routinely used in healthcare settings. For the purposes of this study, the Sit-to-Stand test, the Modified Functional Reach test, and the One-Leg Stance test were used. Although falls were more frequent among individuals with mild cognitive impairment, the fall risk assessment did not show a statistically significant difference. Based on the Timed up and go test, the majority of participants (53.3%) were assessed as being at high risk for falls. A study conducted from 2008 to 2010 in Serbia and Bosnia and Herzegovina among adolescents with mild cognitive impairment and typically developing adolescents showed a statistically significant difference between these groups. It was found that individuals with mild cognitive impairment had a higher fall risk [11]. The reason for the differences observed in this study and our study may be found in the fact that our research involved participants in older age groups, unlike the other study, which included adolescents. With increasing age, the risk of falls increases, and it can be concluded that individuals with intellectual impairments are not at a greater risk for falls than those without intellectual impairments.

The Modified Functional Reach Test was performed to assess postural balance. The results show that individuals with mild cognitive impairment were able to maintain stability on average up to 69.67 cm, while individuals without cognitive impairment maintained stability up to 67.93 cm, with no statistically significant difference observed. The results of our study are positively correlated with the findings of studies by Leslie F. Taylor in the USA [12], Aija Klavina in Lithuania [13], and Cindy Adams in Texas [14], in which no statistically significant difference was observed between the groups when applying the Modified Functional Reach Test.

Based on the literature review and the results of this study, it has been observed that older adults are at high risk of falling. Special attention from society and healthcare

workers should be directed towards fall prevention and preventing complications arising as a result of falls.

Conclusion

Based on the set objectives, applied methodology, and analysis of the obtained research results, the following conclusions can be drawn:

1. Of the total number of participants, 53.3% were assessed as being at high risk for falls, while 46.7% were found to be at moderate risk. No statistically significant difference was found between the groups with and without cognitive impairment, leading to the conclusion that the presence of mild cognitive impairment does not increase the risk of falling in older age.
2. The frequency of falls among residents in geriatric institutions is high, with 51.7% of participants experiencing a fall in the past year. Falls were more frequent among individuals with mild cognitive impairment (31.7%) compared to those without cognitive impairment (20.0%).
3. Assessment of static balance revealed poor static balance among the participants. None of the participants was able to complete the one-leg stance test within the maximum time allotted for different age groups.

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PROCJENA RIZIKA OD PADOVA KOD STARIJIH OSOBA SA UMJERENOM MENTALNOM OMETENOŠĆU I BEZ MENTALNIH SMETNJI

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Sažetak. *Padovi su česti kod starijih osoba i utiču na mortalitet, morbiditet, gubitak funkcionalnog kapaciteta i institucionalizaciju. Preventivne strategije za smanjene rizika od pada obuhvataju: procjenu i ponovnu procjenu rizika od pada, vizuelno obilježavljanje pacijenata sa visokim rizikom, razgovor sa pacijentom o njegovom stepenu rizika za pad te edukacija pacijenata, članova njegove porodice i osoblja o preventivnim intervencijama. Osnovni cilj istraživanja je procijeniti rizik za pad kod osoba treće životne dobi sa umjerenom mentalnom ometenošću i osoba treće životne dobi bez mentalne ometenosti. Prospektivnom studijom je obuhvaćeno 60 ispitanika muškog pola, odabranih metodom namjernog uzorkovanja, koji borave u JU Dom za lica sa invaliditetom Prijedor i JU Dom za starija lica Prijedor. Primjenom testa Timed Up and Go vršena je procjena funkcionalne mobilnosti i rizika za pad, pri čemu je uočeno da je većina ispitanika (53,3%) u visokom riziku za pad pri čemu nije uočena statistički značajna razlika (t= -0,461; p=0,173). U cilju procjene dinamičke ravnoteže u jednostavnom zadatku, korišten je modifikovani Funkcionalni test dohvatanja na kom su osobe sa umjerenom mentalnom ometenošću u prosjeku stabilnost zadržavali do 69,67cm, a osobe bez mentalne ometenosti 67,93 cm (t=0,737; p=0,071). Prilikom procjene statičke posturalne ravnoteže i kontrole balansa ni jedan od ispitanika nije uspio uraditi Test stajanja na jednoj nozi (t= -0,220; p=0,619). U grupama ispitanika sa mentalnom ometenošću i bez mentalne ometenosti nisu dobijene statistički značajne razlike, te se zaključuje da prisustvo umjerene mentalne ometenosti ne povećava rizik od pada u trećoj životnoj dobi.*

Ključne riječi*: stare osobe, padovi, mentalna ometenost*