

Jankowska Paula, Jankowski Krzysztof, Rudnicka-Drożak Ewa. Elderly falls, multifactorial medical problem - how to assess the risk? *Journal of Education, Health and Sport*. 2018;8(9):61-68. eISSN 2391-8306. DOI <http://dx.doi.org/10.5281/zenodo.1326392>  
<http://ojs.ukw.edu.pl/index.php/johs/article/view/5758>

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part b item 1223 (26/01/2017).  
1223 *Journal of Education, Health and Sport* eissn 2391-8306 7

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The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 02.07.2018. Revised: 18.07.2018. Accepted: 02.08.2018.

## **Elderly falls, multifactorial medical problem - how to assess the risk?**

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**Key words: Aged, Falls, Risk**

### **ABSTRACT**

#### **Introduction**

Advanced age of a large part of society is associated with many health as well as social and economic consequences. Among them, disorders of mobility and falls of elderly have important place. The pathophysiology of falls among elderly is complex. It includes visual impairment, vestibular disorders, dementia, sarcopenia and use of many drugs. Screening for falls risk is essential part of everyday primary healthcare provider practice. Critical review of medications, management of chronic diseases may prevent falls. Apart from this, there are some professional functional assessment instruments available.

## Objective

The objective of this work is to present reasons of elderly falls and functional assessment instruments suitable to assess risk of falls.

## Results

Among analyzed instruments Timed Up-and-Go test, Elderly Fall Screening Test, Tinetti Performance Oriented Mobility and Berg Balance Test were chosen to be described, due to the best characteristics according to needs of primary care.

## Conclusion

Falls are important health problem in elderly. Frequently, falls result in serious injury and following disability. Consequences of elderly falls may be even fatal. Thus, healthcare providers should pay attention especially to modifiable risk factors of falls. Among them is polypharmacy and use of selected drug groups. The burden of coordination of patient treatment, critical review of administered drugs and systematic screening for increased falls risk lays on family doctors. The most suitable for primary healthcare setting instrument designed to address this aim, seems to Timed Up-and-Go test. Tools as Elderly Fall Screening Test, Tinetti Performance Oriented Mobility and Berg Balance Test can be used as well.

## INTRODUCTION

The aging of societies is pivotal problem of the modern world. Advanced age of a large part of society is associated with many health as well as social and economic consequences. As seniors are significantly more often using healthcare services, it seems to be essential to identify the specificity of their health problems. Among them, disorders of mobility and falls

of elderly have important place. When a fall can be stated? WHO defines it as an event in the result of which a person accidentally found himself on the ground, floor or other lower level. The range of this problem is severe. It is estimated that during the year, about 30% of people aged over 65 years and more than 40%-50% aged 80 years or more, living in their own homes, experience a fall [1, 2, 3]. Among the institutionalized elderly, the incidence of falls is even higher.

#### Reasons and risk factors

The pathophysiology of falls among elderly is complex. Frequently, in individuals without any other clinical problems, falls may serve as the only signal to the practitioner of a deterioration of general health status for an acute disorder or a worsening of a chronic disease [4].

One of the risk falls risk factors is visual impairment. Improper assessment of distance due to lack of binocular vision. The reasons of vision problems in elderly include macular degeneration, cataracts, glaucoma or simply lack of proper correction [5].

Moreover, functioning of vestibular and proprioceptive systems and hearing sense seem to be among most apparent risk factors of falls. Depth perception providing spatial orientation also plays pivotal role in maintaining postural stability and avoiding a fall [4].

Further, central nervous system problems have crucial impact on falls risk. Reduced cerebral blood flow due to postural hypotension, often met in elderly [6], discopathic changes in the cervical spine and atherosclerotic lesions may result in vitiligo and elevated risk of falls. Such conditions as stroke, neurodegenerative diseases and dementia produce higher danger of falls as well.

Balance problems and lower extremity weakness [1] and any other problems with locomotor system such as previous fractures, sarcopenia, osteoarthritis contribute to fall opportunity elevation.

Multimorbidity and wide use of drugs (also associated polypharmacy) are thought to be one of the most common, and the same time, potentially reversible risk factors for falls in the elderly [7]. Use of more than 3-4 any medications generate severe risk of falls [8]. Use of

hypoglycemic agents, sedatives, hypnotics, antidepressants, anxiolytics, diuretics anticonvulsants is also associated with higher rates of falls [9].

Furthermore, patients' everyday environment may influence on probability of falls. There is some evidence that wet, slippery floors, improper lighting [10], uncomfortable footwear, cables, carpets on the floor, high curbs, damaged ground surfaces and lack handles on the way of transport may increase that risk.

The consequences of falls in elderly may be even fatal. Falls result, in over 50% of cases, in trauma leading to hospitalization [11]. One of the most common is hip fracture. It has very serious consequences either for patients or the whole society. Half of the patients lose their ability to walk and requires lying in bed. Then, those patients may experience typical complications of long-term staying in a lying position, like pressure ulcers, deep vein thrombosis, pulmonary embolism or urinary/pulmonary infection, often leading to death [12]. However, if the course of the disease is more successful, other problems may arise. Patients who have once experienced a fall, feel the fear of another fall and significantly limit their activity, to minimize the risk of an accident [13]. Reduction in physical activity negatively affects functional efficiency and lack of socialization is associated with deterioration of sanity. In addition, it is postulated that the fear of falling along with limiting daily activity is a factor increasing the risk of subsequent falls [14]. Social consequences of elderly falls are connected with expenses on the treatment of people affected. Costs are mainly related with surgical treatment of hip fractures, managing this patient after discharge from the hospital (cost is even higher than surgery) [15] and hospitalization due to persistent lying position complications.

Thus, physician's procedure should include a thorough physical examination and an interview, with particular attention to above mentioned diseases, a review of taken medications and an attempt to reduce number of drugs, instructing the patient about the safety rules in his environment and an indispensable assessment of the fall risk with the use of appropriate tools to reduce as much as possible danger of falls by early intervention.

## OBJECTIVE

The objective of this work is to present reasons of elderly falls and functional assessment instruments suitable to assess risk of falls.

## RESULTS

### Timed Up-and-Go test (TUGT) [16]

Simple test used to assess a person's mobility and requires both static and dynamic balance. Suitable for outpatient settings [17], hence primary care environment, as well. The main advantages are extremely short time of application – assessed as shorter than 1 minute and simplicity. This tool is characterized by 87 % sensitivity and 87% specificity [17] and good correlation with functional skills. The test starts with patient sitting in a chair with arms. Then the individual is asked to stand up and walk 3 meters, turn around, go back, and sit down on the same chair. The elderly is allowed to use everyday walking aid and should wear normal footwear. The cutoff levels for TUGT is 14 seconds.

### Elderly Fall Screening Test (EFST) [18]

This is a longer (it takes about 17 minutes to perform), five-item screening tool. EFST is still assessed as suitable for outpatient clinic environment and nursing home as well. The sensitivity is 93% and specificity – 78% [17]. It allows analysis of falls history (number of falls, their frequency and following injuries). Walking disorders walking pace (low pace, less than 30 meters per minute allows to give point) are likewise evaluated.

### Tinetti Performance Oriented Mobility (POMA) [19]

This instrument can be used both in inpatient and outpatient setting. The patient is asked to perform 16 simple tasks, (9 assessing balance – among others: sitting, rising from chair, nudging probe, turning 360 degrees, sitting down, and 7 assessing gait – among others length and high of step, foot clearance, walking time) and scores 0, 1 or 2 points depending on the degree of abnormality. The test performance takes about 20 minutes and the sensitivity is 80% and specificity – 74% [17].

### Berg Balance Test [20]

This instrument is relatively similar to POMA test, but has higher specificity (86%) and lower sensitivity (77%). Its performance takes about 15 minutes [17]. It includes 14 items (maximum 4 points for each), assessing gait, balance and functional mobility (retrieving object from floor, placing alternate foot on stool). A score in the range of 21-40 indicates for

medium fall risk, and 0-20 high fall risk. It is suitable to use in outpatient environment and especially in patients after cerebrovascular accident.

## CONCLUSIONS

Falls are common in the elderly and constitute an important health problem in this age group. Frequently, falls result in serious injury and following disability. Consequences of elderly falls may be even fatal, due to chronic complications. Falls and their results significantly reduce quality of survivors life, leading to social exclusion, dependence and institutionalization. Thus, healthcare providers should pay attention especially to modifiable risk factors of falls. Among them is polypharmacy and use of selected drug groups. The burden of coordination of patient treatment, critical review of administered drugs and systematic screening for increased falls risk lays on primary health providers. There are many instruments available to evaluate falls risk. Although the best tool are characterized by high sensitivity, specificity and short time of application. All this conditions are fulfilled by Timed Up-and-Go test. Further, Elderly Fall Screening Test, Tinetti Performance Oriented Mobility and Berg Balance Test are suitable for primary healthcare setting.

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