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Original research article

The risk of falling among older adults in long-term care: screening by the Morse Fall Scale

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ABSTRACT

Aim: To identify the incidence of key fall risk factors in groups of older adults in long-term care facilities and to find out which factors can be identified by the Morse Fall Scale (MFS) as significant in relation to high fall risks. Fall risk screening is the basis for efficient intervention planning. MFS is often recommended for fall risk detection even in long-term care settings. No tool for the prediction of fall risks has been tested in Slovakia so far.

Methods: The design of this study is descriptive and correlated. Fall risk factors and fall risk screening (according to MFS) were assessed in 89 older adults in two long-term care facilities. The data were collected from July to October 2016.

Results: The majority of monitored risk factors had a high incidence in the sample. The authors identified that a strong predictor of a fall is mainly the presence of a fall in the patient's clinical history. Statistically significant correlations were found between a history of falling, disorder of the gait and balance, use of ambulatory aids, mental disorder, falling during the study and a high fall risk according to MFS.

Conclusion: This tool provides nurses with the information on the level of fall risk and specific risk factors. It also enables targeted planning of preventive and protective interventions. Despite the clinical efficiency of the tool it is still important to continue testing the prediction value of the tool in different areas of nursing practice in Slovakia.

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Introduction

In older adults, falls are a great health problem in terms of public health. This geriatric syndrome reflects the reduction of functional reserve capacity, which results in vulnerability coupled with accident, impairment, active disease process,

adverse pharmacological stimulus or any combination of these. It is estimated that 30% of people over 65, and 50% of people over 80 experience a fall at least once a year [1]. Falls in long-term care facilities (LTC) are three times more common than in the community of seniors, with roughly 50% of older adults in LTC falling every year, and 40% of these falling multiple times. Falls contribute to the

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admission of an older adult to a hospital or a LTC facility, and the occurrence of falls in this new environment may double [2, 3]. The consequences of falls include distress, fear of falling, pain, injury, loss of confidence, loss of independence, functional decline, reduced quality of life, increased health care expenses, and mortality. Fear of falling may even develop in those older adults who have not experienced a fall. This syndrome appears to be more frequently associated with women and with advancing age, and it can affect gait and balance. It reduces their participation in activities and has a cumulative effect on mobility and dependency. Significant injuries occur in 4–15% of falls. Mortal injuries as a result of a fall occur in 23–40% [1, 4–6].

There is evidence that shows that many falls are preventable if a complete set of risk factors is known. The aetiology of falls is multifactorial, and literary sources describe tens of different fall risk factors, both internal and external. The identification of individual factors that can be influenced enables the choosing of targeted interventions and incorporating them into the patient care plan. Some of the most important and easily identifiable risk factors in older adults are older age (over 80 years), female gender, physical frailty, a history of falls, chronic diseases (cardiovascular, neurological, musculoskeletal system), polymorbidity, risk medication and/or its side effects, decreased physical and cognitive capacity, muscle weakness, unsteady gait and balance, use of ambulatory aids, impaired vision, hearing, urinary incontinence and environmental risks [2, 3, 5–12]. Falls are multicausal and risk factors combine in different ways in older adults. They also change depending on the changes in health status. This is why multifactorial assessment is emphasized. In order to identify fall risks and risk factors, it is necessary to introduce a system of standardized fall risk assessment as a part of a preventive programme in a facility [5, 8, 13, 14].

An important strategy in fall prevention and fall monitoring is the identification of individual risk factors that can be influenced and the identification of high fall risk individuals in order to choose and apply those preventive interventions that can significantly reduce the number of falls and minimize costs in those individuals who do not need these interventions [11, 15, 16]. The methodology of risk assessment places an emphasis on the identification of key risk factors using different methods, such as fall risk screening with a measuring tool, or in-depth clinical and functional examination of a specific risk. Fall risk screening is an efficient method of identifying fall risks. Clinical recommendations and systematic reviews provide evidence of the efficacy of using a measuring tool [3, 5, 10, 17, 18]. The tool may be formulated on the basis of a simple list of risk factors or may be multidimensional depending on the characteristics of the setting and the patient group. Choosing an adequate tool requires careful assessment in order to find the most suitable one for a specific facility. A universal tool does not exist, but one of the most frequently tested and most recommended tools for initial fall risk assessment is the Morse Fall Scale – MFS [3, 10, 14, 19, 20]. Fall prevention is considered a part of a health care professional's responsibility, and an efficient clinical tool

for prevention is the key to solving the problem at hand [21]. The results of this pilot study can be used as the basis of information for fall risk screening in older adults. It can also be implemented into care to improve its quality and safety.

Aim of study

The aim of the study was to identify the incidence of key fall risk factors in a group of older adults in an LTC facility, and to find out which risk factors can be identified as significant in relation to high fall risks using MFS (MFS score ≥ 45).

Materials and methods

This study was a descriptive, correlated study. The study was conducted in 2 local LTC settings in the city of Martin in Slovakia. The data were collected from July to October 2016. All residents of the facility were included in the study. The overall number of participants included in the study was 97. During the study 7 seniors exited, 1 senior returned to home care, and so the final number of participants was 89 (100%).

Data collection

The fall risk inventory designed by the authors included the major intrinsic fall risk factors of older adults and the Morse Fall Scale (MFS) screening tool.

The list of fall risk factors included the following items: gender, age, primary medical diagnosis, number of all diagnoses ≥ 4 (polymorbidity), number of prescribed medications – indication groups ≥ 4 (polypharmacy), the number of drugs used during in 24 h, history of falling, disorder of gait and balance, the use of ambulatory aids, impaired vision, impaired hearing, continence, and sleeping and mental disorders. The presence of disorders and illnesses, objectively diagnosed by the physician was determined by analyzing the subjects' medical files. Some of the risk factors in the list were also present as items in MFS (Table 1).

The MFS is a rating scale for screening fall risks and consists of 6 items: 1. History of falling (immediate history or within 3 months) (no 0, yes 25); 2. Presence of a secondary diagnosis (no 0, yes 15), a secondary diagnosis was coded if the patient had more than one medical diagnosis in his or her patient's chart; 3. Use of an ambulatory aid: none/bed rest/nurse's assistance (0), crutches/cane/walker (15), furniture for support (30); 4. Intravenous therapy/saline lock (no 0, yes 20); 5. Type of gait: normal/bed rest/wheelchair (0), weak (10), impaired (20); 6. Mental status: oriented to own ability (0), overestimates ability or forgets limitations (15). The final possible score range was between 0 and 125, a low fall risk level is rated at ≤ 20 , moderate 25–44, and high ≥ 45 [22]. The cut-off score ≥ 45 identifies patients with a high fall risk, which then initiates the selection of preventive interventions in order to reduce the

Table 1 – Risk factors in the sample (N = 89)

Variable	N (%)	MFS score 0–44 N (%)	MFS score 45–125 N (%)	p
<i>Gender</i>				0.618 ^b
Male	17 (19.1)	12 (17.9)	5 (22.7)	
Female	72 (80.9)	55 (82.1)	17 (77.3)	
<i>Age (year) (M ± SD)</i>	82.8 ± 5.9	82.8 ± 6.0	82.9 ± 5.8	0.760 ^c
65–74	10 (11.2)	7 (10.5)	3 (13.6)	
>74	79 (88.8)	60 (89.5)	19 (86.4)	
<i>Primary medical diagnosis</i>				0.104 ^b
Cardiovascular	19 (21.4)	13 (19.7)	6 (27.1)	
Respiratory	6 (6.7)	6 (8.9)	0 (0.0)	
Musculoskeletal	4 (4.5)	4 (5.9)	0 (0.0)	
Digestive	1 (1.1)	0 (0.0)	1 (4.6)	
Endocrine/metabolic	12 (13.5)	9 (13.4)	3 (13.7)	
Genitourinary	7 (7.8)	7 (10.5)	0 (0.0)	
Neurological	20 (22.5)	15 (22.4)	5 (22.7)	
Psychiatric	13 (14.6)	8 (11.9)	5 (22.7)	
Hematologic	1 (1.1)	1 (1.5)	0 (0.0)	
Osteoporosis	4 (4.5)	2 (2.9)	2 (9.2)	
Others	2 (2.3)	2 (2.9)	0 (0.0)	
<i>Number of diagnoses ≥4^a</i>				0.313 ^b
No	3 (3.4)	3 (4.5)	0 (0.0)	
Yes	86 (96.6)	64 (95.5)	22 (100.0)	
<i>Medications ≥4</i>				0.681 ^b
No	10 (11.2)	7 (10.5)	3 (13.6)	
Yes	79 (88.8)	60 (89.5)	19 (86.4)	
<i>Number of drugs/24 hours (M ± SD)</i>	13.1 ± 6.2	13.1 ± 6.5	13.0 ± 5.1	0.853 ^c
Male	12.3 ± 6.4			
Female	13.3 ± 6.1			
<i>History of falling^a</i>				0.000^b
No	82 (92.1)	66 (98.5)	16 (72.7)	
Yes	7 (7.9)	1 (1.5)	6 (27.3)	
<i>Gait and balance – disorder^a</i>				0.033^b
No	12 (13.5)	12 (17.9)	0 (0.0)	
Yes	77 (86.5)	55 (82.1)	22 (100.0)	
<i>Ambulatory aids^a</i>				0.022^b
No	39 (43.8)	34 (50.8)	5 (22.7)	
Yes	50 (56.2)	33 (49.2)	17 (77.3)	
<i>Vision – disorder</i>				0.855 ^b
No	9 (10.1)	7 (10.4)	2 (9.1)	
Yes	80 (89.9)	60 (89.6)	20 (90.9)	
<i>Hearing – disorder</i>				0.667 ^b
No	44 (49.4)	34 (50.8)	10 (45.5)	
Yes	45 (50.6)	33 (49.2)	12 (54.5)	
<i>Continence – disorder</i>				0.564 ^b
No	1 (1.1)	1 (1.5)	0 (0.0)	
Yes	88 (98.9)	66 (98.5)	22 (100.0)	
<i>Sleeping – disorder</i>				0.051 ^b
No	56 (62.9)	46 (68.7)	10 (45.5)	
Yes	33 (37.1)	21 (31.3)	12 (54.5)	
<i>Mental status – disorder^a</i>				0.001^b
No	26 (29.2)	26 (38.8)	0 (0.0)	
Yes	63 (70.8)	41 (61.2)	22 (100.0)	
<i>Fall during study</i>				0.001^b
No	81 (91.1)	65 (97.0)	16 (72.7)	
Yes	8 (8.9)	2 (3.0)	6 (27.3)	

^a Fall risk factor and at the same time an item in MFS.^b Pearson's chi-squared test (χ^2).^c Mann–Whitney test.

fall risk. Staff nurses can use this tool to identify fall risk factors in older adults. The MFS was used in its original version, without modification.

One supervisor researcher and one trained nurse working in the LTC facility carried out the data collection. At the beginning of the study, in July 2016, each participant's input risk factors were recorded and a fall risk screening according to MFS was carried out. In the following months, only the fall risk screening was repeated. The overall fall risk score for the whole sample, gender and age was then calculated using data from 4 MFS screenings (July, August, September, and October).

Throughout the study, with the exception of the assessment of fall risks, the number of falls in the sample was being recorded. For the purposes of this study, the authors used the following definition of a fall: Unintentionally coming to rest on the ground, floor or other lower level, regardless of whether the faller is injured or not [3]. Falls count as a fall if the person was trying to get out of bed to walk when the fall occurred, or if the patient was being transferred from a wheelchair to a bed [22].

Data analysis

The results were processed in the table processor MS Excel. The demographic and clinical characteristics of the subjects were analyzed through descriptive statistics such as frequencies (*N*), percentages (%), arithmetic mean (*M*), standard deviation (*SD*), and minimal (Min.) and maximal (Max.) values. The differences between cut-off subgroups (MFS score 0–44 and 45–125) were analyzed using Pearson's chi-square test (χ^2). The distribution of values of continuous variables (age and number of medications) in cut-off subgroups of MFS was tested using the Mann–Whitney (*M–W*) test. All data were analyzed using the statistical package SPSS for Windows (version 16.0). During analyses, a *p*-value <0.05 indicated statistical significance.

Results

Subjects' characteristics

In the sample of 89, there was a prevalence of older adult women (80.9%). The average age of the sample was 82.8 ± 5.9 (min. 70, max. 95). The majority of respondents (88.8%) were of advanced age (>74 years old). Among the medical diagnoses recorded, the most common were neurological (22.5%), cardiovascular (21.4%), psychiatric (14.6%), and endocrine and metabolic (13.5%) disorders. As many as 96.6% of the older adults were polymorbid. The study recorded a strong presence of continence disorders (98.9%), visual impairment (89.9%), disorders of gait and balance (86.5%), mental status disorders (70.8%), use of ambulatory aids (56.2%), and hearing disorders (50.6%). More than 88.8% of seniors used ≥ 4 indication drug groups. The average number of drugs taken in 24 h was 13.1 ± 6.2 (min. 3, max. 31). Women used more medication (13.3 ± 6.1 , min. 3, max. 31) than men (12.3 ± 6.4 , min. 3,

max. 25). A statistically significant correlation was found between the following variables: history of falling ($p = 0.000$), disorder of gait and balance ($p = 0.033$), use of ambulatory aids ($p = 0.022$), mental disorder ($p = 0.001$), falling during the study ($p = 0.001$), and a high fall risk (Table 1).

MFS score

Women achieved a higher average MFS fall risk score (36.6 ± 17.0), as did older adults in the younger age group (38.3 ± 10.5). The average MFS fall risk score in the whole sample calculated from 4 measurements was 35.4 ± 15.9 , and therefore at medium fall risk level (Table 2). Low fall risk was identified in 23 older adults (25.8%), medium fall risk was identified in 44 older adults (49.5%), and 22 faced high fall risk (24.7%).

Table 2 – MFS score in sample (*N* = 89)

MFS score	<i>M</i> ± <i>SD</i> (Min., Max.)
<i>Gender</i>	
Male (<i>N</i> = 17)	33.8 ± 18.3 (15–75)
Female (<i>N</i> = 72)	36.6 ± 17.0 (15–105)
<i>Age (year)</i>	
65–74 (<i>N</i> = 10)	38.3 ± 10.5 (15–50)
>74 (<i>N</i> = 79)	35.1 ± 16.5 (15–86.3)
<i>Screening</i>	
First	35.0 ± 15.3 (15–80)
Second	35.3 ± 15.8 (15–80)
Third	35.3 ± 15.8 (15–80)
Fourth	36.1 ± 17.2 (15–105)
Mean	35.4 ± 15.9 (15–86.3)

Falls in the sample

Only 7 participants (7.9%) had a history of falls in their anamnesis. During the study, 8 participants (8.9%) fell – 7 women and 1 man, of which 1 had a low fall risk (after the fall, the fall risk was classified as medium), 3 had a medium fall risk (after the fall, the fall risk was classified as high), and 4 had a high fall risk (after the fall, the fall risk remained high). Falls occurred while walking in the corridors and while getting out of bed. Those adults who experienced a fall showed the typical characteristics of a geriatric patient – vulnerability and frailty. After the fall, the fall had no consequences for 2 participants, 3 had mild injuries (bruises, abrasions), and 3 had serious injuries (pelvic bone fracture, cervical vertebra fracture). The risk factors and the MFS fall risk score (before and after the fall) for this group is indicated in Table 3.

Discussion

As a member state of the European Union, the recommendations of the European Commission are obligatory for the Slovak Republic [23, 24]. Based on these recommendations, the country should prepare a national policy on patient safety and implement it as a priority

Table 3 – Risk factors and MFS scores – older adults who fell

Participant	1	2	3	4	5	6	7	8
Gender	F	F	F	F	F	F	F	M
Age	70	89	88	76	86	82	92	85
Primary medical diagnosis	Neu	Psych	CV	Neu	CV	Psych	Neu	Psych
Number of diagnoses $\geq 4^a$	Y	Y	Y	Y	Y	Y	Y	Y
Medications ≥ 4	Y	Y	–	Y	–	–	–	–
Number of drugs/24 hours	12	20	13	17	16	15	14	8
History of falling ^a	Y	Y	Y	Y	Y	–	Y	Y
Gait and balance – disorder ^a	Y	Y	Y	Y	Y	–	Y	Y
Ambulatory aids ^a	–	–	Y	Y	–	–	–	Y
Vision disorder	Y	Y	Y	Y	Y	Y	Y	Y
Hearing disorder	–	Y	–	Y	–	–	Y	Y
Continence – disorder	Y	Y	Y	Y	Y	Y	Y	Y
Sleeping – disorder	Y	Y	–	–	Y	–	–	–
Mental status – disorder ^a	Y	Y	Y	Y	Y	Y	Y	Y
MFS before the fall	40/40	80/80/80	40/40/40	55/55	65/65	15/15/15	40/40/40	50
MFS after the fall	55/55	105	65	55/55	55/55	40	55	75/75/75

F, female; M, male; Neu, neurological; Psy, psychiatric; CV, cardiovascular; Y, yes; N, no; ^a fall risk factor and at the same time an item in MFS.

in its health care system. Currently, safety standards and protocols are also being prepared and gradually implemented in the area of falls using the experience of the developed countries of the European Union. In 2014, the Health Care Surveillance Authority in Slovakia [25] issued a methodical guide focused on the implementation of a system for reporting errors, mistakes and unexpected undesirable events in institutional care as a minimal requirement for the implementation of an internal quality assessment system and the safety of health services provided.

However, the area of falls is not systematically resolved. A fall is not a monitored indicator in health care quality [26], and falls are recorded rather for the internal needs of the management of the facility. Therefore, national data on the number of falls in acute health care facilities and LTC facilities are not available. The methodical guide [25] on reporting a fall as unexpected undesirable events contains the same instructions for all types of facilities, regardless of the specific nature of each workplace. This is why the facilities prepare their own modified fall incident reports. These reports, however, are filled out after a fall occurs and has been reported to a physician. A major risk factor assessment is not a common part of nursing anamnesis after admitting an individual into a LTC facility. Furthermore, there is a lack of a unified definition of a fall, a lack of risk assessment methodology and a lack of an adequate measuring tool. A complex fall prevention and monitoring programme is absent, as is a national nursing standard. In the facilities where this study was conducted, preventive interventions mainly focus on safety environment, ambulatory aids, supervision for residents with impaired mobility, bed equipment (low position, side rails, objects within reach), and medication control (done by the physician).

The majority of falls can be foreseen as they are related to specific risk factors. The prevalence of women, the participants' average age and the high incidence of risk factors in the sample confirm the demographic changes in an ageing Slovak population and its negative health indicators. Population ageing is one of the most serious consequences of both the current and estimated demographic development in Slovakia, and it will bring about several serious changes. The Slovakian Society must therefore prepare itself for the growth of the share of older adults. Estimates of the growth rate of public investment into health care in correlation with demographics are based on the assumption that half of the years of a longer life expectancy will be spent in poorer health, which will increase the demand for health services, especially in the area of LTC for older adults [27–29]. The occurrence of risk factors in the sample of older adults evidence that their presence and combination increases older people's frailty and leads to their disability. In this sample, the majority of monitored risk factors – female gender, advanced age, polymorbidity followed by pharmacotherapy, disorders of gait and the usage of ambulatory aids, visual impairment, hearing impairment, continence and mental disorders were found to have a high incidence (from 50.6% to 98.9%). In the epidemiology of falls, the main internal factors are normal age-related changes, concurrent diseases, and impairment in the neurological, musculoskeletal, sensory, and cardiovascular systems, and cognitive changes within the weakening homeostatic and adaptive mechanisms. Gender and age were not found to be significant in relation to high fall risk in the sample, but female gender is widely reported in the literature as being associated with an increased risk of falls in older age in many countries [11], and this was also found in the sample of this study. Women suffer more injuries related to falls and greater

disability than men, which is presumably caused by the differences in bone density of elderly men and women, and by the higher mortality of men. Advanced age (80+ years) and reporting two or more chronic conditions were highly significant in association with disability and frailty [7, 30]. Polymorbidity is predictive of polypharmacy. In terms of the groups of risk medications, the adults in the studied sample used mainly antihypertensives (98%), anticoagulants (75%), analgesics (47%), antiarrhythmics (38%), hypnotics (35%), diuretics (31%), antipsychotics (25%), and antidepressants (24%) in various combinations. These types of medication are often implicated in the occurrence of falls among LTC residents [16]. Among the population taking these medications, side effects can also result in falls. The combination of balance instability, taking 4 or more medications, and hip joint weakness is 100% predictive of falls risk [3, 6, 12]. The risk of falling grows due to mental health problems, such as impaired mental status due to cognitive impairment, dementia, depression, mania and anxiety [31]. The presence of these disorders in the sample was high (70.8%). However, it is important to know that each fall may have its own aetiology and that the majority of falls are multicausal, and only rarely are the causes reversible. Despite this fact, solving only one of the causes may have a partial positive influence on the quality of life of an older adult [32]. Falls result from a complex interaction of risk factors. As the number of risk factors increases, there is a dramatic increase in the risk of falling and injury. While each identified fall risk factor has its own relative risk, overall fall risk also increases linearly as the number of risk factors increase. The risk of falling among older adults increases from 8% in those without any fall risk factors to 78% in those older adults who have four or more identified fall risk factors. Therefore, it is important to assess older adults for a variety of risk factors to achieve a more comprehensive understanding of their overall risk of falling [3, 33].

The number of risk factors has led to the creation of different measuring tools, which complicates their efficient use in nursing practice. The assessment of fall risk typically involves either the use of multifactorial assessment tools (MAT) that cover a wide range of fall-risk factors, or functional mobility assessments (FMA) that typically focus on the physiological and functional domains of postural stability, including strength, balance and gait. Some tools exist purely as a mechanism to screen for high-risk populations, while others allow for the tailoring of intervention based on assessment. The MAT typically consists of a checklist comprising questions used to screen the level and the nature of risk based on a combined score of multiple factors known to be associated with fall-related risk. These include factors such as psychological status, mobility dysfunction, present illnesses, sensory deficits, medication use and a history of falling. MFS also belongs to the MAT tools group [34]. A clinically useful predictive tool should be simple to use, and should have a limited number of items; it should not require specialized assessment, technology or skills, and should be consistent for the target group. Furthermore, it should be based on scientific score testing, with solid inter-rater reliability, and high staff adherence [35, 36]. While there

is no gold standard, the MFS is one of the most tested and recommended tools for the initial assessment of fall risk in clinical practice. In 1989, Janice M. Morse developed and tested the MFS for identifying patients at a high risk of anticipated physiological falls, comprising approximately 78% of all falls. Based on the testing of physiological and environmental variables in acute and long-term geriatric and rehabilitation care, Morse identified six significant fall risk factors. During the testing in the original study, the cut-off ≥ 45 was as relatively high sensitivity (78%), specificity (83%), and inter-rater reliability ($r = 0.96$). Longitudinal evaluation has shown that MFS is a valid predictor of a patient's fall. Up to 82.9% of nurses rated the MFS from the perspective of administration as "quick and easy to use", with a maximum time burden of 3 min, and 63% of the nurses stated that they would like to have the MFS permanently included in nursing assessments [37, 38].

In the list of risk factors in this study (the number of monitored risk factors was 14), 5 of the monitored risk factors were also items in MFS, of which 4 were found to be significant factors of high fall risk in the sample. Among them are the following: a history of falling ($p = 0.000$), a disorder of gait and balance ($p = 0.033$), the use of ambulatory aids ($p = 0.022$), and a mental disorder ($p = 0.001$). During the administration of MFS, the recommended cut-off ≥ 45 was kept [22]. The average fall risk score in the sample was 35, which indicates that it is necessary to further test MFS in LTC facilities and to look for an optimal cut-off. Morse states that in LTC a high fall risk may be under a cut-off score of 45 [22], despite the fact that the health status of an older adult in LTC is relatively stable and may not significantly change for a longer period of time. However, the MFS score is sensitive to changes in the patient's health state and level of physical disability, because it is the result of the variability of different combinations of answers. For example, the score rapidly grows after items 1 (score +25) and 3 (score +30) are answered affirmatively. In contrast, in the case of an immobile bedridden older adult, items 3 and 5 are scored with a zero, while other items may be answered affirmatively, which elevates the fall risk to medium or high. After a fall, the individual or the staff implements restrictive measures. These often have the opposite effect as they lead to the deterioration of the physical condition, which again in turn increases the risk of falling [3].

All of the participants in the studied sample who had a history of falling suffered a fall during the study. This item is a strong predictor of falls, and a person's fall history should be routinely evaluated on the day of their admission to LTC, because every resident is at risk of falls [1, 3]. The total score may be used to predict future falls, but it is more important to identify risk factors using the scale and then to plan care to address those risk factors. Morse suggests a cut-off score of 45 as the lowest for high fall risk, and the best for analysis. However, she notes that ideally it should be calibrated for each particular health care setting in order to facilitate the targeted planning of fall prevention strategies to those most at risk. In testing for the best predictive values of the MFS in various clinical environments, a cut-off of between 25 and a maximum of 55 is recommended by Morse. The prediction value of MFS

changes depending on many factors (such as tested cut-off value, type of setting, size and age of the sample, individual patient factors, assessment frequency) and that is why this tool needs to be tested in the same setting at which it is intended to be used [13, 22, 39–41].

The result of the assessment using a measuring tool is the basis for the selection and implementation of single and multifactorial interventions [5], but it should never replace judgement and clinical and functional examination. Predictive tools based on a small number of variables could be preferable, as their administration is generally shorter and easier. However, after fall risk screening it is often necessary to further evaluate the identified risk factor so that the prediction can be accurate [42]. For example, in the cases of gait and mobility disorders it is recommended to use the Tinetti Gait & Balance test (The performance-oriented mobility assessment), Berg Balance Scale, Timed Up and Go Test or Dynamic Gait Index [6, 9, 43].

The assessment of medication history, cognition, strength, and balance, nutrition, medications and environmental hazards requires a multidisciplinary approach [3]. Implementing multiple assessments to detect various fall risk factors may be difficult because of the cost associated with the instrumentation or administration of multiple assessments, staff limitations (this assessment should be performed by a health care professional with appropriate skills and experience), or the inability to devote the necessary time required to perform each of the tests individually [1, 33]. Quick screening procedures or risk scales are not sufficient for LTC settings, but MFS is considered a good example of quick screening for sorting residents into “high risk” or “low risk” categories [3].

Certain tools for further assessment of specific risks have already been established as part of geriatric comprehensive assessments in Slovak (mainly geriatric) health care. These are for example, the Tinetti Gait & Balance test, Timed Up and Go Test, Mini Mental State Examination, and the Geriatric Depression Scale. The implementation of a simple tool for fall risk screening would help to objectify the overall fall risk [42]. The results of this study showed the presence of key factors among very old adults in the two LTC facilities. These key factors may be quickly predicted using MFS after admitting an older adult. The tool fulfils all the criteria for clinical use when the conditions for its administration and training are met. This is why MFS is an efficient tool for use in LTC facilities. Based on the findings of the study, it is also necessary to support evidence-based practice in Slovak nursing practice. Among the best identifiable obstacles of “good practice” are, for example, an inadequate assessment of fall risk, communication failures, lack of adherence to protocols and safety practices, inadequate supervision, staffing levels or skill mix, LTC facility staff workload and a lack of adequate educational sources [3, 8, 19, 44]. Given that nurses have the competency to assess fall risks, it is necessary to initiate national validation studies of risk assessment tools and education and training of personnel on the issue of falls [10, 45]. The influence of education on fall risks and their reduction is greater on staff in LTC settings than

on adults in community settings, even though education alone does not diminish the fall risk [6]. Implications for further research and practice require support and cooperation between the national educational and health institutions in order to comply with the recommendations of the European Commission.

The study has certain limitations. The study was only conducted within two LTC facilities in Martin over a short time period of 4 months. Only intrinsic fall risk factors were monitored, not extrinsic – environmental. The context of the fall (location, timing, and injury) and the following interventions were not monitored. Given the relatively small sample size and the prevalence of females, the results cannot be generalized. Further testing in a larger population of older adults is needed. This partial study is part of a three-year academic project, which will be finalized in 2018.

Conclusion

In conclusion, fall risk assessment is the first indispensable step in detecting specific fall risks in order to select an efficient preventive strategy. A short screening tool such as MFS will provide the nurse with the information not only about the level of fall risk, but also about the specific individual risk of using the items within the tool. It is not sufficient to divide older adults in a facility according to their level of fall risk, but it is also important to continue working with this information and individualize preventive and protective interventions as well as the care plan according to specific risk factors. MFS, which was tested in various foreign research studies and various settings, shows different prediction values, which is why it is necessary to find an optimal cut-off point and validate MFS in the Slovak context for the needs of different facilities.

Ethical aspects and conflict of interest

The study is a partial component of an academic project of the Department of Nursing at the Jessenius Faculty of Medicine in Martin, which is focused on the topic of falls in nursing practice. The research protocol was approved by the Ethics committee of the University hospital in Martin (dated 30. 6. 2016). The author of MFS, J. M. Morse, gave her permission for the translation and use of the tool in the Slovak context. The MFS was translated using a back-translation approach (done by two independent nurses, and the differences in the translation were discussed and a consensus reached). The management of both long-term settings was informed of the purposes of the study and agreed with its realization. The participants were informed of the purpose of the research, and all participants were asked for their informed consent. Anonymous data collection forms with no names or identification numbers were used to prevent a breach of confidentiality. The authors have no conflict of interest to declare.

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