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RETROSPECTIVE ANALYSIS OF PATIENT FALLS AS A BASIS FOR EVIDENCE-BASED PRACTICE

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Abstract

Aims: The aim of this work was to perform a five-year retrospective analysis of patient falls at the Regional University Hospital, as a basis for preventive programme implementation based on the evidence-based practice.

Methods: The obtained data were processed by quantitative research methods. Descriptive statistics were obtained from patient fall report forms that were completed mandatorily over a five-year period. In the next phase, data correlation was performed, and areas in which the preventive anti-fall programmes are performed were determined at the significance level of 5%. The Stata of version 13 was used. The SPSS Answer Tree of version 3.1 was used to identify risk groups.

Results: The Regional University Hospital is one of the largest healthcare facilities in the Czech Republic, with 1,729 beds and 4,480 employees. The analysis included a total of 2,280 patient falls that occurred over the five-year period. The data obtained by the descriptive statistics were correlated with the fall-risk area (chi-squared test). The statistically significant relationships seemed to be: year of monitoring, department, type of ward, age, mental condition, medication use, antipsychotics, cardiovascular drugs, diuretics, medication category, circumstances of fall, patient cooperation, patient mobility and post-fall development.

Conclusion: The processing of patient fall incidence information as one of the most common adverse events in a hospital is relevant for national and transnational comparison. It may be an inspirational incentive for a more effective programme to prevent falls and fall-related injuries in other healthcare facilities.

Keywords: *Adverse event; Evidence-based practice; Fall; Hospital; Patient; Retrospective analysis*

ORIGINAL ARTICLE

INTRODUCTION

Evidence-based practice

The development of science is often superficially understood as a linear shift from less valid to more valid and truthful knowledge. However, new discoveries may not necessarily be new, but they may represent a new grasp of previously known phenomena. Within the decision-making process and in an effort to provide optimal care, it is ideal for healthcare professionals if their opinions, procedures and interventions can be based on current evidence obtained on the highest and best scientific basis. Given the current trend, with the phenomenon of publication computerisation, the orientation and

evaluation of valid and relevant information from a large number of available sources are often beyond the possibilities of medical practitioners. The Institute of Health Care is an American organisation dedicated to improving healthcare throughout the world. Frankel et al. (2017) describes two dominant areas relating to healthcare safety, namely culture and training/education. Among other things, the document states that in order to achieve a high level of process and system reliability, organisations must apply scientific evidence and minimise non-patient-specific options.

Today, the use of presented scientific evidence and its application in practice (evidence-based practice) is a basic requirement for healthcare professionals who introduce new findings into practice.

The demographic situation and its impact on nursing practice

In the context of demographic development and the related forecasts, an increasing number of patients in older age groups can be expected. The issue of patient falls is one of the most discussed topics in the field of safety and the quality of healthcare provided. The incidence of falls increases with age and there is also a higher prevalence among the acutely and chronically ill, as well as hospitalised people and those in long-term institutional care.

A patient's fall becomes a potential forensic, economic and marketing risk that can never be completely eliminated.

Recent research and meta-analyses conducted to identify effective solutions of how to reduce patient falls have no consistent conclusions. However, in most cases, they state that multifactorial preventive fall-prevention programmes can reduce the number of falls and their recurrence in patients of inpatient wards, unlike individual intervention measures. (Botíková et al., 2015; Brabcová et al., 2016; Majkusová and Jarošová, 2014; Spiva et al., 2014; Vlaeyen et al., 2015).

The overview study on the effectiveness of anti-fall measures in hospitalised patients (Horová et al., 2017) has shown that in recent times, world preventive research activities are focused on so-called soft factors, confirming the effectiveness of education and training for both staff and patients.

This review has critically evaluated the selected relevant studies and confirmed that the currently preferred multifactorial intervention programmes include education in their curricula. Educational influence has appeared to be effective in the area of fall-prevention in institutional settings, whether it is the staff or patient training (depends on whether it is a cognitively intact individual). However, the outcome was influenced by the content itself, the concept of the educational process as well as the number of educated areas.

MATERIALS AND METHODS

The aim of the research was to carry out a five-year retrospective analysis of patient falls in a large health care inpatient facility in the Czech Republic to find out which reported areas related to patient falls were the most frequent and whether some areas correlated together positively. Therefore, the analysis deals with the discovery of objective facts relating to patient falls that have actually happened.

The research was conducted in University Hospital in Plzeň, one of the largest Czech hospitals (1,739 beds; 4,560 employees; 20 clinics; 22 wards; 6 institutes; 70,806 hospitalised patients in 2017). It was approved by the hospital management; non-violation of ethical principles during the research was guaranteed.

Based on the evidence-based practice, this hospital seeks to take into account the results of analyses carried out in the area of quality provided (not only) to nursing care but also to patient safety. It is based on the premise that the preventive measures implemented should be supported by adequate information and arguments so that interventions are effective, and also so that there is no unnecessary administrative burden placed on the staff.

The obtained data were processed by quantitative research method. The information mandatorily completed from the patient fall report form was processed for the 2012–2016 period.

The data were described by descriptive statistics and the Chi-squared test was used for relationship testing. If the conditions for its use were not met, the Fisher's exact test was used. The statistical tests were evaluated at a significance level of 5%. However, it should be noted that correlation doesn't imply causality, but only indicates that two phenomena/processes are likely to be dependent on each oth-

er. Nevertheless, some statistically significant correlations may allow more specific targeting of preventive interventions on risky patients.

The Stata of version 13 was used. The SPSS Answer Tree of version 3.1 was used to identify risk groups. For the detailed evaluation of the monitored factors, the complementary CHAID method of decision tree analysis (CHAID Analysis, Chi-squared Automated Interaction Detection) was used. This is a technique specifically designed for categorical data and is based on Pearson's chi-squared test of statistical independence.

In total, 2,280 patient falls were reported during that period. In total, 33 areas were described by descriptive statistics. The following items were included: sample structure, fields by way of care, wards by way of care, number of falls at each clinic, number of falls in each year, number of patients with a fall who were identified as being at risk, number of falls in calendar months, age groups of patients with a fall, patient gender, day and time of a fall, location of a fall, method of fall reporting (signalling), circumstances of a fall, a fall in the patient's history, patient mobility at the time of the fall, patient's self-sufficiency at the time of the fall, patient's ability co-operation at the time of fall, use of aids – general assessment, use of sensory aids, use of motion aids, use of a walking-frame, use of a wheelchair, use of other aids, patient's mental condition before a fall, use of medication, re-categorisation of medications used by patients with a fall, medication type used by patients with a fall, patient post-fall injury, injury type, post-fall unconsciousness, post-fall examination carried out, post-fall treatment carried out, and further development of the patient's post-fall situation.

RESULTS

Incidence of falls

The total number of reported patient falls for that period was 2,280. The percentages in the sample were women 48.7% and men 49.7% (Table 1).

Table 1 – Summary information

Year	No. of falls (*n*)	%	Number of hospitalised patients (*n*)/ year	Number of treatment days (*n*)/year	Number of fall-related injuries (*n*)	Serious injuries (*n*)	%	Number of falls/1,000 patients	Number of fall-related injuries/1,000 treatment days
2012	397	17.4	69 854	480 190	188	52	27.7	5.68	0.39
2013	407	17.9	71 670	493 943	208	52	25.0	5.68	0.42
2014	493	21.6	73 058	493 075	213	29	13.6	6.75	0.43
2015	500	21.9	71 645	483 286	242	55	22.7	6.98	0.50
2016	483	21.2	70 657	480 101	236	45	19.0	6.84	0.49
Total	2 280	100.0	356 884	2 430 595	1 087	233	21.4	6.42	0.45

Occurrence by departments

The most frequent occurrence of patient falls was reported in the internal departments (62.3%), followed by surgical departments (21.3%). For follow-up care, falls were 12.8%. Children's wards reported patient falls in 0.9% of cases.

Most patient falls were reported in standard type inpatient wards (n = 1852; 81.2%). The intensive-care-unit wards reported patient falls at 2.3%, the long-term care inpatient wards at 2.7%. In outpatient departments, 2.2% of patients fell during the five-year period.

Patients at risk

Of the total number of patients that fell (2,280), 60% of patients (1,369) were assessed as risky patients using the Conley screening tool – modified by Jurásková (2007).

36.8% of patients were without risk of falling at the time of their fall. For 3.2% of pa-

tients, there was no information on the possible risk regarding the patient's fall. The most evaluated patients at risk who fell were in internal departments (68%), the lowest number of such patients were in children's wards (0.1%) – Table 2.

Table 2 – A five-year summary: risk of falling

Year	Patients with a risk of falling		Patients without a risk of falling		Total	
	Number	*%*	*Number*	*%*	*Number*	*%*
2012	230	59	158	41	388	100
2013	221	55	181	45	402	100
2014	282	63	166	37	448	100
2015	325	66	171	34	496	100
2016	311	65	164	35	475	100
Total	1,369	62	840	38	2 209	100
Chi-square test, $P = 0.005$; missing system 3%; P – independence test						

Age characteristics

The largest number of falls occurred in patients in the 75–84 age-group (33.7%). The category with the second highest number of falls was the 65–74 age-group (24.7%). In the 85 and older age-group, 19.9% fell. In the children and adolescents age-group (0–17 years of age), there was a fall rate of 2.8%, and among adults aged 18–64, falls occurred at 18.9%.

Time of fall

Most often (in 34.8%), the patients fell during the night (between 10:00 p.m. and 6:00 a.m.), in all departments. During the day, the frequency of patient falls was almost the same in the afternoon (12:00 p.m. – 4:59 p.m.) at a rate of 18.1% and in the evening (5:00 p.m. – 9:59 p.m.) at a similar rate of 18.2%.

October was the calendar month where patients were most likely to experience a fall, but the differences in the number of falls in other months are not statistically significant.

Location of fall

The place where a patient most often fell was in the patient's room (69%). Toilet/bathroom (14%) and the corridor or staircase (9.7%) were other frequent locations of patient falls. For 2.5%, the location of the fall wasn't indicated.

A fall was most often reported by another patient (42.9%). The situation where a patient fell over in the presence of staff members was reported in 38.6% of cases. The patient reported his/her fall by him/herself in 12.7% of cases. For 3.4%, the method of reporting a fall wasn't indicated.

Fall circumstances

The most common situation where a patient fell was when getting out of bed (19.4%), and instability when walking (unable to grab support) in 18%. 16% of patient falls occurred as a result of orthostatic hypotension. 13.4% patients fell off the bed. In almost 5% (4.9%), the patient's fall occurred when moving to (from) a portable toilet.

For 34 patients, the patient wearing unsuitable shoes was reported as the likely cause of the fall.

For 68 patients, falling occurred when climbing over raised sideboards.

38 cases involved falling from a chair or armchair, 9 patients fell from a wheelchair (in 2 cases wheelchair instability was also reported). 11 patients fell as a result of an epileptic seizure.

Characteristics of patients with a fall

Most patients who fell were fully mobile at the time of the fall (46.5%). At the time of fall, 27.8% of the patients were partially mobile, 11.6% were sitting in a chair, 13.5% were lying down and mobile, and 0.6% were lying and immobile.

At the time of their fall, 35% of patients were self-sufficient, 34.3% were partially self-sufficient, 23.3% required increased surveillance, and 3.5% were immobile. In 4% of the forms, the patient's self-sufficiency information was not provided.

For 53.9% of patients who had a fall, the ability to co-operate was absolute at the time of the fall. 36.1% of patients were able to partially cooperate and 5.5% were completely uncooperative. In 4.5% of the forms, information on patient's ability to cooperate was not provided.

67.3% of patients who fell used some kind of compensatory aid.

Nearly half (48.8%) of patients did not use any sensory compensatory aid (hearing aid, glasses, contact lenses). On the contrary, 40.7% used at least one of the aids at the time of their fall.

Motion compensatory aids, crutches or a cane were only used by 26.1% of patients at the time of the fall. 63.3% didn't use these aids. 5.5% of patients were using a walking-frame at the time of the fall. 1% (24) of patients who fell throughout that period used a wheelchair.

66.7% of patients were oriented at the time of fall, 25.1% were disorientated and 4.7% were unstable. In 3.5% of patients, their mental condition was not indicated at the time of their fall.

Use of pharmacotherapy

82.6% of patients (1,884) who fell were using medication at the time of the fall. Only 127 patients that fell (5.6%) did not take any medication. In 269 (11.8%) patients, information on the use of medication was not provided. Most patients who fell were those who took a combination (2 or more) of risk medications (52.3%). 612 patients (26.8%) used 1 risk medication at the time of their fall and 206 patients (9%) did not take any risk medications. Cardiovascular drugs, diuretics, insulin, oral antidiabetics, antidepressants, anxiolytics, hypnotics, sedatives, and antipsychotics were considered to be risk medications.

Incidence of injuries

Nearly half of patients who fell (1,087; 47.7%) suffered a fall-caused injury. 1,185 patients were not injured during the fall.

233 (22% of the injured patients) suffered a severe fall-caused injury, of which 151 people were assessed for the risk of falling.

28.2% (644) patients who had a fall experienced surface abrasion or hematoma. 2 patients (0.1%) suffered from concussion. 9 patients (4.3%) suffered a fracture. 133 patients had a fall-caused lacerated wound that needed treatment with a suture (133; 5.9%). 169 patients (7.4%) suffered a lacerated wound that was not necessary to be treated with a suture. This injury was not included among severe injuries. 36 subjects (1.6%) suffered other injuries, such as epistaxis, surgical wound dehiscence or wound bleeding after amputation, etc.

The most common area for a reported injury was the head (232 cases); other numerous injury areas reported were the upper limbs (in 78 cases) and lower limbs (in 69 cases).

Post-fall examination and treatment

612 patients (26.8%) underwent X-ray examination following the fall. 102 subjects (4.5%) underwent CT examination. In 47 (2.1%) patients, a fall-related medical consultation took place, and 155 (6.8%) patients were examined differently (most frequently by a physician, EEG, etc.). 1,301 patients (57.1%) did not receive any examination after the fall. For 63 subjects, this information was not provided.

For 1,460 patients (64%), no treatment was required immediately after the fall. For 468 (20.5%) subjects, portable toilet was performed.

For 2,134 (93.6%) patients, no other therapeutic or other development was reported due to the fall. As a result of the fall, 57 (2.5%) patients, were transferred to another ward (surgical or ICU). For 13 patients (0.6%), surgery was required in relation to the fall. 4 patients (0.2%) died in connection with their fall during the reporting period. However, it is not possible, on the basis of data provided in the patient fall report, to ascertain whether the fall was the cause of death or the fall occurred due to the patient death.

Ratio analysis

The ratio analysis was focused on the area of specified risk of a patient falling. The risk of a patient falling was evaluated by Conley screening tool – modified by Jurásková, 2007.

The proportion of people at risk of falling, who experienced a fall, was statistically significant in the monitored years. It has been confirmed that this proportion increases significantly with age. It can be stated and the research results suggest that, the proportion of hospitalised people at risk of falling has been increasing in recent years in line with the initial premise of demographic characteristics of patients.

Therefore, the following data obtained by the descriptive statistics were correlated with the fall-risk area (chi-squared test):

Year of monitoring, age, gender, time of the fall, mental condition, medication use, individual types of medication, medication category, fall-caused injuries, circumstances of the fall, patient cooperation, patient mobility, measures taken, post-fall development, hospitalisation (day of fall).

The following relationships seemed to be statistically significant:

Year of monitoring (P = 0.005), department (P < 0.001), type of ward (P < 0.001), age (P < 0.001), mental condition (P < 0.001), medication use (P < 0.001), antipsychotics (P < 0.001), cardiovascular drugs (P < 0.001), diuretics (P < 0.001), medication category (P < 0.001), circumstances of fall (P < 0.001), patient cooperation (P < 0.001), patient mobility (P < 0.001), post-fall development (Fisher's exact test, P = 0.004) – Table 3.

Table 3 – Selected statistically significant relationships (with the fall-risk area)

Occurrence by departments		
internal departments surgical departments follow-up care children's wards	62.3% 21.3% 12.8% 0.9%	P < 0.001
Age characteristics		
0–17 years of age 18–64 age-group 65–74 age-group 75–84 age-group in the 85 and older age-group	2.8% 18.9% 24.7% 33.7% 19.9%	P < 0.001
Mental condition		
oriented at the time of fall disorientated unstable information was not provided	66.7% 25.1% 4.7% 3,5%	P < 0.001
Use of pharmacotherapy		
medication at the time of the fall any medication information was not provided	82.6% 5.6% 11.8%	P < 0.001
Patient cooperation		
absolute ability to co-operate partially cooperate completely uncooperative information was not provided	53.9% 36.1% 5.5% 4.5%	P < 0.001
Patient mobility		
fully mobile at the time of fall partially mobile sitting in a chair lying down and mobile lying down and immobile	46.5% 27.8% 11.6% 13.5% 0.6%	P < 0.001
Post-fall development		
X-ray examination CT examinatio a fall-related medical consultation patients were examined differently (most frequently by a physician, EEG, etc.) any examination information was not provided	26.8% 4.5% 2.1% 6.8% 57.1% 2.7%	Fisher's exact test, P = 0.004

In contrast, the portion of people at risk of falling was the smallest:

- In the case of oriented people (portion of confused and unstable patients is the highest).
- For people not taking any medication.
- In a situation where the fall occurred due to collapse (the highest was found in connection with the use of aids – moving from a portable toilet or a technical defect on the used aids).
- In the case of fully cooperative people (the highest was found for those who only partially cooperate).
- For those being admitted due to a fall – outpatients (the highest of those where surgery or death followed).

The analysis also shows (although not statistically significantly) that the duration of hospitalisation increases the number of people with a fall who have been assessed as a risk patient.

For the first week of hospitalisation, the incidence rate of falls for all patients (at risk of falling or even without risk) is higher, with a maximum number of falls on the 2nd day of hospitalisation.

The ratio analysis shows the importance of patient assessment in the area of risk of falling at the beginning of hospitalisation (up to 8 hours after admission) and the subsequently re-assessment of risk during hospitalisation (change in medication, change in condition, longer hospitalisation, etc.). The finding that the patients, who had fallen down and were assessed as people with a risk of falling, were more likely to be using medication at the time of the fall has been shown to be statistically significant (statistical significance for cardiovascular, diuretic and antipsychotic drugs has been confirmed). Therefore, increased surveillance is well-founded.

Another statistically significant relationship emerged in the area of mobility of patients at risk of falling; namely for immobile or less mobile patients.

Patients at risk of falling are more likely to have surgery as a consequence of the fall, which again points to the need of effectively identifying patients at risk, and to target prevention so that it is not only effective but also not burdening patients and staff unnecessarily.

The information about the missing system – information that was not filled in the forms – is interesting. For some areas, the incidence rate was more than 10% (fall in the patient history, use of aids and medication). This information can be an informative basis for the possible modification of the form for a patient's fall (patient fall report). For 34 patients, unsuitable footwear was indicated as a probable cause in the description of the fall circumstances. For 68 patients, the fall occurred when climbing over raised sideboards. Both situations are described in the literature as frequent factors influencing the risk of patient's fall, so these educational areas should not be neglected. However, statistical significance cannot be specified in this context; this data is presented in the description of the circumstances by the staffs' free expression to the possible cause of the patient's fall and may not always be mentioned.

Within the analysis, the CHAID decision tree method is used as a complementary method to complete other important relations with selected (statistically significant) factors. It was the area of mobility where the causality of the mental condition and the patient's age can be ascertained for mobile, partly mobile and immobile patients.

CHAID decision tree method

This method is a complementary method. Using the decision tree algorithm, factors related to the risk of falling are analysed. The decision trees are used to graphically represent decision analysis and are suitable for multi-tiered decision-making processes with one decision criterion. Their aim is an optimal strategy for the decision maker, which should lead to the best expected outcome. The branching criterion becomes χ^2 (chi-squared test).

Only selected factors came into this analysis, with a significant relationship from previous analyses. As the main category, people at risk of falling were selected and subsequently on the basis of previous results of the chi-squared test, the branches were created:

Mobility: The portion of people at risk of falling is rising depending on limited mobility. Fully mobile people were assessed as a risk in the area of a fall at a rate of 25.3%, but this indicator was 96.6% for people who are immobile, only sitting or lying down. Patients with partial mobility accounted for 27.3% of all people who had a fall, and 88% of them were assessed as being at risk of falling.

Mental condition and age were assessed as other aspects of this method affecting the number of falls.

Mental condition: For those who were fully mobile and mentally-oriented at the time of their fall, the incidence of at-risk patients was 16%. However, this portion is rising sharply in terms of disoriented people where the incidence of at-risk people is 90%. If those people are in the 65 years or more age group the percentage is then 95%.

Age: In the 0–64 age-group, 81% of disoriented people are assessed as at-risk of falling. However, for patients aged 65–84, 99% of people are at risk of falling in the case of disoriented patients.

For people with reduced mobility who weren't affected by cognitive deficits (mentally-disorientated) and were in the 64–85 age-group, the supposed factor which influenced the patient risk rate was whether or not he/she was using risky medication. Surprisingly, the reported patients taking these medications (at least one) were assessed as at-risk in 88.8% of cases, but the patients taking no medication were at risk in 93% of cases.

For those who were immobile (only sitting or lying down) at the time of the fall, mental

condition played a role in lower-age categories (0–64 years) in determining the patient's risk. All patients (100%) in this category (immobile) who were disoriented were assessed to be at risk of falling. Compared to people in the same age category and with the same motion restriction who were mentally oriented, the incidence for at-risk patients was almost double (55% of the cognitively intact subjects).

In the 65 years or more age group, the assessment of mental condition to determine the risk of a patient's fall is important, because in the case of immobile and disoriented people 100% were at risk.

However, it is necessary to state that – despite the fact that in the last mentioned category there is a low number of immobile as well as disorientated people and, therefore, conclusions made are not statistically significant – these patients are at risk at high percentage of representation.

The decision tree method is only to be considered as a complementary method. However, in justified cases, it may become an argumentative base for implementing some interventions into practice.

DISCUSSION

The adverse event reporting system, in this case the fall reporting system, enables a health service provider to identify and analyse areas that can be targeted preventively. It is also possible to respond to identified information based on the evidence-based practice and to evaluate the effectiveness of implementing preventive measures.

As Japanese author Toyabe (2015) discovered in his research, the inadequate reporting of adverse events for various reasons is a serious problem. In this study, which was conducted in 2011 (June–August) at a Japanese hospital in Niigata (23 clinics, 825 beds, 4,439 patients admitted during given period), it was discovered that up to 25% of falls involving patients went unrecorded in the hospital system of undesirable events. The authors compared the printed documentation and the hospital electronic system. They concluded that their result is comparable to those in other studies conducted in other countries, such as the Australian research team of Hill et al. (2010). In our analysis, we also found that some items of the fall report form are incomplete when filled-in. The so-called missing system mostly involved filling information on a fall into the patient's history (14.1%), patient mobility at the time of the fall (4.1%), use of compensatory aids (10.6%), and medication use at the time of the fall (11.8%). The area of the patient's risk of falling wasn't detectable based on the form in 3.2% of cases. Failure to provide information in the patient's history regarding the patient's fall could be due to a poorly structured patient fall report form. Therefore, one of the recommendations resulting from the analysis is amendment and modification of the forms, including their unification with an electronic version. A hospital's middle and top management play an important role here; they must be familiar with the results and must contribute to the company culture as stated by Frankel et al. (2017).

As an interesting result, we evaluate the influence of the given medication groups on the occurrence of falls involving people at risk of falling. In this context, every fall of a person over the age of 65 who uses medication should be an alarming signal, and an impulse for the analysis of risk factors and taking preventive measures (Uríčková et al., 2018).

This information is important to the patient and his/her close family/friends and should not be underestimated within the educational process. The influence of medication use and polypharmacy on the risk of falling of a patient/individual is confirmed by Majkusová and Jarošová (2014) who state that taking antihypertensive agents (65% of patients) and psychopharmaceuticals (48% of patients) is a risk factor in falls in their retrospective study of comparable extent and local scope with our analysis (3,477 patients, Czech hospital). In our analysis, statistical significance was confirmed for patients at risk of falling and cardiovascular, diuretic, and antipsychotic drugs.

In addition, this author recommends benchmarking for the quality indicator monitoring (the ratio of the number of people injured due to a fall to 1,000 treatment days).

Institute for Safe Medication Practises Canada (2015) confirms the following most common medication groups (based on the analysis of medication-related incidents, n = 243) that are reported in connection with patient falls, namely opioids, antipsychotics, antidiabetics and cardiovascular drugs (includ-

ing diuretics). In addition, it recommends to educate patients and their close family/friends about the possible side-effects of all medication that may have an effect on a potential fall (dizziness, drowsiness, syncope, bradycardia, muscle weakness and Parkinson's symptoms). These effects were shown in 7.8% of reported patient falls. The analysis has shown key issues associated with falls and risky fall-related situations, including medication, lack of proactive clinical assessment, communication gaps and medication use failure.

In the European environment, a similar research was conducted by the Austrian research team Lindner et al. (2015) that evaluated risk factors for patient falls (n = 195) over two years in selected Austrian hospitals (11,812 hospitalised patients during the research period). In his conclusions, he noted that an increased risk of falls was seen for patients treated with more than one diuretic. The most commonly used diuretics include hydrochlorothiazide and furosemide. This study confirmed that chronic heart failure, dementia and the use of more than one diuretic are risk factors for falling in the cohort of hospitalised patients. None of the risk factors investigated were statistically significant in the area of post-fall injury.

The aforementioned research team of Australian author Hill et al. (2010) dealt with the views of medical staff on the influence of individualised patient education in a rehabilitation clinic in the fall prevention area. The author relied on the fact that research on the effectiveness of various interventions to prevent patient falls did not have clear and effectivity-confirmatory conclusions – Lee et al. (2014), Haines et al. (2010; 2013), Sahota et al. (2013), Shorr et al. (2012). However, they did coincide with the positive impact of individualised education.

Within the Australian research of Hill et al. (2010), a special educational Save Recovery Programme using multimedia support has been created. Within the research, pedagogical and didactic knowledge of educators were perceived as a valuable part of education. Therefore, the results of our analysis will be presented in practice by methods that take the didactic and andragogical aspects of education into account. The output is represented by an upcoming e-learning programme that will be used as learning material for both students and practitioners.

CONCLUSIONS

The five-year retrospective analysis of patients' falls summarises information about people who fall in a healthcare facility. Therefore, the risk areas of a given hospital were detected regarding the area of fall prevention. The preventive measures implemented should be supported by adequate arguments so that interventions are effective and there is no unnecessary administrative burden placed on the staff. Results of the analysis should contribute to more effective patient and staff education. In education activities, patients' age, mobility, mental condition and medication use have to be taken into account. The implementation of modern technologies allows the use of modern education methods: e-learning (staff), videospots, electronic aids (tablets, DVD's, etc.). This is an increasingly popular form of education for its availability, clarity and the possibility of flexible participation for participants.

Another suggestion is to re-evaluate the existing patient fall report form and to modify it so that it can provide information about fall circumstances more effectively and all items are completely filled in.

The analysis confirmed that the portion of patients who are at risk of falling and who have fallen, has statistically significantly increased in recent years, which is related to the demographic statistics of the company and to the compression of the number of falls in older age groups. The calculations further confirmed that with the increasing age the portion of people at risk of falling is also increasing. Therefore, monitoring patient falls and their evaluation in a detailed way is important. This analysis can, among other things, become the basis for benchmarking with other healthcare facilities and for comparison at national and transnational levels.

Conflict of interests
The authors have no conflict of interests to disclose.

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