

Risk of falls in patients in different hospital wards in light of physiotherapists' opinions

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Abstract

Introduction: Among hospitalised patients, falls are the most frequently reported safety incident. Recurrent falls have various causes. Although they are unavoidable, 20–30% of falls are preventable.

Aim of the research: The aim of the research was to get to know the opinion of physiotherapists about whether falls are a significant systemic problem in Poland, and to determine the risk of falls in hospital wards. Additionally, an attempt was made to assess the place in the hospital where patients most often fall.

Material and methods: To conduct the study, an original survey questionnaire was prepared. It consisted of 11 questions and was published on Survio.com in May 2021. The study involved 155 physiotherapists: 97 (62.6%) women and 58 (37.4%) men. Quantitative and qualitative analysis of the obtained results was performed using Microsoft Excel Office 365 and the IBM® SPSS® Statistics. Differences in numbers between variables expressed on a nominal scale were analysed using the χ^2 test, the Mann-Whitney U test, and the Kruskal-Wallis test with Dunn's post hoc test. In all tests used, results with a significance level of $p < 0.05$ were considered statistically significant.

Results and conclusions: According to physiotherapists, patient falls in hospitals in Poland are a significant systemic problem. Physiotherapists determined that the risk of falling in the geriatric ward was high ($p < 0.001$), but low in the internal medicine ward ($p < 0.001$). It was indicated that the risk of falling is highest in the toilet and bathroom ($p < 0.001$), and an average risk exists in the patient's room and corridor ($p < 0.001$).

Introduction

An unexpected fall is a situation in which someone accidentally finds themselves on the ground or floor for reasons other than a violent impact, loss of consciousness, or sudden paralysis as a result of, for example, a stroke or an epileptic seizure. However, only half of the people who fall are able to get up on their own. Recurrent falls usually have a variety of causes, and the most common modifiable risk factors are poor balance, gait problems, use of certain medications, weakness associated with diseases such as Parkinson's, stroke, joint disorders, cognitive problems, poor eyesight (often due to cataracts), the environment, and inappropriate footwear [1, 2].

Among hospitalised patients, falls are the most frequently reported safety incident. Although they are inevitable, 20–30% of falls can be prevented by

assessing the risk and then taking action to reduce it. Falls can lead to death or serious injury, including fractures. The fall cannot be considered harmless. It is associated with a longer hospital stay, delayed recovery, and the fear of another fall [3].

In rehabilitation centres, where patients are motivated to be physically active, the number of falls typically ranges from 3 to 16 cases for every 1000 bed days. About 30% of these falls end in injuries. Recorded injuries can include light damage such as cuts, bruises, sprains, or muscle strains, as well as more serious injuries, including head injuries, fractures, and even fatalities. In addition, there may be feelings of anxiety and fear of further falls [4].

The risk of falling among the elderly varies according to their living environment: about 35% of community-dwelling people aged 65 and older experience

falls each year, in contrast to about 50% of those living in long-term care facilities. The likelihood of falling increases with age and increasing physical frailty [5].

Risk factors for falls in the hospital include advanced age (> 85 years), recent fall, male gender, gait instability, side effects of medications, urinary incontinence, and neurocardiovascular instability. Current guidelines from the National Institute for Health and Care Excellence recommend that hospitalised patients over the age of 65 years and patients aged 50–64 years who are found to be at higher risk of falling should be treated as an at-risk population. Falls prevention in hospitals is an issue that should concern the entire medical staff [3].

According to recommendations from the National Institute for Health and Care Excellence (NICE), elderly patients in hospitals are at high risk for falls due to a variety of factors, including poor general well-being, pre-existing concurrent illnesses, use of painkillers, experiencing pain, use of multiple medications at the same time, and muscle weakness. Nevertheless, many of these patients are unaware of the risks associated with their condition [6].

Approximately one million patients are hospitalised annually in the United States. National standards indicate that in surgery wards, general medicine wards, and medical-surgical wards the rate is 3.44 falls/1000 day stays. About a quarter of falls among hospitalised patients are traumatic. Considering the aging of the population and the negative consequences associated with falls, the main goal of the efforts is to reduce the frequency of falls and related injuries. This seeks to improve overall patient safety and increase the quality of health care [7].

Hospitals use various strategies to prevent falls. These include educating patients and healthcare professionals, adapting the environment, using assistive devices, conducting therapeutic exercises, monitoring medications, ensuring proper nutrition, managing cognitive impairment, and implementing policies and systems to reduce the risk of falls. Examples of systems include holding team meetings after each fall, reporting incidents to nurses, conducting audits, and regularly reporting falls statistics [4].

The authors of the paper by Gawrońska and Lorkowski emphasise that accurate and personalised assessment of risk factors for falls can significantly reduce the number of orthopaedic interventions needed. This approach has a direct impact on reducing the risk of postoperative complications and overall mortality. Consequently, fall prevention and prevention are key, but often underestimated, aspects of orthopaedics and public health. The implementation of diagnostic tools based on evidence-based medicine (EBM) and the use of artificial intelligence technology can help reduce the number of falls and the need for orthopaedic surgery [8].

Aim of the research

The aim of the research was to become acquainted with the opinions of physiotherapists about whether falls are a significant systemic problem in Poland, and to determine the risk of falls in hospital wards. Additionally, an attempt was made to assess the place in the hospital where patients most often fall.

Material and methods

To conduct a study on the issue of patient falls in hospitals in Poland in light of the opinions of physiotherapists, an original survey questionnaire was prepared. It consisted of 11 questions and was published on Survio.com in May 2021. The study involved 155 physiotherapists, 97 (62.6%) women and 58 (37.4%) men. Of the 155 respondents, 50.3% of physiotherapists worked in hospitals, 33.5% in clinics, and 16.2% in other places. It is worth noting that the study group includes physiotherapists who work in several places. The respondents were informed what the study was about and that all the questions should be answered.

The questions that the respondents were asked to answer were as follows:

1. Gender
2. Work experience as a physiotherapist
3. Main place of work
4. In your opinion, do patient falls in Poland constitute a significant systemic problem?
5. Please indicate in which hospital wards you think there is a risk of patient falls
6. Please indicate places in the hospital where there is a risk of a patient falling
7. What was the number of your patients who suffered a fall in hospital in the last 12 months?
8. What do you think are the main causes of patient falls in hospital?
9. In your opinion, are physiotherapists in Poland involved in measures to prevent patients from falling in hospitals?
10. At the current stage of your work as a physiotherapist, are you sufficiently prepared to conduct professional activities with patients aimed at preventing falls in hospital?
11. Which of the professional activities of a physiotherapist do you think are most important in preventing falls of patients in hospitals?

Statistical analysis

Quantitative and qualitative analysis of the obtained results was performed using a software: Microsoft Excel Office 365 and the IBM® SPSS® Statistics. Differences in numbers between variables expressed on a nominal scale were analysed using the χ^2 test, the Mann-Whitney *U* test, and the Kruskal-Wallis

test with Dunn's post hoc test. In all tests used, results with a significance level of $p < 0.05$ were considered statistically significant.

Results

When asked whether patient falls in hospitals in Poland are a significant systemic problem, 72.9% of respondents answered that this problem is particularly important. The seniority level determines the attitude of physiotherapists regarding the importance of the problem of falls ($p = 0.001$). There was also a positive correlation in terms of work experience, which indicates that with increasing work experience, the problem of falls is more noticeable ($r = 0.208$, $p = 0.037$). A statistically significant group of physiotherapists who declare hospital as their main place of work are physiotherapists whose work experience is less than 5 years ($p = 0.002$) (Figure 1).

Physiotherapists were asked to determine the level of risk of falls in individual specialist departments in the hospital. Statistical analysis showed significant responses in terms of determining the risk of falls in individual departments. In reference to the study, physiotherapists determined that the risk of falling in the geriatric ward was high ($p < 0.001$). Of the 155 respondents, 116 (74.84%) indicated that the patient's risk of falling was high, 25 (16.3%) medium, 13 (8.39%) low, and 1 (0.65%) replied that there was no risk of falling. Similarly, the same professional group assessed the risk of falling in the internal medicine ward as low ($p < 0.001$). Out of 155 people, 27 (17.42%) answered that the risk of falling was high, 61 (39.35%) medium, 62 (40%) low, and 5 (3.23%) that there was no risk of falling. With regard to the place

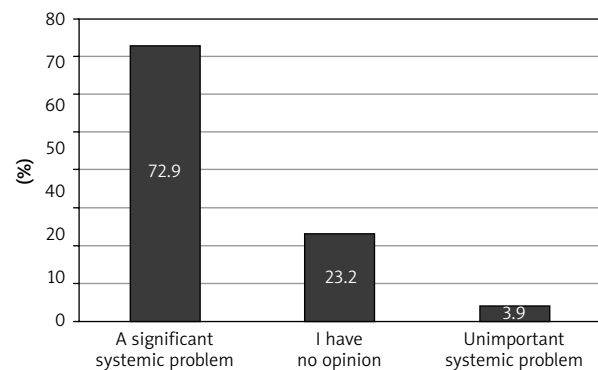


Figure 1. Fall in a hospital ward as a significant systemic problem in Poland, in the physiotherapists' opinions

in the hospital where, according to physiotherapists, the risk of falling is the highest, it was indicated that it is the toilet and bathroom ($p < 0.001$), and the average level of risk occurs in the patient room and the corridor ($p < 0.001$) (Table 1).

Similarly, when asked to indicate a place in the hospital, physiotherapists determined the statistical risk of falling significantly (Table 2).

Physiotherapists were asked to determine which professional activities are most important in preventing falls in hospitals. It was shown that, in the opinion of physiotherapists, the most important factors in the prevention of falls in hospitals are kinesiotherapy ($p = 0.009$), medical device prescription ($p = 0.03$), and selection of medical devices ($p = 0.001$) (Figure 2).

Discussion

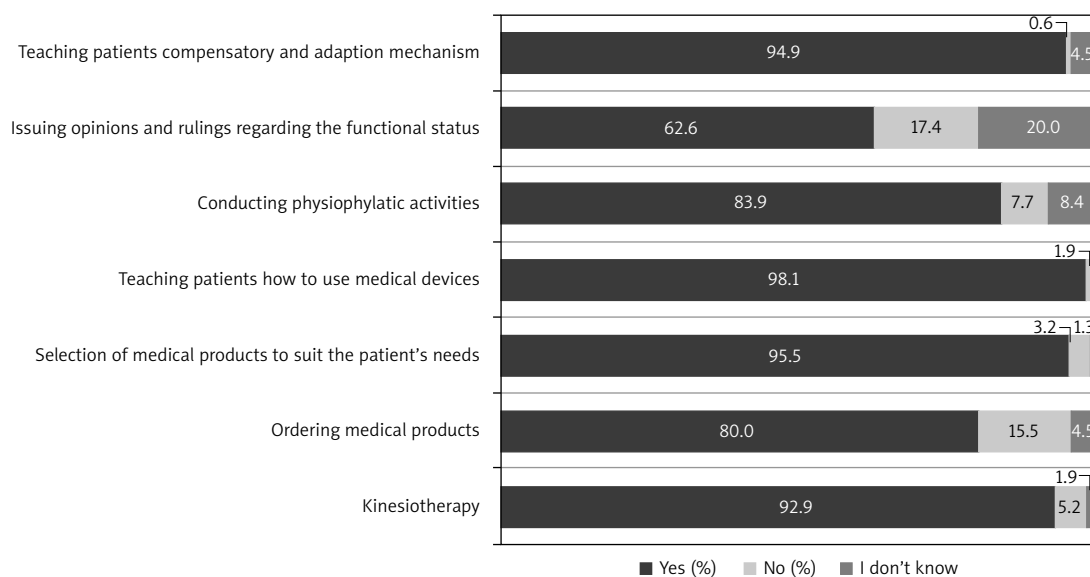
In their study, Callis *et al.* conclude that falls are a significant problem for hospitals from both a clini-

Table 1. Risk of falling in individual hospital wards in Poland, in the physiotherapists' opinions

Department	No risk of falling		Low risk of falling		Medium risk of falling		High risk of falling	
	χ^2	Persons (%)	χ^2	Persons (%)	χ^2	Persons (%)	χ^2	Persons (%)
General surgery department	–	1.3	–	24.5	$p < 0.001$	57.4	–	16.8
Orthopaedics department	–	0.6	–	11	–	31.6	$p < 0.001$	56.8
Rehabilitation department	–	1.3	–	18	$p < 0.001$	41.3	–	39.4
Department of internal diseases	–	3.2	$p < 0.001$	40	–	39.4	–	17.4
Geriatrics department	–	0.6	–	8.4	–	16.2	$p < 0.001$	74.8
Paediatrics department	–	10.4	$p < 0.001$	47.7	–	30.3	–	11.6
Neonatology department	$p < 0.001$	47	–	38	–	13	–	2

Table 2. Assessment of the risk of falling in specific places in the hospital in the opinions of physiotherapists

Place	No risk of falling		Low risk of falling		Medium risk of falling		High risk of falling	
	χ^2	Persons (%)	χ^2	Persons (%)	χ^2	Persons (%)	χ^2	Persons (%)
Ward	–	2	–	22	$p < 0.001$	44.5	–	31.5
Toilet	–	0	–	4	–	27	$p < 0.001$	69
Bathroom	–	0.5	–	2	–	18	$p < 0.001$	79.5
Corridor	–	0	–	20.5	$p < 0.001$	58	–	21.5
Surgical block	$p < 0.001$	52	–	40.5	–	2.5	–	5

**Figure 2.** The most important professional activities of a physiotherapist in the prevention of patient falls in hospitals

cal and legal and regulatory perspective. They are a major threat to patient safety, both health-wise and legally. Eleven risk factors have been identified as playing a key role in the occurrence of falls, and it is significant that current risk assessment tools do not take these factors into account. The facts clearly confirm that falls are a real phenomenon. Patients are particularly at risk of falls during hospitalisation, which can lead to serious injuries such as fractures or subdural haematoma. The effects of falls have a significant impact on patients, prolonging their stay in hospital and worsening their overall health [9].

In the study by Dzieża-Grudnik *et al.*, which concerned falls in patients hospitalised at the Department of Internal Medicine and Geriatrics at the University Hospital in Krakow, it was found that in 2012 and 2013, 60 patients fell during their hospital stay, which constituted approximately 1% of all hospitalised patients. Patients most often experienced falls during the initial period of hospitalisation. It most often occurred near the bed (67%) and in the bathroom (28%).

In most cases, the patient fall did not result in serious consequences; however, 8 patients (13%) suffered from serious injuries such as fractures of lower limb bones, facial injuries, and bleeding into the central nervous system [10]. In their study, Kamińska *et al.* reported that in the years 2006–2017 in the Independent Public Provincial Hospital in Szczecin (SPWSZ) there were 2330 accident incidents, of which falls accounted for 96.2%. The authors indicate that in 2012–2017 most accidents occurred while walking (31.9%). Almost 25% of all incidents were the result of a fall, most often from a bed. In 67% of cases, the presented events occurred in the patient's room, 10.1% in the corridor, and 9.6% in the bathroom. In the analysis of the most common causes of accidents in 2016–2017, the dominant factors include lack of compliance with staff recommendations by patients (58.5%) and the health condition of patients (24.2%) [11].

Mikos *et al.* conducted a study in an urban public multidisciplinary hospital between 2013 and 2019. Patient data were retrieved from the hospital's fall

reporting system. The highest number of fall-related incidents were recorded in rehabilitation and internal medicine departments, where the rates were 1.92% and 1.18%, respectively. In turn, the lowest number of cases occurred in the departments of orthopaedics (0.15%) and rheumatology (0.21%) ($p < 0.001$). Most falls occurred late in the evening and at night (56.71%), and most of them occurred in bed (55.86%). The crude incidence rate (cIR) for falls was 6484 cases per thousand hospitalisations. An increase in overall cIR was observed from 2013 to 2017, reaching a peak in 2016, followed by a slight decline from 2017 to 2019, with noticeable differences between sites [12]. In relation to our own research, in the opinion of physiotherapists, the risk of falling in the rehabilitation ward is medium, while in the orthopaedics ward it is high, which does not fully reflect the results obtained in the study by Mikos *et al.* Physiotherapists also believe that there is a low risk of falling in the internal medicine ward.

Vassallo *et al.*, in a paper on risk factors for falls in elderly patients with cognitive impairment residing in rehabilitation units, reported that unsteady walking was the main self-reported factor increasing the risk of falls in patients with cognitive impairment in rehabilitation facilities. To reduce the number of falls in this group, measures are required to improve walking technique or increase the safety of people with walking problems [13]. Przysada *et al.* conducted a study throughout 2007–2008 on a group of 1429 patients hospitalised in the Rehabilitation Department. Risk factors and the substrate of the fall were analysed using a fall protocol that included personal data, diagnosis, causes, circumstances, and consequences of the incident. It was shown that patients most often suffered falls in the patient room while performing self-care (29%), walking (27%), and when changing position from sitting to standing, and vice versa (20%). Falls while sitting accounted for 14%, during bathroom self-care activities 13%, and while lying in bed 12%. The least frequent falls occurred while walking with the help of a therapist, accounting for only 1% of cases [14].

One-third of people aged 65 years and over experience at least one fall a year, and for those over 80 years old the rate is as high as one in two. Therefore, it is important to regularly assess fall risk in older patients, especially those who rely on long-term primary care for their chronic conditions. This approach allows a focus on preventing falls and maintaining the safety of older people [15]. In the study, Mazur *et al.* point out that patients in the geriatric ward are a group at high risk of falling. Patients included in the study who suffered a fall did not follow the recommendations implemented in the fall prevention department [16]. In another study, Mazur *et al.* examined 100 patients admitted to the Geriatrics Department. The most important fall risk factors are delirium and non-compli-

ance with staff recommendations [17]. In a study on the assessment of the relationship between the risk of falls and physical fitness and the occurrence of falls among residents of private nursing homes, Kubica reported that there is a relationship between the above-mentioned factors. The author indicates that, in light of her research, it seems justified to implement a multifactorial fall prevention strategy into geriatric care [18]. The study by Grochans *et al.* included 152 patients hospitalised in the geriatric ward of Germany's Malteser Krankenhaus Hospital in Berlin. In the study, falls occurred most frequently (64.1% of cases) when the patient attempted to move independently. While walking to the toilet, 32.1% of the subjects fell. A fall from bed was recorded in 13.2% of patients, while 11.3% fell from a wheelchair. In this group of patients, no falls were recorded on the toilet or while being helped to mobilise by a third party. Unsteady gait was identified as the main cause of falls, accounting for 95% of cases, with the remaining 5% attributed to dizziness and fainting [19]. A study by Žak *et al.* found that despite successful total hip alloplasty after a femoral neck fracture, elderly people in nursing facilities are still at high risk for repeated, potentially injurious falls [20]. A study by Magnuszewski *et al.* on falls in a Geriatric Hospital Unit in the context of fall risk factors detected in a comprehensive geriatric assessment examined that most falls occurred in patients' rooms (72%), and less frequently in bathrooms (21%) and hallways (7%). The most common cause of these incidents was getting out of bed. In half of the cases, falls led to injury, with the head or upper extremities most often involved [21].

In Australia, a retrospective analysis of falls in children aged 0 to 18 years in various health care facilities such as hospitals, outpatient, emergency, and community settings was conducted. The study used the Children's Health Queensland Hospital and Health Service (CHQ-HHS) clinical incident and electronic health record database. The data collected included 385 fall events. Most often, children aged 0–2 years (46.75%) were the victims of falls, and boys constituted the majority of the injured (55.58%). The most common mechanism was falling out of bed (30.65%). The incidence of falls in hospitals was 0.53 falls per 1000 bed days in tertiary hospitals and accounted for 1.2% of reports to health care facilities. Falls from bed were particularly common in tertiary care hospitals (39.84%) and emergency departments (72.13%). Falls from furniture/equipment accounted for 26.04% of outpatient falls. Most falls occurred in the presence of parents/care providers (79.48%), and 4.66% of patients experienced multiple falls. The importance of appropriate use of side barriers and implementation of fall prevention strategies, including education of parents/care providers, was emphasised [22]. In our study, according to physiotherapists, the risk of falling in the paediatric ward is low.

In relation to our own research, 126 (81.29%) physiotherapists believe that at the current stage of their work in the profession they are sufficiently prepared to conduct professional activities with patients aimed at preventing falls in hospitals.

The work by Venema *et al.* confirms the key role of physiotherapists in hospital teams to reduce the risk of patient falls. Within physiotherapy and occupational therapy, it is important to note the use of walking belts and the implementation of other methods to move patients safely, which is important in preventing falls [7]. According to a study by Hoyer *et al.*, rehabilitation therapists receive more advanced training in safely mobilising patients than do nurses, who in turn feel less confident in their mobilisation skills compared to therapists [23]. Physiotherapists can play a key role in fall risk reduction teams by sharing their knowledge of safe mobilisation. This knowledge can be transferred to nursing staff both in the context of direct patient care and through organisational competency training on safe mobilisation methods. Such interdisciplinary interaction emphasises a team approach to minimising the risk of falls, treating it as a quality indicator at the organizational level, not just at the nursing level [7, 24]. In Niewiadomska's study of the principles of a geriatric department in Germany, using the example of the Lutherstift Evangelical Hospital in Frankfurt/Oder, she points out that physiotherapists with a bachelor's degree in physiotherapy or physical rehabilitation have, since 2017, been encouraged by the Federal Geriatric Association to attend a specialised geriatric course, culminating in an exam. As part of their duties, in the context of geriatric assessment (COG), they perform an analysis of patient mobility and assesses the risk of falls at the beginning and end of a hospital stay, using the Tinetti test, the Timed Up and Go test, and the Esslinger Transferskala test, which assess the need for support in moving a patient from a chair to a wheelchair. In addition to standard physiotherapy and massage, the physiotherapist's duties also include preparing patients to wear a prosthesis after limb amputation, learning to move with such a prosthesis, and ordering necessary orthopaedic equipment, such as a wheelchair [25]. Regarding their own research, physiotherapists pointed out that the selection of appropriate medical devices is also important in reducing the risk of falling. In the study by Dusińska and Bonior, based on the research presented in the article, they point out that exercises are effective in preventing falls. It was also determined that the use of assistive devices in the form of canes and walkers increases contact with the ground, which improves stability and protects the senior against falls. Medical supplies can also reduce older people's fear of falling [26].

The paper by Cameron *et al.* analysed, among other things, 3 different studies on the effect of additional physiotherapy activities (supervised exercises) on pa-

tients in the subacute phase undergoing rehabilitation in rehabilitation units. Due to the very low quality of scientific data, it is difficult to assess conclusively whether additional physiotherapy effectively reduces the number of falls [27]. A study by Sherrington *et al.* to evaluate the effects of a home exercise program on the frequency of falls and mobility among people who had recently left the hospital found that tailored home exercises significantly improved mobility outcomes. However, they also observed a significant increase in the number of falls among this group of older people who had recently been discharged from the hospital [28]. Regarding our own study, 92.9% of physiotherapists believe that kinesiotherapy is an important professional activity of physiotherapists in the prevention of falls among hospitalised patients.

A research paper by LeLaurin and Shorr highlights that patients in hospitals are often issued socks with non-slip bottoms, assuming that they will increase traction and thus reduce the risk of falls. However, in the face of manufacturers' assurances, there are doubts about their actual ability to prevent slips. The limited amount of research on slip-resistant socks has not yielded conclusive evidence of their effectiveness in preventing falls. In addition, these socks may contribute to the spread of treatment-resistant infections in hospitals. In light of the lack of strong evidence for their utility, and given the risk of infection transmission, use of patients' own footwear appears to be the safest option for preventing falls [29].

A study by Kalu *et al.*, which focused on physiotherapists in Nigeria, found that 89% rated their knowledge of fall prevention among the elderly as high, while 64% believed their practice in this area was also at a high level. In a detailed analysis, 40% of respondents said they had moderate knowledge of the impact of taking multiple medications on the risk of falls. Moreover, half of the survey participants indicated a low level of involvement in referring patients to other medical specialists; respectively, 40% and 41% reported a moderate level of practice on documenting risk factors and treatment plans. No relationship was observed between age, gender, or length of service and level of knowledge or practice. From the results of this study, it appears that physiotherapists in Nigeria generally have good knowledge and skills in preventing falls among the elderly, but at the same time there are areas, such as knowledge of risk factors, documentation, and collaboration with other professionals, that need further development. This suggests the need for region-specific clinical guidelines that could help fill these gaps in professional practice [30].

Because the research was conducted in the form of an electronic survey, this constitutes a certain limitation of the work. This was not a standardised test, and the authors had no control over the accuracy of the answers.

Conclusions

Patient falls in hospitals in Poland are a significant systemic problem. In the opinions of physiotherapists, they are sufficiently prepared to conduct professional activities with patients aimed at preventing falls in hospitals. According to physiotherapists, the greatest risk of falling occurs in the geriatric ward. They also indicated that the risk of falling is the greatest in the toilet and bathroom, which is not presented in the cited literature.

It should be added that the work has practical value and may constitute the basis for clinical considerations on improving the safety of hospitalised patients in Poland. Respondents paid particular attention to shortages in the number of staff (including nurses and physiotherapists) employed in hospitals.

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Ethical approval

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Conflict of interest

The authors declare no conflict of interest.

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