

Characterisation of reported falls in a large hospital in southern Brazil: an observational study

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Abstract

Introduction

Hospital falls are recurrent adverse events that directly affect patient safety, representing a significant challenge for healthcare institutions. Although widely documented with regard to patients, falls involving members of the hospital community, such as family members, companions and workers, continue to receive limited attention in the literature.

Objective

To characterise reported falls in a large hospital in southern Brazil.

Methods

A cross-sectional, descriptive and retrospective study with a quantitative approach. Data were extracted from the fall reports recorded in 2022 in the institution's incident reporting system. The sample included complete records of falls involving patients and members of the community. Data were analysed using descriptive statistics.

Results

Of the 294 reports analysed, 249 (84.7%) referred to patients and 45 (15.3%) to community members. Among patients, 66% of falls occurred in older adults aged 60 years or over, with a predominance of intrinsic factors, such as imbalance (28.5%) and loss of strength (20.1%). In the community group, composed mainly of middle-aged adults, although intrinsic factors remained slightly more frequent, a high proportion of falls was associated with extrinsic factors (47%), especially trips and slips. More than half of the events occurred in the patient's room or bathroom, approximately 24% resulted in injuries, and 39% were witnessed by companions, family members or healthcare professionals, which may have contributed to mitigating the impact of the event.

Conclusion

The majority of falls occurred among older patients (≥ 60 years), mainly associated with intrinsic factors, whereas in the community, composed of middle-aged adults, a high proportion of falls due to extrinsic factors was observed. These results reinforce the importance of implementing prevention strategies that include environmental interventions and educational actions directed not only at patients but also at companions and family members present in the hospital environment.

Keywords

Accidental Falls; Accident Prevention; Patient Education; Risk Factors; Nursing.

Introduction

Hospital falls are recurrent adverse events that significantly affect patient safety, particularly among older adults. It is estimated that the prevalence of these incidents varies between 3 and 10 falls per 1,000 patient-days, with a marked impact on long-stay inpatient units, where fall-related injuries are especially frequent.¹

The consequences of falls go beyond minor injuries. In certain cases, they can result in severe trauma, such as fractures and head injuries, which significantly increase recovery time and the burden on healthcare teams.²

Falls can be influenced by intrinsic factors, such as advanced age, previous history of falls, clinical conditions and medication use, or by extrinsic factors related to the environment, such as insufficient lighting, mats or slippery floors and unexpected obstacles.³

The implementation of fall prevention protocols has proved essential, not only to improve patient safety but also to avoid significant costs. One study demonstrated that the adoption of evidence-based programmes resulted in substantial savings for hospitals by reducing the expenses associated with preventable falls.⁴

Despite the extensive literature on falls in the hospital environment, most studies focus on inpatients and on the clinical factors associated with fall risk. However, individuals who form part of the hospital community, such as family members, companions and workers, also circulate within these environments and may be exposed to risks related to the physical characteristics of the space and to the organisational dynamics of healthcare institutions. Furthermore, caregivers and family members may present greater vulnerability associated with emotional and physical overload while accompanying the hospitalised patient.⁵ The limited body of scientific literature analysing falls in these groups highlights a gap in knowledge about the occurrence of these events beyond patients.

This study aims to characterise the reported falls in a large hospital in southern Brazil. The results of this work aim to contribute to the formulation of fall prevention strategies, promoting a safer environment both for patients and for the other members of the hospital community.

Methods

This is a cross-sectional, descriptive and retrospective study with a quantitative approach, developed in accordance with the guidelines of the *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE). Cross-sectional studies are characterised by the collection and analysis of data from a given group of people, in a single period and place. Descriptive research comprises the organisation and presentation of data, with the aim of describing characteristics and phenomena that express the reality observed in the study. The quantitative approach refers to the collection and analysis of numerical data relating to specific variables of interest, using descriptive and analytical statistics.⁶ All the reports of falls occurring throughout 2022 were selected.

The data were obtained from the institutional database, built from the reports of occurrences. These reports were submitted by healthcare professionals at the time the fall was identified, through the institution's computerised adverse-event reporting system, using a structured electronic form. The system requires the mandatory completion of all fields before the report is closed, ensuring the completeness of the information recorded. Accordingly, all fall reports submitted during the study period were included in the analysis, with no cases excluded due to incomplete data.

Access to the information was preceded by the signing of a Data Use Agreement (TCUD). The study population corresponded to the total number of reports made in 2022. The sample consisted of all the reports that were complete and contained the data of interest for this study, including falls involving patients, workers, companions and/or family members. The following variables of interest were extracted from the fall-occurrence reporting database and organised in a spreadsheet on the Google Sheets® platform. Sociodemographic variables and variables related to the occurrence of the fall were analysed. The sociodemographic variables included age and gender, while the event-related variables comprised the shift, the place and the department of the occurrence, as well as the associated factors and the consequences of the event. The data collected were organised in Excel® spreadsheets, stored on an electronic device for the exclusive use of the principal investigator and password-protected, ensuring the security, integrity and confidentiality of the information.

The data were organised and processed for subsequent export to the *Statistical Package for the Social Sciences* (SPSS®) 25.0 software. Descriptive statistical analysis was performed, with the results presented as absolute and relative frequencies for categorical variables. For quantitative variables, measures of central tendency and dispersion were used, presented as mean and standard deviation. The study was approved by the Research Ethics Committee (opinions no. 5.936.543 and no. 6.117.842).

Results

A total of 294 fall reports were recorded in the period analysed. Of these, 249 (84.7%) involved patients and 45 (15.3%) community members. Table 1 presents the detailed results of the characterisation of the falls recorded in the two groups – patients and community – from January to December 2022. The group designated “community” comprised the following categories: family members or companions 40 (88.9%) and institution workers 5 (11.1%). In the characterisation, a predominance of falls among patients aged 60 years or over was observed, as evidenced by the mean age. However, the events covered a wide age range, with ages between 1 and 97 years.

Table 1 - Characterisation of falls involving patients and the community (n=294) in a hospital institution, from January to December 2022. Porto Alegre. Rio Grande do Sul, Brazil, 2024.

Variables	Patients (n=249) n(%)	Community (n=45) n(%)
Age (years)	62.8(22.2)*	57.2(22.3)*
Gender (female)	131(52.6)	31(68.9)
Shift of Occurrence		
Morning	65(26.1)	9(20.0)
Afternoon	89(35.7)	16(35.6)
Night	95(38.2)	20(44.4)
Department of Occurrence		
Inpatient Unit	192(77.1)	27(60.0)
Maternity and Obstetric Centre	2(0.80)	4(8.9)
Outpatient Clinics and Medical Offices	14(5.6)	-
Examinations Department	10(4.0)	2(4.4)
Intensive Care Unit	5(2.0)	1(2.2)
Adult Emergency Department	21(8.4)	4(8.9)
Paediatric Emergency Department	1(0.4)	-
Operating Theatre and Recovery Room	4(1.6)	-
Outdoor area	-	6(13.4)
Reception	-	1(2.2)
Use of Fall-Risk Medication (yes)	163(65.5)	14(31.1)
Motor Deficit (yes)	91(36.5)	8(17.8)
Harm Resulting from the Fall		
No apparent harm	193(77.5)	30(66.7)
Contusion	-	6(13.4)
Abrasion	22(8.9)	4(8.9)
Haematoma	13(5.2)	1(2.2)
Oedema	8(3.2)	1(2.2)
Cut	6(2.4)	4(4.4)

Traumatic Brain Injury	4(1.6)	1(2.2)
Fracture	3(1.2)	-
Reason for the Fall		
Imbalance	71(28.5)	12(26.7)
Loss of strength	50(20.1)	5(11.1)
Slipping	39(15.7)	9(19.9)
Mental confusion	34(13.7)	-
Hypotension	29(11.6)	7(15.6)
Tripping	15(6.0)	8(17.8)
Related to equipment failure	7(2.8)	-
Related to human error	4(1.6)	4(8.9)

Source: Research data.

Notes: - Numerical value equal to zero, not resulting from rounding; * Mean and standard deviation.

Regarding the age of the patients, Figure 1 presents the distribution of falls (n = 249) by patient age group.

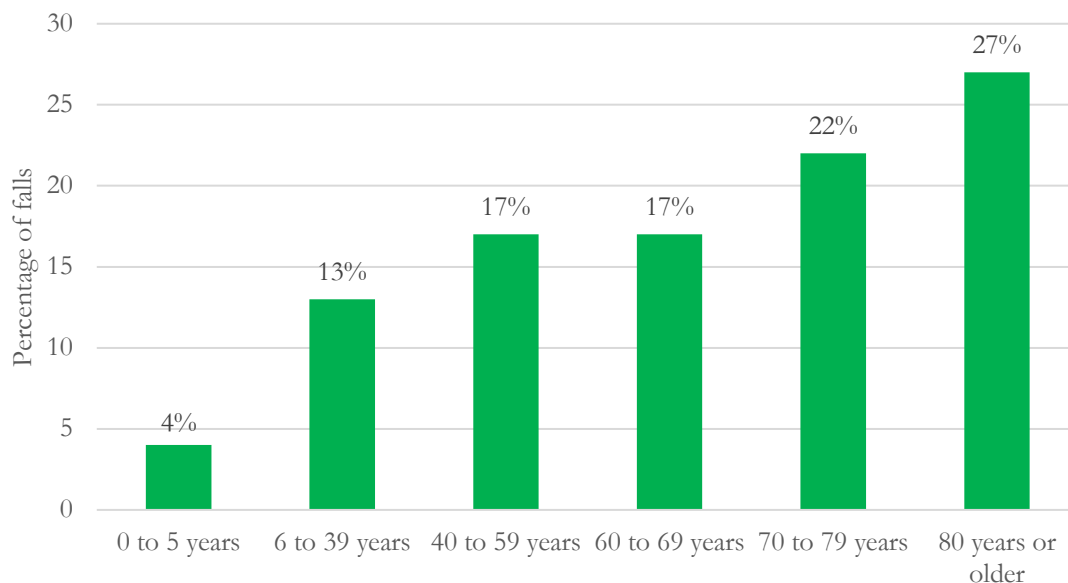


Figure 1 - Distribution of falls (n=294) by patient age group in a hospital institution, from January to December 2022. Porto Alegre. Rio Grande do Sul, Brazil, 2024.

Source: Research data.

The data by age group indicate that approximately 66% of cases occurred in individuals aged 60 years or over. In the community group, ages were concentrated among middle-aged adults. As for the months of the year with the highest number of cases, among patients, the months of August, with 28 (11.2%) occurrences, and January, with 26 (10.4%), stood out. In the community group, October recorded the highest number of fall cases, with 8 (17.8%) occurrences.

In the community group, 13 (28.9%) of the recorded falls required initial medical attention. Among patients, 58 (23.3%) prompted the request for further diagnostic tests following the event. Most falls among patients occurred in the patient's room 134 (53.8%), followed by the bathroom 84 (33.7%) and, to a lesser extent, other locations.

Motor deficit was identified in one third of the patients whose falls were recorded, whereas in the community group it was observed in one fifth of cases. A total of 137 (55.0%) had a physiotherapy prescription. Visual deficit was recorded in 2 cases (4.4%) of falls occurring in the community group.

In both groups, more than half of the falls caused no harm; however, in 22.5% of patients and 33.3% of the community, injuries such as contusions, abrasions, haematomas, oedemas, cuts, traumatic brain injuries and fractures were recorded. The mean age of the patients who suffered falls with fracture or traumatic brain injury was 73 ± 18.9 years.

As for the reasons for the falls, intrinsic factors predominated among patients 238 (95.5%), whereas in the community, although they were also more frequent 24 (53.3%), a significantly higher proportion of falls was associated with extrinsic factors 21 (46.7%), showing a greater influence of environmental elements in these events.

Among the 249 records of patient falls, 213 (85.5%) had an active fall prevention protocol; of these, 171 (68.7%) were classified as high risk, 61 (24.5%) medium risk, 6 (2.4%) low risk and 11 (4.4%) had no such information recorded.

As regards the timing of the patients' risk assessment, 112 (44.9%) had been assessed within the 12 hours preceding the fall, 104 (41.8%) between 12 and 24 hours, 1 (0.4%) between 24 and 72 hours and 32 (12.9%) had no record. Among the patients who suffered falls, 3 (1.2%) were under mechanical restraint. In addition, 97 (39.0%) of the episodes were witnessed by a companion, family member or healthcare professional, a circumstance that may have contributed to mitigating the impact of the event. Specifically, 63 falls (25.3%) occurred in the presence of a family member or companion, while 34 (13.7%) were witnessed by a healthcare professional.

The graph in Figure 2 shows the monthly distribution of falls, allowing a comparison between the occurrence of falls among patients and the community over the months.

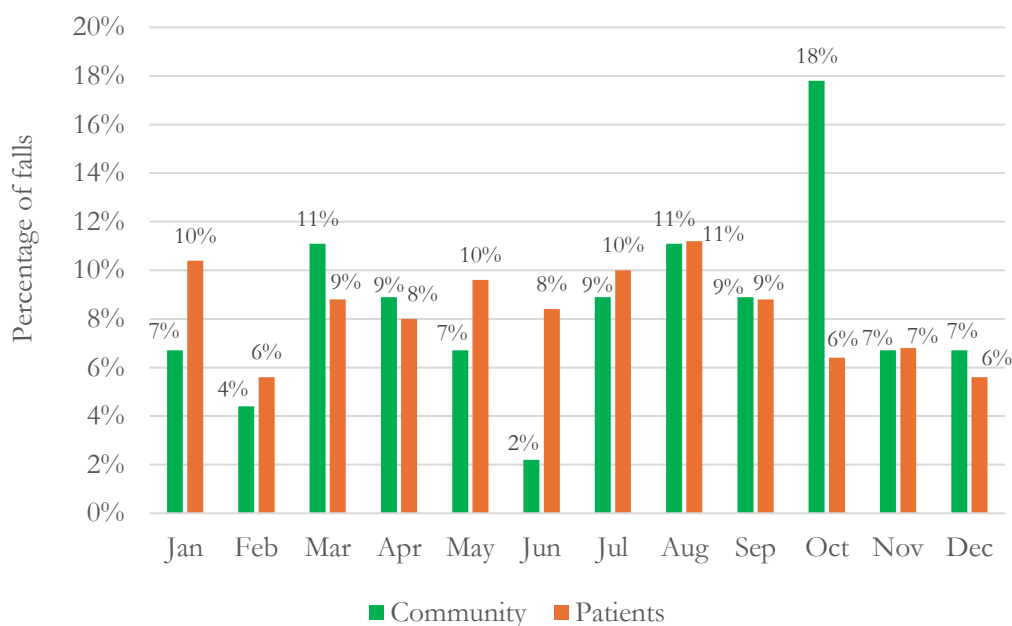


Figure 2 - Distribution of falls (n=294) by month of occurrence in a hospital institution, from January to December 2022. Porto Alegre. Rio Grande do Sul, Brazil, 2024.

Source: Research data.

Discussion

The results of this study showed that most falls occurred among older patients, mainly aged over 60 years, and were predominantly associated with intrinsic factors, such as imbalance and loss of strength. In contrast, in the community group, composed of family members, companions and workers, a considerable proportion of falls was related to extrinsic factors, such as trips and slips. These results make it possible to understand not only the profile of falls among hospitalised patients but also highlight the occurrence of these events among

members of the hospital community, extending the analysis beyond the group traditionally investigated in the literature.

In this study, the records were organised into two broad groups of specific populations: falls occurring in the community and patient falls. Although the scientific literature on falls in the hospital environment is vast, there is a notable scarcity of studies focusing on falls involving community members. This gap in specific research on this phenomenon is particularly relevant, considering the fundamental role that these community members play in providing care and support to hospitalised patients. In this study, 45 occurrences (15.3%) involved falls of community members. Although they represent a lower percentage compared with patient falls, they constitute a considerable number, with significant impacts both for the institution and for society. Most of these falls occurred among companions and family members, who represent the majority of cases, possibly because workers are better prepared to deal with the risks of the hospital environment, which is more familiar to them. Studies corroborate that caregivers, such as family members and companions, face greater health vulnerabilities due to the demands of their role and the difficulty of prioritising self-care.^{5,7}

In the analysis of falls by age, the results indicate that the mean age was 62.8 years for patients and 57.2 years for community members. It is likely that patients are predominantly older, given that hospitals generally treat a population with a variety of clinical conditions that tend to manifest at more advanced ages.^{8,9} In this context, the community outside the hospital environment, composed of employees, family members and companions, is naturally younger when compared with hospitalised patients.

Although the mean age of the patients was 62.8 years, particular attention should be drawn to the age group of 80 years or over, which totalled 67 cases, corresponding to 26.9% of the total. Falls among older adults in this age group are associated with a significantly increased risk of serious injury, as evidenced in this study. Among the patients who presented fracture or traumatic brain injury (TBI), the mean age was 73 years, with a standard deviation of 18.9. This finding reinforces what is widely described in the literature, which identifies older adults as the group most vulnerable to the adverse consequences of falls, due to the presence of comorbidities, musculoskeletal frailty and a higher risk of complications after trauma.^{10,11} In addition to the direct impact on physical health, injuries such as hip fractures and TBI are frequently associated with prolonged morbidity and increased mortality.^{12,13}

Regarding the characteristics of falls among patients and community members, the study revealed no significant differences between the sexes of the individuals who suffered falls. However, a predominance of the female sex was observed, with 162 cases (55.1%) of all reports. This trend is corroborated by other researchers, who associate this finding with several factors that make falls more common among women. For example, the higher incidence of osteoporosis and post-menopausal hormonal changes can affect postural balance, in addition to the reduction in muscle mass.¹⁴

Furthermore, in the community group, the predominance of the female sex was even more marked, with 31 cases (68.9%). This result may be attributed to the fact that a greater number of women undertake the role of caregiver compared with men.¹⁵

The night shift proved the most susceptible to the occurrence of falls, both among patients, with 95 cases (38.2%), and among community members, with 20 cases (44.4%). This finding is in line with Jahangiri et al. (2024), who highlight the combined influence of intrinsic factors such as sleep-related physiological changes and medication effects; and extrinsic factors such as insufficient lighting and reduced supervision, in increasing the risk of falls in hospital settings.^{3,10}

In the community context, although intrinsic factors remained more frequent, there was a considerably higher proportion of falls associated with extrinsic factors. This finding suggests that adverse environmental conditions, such as insufficient lighting, lack of familiarity with the space and inadequate layout of the environment, may have contributed to the high occurrence of falls, especially during the night period. In contrast, in the patient context, falls showed a closer association with intrinsic factors.

One of the intrinsic factors identified in the present study was medication use, whose prevalence was significantly higher among patients 163 cases (65.5%) compared with the community 14 cases (31.1%). The literature has pointed to psychotropic drugs, including antidepressants, anticholinergics, benzodiazepines and antipsychotics, as agents that increase the risk of falls. Their administration, although frequent during the daytime, tends to be more concentrated during the night shift.^{16,17}

In addition, the use of multiple sleep medications was associated with a higher recurrence of falls in the same patient.¹⁸

In view of these findings, the importance of implementing strategies aimed at improving safety during the night shift becomes evident. Measures such as optimising lighting, reorganising the environment and carefully reviewing medication prescriptions can be fundamental to reducing the risk of falls during this period and promoting the safety of patients and community members.

The analysis of the monthly distribution of falls identified peaks in August (11.2%) and January (10.4%) among patients, and in October (17.8%) in the community group. These periods may reflect seasonal and institutional factors, such as the increase in hospital admissions for respiratory diseases during the winter (July–August) and the greater influx of visitors in October, potentially associated with seasonal events or adverse weather conditions. Changes in hospital dynamics, such as staff holiday periods and higher bed occupancy rates, can also overload care teams and compromise supervision.¹⁹

As for the location of the falls, it was observed, in general, that most occurred in the inpatient units, with 219 cases (74.5%), of which 27 (60.0%) were recorded in the community group and 192 (77.1%) among patients. These results are in line with previous studies, which also identified these environments as high-risk areas for hospital falls. This may be attributed to the prolonged stay of patients and companions in these units, which increases the opportunities for falls to occur.^{1,20}

Departments such as the Intensive Care Unit (ICU), the Paediatric Emergency Department, the operating theatre and recovery room, and the maternity and obstetric centre showed a low incidence of falls in this study. This trend may be attributed to the fact that these are departments with greater supervision by professionals, due to the critical condition of the patients admitted there.^{21,22}

The results of this study identified patients' rooms 129 (51.8%), and bathrooms 76 (30.5%) as the most frequent locations of falls, while corridors, waiting rooms and staircases accounted for a lower proportion. These findings corroborate the literature. The prevalence of falls in these locations may be attributed to factors such as the reduced mobility of patients in their rooms and slippery surfaces in bathrooms, which highlights the importance of targeted interventions, such as the installation of grab rails and the adaptation of the physical space.²³

Hospitalisation is consistently identified, in several studies, as a significant factor in increasing the risk of falls among patients. This relationship is influenced by a variety of interconnected factors. One such factor is prolonged immobility during hospitalisation, which can result in the loss of muscle strength and balance, compromising patients' ability to move safely. Physical deconditioning resulting from inactivity during the hospital stay further aggravates vulnerability to falls, due to muscle weakness and decreased physical endurance. In addition, cognitive changes, such as confusion or disorientation, can impair cerebral control of gait and the perception of risk situations.^{24,25}

The costs avoided by implementing fall prevention programmes are relevant in the hospital context. One study found that, after the adoption of an evidence-based fall prevention programme, there was an estimated saving of US\$14,600 in net avoided costs per 1,000 patient-days, which highlights the positive financial impact of these interventions.⁴ This reinforces the importance of such programmes, not only in terms of patient safety, but also in terms of the efficiency and sustainability of healthcare services. In this study, further diagnostic tests were requested in 58 cases (23.3%) after the fall, in order to investigate possible harm, which suggests a financial cost that could have been avoided with adequate preventive actions.

Furthermore, it is interesting to note that most of the patients who suffered falls already had a physiotherapy prescription, totalling 137 cases (55.0%), which may suggest that this population already had some degree of functional impairment. It is also worth noting that 91 patients (36.5%) had a motor deficit prior to the fall. This correlation strengthens the understanding of the importance of these intrinsic factors in the occurrence of falls during hospitalisation and encourages the consideration of strategies that include the promotion of exercise and/or referral for physiotherapy assessment as preventive measures.²⁶ These findings reinforce that most patient falls were related to intrinsic factors, with imbalance being the most common reason, with 71 cases (28.5%), followed by loss of strength with 50 cases (20.1%) and mental confusion with 34 cases (13.7%).

In the community group, the high proportion of falls associated with extrinsic factors suggests a greater influence of environmental conditions on the occurrence of these events. Elements such as insufficient lighting, inadequate signage, slippery floors and architectural barriers can contribute to an increased risk of falls among family members and companions, especially as these are individuals who are often unfamiliar with the hospital environment.³

With regard to the harm resulting from falls, most incidents did not result in apparent harm, both among patients, with 193 cases (77.5%), and in the community, with 30 cases (66.7%). This finding is in line with the results of other studies.^{8,23} However, even in the absence of physical harm, the occurrence of a fall is directly associated with psychosocial consequences, such as the fear of falling again, which can lead to restricted mobility and loss of autonomy.^{12,13}

Other results obtained in this study indicate a promising trend regarding the implementation of fall prevention interventions. The high rate of fall risk assessment among patients suggests a growing awareness of the importance of early identification of risk factors. In addition, the implementation of the fall prevention protocol

in 213 (85.5%) of the cases demonstrates significant adherence to good practice guidelines, showing the healthcare team's commitment to mitigating the risks associated with falls.^{27,28}

Furthermore, in 97 (39.0%) falls recorded among patients there was assistance at the time of the event, from family members, companions or healthcare professionals, which may have contributed to mitigating the impact of the event and reducing the occurrence of harm. This finding reinforces the importance of supervision during patient mobilisation as a preventive measure.²⁹

However, despite the high proportion of patients with an active fall prevention protocol at the time of the event 213 (85.5%), the occurrence of falls in this group shows that the presence of the protocol does not, in itself, guarantee the effective prevention of these events. In the hospital context, particularly among older patients, many individuals present multiple intrinsic risk factors, which means that a large part of the inpatient population is already classified as being at high risk of falls. In this scenario, recent guidelines indicate that the isolated use of risk stratification instruments has limited usefulness, and a more comprehensive approach based on continuous clinical assessment and the implementation of multifactorial interventions is recommended.²⁹

These findings also align with international patient safety recommendations. Organisations such as the World Health Organization and the Joint Commission recognise fall prevention as a priority in healthcare safety programmes, emphasising the systematic identification of risks, the implementation of institutional protocols and the active involvement of patients and family members in preventive strategies. In the Brazilian context, such recommendations are aligned with national patient safety policies, which encourage the implementation of institutional protocols and the strengthening of the safety culture in healthcare organisations.^{30,31}

Conclusion

It was found that most falls occurred among older patients, particularly those aged over 60 years, whereas in the community, composed of companions, family members and healthcare professionals, they were more frequent among middle-aged adults. Among patients, falls were predominantly associated with intrinsic factors, such as imbalance and loss of strength. In the community, although intrinsic factors remained slightly more prevalent, a high proportion of falls was related to extrinsic factors, especially trips and slips. The results indicate that the presence of the protocol alone may not be sufficient to prevent falls, reinforcing the need for multifactorial interventions adapted to the clinical and functional characteristics of patients. These findings reinforce the need for evidence-based prevention strategies, with interventions adapted to each group. From a practical point of view, it is recommended that educational actions for patients, companions and healthcare professionals be strengthened, with an emphasis on continuing education. In terms of management, it is essential to periodically review the protocols and invest in adapting the hospital environment, including improvements in lighting and the installation of grab rails.

Immediate assistance during falls proved relevant in reducing harm, demonstrating readiness and effectiveness in the response. At the same time, the economic benefits of prevention programmes are highlighted, not only in safeguarding patient safety, but also in the efficiency and sustainability of healthcare services, considering the costs associated with examinations and the treatment of injuries.

Ultimately, this study broadens the understanding of falls in the hospital context and underlines the need for continuous preventive strategies, both for patients and for the hospital community. These results may also serve as a basis for policies and practices aimed at reducing the incidence of falls and improving clinical and organisational outcomes. It is recommended that future research explore in depth the factors associated with falls in the community, including longitudinal studies to assess the impact of interventions over time.

Study limitations

This study has some limitations that should be considered. The use of secondary data from incident reports may have resulted in under-reporting, since not all falls that occurred may have been recorded, given that the process depends on a professional taking the initiative to submit the report. In addition, there may be information biases associated with the quality or accuracy of the records made by healthcare professionals at the time of reporting. Furthermore, the focus on a single hospital institution limits the generalisation of the results to other contexts. The retrospective design and the absence of a qualitative analysis restrict the understanding of contextual factors and the perceptions of those involved. Additionally, the absence of follow-up of individuals after the event prevents the assessment of late outcomes or possible recurrences of falls.

Authorship and Contributions

JRTS: Study conception and design; data collection; analysis and interpretation of data; drafting of the manuscript; approval of the final version of the manuscript and taking responsibility for it.

AAP: Study conception and design; critical review of the manuscript; approval of the final version of the manuscript and assumption of responsibility for it.

AAAL: Study conception and design; critical review of the manuscript; approval of the final version of the manuscript and assumption of responsibility for it.

MCMPM: Critical review of the manuscript; approval of the final version of the manuscript and assumption of responsibility for it.

CCM: Critical review of the manuscript; approval of the final version of the manuscript and assumption of responsibility for it.

SMC: Critical review of the manuscript; approval of the final version of the manuscript and assumption of responsibility for it.

ELP: Critical review of the manuscript; approval of the final version of the manuscript and assumption of responsibility for it.

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No conflicts of interest were declared by the author(s).

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Data availability statement

The data underpinning the results of this study are available upon receipt of a reasoned request to the corresponding author, subject to ethical and confidentiality restrictions designed to protect participants' privacy.

References

1. Hong L, Dong Y, Zhou W, Wang C, Jiang H, Wang P, Sun Y. Incidence and clinical characteristics of fall-related injuries among older inpatients at a tertiary grade a hospital in Shandong province from 2018 to 2020. *BMC Geriatr* [Internet]. 2022 [cited 2023 Jan 16];22(1):632. Available from: <https://doi.org/10.1186/s12877-022-03321-y>
2. Peterson AB, Kegler SR. Deaths from fall-related traumatic brain injury - United States, 2008-2017. *MMWR Morb Mortal Wkly Rep* [Internet]. 2020 [cited 2023 Jan 16];69(9):225-30. Available from: <https://doi.org/10.15585/mmwr.mm6909a2>
3. Jahangiri S, Abdollahi M, Patil R, Rashedi E, Azadeh-Fard N. An inpatient fall risk assessment tool: application of machine learning models on intrinsic and extrinsic risk factors. *Mach Learn Applic* [Internet]. 2024 [cited 2025 Jan 17];15:100519. Available from: <https://doi.org/10.1016/j.mlwa.2023.100519>
4. Dykes PC, Curtin-Bowen M, Lipsitz S, Franz C, Adelman J, Adkison L, et al. Cost of inpatient falls and cost-benefit analysis of implementation of an evidence-based fall prevention program. *JAMA Health Forum* [Internet]. 2023 [cited 2024 Jan 17];4(1):e225125. Available from: <https://doi.org/10.1001/jamahealthforum.2022.5125>
5. Sabo K, Chin E. Self-care needs and practices for the older adult caregiver: an integrative review. *Geriatr Nurs*. [Internet]. 2021 Mar [cited 2023 Jan 17];42(2):570-81. Available from: <https://doi.org/10.1016/j.gerinurse.2020.10.013>
6. Zangirolami-Raimundo J, Echeimberg JO, Leone C. Research methodology topics: cross-sectional studies. *J. Hum. Growth Dev.* [Internet]. 2018 [cited 2023 Jan 21];28(3):356-60. Available from: <https://doi.org/10.7322/jhgd.152198>
7. Ziesemer NB, Lüders D, Gonçalves CG, Hey AP, Guarinello AC, Massi G. Perfil de cuidadores formais domiciliares de idosos em um cenário sul brasileiro. *Res Soc Dev* [Internet]. 2020 Nov 27 [cited 2023 Fev 3];9(11):2-12. Available from: <https://doi.org/10.33448/rsd-v9i11.10111>
8. Amorim JSCD, Souza MAN, Mambrini JVM, Lima-Costa MF, Peixoto SV. Prevalência de queda grave e fatores associados em idosos brasileiros: resultados da pesquisa nacional de saúde, 2013. *Ciênc Saúde Colet* [Internet]. 2021 Jan [cited 2023 Fev 3];26(1):185-96. Available from: <http://dx.doi.org/10.1590/1413-81232020261.30542018>
9. Luna-Rodríguez ME, Aranda-Gallardo M, Canca-Sánchez JC, Moya-Suárez AB, Vázquez-Blanco MJ, Morales-Asencio JM. Perfil del paciente que sufre caídas en el entorno hospitalario: estudio multicéntrico.

Enferm Clin [Internet]. 2020 Jul [cited 2023 Mar 15];30(4):236-43. Available from: <http://dx.doi.org/10.1016/j.enfcli.2019.05.005>

10. Okrah AK, Tharrington S, Shin I, Wagoner A, Woodsmall KS, Jehu DA. Risk factors for fall-related mild traumatic brain injuries among older adults: A systematic review highlighting research gaps. *Int J Environ Res Public Health* [Internet]. 2025 Feb 11 [cited 2025 Mar 15];22(2):255. Available from: <https://doi.org/10.3390/ijerph22020255>

11. Forssten SP, Ahl Hulme R, Forssten MP, Ribeiro MAF Jr, Sarani B, Mohseni S. Predictors of outcomes in geriatric patients with moderate traumatic brain injury after ground level falls. *Front Med* [Internet]. 2023 Dec 12 [cited 2024 Mar 15];10:1290201. Available from: <https://doi.org/10.3389/fmed.2023.1290201>

12. Peterson AB, Kegler SR. Deaths from fall-related traumatic brain injury - United States, 2008-2017. *MMWR Morb Mortal Wkly Rep* [Internet]. 2020 [cited 2024 Mar 02];69(9):225-30. Available from: <http://dx.doi.org/10.15585/mmwr.mm6909a2>

13. Giovannini S, Brau F, Galluzzo V, Santagada DA, Loreti C, Biscotti L, et al. Falls among older adults: screening, identification, rehabilitation, and management. *Appl Sci* [Internet]. 2022 [cited 2025 Jul 22];12(15):7934. Available from: <https://www.mdpi.com/2076-3417/12/15/7934>

14. Inoue T, Maeda K, Nagano A, Shimizu A, Ueshima J, Murotani K, et al. Related factors and clinical outcomes of osteosarcopenia: A narrative review. *Nutrients* [Internet]. 2021 Jan 20 [cited 2025 Jul 22];13(2):291. Available from: <http://dx.doi.org/10.3390/nu13020291>

15. Sousa GS, Silva RM, Reinaldo AMS, Soares SM, Gutierrez DMD, Figueiredo MLF. “A gente não é de ferro”: vivências de cuidadores familiares sobre o cuidado com idosos dependentes no Brasil. *Ciênc Saúde Colet* [Internet]. 2021 Jan [cited 2025 Jul 22];26(1):27-36. Available from: <http://dx.doi.org/10.1590/1413-81232020261.30172020>

16. Gallagher E, Mehmood M, Lavan A, Kenny RA, Briggs R. Psychotropic medication use and future unexplained and injurious falls and fracture amongst community-dwelling older people: data from TILDA. *Eur Geriatr Med* [Internet]. 2023 Jun [cited 2025 Jul 22];14(3):455-63. Available from: <http://dx.doi.org/10.1007/s41999-023-00786-x>

17. Li SJ, Hwang HF, Yu WY, Lin MR. Potentially inappropriate medication use, polypharmacy, and falls among hospitalized patients. *Geriatr Gerontol Int* [Internet]. 2022 Oct [cited 2025 Jul 22];22(10):857-64. Available from: <http://dx.doi.org/10.1111/ggi.14473>

18. Kobayashi K, Ando K, Nakashima H, Suzuki Y, Nagao Y, Imagama S. Relationship between use of sleep medication and accidental falls during hospitalization. *Nagoya J Med Sci* [Internet]. 2021 Nov [cited 2025 Jul 22];83(4):851-60. Available from: <http://dx.doi.org/10.18999/nagjms.83.4.851>

19. Stolt LROG, Kolish DV, Cardoso MRA, Tanaka C, Vasconcelos EFS, Pereira EC, et al. Quedas acidentais em mulheres de meia-idade. *Rev Saúde Pública* [Internet]. 2020 Dec 12 [cited 2025 Jul 23];54:141. Available from: <http://dx.doi.org/10.11606/s1518-8787.2020054002579>

20. Garcia A, Bjarnadottir RRI, Keenan GM, Macieira TGR. Nurses' perceptions of recommended fall prevention strategies: A rapid review. *J Nurs Care Qual* [Internet]. 2022 Jul-Sep 01 [cited 2025 Jul 23];37(3):249-256. Available from: <https://doi.org/10.1097/NCQ.0000000000000605>

21. Specht AM, Sousa GP, Beghetto MG. Incidence of falls in a cohort of critical adults: a cause for concerns? *Rev Gaucha Enferm* [Internet]. 2020 [cited 2024 Nov 23];41(spe):e20190167. Available from: <https://doi.org/10.1590/1983-1447.2020.20190167>

22. Mikos M, Banas T, Czerw A, Banas B, Strzpek Ł, Curylo M. Hospital inpatient falls across clinical departments. *Int J Environ Res Public Health* [Internet]. 2021 [cited 2024 Nov 10];18(15):8167. Available from: <https://doi.org/10.3390/ijerph18158167>

23. Hermann AP, Medeiros ARP, Zanescio C, Andrade IM, Wolff LD, Figueiredo KC, et al. Quedas entre pacientes internados em um hospital público e de ensino. *REME* [Internet]. 2023 [cited 2025 Jul 23];27:2-8. Available from: <https://periodicos.ufmg.br/index.php/reme/article/view/38457>

24. Araujo EAKD, Leite Junior HMT, Santana RF, Pinheiro DS. Capacidade funcional de idosos na internação e três meses do pós-alta hospitalar. *Estud Interdiscipl Envelhec* [Internet]. 2021 [citado 2024 Nov 10];26(1):112-23. Available from: <http://dx.doi.org/10.22456/2316-2171.93511>



25. Pieruccini-Faria F, Sarquis-Adamson Y, Anton-Rodrigo I, Noguerón-García A, Bray NW, Camicioli R, et al. Mapping associations between gait decline and fall risk in mild cognitive impairment. *J Am Geriatr Soc* [Internet]. 2019 Dec 17[cited 2025 Jan 23];68(3):576-84. Available from: <http://dx.doi.org/10.1111/jgs.16265>
26. Sherrington C, Fairhall N, Kwok W, Wallbank G, Tiedemann A, Michaleff ZA, et al. Evidence on physical activity and falls prevention for people aged 65+ years: systematic review to inform the WHO guidelines on physical activity and sedentary behaviour. *Int J Behav Nutr Phys Act* [Internet]. 2020 Nov 26 [cited 2025 Jul 23];17(1):110-28. Available from: <http://dx.doi.org/10.1186/s12966-020-01041-3>
27. Alanazi FK, Lapkin S, Molloy L, Sim J. The impact of safety culture, quality of care, missed care and nurse staffing on patient falls: A multisource association study. *J Clin Nurs* [Internet]. 2023 [cited 2025 Jul 27];32(19-20):7260-7272. Available from: <https://doi.org/10.1111/jocn.16792>
28. Sena AC, Alvarez AM, Nunes SFL, Costa NP. Nursing care related to fall prevention among hospitalized elderly people: An integrative review. *Rev Bras Enferm* [Internet]. 2021 [cited 2025 Jul 27];74Suppl 2(Suppl 2):e20200904. Available from: <https://doi.org/10.1590/0034-7167-2020-0904>
29. McKercher JP, Peiris CL, Hill AM, Peterson S, Thwaites C, Fowler-Davis S, et al. Clinical practice guidelines for hospital falls: a global analysis and systematic review. *Age Ageing* [Internet]. 2024 [cited 2025 Jul 27];53(7):afae149. Available from: <https://doi.org/10.1093/ageing/afae149>
30. World Health Organization. Global patient safety action plan 2021–2030: towards eliminating avoidable harm in health care [Internet]. Geneva: World Health Organization; 2021 [cited 2025 Jul 27]. Available from: <https://www.who.int/publications/i/item/9789240032705>.
31. Brasil. Ministério da Saúde. Portaria nº 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP) [Internet]. Brasília: Ministério da Saúde; 2013 [cited 2025 Jul 27]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/gm/2013/prt0529_01_04_2013.html