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COVID-19 and the Elderly: A Paradox of Increased Fall Incidents and Improved Functional Status Among Institutionalized Elders

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Abstract

The COVID-19 pandemic has had a profound impact on institutionalized older adults, yet its effect on fall risk remains poorly understood. This study aimed to assess the prevalence of fall risk and to identify associated factors in this population following the pandemic. A comparative analysis across several institutions revealed a paradoxical increase in fall incidence despite improvements in functional status, particularly among individuals aged 80 years and older. No significant changes were observed in medication use, a well-established fall risk factor. However, there was a notable decrease in reported auditory deficits and a shift in self-perceived health status, with a greater proportion of participants rating their health positively post-pandemic. These results highlight the multifactorial nature of fall risk, emphasizing the importance of comprehensive prevention strategies that address physical, behavioral, and environmental determinants. This study contributes to understanding the complex interactions between the pandemic and fall risk among institutionalized elders and underscores the need for healthcare providers and policymakers to prioritise the wellbeing and safety of this vulnerable population during ongoing and future public health challenges.

Keywords: COVID-19; institutionalized elders; falls; risk factors; health and well-being

1. Introduction

The aging population has been on the rise due to declining birth and mortality rates, as well as enhanced healthcare [1]. This process brings physiological, morphological, biochemical, and emotional changes. It is characterized by a progressive loss of physical and sensory functions, making individuals more vulnerable and prone to developing new diseases that may affect their autonomy and independence [1].

These aging-induced transformations result in physical and mental changes and functional decline. The body gradually loses the ability to maintain homeostasis, and there's an increase in vulnerability to diseases and stress, loss of bone density, decrease in muscle strength and tone, and weight [2]. These changes make older adults more susceptible to fractures, kyphosis, and loss of flexibility and endurance [2].

Consequently, balance loss, or the inability to recover it, increases the likelihood of falls, defined as an event resulting in an individual inadvertently landing on the ground, floor, or lower level, potentially leading to fatal or non-fatal injuries [3]. Falls are more frequent in the elderly due to the associated risks, which may cause more harm given their physical condition [4].

Falls have multifactorial causes, both extrinsic (environmental changes, poor lighting, use of rugs) and intrinsic (physical diseases, neurological alterations, sensory impairment). They pose many

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challenges and, beyond physical dangers, falls carry severe psychological and social consequences [2,5–9].

According to WHO, falls are deemed a serious public health problem, with an estimated 684,000 fatal falls occurring annually, making it the second leading cause of accidental injury-related deaths [3]. Considered a social, economic, and political issue, it should be treated as a concern for society since it has a massive impact on the functionality of the elderly at personal, social, community, and economic levels. Therefore, it becomes crucial to identify the main causes and consequences to act on prevention [5,10,11].

Longevity and cognitive changes are linked to the likelihood of institutionalizing an elderly person [12]. It's important to note that falls are more prevalent and pose greater risks in elder care facilities than in other environments [12–14]. Around 60% of residents in these homes experience falls yearly, and approximately half fall multiple times [2,15,16]. Injuries related to falls are considered the primary reason for hospitalization among these residents [17].

Elderly Residential Structures (ERS) serve as a social response destined for collective accommodation, either temporary or permanent. Here, social support activities are developed, and nursing care is provided. The objectives of these structures are: to provide permanent services suited to the biopsychosocial issues of the elderly; contribute and stimulate the process of active aging; create conditions that encourage intra-family relationships; and enhance social integration [18].

People living in institutions are subject to several risks that circumstantially increase the likelihood of falling. Such factors include lower limb weakness, postural instability, functional incapacity, dizziness, decreased visual and auditory acuity, arthritis, depression, and polypharmacy. The appreciation and interaction among various risk factors are important for clinical situation assessment and fall prevention, as well as their consequences [2,5,6,13,14].

However, in recent global events, with the COVID-19 pandemic, new challenges to the issue of falls in the aging population have risen. As the body's immunity declines with age, elderly patients hospitalized due to COVID-19 might be at higher mortality risk [18]. Aging itself was found to be the most important risk factor associated with mortality and morbidity one year after diagnosis of COVID-19. People with disabilities institutionalized or low socioeconomic status is significantly more likely to have more health issues after COVID-19 [19].

Moreover, frailty, a condition often associated with aging, was found to be positively associated with COVID-19 hospitalization once infected, independent of sociodemographic and lifestyle factors [20]. This suggests that frailty could potentially increase the risk of falls in the elderly during the pandemic, as hospitalization often leads to decreased physical activity and increased bed rest, which can contribute to muscle weakness and balance issues.

By adding a new layer of complexity to the issue of falls in the aging population, it is crucial to consider the impacts of the pandemic when addressing this issue which leads to the need to understand how the paradigm of risk of falls have shifted, particularly when it comes to ERS.

Given the onset of COVID-19, more than ever, it is imperative to shed light on how the pandemic has shifted the risk of falls among the institutionalized elderly, specifically within the Portuguese context. This understanding is fundamental to devise effective strategies to minimize this heightened risk and boost their quality of life. Therefore, this research intends to evaluate the prevalence of fall risk in elderly residential structures in Portugal and to identify the factors that have contributed to the changes in fall risk in the aftermath of the COVID-19 pandemic. This, in turn, will guide the proposition of pertinent strategies and interventions tailored to this new landscape.

2. Materials and Methods

This study is part of a broader project investigating and implementing a fall risk assessment protocol in elderly residential institutions. The protocol incorporated a range of assessments including a socio-demographic questionnaire, health and biological aspects, pain evaluation, fall risk assessment, Barthel Index, 6-item Cognitive Impairment Test (6CIT), Timed Get Up and Go (TUG) Test, and Tinetti's mobility and balance evaluation.

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This quantitative, correlational, descriptive study adopted a non-probabilistic convenience sampling technique. The study holds pertinence due to its potential to contribute to the identification of fall-associated risks in elderly residential institutions, thereby enabling subsequent interventions to reduce fall incidences.

The protocol was applied to residents in thirteen elderly residential structures in the central region of Portugal, during the clinical training of "Nursing in Elderly Health and Geriatrics" as part of the bachelor's degree in nursing. The protocol was implemented by third and fourth-year nursing students over two years, from September 2018 to December 2022. Data was separated into two moments, before February 2020 (pre-COVID) and between September 2021 and December 2022 (post-COVID).

Inclusion criteria for the study were: residency in one of the residential structures, age over 65 years, and others. Exclusion criteria included diagnosed dementia, immobility, and day center attendees. Nursing students selected participants during their clinical teaching. The selection was based on convenience, and students chose one resident to whom they applied the protocol, subsequently developing a care plan based on the potential frailties identified through protocol analysis.

Data collection entailed two steps: an interview (data collection) and scale and test applications. In the initial stage, socio-demographic information was gathered, including age, gender, and education. Biological and health data included self-perception of their health status, visual and auditory deficits, and regular medications. Information regarding fear of falling was also collected.

In the second stage, scales were employed. Through the Barthel Index, we assessed the elders' level of independence in performing ten daily living activities. Data were collected via direct observation, clinical systems, and resident interviews.

The 6CIT, a brief and simple cognitive screening tool, was used to identify any potential cognitive impairment among the elderly. The Timed Up and Go Test assessed the gait's ability, quality, and timing. It also evaluated the functional mobility and balance of the elderly, both residents in institutions and others. The test procedure was explained to the elder before administration.

Tinetti's Test was applied to classify aspects of the march such as speed, step distance, symmetry, and balance standing up, turning, and with closed eyes. The test was divided into static and dynamic balance, with only a single application.

Beyond these tests, data concerning the number of falls, the circumstances, and the timing of each event were meticulously recorded. This allowed for a multi-dimensional understanding of the factors contributing to the risk of falls in these institutions and how the pandemic may have influenced these dynamics.

The collected data were analyzed using the statistical software SPSS version 28. For the analysis of the data, rigorous statistical techniques were applied. Comparisons between the pre- and post-COVID data were conducted using the appropriate statistical tests, either paired sample t-tests or Wilcoxon signed-rank tests, or Spearman's or Pearson's correlations, depending on the distribution and type of data.

The results were subsequently interpreted in the context of the current literature, providing valuable insights into the alterations in fall risk dynamics in the COVID-19 scenario. This understanding is expected to contribute significantly to developing efficient prevention strategies and interventions, enhancing the care of our elderly population during these challenging times.

3. Results

The study sample comprised 193 individuals surveyed before the onset of the COVID-19 pandemic (pre-COVID group) and 243 individuals surveyed after the onset of the pandemic (post-COVID group). The pre-COVID group had a mean age of 46.7 years (SD=18.2), with 54.9% (n=106) being female. The post-COVID group had a slightly higher mean age of 47.9 years (SD=18.7), with a similar gender distribution, 56.8% (n=138) being female. No statistically significant difference was found in the mean ages of the two groups [t(437)=-1.151; p=.250; d =-.111 95% CI [-.299;.078]], as well

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as no significant association was found between the gender distribution and the moment when data was collected [$X^2(1)=3.447$; p=.063].

The participants' self-perception of their health status was also examined. In the pre-COVID group, 10.3% (n=20) rated their health as very good, 54.4% (n=106) as good, 33.8% (n=66) as bad, and 1.5% (n=3) as very bad. In contrast, in the post-COVID group, 3.7% (n=9) rated their health as very good, 63.8% (n=155) as good, 30.0% (n=73) as bad, and 2.5% (n=6) as very bad, with the presence of a statistically significant association between the variables [$X^2(3)=9.579$; p=.023].

In the pre-COVID period, certain factors contributed to the risk of falls. However, in the post-COVID period, the dynamics changed significantly.

In relation to the factors influencing the risk of falling, in what concerns medication use, a majority of the participants were taking 5 or more medications in both periods (87.2% pre-COVID and 91.4% post-COVID). However, the changes due to COVID-19 did not significantly affect the number of medications used by the participants [$X^2(3)=.109$; p=.991].

There was no significant association in the gender distribution of fall incidents between the pre-COVID and post-COVID periods. The percentage of falls among females was 76.9% in the pre-COVID period and 84.0% in the post-COVID period. Similarly, the percentage of falls among males was 23.1% in the pre-COVID period and 16.0% in the post-COVID period. These associations are not statistically significant [$X^2(1)=3.447$; p=.063].

Risk factors

Our analysis also examined the presence of sensory deficits, specifically visual and auditory deficits, in the pre-COVID and post-COVID periods. For auditory deficits, we found a significant difference between the two periods. In the pre-COVID period, 61.5% (n=120) of the participants reported having an auditory deficit. This percentage decreased to 50.4% (n=123) in the post-COVID period. The association between the presence of auditory deficits and the assessment period was statistically significant [$X^2(1)=5.431$; p=.020], suggesting a decrease in reported auditory deficits in the post-COVID period. On the other hand, the presence of visual deficits did not significantly differ between the two periods. In the pre-COVID period, 18.5% (n=36) of the participants reported having a visual deficit, compared to 22.1% (n=54) in the post-COVID period. The association between the presence of visual deficits and the assessment period was not statistically significant [$X^2(1)=.895$; p=.344], indicating that the reported visual deficits remained relatively stable across the two periods.

Regarding functional independence changes between the two periods, the Barthel Index scores, which evaluate the participant's ability to perform activities of daily living, showed a slight increase in the post-COVID period (Mean=75.80, SD=19.544) compared to the pre-COVID period (Mean=72.10, SD=21.811). However, the statistical analysis of these scores did not reveal a significant difference between the pre-COVID and post-COVID periods [t(437)=-1.870, p=.062; d =-.180 95% CI [-.368;.009]].

The Six Item Cognitive Impairment Test (6CIT), which evaluates cognitive performance, showed a slight increase in the mean score in the post-COVID period (Mean=11.61, SD=7.793) compared to the pre-COVID period (Mean=10.77, SD=8.025). However, the statistical analysis did not reveal a significant difference between the two periods [t(437)=-1.109; p=.268; d =-.107 95% CI [-.295;.082]].

As for the Timed Up and Go (TUG) test, which assesses the participants' mobility and balance, showed a slight increase in the mean-time taken to complete the test in the post-COVID period (Mean=38.29 seconds, SD=32.468) compared to the pre-COVID period (Mean=34.92 seconds, SD=29.043). However, the statistical analysis did not reveal a significant difference between the two periods [t(430)=-1.125; p=.261; d =-.109 95% CI [-.298;.081]], indicating that the mobility and balance of the participants remained relatively stable across the two periods.

Regarding mobility changes between the two periods, the Performance-Oriented Mobility Assessment (POMA) scores, which evaluate the participants' balance and gait, showed a slight increase in the post-COVID period for both the static (from 8.52 pre-COVID, SD=3.12, to 9.14 post-COVID, SD=3.10) and dynamic (from 6.55 pre-COVID, SD=2.87, to 7.07 post-COVID, SD=2.80) components. The statistical analysis of these scores revealed the presence of a significant difference between the pre-COVID and post-COVID periods regarding the static components [t(437)=-2.065;

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p=0.040; *d* =-.198 95% CI [-.387;-.010]] while no significant difference was observed between the pre and post-COVID regarding the dynamic components [t(437)=-1.912; p=.056; *d* =-.184 95% CI [-.372;.005]]. In addition, the total POMA scores, which combine the static and dynamic components, showed a slight increase in the post-COVID period (Mean=16.21, SD=5.385) compared to the pre-COVID period (Mean=15.08, SD=5.448). The statistical analysis revealed a significant difference between the two periods [t(437)=-2.185; p=.029; *d* =-.210 95% CI [-.399;.-021]], indicating a slight improvement in the participants' overall mobility and balance post-COVID.

Falls and their characteristics

The characteristics of the falls also varied between the two periods. Our study observed a significant difference in the number of falls between the pre- and post-COVID periods. The average number of falls during the pre-COVID period was 1.01 (SD=1.204), while in the post-COVID period, this number increased to 2.13 (SD=2.379). This difference was statistically significant [t(342)=-5.738; p < .001; *d* =-.624 95% CI [-.842;-.406]], with a mean difference of -1.129 (SE=.197; 95% CI [-1.516, -.742]).

There were noticeable differences between the two periods in terms of the characteristics of these falls. For instance, the location of falls varied. In the pre-COVID period, 46.7% of falls occurred in the bedroom, 10.3% in the bathroom, 2.6% in the dining room, 11.3% in the living room, 3.1% on stairs, and 26.2% in other locations. In the post-COVID period, the distribution changed, with 34.1% of falls occurring in the bedroom, 17.9% in the bathroom, 5.6% in the dining room, 14.5% in the living room, 5.0% on stairs, and 22.9% in other locations. Thus, the most common location for falls in both periods was the bedroom, but the frequency of falls in the bathroom increased in the post-COVID period. This change in the location of falls was statistically significant [$X^2(5)=11.714$; p=0.039].

Regarding the timing of the falls, most falls occurred during the day in both periods (86.2% pre-COVID and 73.3% post-COVID). However, there was a significant shift in the post-COVID period with a higher proportion of falls occurring during the night, resulting in a significant association between these variables [$X^2(1)=9.235$; p=0.002]."

Consequences of falling

When considering the consequences of falls, there was no significant association between the period (pre-COVID vs post-COVID) and whether the fall resulted in injury [$X^2(1)=2.155$; p=.142]. In both periods, a substantial number of falls did not result in injury (60.0% pre-COVID and 52.5% post-COVID).

As for the fear of falling, a major and severe emotional consequence of falls, in the pre-COVID period, the distribution of fear of falling was as follows: "None" (14.4%), "Little" (15.4%), "Some" (36.9%), and "A lot" (33.2%). In the post-COVID period, the distribution changed to: "None" (13.3%), "Little" (15.8%), "Some" (37.3%), and "A lot" (33.6%). Furthermore, the fear of falling, did not show a significant association to the two periods [$X^2(3)=.109$; p=.991].

4. Discussion

The COVID-19 pandemic has undeniably profoundly impacted global health, with the elderly population being particularly susceptible to severe outcomes. This has led to a paradigm shift in the understanding and management of falls among institutionalized elders. Older adults, especially those with pre-existing health conditions, are at a higher risk of developing severe symptoms and complications from the virus. A recent study by Núñez-Cortés et al. [19] has shed light on the severity of this issue, revealing that older adults with severe COVID-19 have a higher one-year mortality rate. This alarming finding underscores the need for targeted interventions to protect this vulnerable population.

Frailty, a common condition in the elderly characterized by decreased physiological reserves and resistance to stressors, has been identified as a significant risk factor for hospitalization due to COVID-19 infection among older adults [20]. This suggests that the physiological decline associated with frailty may exacerbate the severity of COVID-19 symptoms, leading to a higher likelihood of higher risk of falling. Therefore, it is crucial to consider older adults' frailty status in managing and treating COVID-19.

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Moreover, the pandemic has necessitated a reevaluation of the factors contributing to falls among institutionalized elders. The increased isolation and reduced physical activity due to lockdown measures may have exacerbated the risk of falls in this population. This highlights the importance of comprehensive and tailored healthcare strategies to protect and support the elderly during the pandemic. This includes proactive screening for COVID-19, prioritizing older adults for vaccination, and providing supportive care to manage pre-existing conditions and frailty. Additionally, it is essential to ensure that older adults have access to accurate information about COVID-19 and the necessary resources to protect themselves from the virus.

The results of this study provide a comprehensive overview of the changes in the risk of falls and related factors among the study participants during the COVID-19 pandemic. The study sample was divided into two groups, pre-COVID and post-COVID, with similar demographic characteristics, ensuring a fair comparison. The findings of this study underscore the critical importance of understanding the risk factors associated with falls in the elderly population, particularly in the context of the ongoing COVID-19 pandemic.

Patients' characteristics

The data revealed that the majority of falls occurred in individuals aged 80 years and above. This is consistent with previous research suggesting that falls risk increases with age [1,2,5]. The increased risk of falls in this age group may be attributed to several factors. Age-related physiological changes, such as decreased muscle strength, balance issues, and cognitive decline, can increase fall risk [2]. Moreover, the presence of chronic diseases, which are more common in older adults, can further exacerbate this risk [1]. In the context of the COVID-19 pandemic, additional factors such as increased isolation, reduced physical activity due to lockdown measures, and the physiological impact of the virus itself may have further heightened the risk of falls among the elderly [19,20].

The self-perception of health status among participants significantly changed after the onset of the pandemic, with a higher percentage of participants in the post-COVID group rating their health as good. This could be attributed to the heightened awareness of health and well-being after the pandemic, or perhaps a shift in perspective where individuals felt healthier compared to those infected. However, this is speculative and further research is needed to understand this change.

Risk factors

The study found no significant change in medication use, a known fall risk factor, during the pandemic. This suggests that the pandemic did not significantly affect the medical management of the participant's health conditions. However, it would be interesting to explore whether there were changes in the types of medications used, as some medications may have been more difficult to access during the pandemic.

Interestingly, the study found a significant decrease in reported auditory deficits post-COVID. This could be due to various reasons, such as changes in environmental noise levels due to lockdown measures, or increased use of hearing aids [20,21]. However, the reported visual deficits remained relatively stable across the two periods. This could suggest that the pandemic had a differential impact on sensory health, which would be an interesting avenue for further research.

The study found no significant changes in cognitive performance during the pandemic. This is somewhat surprising, given the potential impact of social isolation and reduced physical activity on these factors [21]. However, it is possible that the measure used in this study (the 6CIT) was not sensitive enough to detect subtle changes in this domain.

An intriguing paradox emerged from our study. Despite the slight improvement in functional status, as indicated by the Barthel Index and POMA scores, the number of falls increased in the post-COVID period. Several factors could explain this counterintuitive finding. Firstly, the improvement in functional status might have led to an increased sense of independence and confidence among the institutionalized elders. This could have encouraged them to engage in activities without assistance, thereby increasing their exposure to fall risks [22]. This is particularly relevant in the night shift, where less supervision and assistance might be available, leading to a higher risk of falls [23]. Secondly, improving functional status might not necessarily translate into improved balance and

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mobility, which are critical for preventing falls. The study found that the Timed Up and Go test scores, which assess mobility and balance, remained relatively stable across the two periods. This suggests that despite their improved functional status, the participants' balance and mobility might not have improved to the same extent, leaving them susceptible to falls [24]. It is also possible that the pandemic-related changes in routines and environments, such as increased isolation and reduced physical activity, might have offset the benefits of improved functional status. These changes could have led to deconditioning, increased fatigue, and altered sleep patterns, which are all known risk factors for falls [5,25]. Thus, while improving functional status is a positive outcome, it underscores the need for comprehensive fall prevention strategies that consider physical health and behavioral and environmental factors. This is particularly important during public health crises like the COVID-19 pandemic, which can significantly alter daily routines and living conditions.

Falls and their characteristics

The study found a significant increase in the average number of falls in the post-COVID period. This is a concerning finding, as falls can lead to serious injuries and loss of independence [20]. This could be linked to routine changes, reduced staffing, and increased stress levels due to the pandemic [19]. These findings align with the results from our study, emphasizing the need for comprehensive fall prevention strategies tailored to the unique challenges posed by the pandemic. The shift in the location and timing of falls, with more falls occurring in the bathroom and during the night, could be related to changes in daily routines and environmental factors during and after the pandemic [20]. For example, individuals may have been using the bathroom more frequently at night due to changes in sleep patterns or increased fluid intake [21]. Despite no significant changes in functional independence, cognitive performance, and medication use, the increase in falls suggests that other factors, potentially related to the pandemic, were contributing to this increase.

The consequences of falls, in terms of injury and fear of falling are considered a very relevant aspect of this phenomenon [26]. However, our study did not show a significant association between the two periods. This suggests that increased falls during the pandemic did not necessarily lead to more severe outcomes. Nevertheless, the fear of falling remained relatively stable, which could indicate a persistent concern about falling among the participants [21].

The COVID-19 pandemic has underscored the vulnerability of the elderly population to severe health outcomes and has shifted the paradigm of understanding falls among institutionalized elders. The findings from recent studies emphasize the need for targeted strategies to protect this population, particularly those with pre-existing conditions and frailty. As the pandemic continues, it is crucial to prioritize the health and wellbeing of older adults to mitigate the impact of COVID-19 on this population and to address the increased risk of falls.

Our study reinforces the importance of understanding and addressing the risk factors for falls in the elderly population, particularly in the context of the COVID-19 pandemic. The findings underscore the need for targeted interventions to reduce the risk of falls among older adults, focusing on those aged 80 and above [5]. As the pandemic continues, it is crucial to prioritize the health and wellbeing of older adults, considering the increased risk of falls and the unique challenges posed by the pandemic [20].

5. Conclusion

In conclusion, our study revealed a paradoxical scenario where improved functional status did not decrease falls among institutionalized elders during the COVID-19 pandemic. This underscores the complexity of fall prevention and the need for comprehensive strategies that consider physical health and behavioral and environmental factors. Thus, our findings underscore the heightened vulnerability of this population, particularly those aged 80 and above, and the need for targeted interventions to mitigate this risk. However, it is important to acknowledge the limitations of our study.

Firstly, while our study was conducted across multiple institutions, there may have been variations in the specific conditions and practices across these settings, which could influence the risk of falls. Secondly, our study compared two distinct groups of individuals in the pre-COVID and post-

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COVID periods. This introduces the potential for differences in individual characteristics that were not controlled for in the study, which could have influenced the results. Thirdly, while our study provides a comprehensive overview of the changes in fall risk and related factors during the pandemic, it is based on self-reported data, which may be subject to recall bias. Lastly, our study did not assess the impact of the pandemic on the participants' mental health and specific medication usage, which could have indirectly affected their risk of falls.

Despite these limitations, our study has significant implications for practice. It highlights the need for comprehensive and tailored healthcare strategies to protect and support the elderly during public health crises like the COVID-19 pandemic. This includes proactive screening for COVID-19, prioritizing older adults for vaccination, and providing supportive care to manage pre-existing conditions and frailty. Moreover, our findings underscore the importance of considering the unique challenges posed by the pandemic, such as increased isolation and reduced physical activity, in the development of fall prevention strategies.

Our study illuminates the complex interplay between the COVID-19 pandemic and the risk of falls among institutionalized elders. It serves as a clarion call for healthcare providers, policymakers, and researchers to prioritize the health and wellbeing of older adults in the face of unprecedented challenges. As we navigate the ongoing pandemic and beyond, our study stands as a testament to the resilience of the elderly population and the enduring importance of safeguarding their health and dignity.

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References

1. Menezes, J.N.R.; Monte Costa, M. de P.; Silva Iwata, A.C. do N.; Mota de Araujo, P.; Oliveira, L.G.; De Souza, C.G.D.; Duarte Fernandes, P.H.P. A Visão Do Idoso Sobre o Seu Processo de Envelhecimento. *Rev. Context. Saúde* **2018**, *18*, 8–12. https://doi.org/10.21527/2176-7114.2018.35.8-12.
2. Smeltzer, S.C.; Bare, B.G.; Hinkle, J.L.; Cheever, K.H. Cuidados de Saúde Do Idoso. In *Brunner & Suddarth – Tratado de Enfermagem Médico-Cirúrgico*; Gen/Guanabara Koogan: Rio de Janeiro, Brasil, 2011; pp. 197–218.
3. WHO World Health Organization - Falls Available online: https://www.who.int/news-room/fact-sheets/detail/falls (accessed on 22 December 2021).
4. Sousa, R.A.M. Prevenção de Quedas Na População Geriátrica, Universidade de Coimbra, 2015.

 doi:10.20944/preprints202507.2123.v1

5. Baixinho, C.L.; Dixe, M.D.A.; Madeira, C.; Alves, S.; Henriques, M.A. Falls in Institutionalized Elderly with and without Cognitive Decline A Study of Some Factors. *Dement. Neuropsychol.* **2019**, *13*, 116–121. https://doi.org/10.1590/1980-57642018dn13-010014.
6. Rosa, V.P.P.; Cappellari, F.C.B.D.; Urbanetto, J. de S. Analysis of Risk Factors for Falls among Institutionalized Elderly Persons. *Rev. Bras. Geriatr. e Gerontol.* **2019**, *22*. https://doi.org/10.1590/1981-22562019022.180138.
7. Lana, L.D.; Ziani, J. da S.; Aguirre, T.F.; Tier, C.G.; Abreu, D.P.G. Fatores de Risco Para Quedas Em Idosos: Revisão Integrativa. *Rev. Kairós-Gerontologia* **2022**, *24*, 309–327. https://doi.org/10.23925/2176-901X.2021v24i2p309-327.
8. Luebbert, S.; Finkel, C. Falls in Senior Adults Part II: Management, Treatment, Prevention, and Therapy Plans. *Mo. Med.* **2022**, *119*, 255–260.
9. Lima, A.; Martins, M.; Ferreira, M.; Schoeller, S.; Sampaio, F.; Neves, H.; Parola, V. Validação Da Escala de Autoavaliação Da Promoção Da Autonomia Dos Idosos (EAPAI) Por Parte Dos Enfermeiros. *Rev. Enferm. Ref.* **2021**, *V Série*. https://doi.org/10.12707/RV21003.
10. Baixinho, C.L.; Dixe, M.D.A. Practices and Behaviors of Professionals after Falls in Institutionalized Elderly with and without Cognitive Decline. *Dement. Neuropsychol.* **2020**, *14*, 62–68. https://doi.org/10.1590/1980-57642020dn14-010010.
11. Abreu, D.R. de O.M.; Azevedo, R.C. de S.; Silva, A.M.C. da; Reiners, A.A.O.; Abreu, H.C.A. Fatores Associados à Recorrência de Quedas Em Uma Coorte de Idosos. *Cien. Saude Colet.* **2016**, *21*, 3439–3446. https://doi.org/10.1590/1413-812320152111.21512015.
12. Spector, W.; Shaffer, T.; Potter, D.E.B.; Correa-de-Araujo, R.; Rhona Limcangco, M. Risk Factors Associated with the Occurrence of Fractures in U.S. Nursing Homes: Resident and Facility Characteristics and Prescription Medications. *J. Am. Geriatr. Soc.* **2007**, *55*, 327–333. https://doi.org/10.1111/j.1532-5415.2007.01081.x.
13. Rubenstein, L.Z. Falls in Older People: Epidemiology, Risk Factors and Strategies for Prevention. *Age Ageing* **2006**, *35*, ii37–ii41. https://doi.org/10.1093/ageing/afl084.
14. Carroll, N. V.; Delafuente, J.C.; Cox, F.M.; Narayanan, S. Fall-Related Hospitalization and Facility Costs Among Residents of Institutions Providing Long-Term Care. *Gerontologist* **2008**, *48*, 213–222. https://doi.org/10.1093/geront/48.2.213.
15. Gonçalves, L.G.; Vieira, S.T.; Siqueira, F.V.; Hallal, P.C. Prevalência de Quedas Em Idosos Asilados Do Município de Rio Grande, RS. *Rev. Saude Publica* 2008, *42*.
16. Gruneir, A.; Bell, C.M.; Bronskill, S.E.; Schull, M.; Anderson, G.M.; Rochon, P.A. Frequency and Pattern of Emergency Department Visits by Long-Term Care Residents-A Population-Based Study. *J. Am. Geriatr. Soc.* **2010**, *58*, 510–517. https://doi.org/10.1111/j.1532-5415.2010.02736.x.
17. IPSS *Guia Prático, Apoios Sociais – Pessoas Idosas*; 2017;
18. Del Duca, G.F.; Antes, D.L.; Hallal, P.C. Quedas e Fraturas Entre Residentes de Instituições de Longa Permanência Para Idosos. *Rev. Bras. Epidemiol.* **2013**, *16*, 68–76. https://doi.org/10.1590/S1415-790X2013000100007.
19. Núñez-Cortés, R.; López-Bueno, R.; Torres-Castro, R.; Soto-Carmona, C.; Ortega-Palavecinos, M.; Pérez-Alenda, S.; Solis-Navarro, L.; DÍaz-Cambronero, Ó.; Martinez-Arnau, F.M.; Calatayud, J. Risk Factors for One-Year Mortality in Hospitalized Adults with Severe COVID-19. *Aging Dis.* **2023**, *14*, 14. https://doi.org/10.14336/AD.2022.0424.
20. Zhu, Y.; Sealy, M.J.; Jager-Wittenaar, H.; Mierau, J.O.; Bakker, S.J.L.; Navis, G.J.; Boezen, H.M.; Mierau, J.O.; Franke, H.L.; Dekens, J.; et al. Frailty and Risk of Hospitalization from COVID-19 Infection among Older Adults: Evidence from the Dutch Lifelines COVID-19 Cohort Study. *Aging Clin. Exp. Res.* **2022**, *34*, 2693–2702. https://doi.org/10.1007/s40520-022-02268-9.
21. Kim, J.; Byun, M.; Kim, M. Physical and Psychological Factors Associated with Poor Self-Reported Health Status in Older Adults with Falls. *Int. J. Environ. Res. Public Health* **2020**, *17*, 3548. https://doi.org/10.3390/ijerph17103548.

 doi:10.20944/preprints202507.2123.v1

22. Machón, M.; Vergara, I.; Dorronsoro, M.; Vrotsou, K.; Larrañaga, I. Self-Perceived Health in Functionally Independent Older People: Associated Factors. *BMC Geriatr.* **2016**, *16*, 66. https://doi.org/10.1186/s12877-016-0239-9.
23. Casas-Herrero, A.; Anton-Rodrigo, I.; Zambom-Ferraresi, F.; Sáez de Asteasu, M.L.; Martinez-Velilla, N.; Elexpuru-Estomba, J.; Marin-Epelde, I.; Ramon-Espinoza, F.; Petidier-Torregrosa, R.; Sanchez-Sanchez, J.L.; et al. Effect of a Multicomponent Exercise Programme (VIVIFRAIL) on Functional Capacity in Frail Community Elders with Cognitive Decline: Study Protocol for a Randomized Multicentre Control Trial. *Trials* **2019**, *20*, 362. https://doi.org/10.1186/s13063-019-3426-0.
24. Mateo-Abad, M.; Vrotsou, K.; Padilla Ruiz, M.; Montiel-Luque, A.; Saucedo Figueredo, M. del C.; Machón, M.; Rivas Ruiz, F.; Vergara, I. Use of Health Care Services According to Functional Performance in Community-Dwelling Older Adults in Spain. An Approach Using GAMLSS Models. *PLoS One* **2022**, *17*, e0277681. https://doi.org/10.1371/journal.pone.0277681.
25. Soares Lavareda Baixinho, C.R.; Coelho Rodrigues Dixe, M. dos A.; Pereira Henriques, M.A. Queda Nas Instituições de Longa Permanência Para Idosos: Validação de Protocolo. *Rev. Bras. Enferm.* **2017**, *70*, 773–779. https://doi.org/10.1590/0034-7167-2017-0109.
26. Gettens, S.; Fulbrook, P. Fear of Falling: Association between the Modified Falls Efficacy Scale, in-Hospital Falls and Hospital Length of Stay. *J. Eval. Clin. Pract.* **2015**, *21*, 43–50. https://doi.org/10.1111/jep.12226.