EPIDEMIOLOGY OF FALLS AMONG ELDER POPULATION IN PESHAWAR, PAKISTAN: A CROSS-SECTION ANALYSIS

Original Research

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ABSTRACT

Background: Falls among the elderly are a significant public health concern that can lead to severe injuries and diminished quality of life. In Peshawar, Pakistan, the unique cultural, environmental, and socioeconomic factors may specifically influence the prevalence and risk factors of falls within this demographic.

Objective: The aim of this study is to determine the prevalence of falls and to identify critical risk factors for falls among the elderly in Peshawar.

Methods: Conducted from March to August 2024, this cross-sectional study enrolled 68 elderly individuals aged 60 and above from three tertiary care hospitals in Peshawar—Jinnah Teaching Hospital, Lady Reading Hospital, and Hayatabad Medical Complex. Participants were selected through non-probability convenient sampling. Data collection was performed using a validated Likert scale questionnaire. Statistical analysis involved descriptive statistics and Chi-square tests, utilizing SPSS version 26.

Results: Of the participants, 34% reported at least one fall in the previous year, with falls more frequently occurring at night (38%) than during the day (34%). Most falls took place either at home (34%) or in public areas (37%). Significant injuries were reported by 34% of those who fell, including bone fractures (34%) and head injuries (32%). Notably, 38% of participants were regularly taking medications known to increase fall risk.

Conclusion: The findings indicate a high prevalence of falls among the elderly in Peshawar, often resulting in serious injuries. Effective fall prevention strategies should focus on improving home safety, managing medication side effects, and encouraging regular physical activity to mitigate the risk of falls in this vulnerable population.

Keywords: Elderly; Falls; Home Safety; Medication Side Effects; Peshawar; Physical Activity; Risk Factors.

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INTRODUCTION

Falls among the elderly are increasingly recognized as a major public health issue, affecting a substantial portion of this population annually. According to the World Health Organization, a fall is defined as an event that results in an individual inadvertently coming to rest on the ground or another lower level without overwhelming external force (1)-(2). The United Nations designates individuals aged 60 years and above as elderly, a demographic that experiences a plethora of adverse clinical and social consequences due to falls, often referred to as a geriatric syndrome (3)-(4). Epidemiologically, between 28% and 35% of the elderly experience falls each year, a proportion that increases with age and frailty (5).

The incidence of falls can vary widely, with reported rates ranging from 14.9% to 66.2%. On average, elderly individuals consume between 2.7 to 4.5 medications daily, and a significant portion of falls occur at home, highlighting environmental risks such as inadequate furniture and poor infrastructure (6)-(7). There are notable differences between rural and urban elderly populations in terms of medication intake, fall rates, and physical activity, which suggest varying risk profiles dependent on geographic and lifestyle factors (8). The prevalence of falls is not confined to any one region, with varying rates reported globally from 10% to 53% in Hyderabad, India, to over 50% in Saudi Arabia, underscoring the universality of the issue (9). Additionally, falls have a higher incidence among females, and one out of every three elderly individuals suffers a fall annually, with fractures occurring in 87% of these cases (10)-(11). Recent studies have elucidated numerous risk factors and intervention strategies. For example, a cross-sectional study utilizing the Edmonton Fragility scale identified that 22.8% of the participants were prone to falls, with significant percentages also at risk according to other mobility and balance assessments (12). Chronic diseases and treatments, such as the use of benzodiazepines among elderly women, have been identified as major risk factors for falls at home (7). Intervention studies have shown that exercises incorporating virtual reality can enhance balance and reduce fear of falling, with targeted programs improving muscle strength and psychological well-being, thus demonstrating the efficacy of preventive strategies (13)-(14).

In light of these findings, the importance of developing tailored fall-prevention strategies is evident, especially in regions with unique socioeconomic and cultural characteristics like Peshawar. This city's distinctive demographic profile makes it an ideal setting to study and address falls among the elderly. The objective of this study is to assess the prevalence and key risk factors associated with falls among the elderly population in the tertiary settings of Peshawar, aiming to inform healthcare policies and intervention strategies that are sensitive to the local context. This approach not only enhances the understanding of fall dynamics but also supports the development of effective prevention programs tailored to meet the specific needs of Peshawar's elderly residents.

METHODS

The methodology employed for this study utilized a descriptive cross-sectional design, which was conducted over a period from March to August 2024, across three major hospitals in Peshawar: Jinnah Teaching Hospital, Lady Reading Hospital, and Hayatabad Medical Complex. Ethical approval was secured from the Ethical Review Committee of Jinnah Medical College, ensuring adherence to ethical standards in research (19)-(20). A calculated sample size of 68 individuals was deemed sufficient for the study parameters, which included a population size of 20,000. This sample was determined using the WHO sample size calculator and Rao soft software, with assumptions of a 10% margin of error, a 90% confidence level, and a 50% response rate. A non-probability convenience sampling method was employed to select participants, which involved enrolling individuals who met specific inclusion criteria and were accessible at the study sites (21).

The inclusion criteria stipulated that participants must be 60 years of age or older, willing to participate, able to communicate in Pashto, Urdu, or English, and physically capable of attending the study sites. Excluded from the study were individuals requiring intensive care unit monitoring, those with cognitive impairments or progressive neurological disorders such as advanced Parkinson's disease, and those suffering from severe chronic conditions like cancer or severe arthritis. Data collection was performed using a validated 21-item Likert scale, which assessed a range of symptoms and risk factors related to falls, excluding sociodemographic factors. This tool was proven to have good internal consistency with a Cronbach's alpha ranging from 0.77 to 0.92, and excellent test-retest and inter-rater reliability,

Volume 2 Issue 2: Falls Epidemiology in Elderly, Peshawar
Hussain M et al.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH
AND REHABILITATION ■ ■ ■

indicating consistency and stability over time and across different raters (3). The scale's content and criteria validity were also confirmed through its ability to distinguish between individuals with and without falls and its association with various risk factors.

Data analysis was conducted using SPSS software version 26. The analysis included calculating means and standard deviations for continuous variables and describing categorical variables in frequencies and proportions. Inferential statistics, such as the Chi-square test, were utilized to examine the significant associations between categorical variables, such as the experience of falls and the use of mobility aids or medications, helping to identify specific factors that might influence the prevalence rates of falls among different age groups.

RESULTS

The study's results illuminated the prevalent issue of falls among the elderly in Peshawar, revealing that falls occurred almost equally during day and night times. A notable finding was the slight inclination towards nighttime falls, underscoring the need for adequate lighting and safety measures during these hours. The data indicated that falls were predominantly experienced at home (34%), compared to public places (37%), which emphasizes the importance of safety evaluations and interventions within the home environment.

Gender distribution among participants showed a higher percentage of males (57.4%) compared to females (42.6%). Age analysis revealed that falls were more frequent in the 65-70 years age group, representing 30.9% of the study population. Educational levels varied, with the majority having no formal education (66.2%), potentially impacting their awareness and ability to implement fall prevention measures.

Table 1 Summary Statistics of Participant Responses

Variable	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Range	Minimum	Maximum	Sum
Gender	1.4	0.06	1.0	1.0	0.49	1.0	1.0	2.0	97.0
Current Age in Years	2.5	0.12	2.5	2.0	1.0	3.0	1.0	4.0	171.0
Educational Level	1.5	0.10	1.0	1.0	0.88	3.0	1.0	4.0	105.0
Current Living Situation	3.1	0.09	3.0	3.0	0.77	3.0	1.0	4.0	217.0
Experienced a Fall in the Past Year	2.3	0.12	3.0	3.0	1.0	4.0	0.0	4.0	159.0
Not Experiencing a Chronic Disease at That Time	3.5	0.06	4.0	4.0	0.4	1.0	3.0	4.0	243.0
Mostly Fell in the Night Time	2.6	0.15	3.0	3.0	1.2	4.0	0.0	4.0	180.0
Mostly Fall in the Day Time	2.6	0.13	3.0	3.0	1.1	4.0	0.0	4.0	178.0
Fell at Home	2.3	0.15	3.0	3.0	1.2	4.0	0.0	4.0	162.0
Fell at Public Places	2.5	0.14	3.0	4.0	1.1	4.0	0.0	4.0	176.0
Badly Injured by the Fall	2.5	0.17	3.0	4.0	1.4	4.0	0.0	4.0	170.0
Bone Badly Fractured Due to the Fall	2.3	0.18	3.0	4.0	1.5	4.0	0.0	4.0	159.0
Head Badly Injured by the Fall	2.2	0.13	2.0	3.0	1.0	4.0	0.0	4.0	155.0
Regularly Take Medications	2.6	0.15	3.0	4.0	1.2	4.0	0.0	4.0	179.0

Variable	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Range	Minimum	Maximum	Sum
Confidence in Ability to Walk Without Assistance	2.6	0.14	3.0	4.0	1.2	4.0	0.0	4.0	179.0
Experienced Dizziness, Joint Pain, or Lightheadedness	2.4	0.17	2.5	4.0	1.4	4.0	0.0	4.0	164.0
Difficulty Seeing Even with Glasses	2.2	0.13	2.0	3.0	1.1	4.0	0.0	4.0	155.0
Adequate Lighting in All Areas at Home	2.4	0.11	3.0	3.0	1.2	4.0	0.0	4.0	168.0
Use of Handrails or Grab Bars	2.9	0.21	3.0	4.0	1.7	14.0	0.0	4.0	199.0
No Clutter or Slippery Floors at Home	2.4	0.13	3.0	3.0	1.1	4.0	0.0	4.0	168.0
Feel Safe Moving Around Home at Night	2.5	0.13	3.0	3.0	1.1	4.0	0.0	4.0	176.0
Home Modified to Prevent Falls	2.2	0.16	2.0	3.0	1.3	4.0	0.0	4.0	152.0
Engage in Regular Physical Activity	2.4	0.15	3.0	3.0	1.2	4.0	0.0	4.0	168.0
Use Mobility Aids	2.5	0.14	3.0	3.0	1.1	4.0	0.0	4.0	170.0
Trouble Getting Up from Chair or Bed	2.3	0.16	2.0	4.0	1.3	4.0	0.0	4.0	161.0

The living situation of participants also provided insights, with 50% living in nuclear families and 36.8% in extended families, indicating a potential support network that could be leveraged in fall prevention strategies. The statistical analysis using the Chi-square test highlighted significant associations, although some cells in the analysis had expected counts less than five, suggesting caution in interpreting these results due to small sample sizes.

Table 2 Demographic and Social Characteristics of Participants

Category	Gender	Age	Educational Level	Current Living Situation
Frequency (Percentage)				
Male	39 (57.4%)			
Female	29 (42.6%)			
60-65 years		13 (19.1%)		
65-70 years		21 (30.9%)		
70-75 years		20 (29.4%)		
76 & above		14 (20.6%)		
No formal education			45 (66.2%)	

Category	Gender	Age	Educational Level	Current Living Situation
Primary education			13 (19.1%)	
Secondary education			6 (8.8%)	
Higher education			4 (5.9%)	
Alone				3 (4.4%)
Single-family				6 (8.8%)
Nuclear family				34 (50.0%)
Extended family				25 (36.8%)
Total	68 (100.0%)	68 (100.0%)	68 (100.0%)	68 (100.0%)

In terms of fall consequences, 34% of participants reported severe injuries including bone fractures and head injuries, which reflects the serious impact falls can have on health. Despite the risks, 38% of the elderly expressed confidence in their ability to walk without assistance, and 34% reported engaging in regular physical activity or exercise, which are positive indicators for promoting mobility and reducing fall risk.

Inferential statistic and Chi Square test:

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.887a	4	.064
Likelihood Ratio	9.390	4	.052
Linear-by-Linear Association	1.238	1	.266
N of Valid Cases	68		

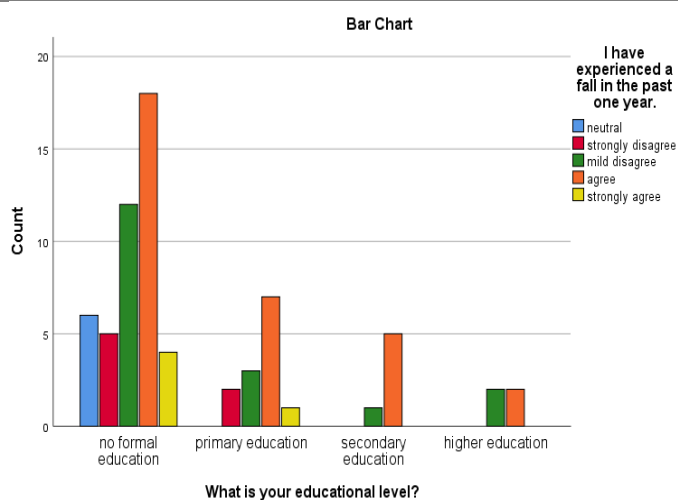6 cells (60.0%) have expected count less than 5. The minimum expected count is 2.13

Volume 2 Issue 2: Falls Epidemiology in Elderly, Peshawar
Hussain M et al.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH
AND REHABILITATION ◼ ◼ ◼
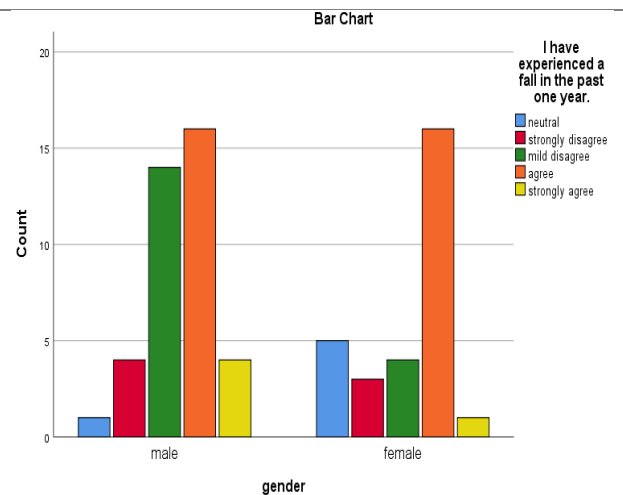
|	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24.693a	12	.016
Likelihood Ratio	27.562	12	.006
Linear-by-Linear Association	.125	1	.723
N of Valid Cases	68		
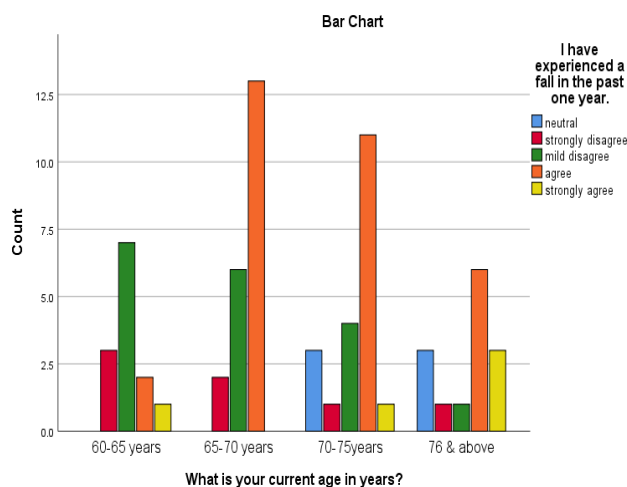
a. 14 cells (70.0%) have expected count less than 5. The minimum expected count is .96.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.735a	12	.725
Likelihood Ratio	11.898	12	.454
Linear-by-Linear Association	1.852	1	.174
N of Valid Cases	68		

a. 17 cells (85.0%) have expected count less than 5. The minimum expected count is .29.

Volume 2 Issue 2: Falls Epidemiology in Elderly, Peshawar
Hussain M et al.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH
AND REHABILITATION ■ ■ ■

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.390a	12	.582
Likelihood Ratio	11.684	12	.471
Linear-by-Linear Association	.149	1	.700
N of Valid Cases	68		
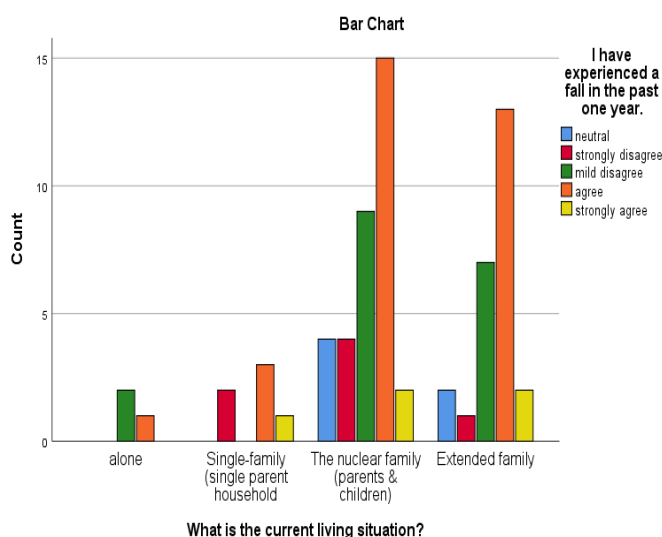
a. 16 cells (80.0%) have expected count less than 5. The minimum expected count is .22.

Overall, the study emphasizes the critical need for targeted fall prevention programs that consider the specific needs and living conditions of the elderly in Peshawar, incorporating regular physical activity, proper use of mobility aids, and home safety modifications to mitigate the risks and consequences of falls.

DISCUSSION

The findings of this study underscore the substantial prevalence of falls among the elderly in Peshawar, with 34% of participants reporting a fall within the last year, aligning closely with the global range of 28% to 35% noted in previous studies (References 1-11). This correlation not only substantiates the universality of fall risks among the elderly but also highlights the local implications of global health phenomena. Furthermore, the data reinforce that age and frailty are significant predictors of falls, particularly among those aged 70 and above, supporting earlier assertions regarding the escalation of fall risk with advancing age (Reference 5).

Serious injuries such as bone fractures and head trauma were reported in 34% of fall incidents, mirroring the broader literature on the severe consequences of falls in this demographic (Reference 11). This study has successfully identified chronic disease absence and medication use as crucial factors in fall risks. Notably, 50% of participants without chronic diseases experienced falls, indicating that fall risks extend beyond chronic conditions, and 38% of the elderly population admitted to regular medication use, echoing findings that medications can significantly increase fall risk (Reference 7). Environmental factors play a pivotal role, with most falls occurring at home (34%) or in public areas (37%). This distribution affirms the necessity for targeted environmental interventions, as suggested by the literature review (References 6-7). Furthermore, preventative strategies such as physical activity and home modifications were shown to be partially effective, with 34% of participants engaging in regular physical activity and 32% modifying their homes to prevent falls. These findings suggest a gap in the widespread adoption of such measures, advocating for enhanced community and health policy-driven initiatives (References 13-17).

The study's strengths lie in its context-specific approach, utilizing multiple teaching hospitals across Peshawar to enhance the representativeness of the findings within this unique cultural, environmental, and socioeconomic setting. However, the study is not without limitations. The small sample size of 68 participants may restrict the generalizability of the findings, and the non-probability convenience sampling method could introduce bias, limiting the representativeness of the results. Additionally, reliance on self-reported data raises concerns regarding the accuracy of the recall, particularly for incidents such as falls and their associated factors. To address these issues and enhance the reliability of future research, it is recommended to expand the study across a broader geographic area and increase the sample size. This would not only provide a more comprehensive analysis of the fall risk factors but also enhance the application of the findings to a wider population, ensuring that preventive measures can be accurately tailored to the needs of the elderly across different regions.

Volume 2 Issue 2: Falls Epidemiology in Elderly, Peshawar
Hussain M et al.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH
AND REHABILITATION ■ ■ ■

CONCLUSION

The research conducted illustrates a notable incidence of falls among the elderly in Peshawar, with one-third of the participants experiencing a fall within the last year. This underlines the critical need for bespoke interventions aimed at reducing fall risks. Effective strategies should focus on enhancing home safety and elevating public awareness about the factors that contribute to falls. The results of this study highlight the necessity of developing prevention tactics that are specifically tailored to fit the distinct cultural and environmental contexts of Peshawar, ensuring that the interventions are both relevant and effective for the local elderly population.

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