

Proportion, Pattern, and Predictors of Falls in Older Adults – A Community-based Observational Study in Rural West Bengal

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INTRODUCTION

Falls with increasing age are commonly reported across the world with adverse consequences, such as injuries, trauma, fracture, subsequent loss of independence, poor quality of life, and even death.^[1] Globally, falls are the second leading cause of injury-associated death, after road traffic injuries, with more than 80% occurring in developing countries making it a major public health issue.^[2] In India, falls among the elderly have been reported with yearly prevalence ranging from 13% to 54%.^[1,3-8] With increasing age, people become more vulnerable to falls due to the decline of many normal reactions, vision,

hearing, locomotor abilities, and reflex actions, in addition to fragility, and prolonged recovery process.^[9] The fearfulness of falls after an incident further leads to inactivity and reduced muscle strength and balance making the individual more vulnerable to falls. Apart from poor balance and gait resulting from causes such as Parkinson's disease, stroke, impaired cognition, use of sedatives, antipsychotics, joint disorders, and poor

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ABSTRACT

Introduction: In spite of falls being a major public health problem, where most of the falls are preventable, there is a lack of epidemiological investigation among those aged 50 and above, especially in developing countries. Hence, we investigate the proportion, pattern, and predictors of falls in this age group. **Materials and Methods:** This cross-sectional community-based study was done in the Uluberia-II block of Howrah district, West Bengal, from February to July 2021. A multistage cluster sampling method was used to meet the sample size. Data were collected with the help of a structured interview schedule. Predictors were estimated by the SPSS version 16 and defined in adjusted odds ratio (AOR) with a 95% confidence interval. **Results:** Among 170 study participants, 34.7% (59/170) experienced at least one episode of fall, while 20.6% (35/170) experienced recurrent falls in 12 months. Most (78%; 46/59) falls occurred in the home environment and due to slippage (67.8%; 40/59) on the floor. 84.7% (50/59) sustained any type of injuries, 47.5% (28/59) required either consultation of a physician or medication, and 6.8% (4/59) required hospitalization. Safety Checklist Score measured 75.3% (128/170) had a poor household environment, within that 30.6% (52/170) had a seriously poor household environment, which was an important predictor of falls ([AOR] = 3.59 [1.24–10.38]). Fear of fall (AOR = 6.18 [1.77–21.53]) measured by shortfall efficacy scale and nonformal education (AOR = 5.05 [1.33–19.07]) were also predictors of falls. **Conclusion:** Considerable proportion of falls occurred in the past year, which can be preventable by improving modifiable environmental factors and detection of fear of fall in persons at different levels of health-care facilities.

KEYWORDS: Falls, fear of fall, household environment, injury, older adults

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vision, the household environment also contributes as an important factor associated with falls.^[10] Prior evidences suggest, on average, 50%–60% of falls occur at home subsequent to poor household environmental factors such as uneven surface, no stair railings and grab handle, loose rugs, clutter, and poor lighting.^[11]

The elderly, aged 60 years and above, had been the priority population for the studies regarding falls. However, some researchers preferred to include older adults aged 50 years and above in this context. Stewart Williams *et al.* studied 32,663 older adults in six low- and middle-income countries, including India, for the prevalence and risk factors of falls. The same study also included a few environmental conditions such as flooring and water source apart from various sociodemographic, pathological, and psychological factors as the potential correlates of falls.^[12] India, with an increasing proportion of older adults, is expected to face more health-related issues in that population group, including falls and their adverse consequences. However, falls and their modifiable correlates, including household environment, were less studied. With this backdrop, the present study was formulated to find out the proportion, pattern, and associated factors of falls among those aged 50 and above, with more emphasis on household environmental factors.

MATERIALS AND METHODS

Study type and setting

A community-based cross-sectional study was conducted in the Uluberia-II block of Howrah district, West Bengal, India, from February to July 2021. The Uluberia-II block has 36 villages with a total population of 191,599.^[13] Considering the feasibility, the study was conducted in 10 sampled villages.

Study population

The study population comprised permanent resident adults aged 50 years and above. Those who were morbidly ill or bedridden at the time of the study, had congenital or acquired, unilateral or bilateral lower limb paralysis, and had a serious neurological and psychiatric illness were excluded from the study [Figure 1].

Sampling

Based on the reported prevalence (P) of fall 36.6%,^[9] assuming 5% alpha, $Z_{1-\alpha/2} = 1.96$, absolute error (L) = 9%, and using the formula $[Z_{1-\alpha/2}]^2 \times P \times (1-P)/L^2$, the calculated sample size was 110.05. As the sampling was conducted by cluster sampling, a design effect of 1.5 was considered. Accordingly, a sample of $(110.05 \times 1.5 = 165.07) \approx 166$ was needed from 10 clusters (villages). Therefore, considering the participants per cluster $(166 \div 10 = 16.6) \approx 17$, the final sample size was $(10 \times 17) 170$ adults aged 50 and above.

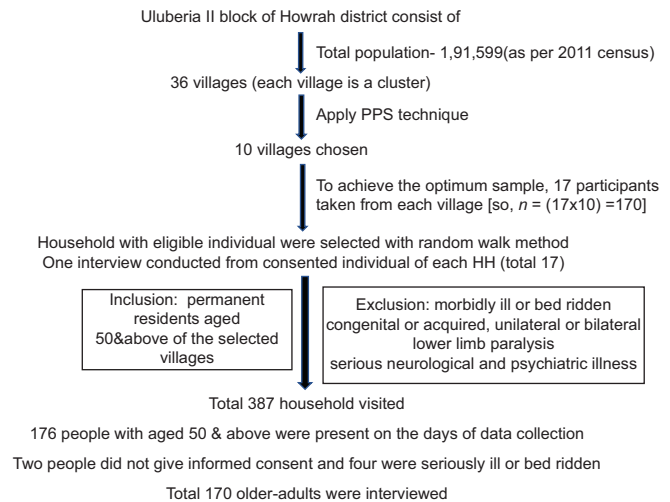


Figure 1: Flow diagram of the selection of the study participants

In the first stage of cluster sampling, villages (clusters) were considered the primary sampling unit. All 36 villages were listed with their population size and cumulative population. From the list, 10 villages were selected by Probability Proportional to Size technique. In the 2nd phase, households having eligible individuals from each selected village were identified with the random walk method as no prior survey or information on house numbers having elderly persons was available. After reaching the center of the selected village, one direction was chosen randomly. Then, consecutive houses in that direction were visited for eligible participants. Households with at least one individual aged 50 years or more were selected. In the case of more than one eligible individual, the younger one was approached to have a uniformity of selection. The eligible individual was administered with written informed consent (in the presence of a witness in case of illiterate), and only the consented individual was approached for an interview. This was continued until 17 interviews were completed in each 10 selected villages [Figure 1].

Operational definition

Fall

An event that results in a person coming to rest inadvertently on the ground floor or other lower level. Falls due to assault and intentional self-harm were not included in this study. Falls from transport vehicles, burning buildings, and falls into the fire, water, and machinery were also excluded from this study.^[14]

Visual impairment

The International Classification of Diseases 11 (2018) classifies vision impairment into this category.^[15]

Distance vision impairment:

- Mild – visual acuity worse than 6/12–6/18

- Moderate – visual acuity worse than 6/18–6/60
- Severe – visual acuity worse than 6/60–3/60
- Blindness – visual acuity worse than 3/60.

Joint family

Apart from the father, mother, and their son/daughter, if the family composition is made of grandfather or grandmother or both, consider it as a joint family.

Socioeconomic scale

The modified BG Prasad scale 2021 was used to categorize the participants into class I–V.^[16] Further classes I-II were clubbed into upper, III as middle, and IV-V as a lower socioeconomic class.

Educational

Completed years of schooling were recorded. Further participants were classified into having nonformal education (0 years of schooling), below secondary (up to completed class 9), and secondary and above (completed class 10 and above) levels.

Occupation

Information of the participants' main occupation was recorded. Subsequently, the participants were classified as homemakers (involved in household work), working (engaged in any kind of work for which he/she was receiving payment), and not working (not engaged in any work, including the retired/pensioner participants).

Financial dependency

The participant who did not have any source of income from work, not even had any type of pension, and financially dependent on their son or daughter or others.

Chronic illness

Self-report or medical records mentioning chronic illnesses were considered. Multimorbidity was defined as the presence of more than one such chronic illness among the participants. Measurement of blood pressure and random blood sugar made during the interview was not used for the classification of hypertension or diabetes mellitus.

Body mass index

Body mass index (BMI) was calculated with the standard formula (weight in kg/height in meter²) and categorized according to the Asian classification of BMI, underweight (<18.5), normal (18.5–22.9), overweight (23–24.9), pre-obese (25–29.9), and obese (≥ 30).

Data collection

A face-to-face interview was conducted for all the study participants using a predesigned, pretested, structured schedule (in the Bengali language) with the following components:

- Questions related to the demographic, socioeconomic, and behavioral characteristics
- Household safety checklist (observation facilitated by interview checklist): Modified from the original version of the Centers for Disease Control and Prevention household checklist includes the condition of floors, stairs and steps, kitchen, bathroom, bedrooms, and drinking and domestic water collection site. Modification of the original version was made based on the initial observation and interview of villagers to understand all vulnerable places of falls during the pilot phase of the study. Based on the responses and their score, a summative score was obtained, which was further classified according to the tertile distribution of attained score into three categories, (i) no or mild lack of safety environment, (ii) moderately poor household environment, and (iii) seriously poor household environment [Table 1]^[17]
- History of falls: The main outcome of the study, an incident of fall, was considered when there was either self-report of such an incident or medical records mentioning the fall within the past 1 year from the interview date. In the case of recurrent falls, the most severe fall episode as perceived by the participants was considered for further assessment of fall-related injuries
- Short Fall Efficacy Scale-International: It contains seven questions with a four-point Likert scale response. The scale determines the fear of fall or concerns of fall of the individual participant; out of a total score of 28, score 7–8 – low concern, score 9–13 – moderate concern, and score 14–28 – high concern^[18]
- Tilburg Frailty Scale: The score on the total frailty ranges from 0 to 15. The maximum scores refer to the highest level of frailty, or a score of 5 and above is considered frail^[19]
- Morbidity profile: Self-report or medical records of any chronic morbidity
- Mini-mental state examination (MMSE, for cognitive function assessment), where score 24–30 – no cognitive impairment, score 18–23 – mild cognitive impairment, and score 0–17 – severe cognitive impairment^[20]
- Assessment of visual acuity (distant vision) done by Snellen chart
- Assessment of blood pressure and random blood glucose level by digital sphygmomanometer and portable glucometer machine was done, respectively
- Anthropometric assessment – height and weight were measured with a nonstretchable measuring tape and calibrated weighing machine.

Table 1: Household Safety Checklist*

	Always (2)	Sometimes (1)	Never (0)
A. Floors			
1. When you walk through a room, do you have to walk around furniture?	2	1	0
2. Are there papers, books, towels, shoes, boxes, or other objects on the floor?	2	1	0
3. Do you have to walk over or around wires or cords (such as stand fan and extension cord)	2	1	0
B. Stairs and steps			
4. Are there papers, shoes, books, or other objects on the stairs?	2	1	0
	Yes (1)	No (0)	
5. Are some steps broken or uneven?	1	0	
6. Are you missing a light over the stairway?	1	0	
7. Are the handrails loose or broken?	1	0	
8. Is there any handrail on only one side of the stairs?	1	0	
C. Kitchen			
9. Are there things you use often on high shelves?	1	0	
10. Is your step stool unsteady?	1	0	
D. Bathrooms			
11. Is the floor or surrounding of the bathrooms slippery?	1	0	
E. Bedrooms			
12. Is the light near the bed hard to reach?	1	0	
13. Is the path from your bed to the bathroom dark?	1	0	
F. Others			
14. Is the floor of the house being uneven in a few areas?	1	0	
15. Is the incident of wet floor remaining sometimes?	1	0	
16. Is the door frame uneven from the floor?	1	0	
17. Is the roof enclosure not high enough?	1	0	
18. Does the road around the house become slippery or mossy when it rains?	1	0	
19. Are bricks kept around the house during the rain?	1	0	
20. Is there moss in ponds or water collection sites?	1	0	

*Maximum attainable score was 24. After data analysis, attained score (range: 0–18) was categorized based on tertile distribution, indicating score 0–6: no or mild lack of safety environment, score 7–9: moderately poor household environment, and score ≥ 10 : seriously poor household environment

Statistical analysis

Data were analyzed using Microsoft Excel 2016 and SPSS version 28 (IBM SPSS Statistics). Descriptive statistics were presented with a mean (\pm standard deviation [SD]) or median (interquartile range) based on the distribution of underlying numerical data and frequency (%) for categorical data with a 95% confidence interval (95% CI) wherever applicable. Inferential statistics, including univariate and multivariable logistic regression, were performed; the strength of association was represented with an odds ratio (OR) and adjusted OR (AOR), respectively, with a 95% CI value. Biologically plausible variables with $P < 0.25$ in univariate models were selected in the final multivariable model.

RESULTS

Sociodemographic and socioeconomic characteristics

The mean (\pm SD) age of the study participants ($n = 170$) was 61.5 ± 8.8 years; more than half of them were female (58.2%). Among them, 66.5% had formal

education, 35.3% were engaged in any kind of work, and 65.9% belonged to the lower socioeconomic class [Table 2].

Morbidity profile

A sizable proportion (67.6%) of the participants had chronic morbidity with hypertension as the most prevalent (35.9%), followed by diabetes mellitus (18.2%) and cardiovascular diseases (14.1%). Visual impairments were present among 34.1%, whereas frailty was found among 53.5%. MMSE revealed 13.5% of the participants with severe cognition impairment [Table 3].

History of fall

In the past 12 months ($n = 59$), 34.7% of the participants had experienced at least one episode of fall; of whom 69.5% were female. Recurrent episodes of falls were experienced by ($n = 35$) 20.6% with 68.6% female among them. Significant injury after fall recurring hospitalization was reported among ($n = 4$) 6.7%, whereas ($n = 28$) 47.5% needed physician consultation or medication. Most falls were reported at home (44.1%), followed by within the household

Table 2: Distribution of the study participants according to the sociodemographic characteristics (n=170)

Characteristics	Category	n (%)
Age (years)	50–65	125 (73.5)
	>65	45 (26.5)
Sex	Male	71 (41.8)
	Female	99 (58.2)
Religion	Muslim	35 (20.6)
	Hindu	135 (79.4)
Caste	Others (general caste)	8 (4.7)
	OBC	33 (19.4)
	SC	129 (75.9)
Living with spouse	Yes	127 (74.7)
	No	43 (25.3)
Type of family	Nuclear family	47 (27.6)
	Other than a nuclear family	123 (72.4)
Financial dependency	No	102 (60.0)
	Yes	68 (40.0)
SEC	Upper class	10 (5.9)
	Middle class	48 (28.2)
	Lower class	112 (65.9)
Education	Nonformal education	57 (33.5)
	Below secondary	73 (43.0)
	Secondary and above	40 (23.5)
Occupation	Homemaker	81 (47.6)
	Not working	29 (17.1)
	Working	60 (35.3)

SEC: Socioeconomic class, OBC: Other backward caste, SC: Schedule caste

premises (33.9%). Fall due to slip was the most frequent cause (67.8%) [Table 4].

Household safety

Assessment of household safety revealed that 30.6% of households had a seriously poor household environment, whereas 44.7% had a moderately poor household environment.

Fear of fall

On the assessment of fear of fall, 58.8% of the participants reported their high concern, whereas 16.5% were moderately concerned anticipating falls.

Predictors of falls

Univariate logistic regression analysis showed that female sex (OR 2.08 [95% CI 1.06–4.05]), nonformal education (OR 3.6 [1.41–9.15]), mild cognitive impairment (OR 2.14 [1.02–4.47]), and increasing frailty (OR 1.16 [1.02–1.31]) had significantly higher odds of falls. In addition, seriously poor household environment (OR 2.50 [1.05–5.92]) and high and moderate concern of fall (OR 6.05 [2.19–16.68] and 3.50 [1.02–11.93], respectively) were also associated with the event of falls. However, in multivariable logistic regression analysis, nonformal education (AOR

5.05 [1.33–19.07]), seriously poor household environment (AOR 3.59 [1.24–10.38]), and high and moderate concern of fall (AOR 6.18 [1.77–21.53] and 6.65 [1.56–28.22]) were the only factors found to have significantly higher odds of falls [Table 5].

DISCUSSION

The present study revealed a considerable proportion of falls among older adults both within the past 12 months (34.7%) and 1 month (14.2%) with female predominance. Previous reports from India and abroad indicated fall prevalence within 1 year ranging between 13% and 66.7%.^[1,3-9,21-25] Alike the present study, community-based assessment in the rural settings of Haryana (36.6%) and Chandigarh (28.8%) reported almost similar prevalence of falls within 1 year among the elderly population.^[7,9] Similarly, Tripathy *et al.* reported an annual fall prevalence of 31% among the elderly of the rural, urban, and slum areas in Chandigarh.^[4] A higher prevalence of fall (66.7%) was evidenced in a study conducted in Brazil by Rodrigues *et al.*^[25] A higher burden of comorbidity (91.2%) and more female participants (70%) could be the possible explanation for the high fall burden in that population. Observation from a cohort in Kerala reported an incidence rate of falls as 31/100 persons-years, almost in line with the cross-sectional finding of the present study.^[26]

Any injury following a fall (84.7%) reported in the present study was a little higher than the findings of Sirohi *et al.* (62.9%).^[9] Most of the prior studies reported around 34%–74% of injuries following a fall.^[4,5,23] Alike prior evidence, the slip was also the predominant cause of falls in our study.^[4,7] Although a higher proportion of injury from falls was reported, only 10.1% of the participants experienced any fracture in comparison to previous reports of Sirohi *et al.* (9.5%), Dsouza *et al.* (15.8%), and Joshi *et al.* (21.3%).^[3,9,22] A lower proportion of fracture in the rural settings, as reported by the present study and Sirohi *et al.*,^[9] was probably due to kutchha floors and roads compared to pucca floors and roads in the urban areas. The inclusion of relatively younger study participants (≥ 50 years) could be another reason for less proportion of fractures in our study.

Poor household environment attributable to slippery and uneven floors, poor lighting, and lack of supporting handles as mentioned in the household safety checklist, overall was found to be a significant predictor of falls. It was observed during data collection that the area in and around the bathroom remained constantly wet, and the premises become more slippery during the rainy season

Table 3: Distribution of the study participants according to their chronic morbidities and substance use status (n=170)

Characteristics	Category	n (%)
Chronic illness	Absent	55 (32.4)
	Present	115 (67.6)
Type of illnesses (multiple responses included)	Hypertension	61 (35.9)
	Diabetes	31 (18.2)
	Cardiovascular disorders	24 (14.1)
	GERD	19 (11.2)
	Musculoskeletal	18 (10.6)
	Hypothyroidism	12 (7.1)
	Asthma/COPD	12 (7.1)
	Psychiatric disorders	8 (4.7)
	Others [§]	12 (7.1)
Multimorbidity (n=115)	Absent	60 (35.3)
	Present	55 (32.3)
Visual impairment	No impairment	112 (65.9)
	Mild	34 (20)
	Moderate	21 (12.4)
	Severe	2 (1.2)
	Blindness	1 (0.6)
Frailty	Frailty score and median (IQR)	8 (6–10)
	Not frail	79 (46.5)
	Frail	91 (53.5)
BMI (Asian category for the WHO classification)	Underweight (<18.5)	23 (13.5)
	Normal (18.5–22.9)	73 (42.9)
	Overweight (23–24.9)	26 (15.3)
	Pre-obese (25–29.9)	40 (25.3)
	Obese (≥30)	8 (4.7)
Elevated blood pressure	No	68 (40.0)
	Yes (SBP ≥140 and/or DBP ≥90 mm Hg)	102 (60.0)
Elevated random capillary blood glucose	No	122 (71.8)
	Yes (≥140 mg/dL)	48 (28.2)
MMSE	No cognitive impairment	57 (33.5)
	Mild cognitive impairment	90 (52.9)
	Severe cognitive impairment	23 (13.5)
Any kind of substance use	Absent	104 (61.2)
	Present	66 (38.8)
Different types of substance use (multiple responses included) (n=66)	Smoking tobacco	27 (15.9)
	Chewing tobacco	36 (21.2)
	Betel nut	10 (5.9)
	Others [¶]	4 (2.4)

[§]Others included Alzheimer's disease, parkinsonism, chronic kidney disorder, rheumatological disorder, dermatological disorder, and anemia. [¶]Others included alcohol and ganja. BMI: Body mass index, WHO: World Health Organization, GERD: Gastroesophageal reflux disease, COPD: Chronic obstructive pulmonary disease, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, IQR: Interquartile range, MMSE: Mini-mental state examination

in the absence of proper maintenance. Altogether, these factors could increase the chance of falls by slipping on the household premises, which was the most frequent site of falls as reported here. This finding is similar to previous studies.^[7,27] The household environment as a significantly associated factor of falls must also be considered an important preventable component within the capacity of the household.

Factors such as female sex, higher age (age >80), and low socioeconomic status were not significantly

associated with falls, unlike a few previous reports.^[5,28] However, univariate analysis revealed females with higher risk, which was not reflected in multivariable models perhaps due to the small sample size.

Participants with nonformal education had higher odds of falls, similar to the findings of Gamage *et al.*, possibly indicating the role of education as one of the social determinants of health.^[29] Fear of fall, as reported by previous literature, was also found to be a risk factor for falls among the participants.^[1,10,26] As already argued,

Table 4: Characteristics of the study participants according to their place, reasons, and consequences of fall (n=170)

Characteristics	n (%)
Total fall in the past 12 months [†] (95% CI)	59 (34.7), (27.6–42.4)
Total fall in the past 1 month (95% CI)	24 (14.2), (9.3–20.3)
Recurrent fall (>1 episode of fall in the past 12 months) [‡]	35 (20.6)
Injury associated with fall (n=59) [‡]	
No injury sustain	9 (5.3)
Had a minor injury that needed no medication or consultation	18 (10.6)
Significant injuries that needed physician consultation or medication	28 (16.5)
Significant injuries that needed hospitalization	4 (2.3)
Place of fall (n=59)	
At home	26 (44.1)
Within household premises	20 (33.9)
Other outdoor sites	12 (20.3)
At hospital	1 (1.7)
Perceived cause of fall (n=59)	
Slipped	40 (67.8)
Uneven surface/lack of attention/obstacle	10 (16.9)
Sudden blackout/dizziness due to generalized weakness	6 (10.2)
Miscellaneous cause	3 (5.1)

[†]Out of those who experienced falls, 41 (69.5%) participants were female, [‡]Out of those who experienced recurrent falls, 24 (68.6%) participants were female, [‡]10.1% (six out of 59 cases of fall) resulted in a fracture. CI: Confidence interval

Table 5: Predictors of falls among the participants: univariate and multivariable logistic regression (n=170)[#]

Variables	Category	Number of falls (%)	OR (95% CI)	P	AOR (95%CI)	P
Age category (years)	50–65	47 (37.6)	1.65 (0.78–3.52)	0.18	1.52 (0.59–3.94)	0.38
	>65	12 (26.7)	1	-	1	-
Sex	Female	41 (41.4)	2.08 (1.06–4.05)	0.03	1.03 (0.28–3.79)	0.961
	Male (reference)	18 (25.4)	1	-	1	-
Education	No formal education	27 (47.4)	3.6 (1.41–9.15)	0.007	5.05 (1.33–19.07)	0.017
	Primary	24 (32.9)	1.95 (0.78–4.89)	0.15	2.05 (0.64–6.49)	0.222
	Secondary and above (reference)	8 (20.0)	1	-	1	-
Occupation	Homemaker	34 (42.0)	1.98 (0.96–4.09)	0.06	1.75 (0.54–5.68)	0.348
	Not working	9 (31.0)	1.23 (0.46–3.27)	0.66	0.77 (0.23–2.61)	0.68
	Currently working (reference)	16 (26.7)	1	-	1	-
Safety Checklist Score	Seriously poor household environment	26 (41.2)	2.50 (1.05–5.92)	0.037	3.59 (1.24–10.38)	0.018
	Moderately poor household environment	21 (27.6)	0.95 (0.41–2.20)	0.91	0.97 (0.36–2.61)	0.955
	No or mild lack of safety environment (reference)	12 (28.6)	1	-	1	-
Short Fall Efficacy Score	High concern	45 (45)	6.05 (2.19–16.68)	0.000	6.18 (1.77–21.53)	0.004
	Moderate concern	9 (32.1)	3.50 (1.02–11.93)	0.045	6.65 (1.56–28.22)	0.010
	Low concern (reference)	5 (11.9)	1	-	1	-
Frailty	Mean±SD	7.88±2.58	1.16 (1.02–1.31)	0.023	1.11 (0.92–1.33)	0.250
Cognition	Severe cognition impairment	8 (34.8)	1.63 (0.57–4.67)	0.35	0.90 (0.32–2.48)	0.844
	Mild cognition impairment	37 (41.1)	2.14 (1.02–4.47)	0.042	0.55 (0.12–2.43)	0.43
	No cognition impairment (reference)	14 (24.6)	1	-	1	-
Visual impairment	Present	15 (25.9)	0.53 (0.26–1.08)	0.08	0.59 (0.29–1.13)	0.18
	Absent	44 (39.3)	1	-	1	-

[#]Model adjusted for those variables had $P < 0.25$ in univariate logistic regression, including age, sex, education, occupation, Safety Checklist Score, Short Fall Efficacy Score, cognitive status, frailty, and visual impairment. Cox and Snell $R^2 = 0.22$ and Nagelkerke $R^2 = 0.31$. Hosmer–Lemeshow test ($\chi^2 = 6.66$, $df = 8$, $P = 0.573$); hence, no sufficient evidence to reject the model. OR: Odds ratio, AOR: Adjusted OR, CI: Confidence interval, SD: Standard deviation

like a vicious cycle, fear of falling even with a near-fall experience could lead to restriction of daily activities, anxiety, and depression, which is further worsened by

the lack of family support, cognitive impairments, poor balance, and history of falls making the participants more vulnerable for the next fall.^[10]

Known predictors of falls such as visual impairment, hearing impairment, cognitive impairment, alcohol consumption, hypertension, chronic obstructive lung disease, multimorbidity, frailty, and many other independent factors taken in our study were not associated with falls.^[1,7,9,26,28] Furthermore, many other predictors as suggested by the previous literature were not included in the study due to the nonfeasibility of the circumstances.^[1,7,9,12,25-28]

The inclusion of older adults has broadened the scope of the study findings. More stress on the household environmental factors as the potential predictors of falls provided the scope of designing household-based preventive measures to reduce the risk.

Recall bias might result in underreporting of falls. Individuals who might have died due to falls could be included here leading to the possibility of survival bias, and as a cross-sectional design, it also could not establish any temporality of the observed association.

CONCLUSION

Falls were common among older adults (34.7%). With nearly half who experienced falls suffered from injuries that required either medication or consultation and one in 15 required hospitalizations. Environmental conditions, fear of fall, and poor literacy were the predictors of falls. Interventions such as proper house construction for environmental risk reduction in line with Pradhan Mantri Awas Yojana and community-level awareness regarding the simple preventive measure at the household level to reduce the risk of falls, especially among older adults, need to be implemented. Awareness generation, counseling regarding fear of fall, and family support could be offered at the primary health-care delivery system in coordination with the National Program for Health Care of the Elderly.

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Conflicts of interest

There are no conflicts of interest.

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