Risk of Fall among Elderly People Residing in an Urban Municipality of Eastern Nepal

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Abstract

Introduction: Falls are a major public health issue and a leading cause of morbidity and mortality among older people. Majority of falls are preventable and injuries related to it can be reduced through early identification of risk factors and timely introduction of appropriate intervention. Therefore, the purpose of this study was to find out the risk of falls and its associated factors among elderly people.

Methods: A descriptive cross-sectional design was used. Using non-probability purposive sampling technique, a total of 103 elderly people aged 70 - 79 years were selected. Data were collected from the respondents by using pretested semi-structured interview schedule and "Time Up and Go" test at their homes. Data were analyzed by using descriptive and inferential statistics.

Results: Out of 103 respondents, 52.4% reported a history of falls within 12 months, 68% had history of chronic disease and 65% were taking medicine. Vision problem was reported by 74.8%. "Time Up and Go" test revealed that the majority (61.2%) were at high risk of fall. The risk was significantly associated with age (p = 0.001), educational status (p = 0.019) and history of fall within 12 months (p = 0.001).

Conclusion: Study concludes that elderly people aged 70 to 79 tend to be generally at high risk of fall. Age, educational status and history of fall within 12 months influence the risk of fall among elderly people.

INTRODUCTION

The aging population is one of the most significant populations in the 21st century. It is estimated that one in six persons in the world will be aged 60 years or over by 2030. Over the next three decades, the number of older persons worldwide is projected to be more than double, reaching over 1.5 billion in 2050.

With aging, great variety of molecular and cellular alterations occur over time, which leads to decrease in motor function and reduction in muscle strength and its endurance. Besides this, chronic diseases, vision problems, medications, previous history of fall, alcohol intake etc. can cause variety of problems among elderly and one of these is an increased risk of fall among them.[1-4]

Falls are the second leading cause of death due to unintentional injuries in 2017.[5] Globally an estimated 6,84,000 individuals die from falls, of which over 80% are in low and middle-income countries. Fall injuries is considered as a major public health concern in Nepal because the prevalence of non-fatal fall injury is 5.23% and a fatal fall injury prevalence is 8.8%.[5,6] Falls may lead to prolonged hospitalization, restriction of activities and mobility, change in balance and postural control, social isolation, anxiety and depression.[7,8] The cost of treatment is high in fall-related injuries and causes a huge burden

to family caregivers. It is important to identify the risk factors in order to adopt preventive measures for these events of fall. The findings of this study might be helpful to the concerned authority in developing strategies for designing fall prevention programs suitable for elderly and in advocating safety measures. This type of study was well researched in different parts of the world, but limited published studies regarding this issue in the Eastern part of Nepal were found. Therefore, this study was carried to find out the risk of fall and its associated factors among elderly people of Birtamod-2, Jhapa, Nepal.

METHODS

A descriptive cross-sectional design was used. Study population consisted of elderly people aged 70 - 79 years residing in Birtamod Municipality Ward Number 2, Jhapa, Nepal. A non-probability purposive sampling technique was used to select a total of 103 elderly people. The required sample size was calculated using the Cochran's formula i.e., $n = Z^2pq / d^2$ where, n = required sample size; Z = value of alpha at 95% confidence interval i.e. 1.96, p = prevalence of risk of fall as 59.2% [9] and d = allowable error as 10%. Using these values, the calculated sample size (n) came to be 93. Adding the anticipated non-response rate of 10%, the final sample size was 103.

Instruments consisted of a semi-structured interview schedule on socio-demographics and health related variables developed by the researcher through literature review and an observation tool i.e., Time Up and Go (TUG) test for the assessment of the risk of fall. TUG test developed by Podsiadlo & Richardson is a valid and reliable test for quantifying functional mobility and assessment of the risk of fall.[10] This test had been already used in Nepalese context.[9] In this test, older adults were asked to walk at his / her own speed for three meter distance and the test ends when individual sits back on the chair. By calculating the total time taken to complete distance by the elderly people to perform the test, they were categorized into high risk and low risk by using the cut off score to categorize the risk of fall in older adults aged 70 - 79 years as 13.5 second (i.e., high risk: ≥ 13.5 second and low risk: < 13.5 second). The interview schedule and instruction for the TUG test were translated in Nepali language by the principal-author with back translation by the co-authors to ensure validity. The Nepali version instruments were pre-tested among ten elderly people (10% of the sample size) of Ward Number 1 of Birtamod Municipality, Jhapa, Nepal for assessing clarity and feasibility. Research proposal was approved by the Institutional Review Committee of Nepalese Army Institute of Health Sciences (Reg. No. 752). Permission for data collection was obtained from the Chairperson of the Birtamod Municipality 2. Informed written consent was obtained from each respondent prior to including them

in the study. Data were collected in two weeks' duration from 16 January 2023 to 29 January 2023 through interview and TUG test. Confidentiality of the respondents was maintained by including the code number instead of the name in the instrument. Data were entered in the software i.e. statistical package for the social science (SPSS) version 16 and analyzed using descriptive and inferential statistics i.e. chi-square test to find out the association of the risk of fall with demographic and health related variables. The p value of < 0.05 was considered to be statistically significant in association.

RESULTS

Among 103 elderly people, more than half (52.4%) belonged to the age group 70 - 74 years with the mean age and SD as 73.83 ± 3.094 years. The sociodemographic characteristics of the study population is depicted in Table 1.

Table 1: Socio-demographic characteristics of the respondents

Characteristics	Number	Percent
Age in completed year # (N = 103)		
70 - 74	54	52.4
75 - 79	49	47.6
Sex (N = 103)		
Male	61	59.2
Female	42	40.8
Family type (N = 103)		
Nuclear	15	14.6
Joint/extended family	88	85.4
Educational status (N = 103)		
Can read and write	42	40.8
Cannot read and write	61	59.2
Educational level (N = 42)		
Informal	18	42.9
Basic level	15	35.7
Secondary level	9	21.4
Bachelor and above level	–	–

Mean ± SD 73.83 ±3.094

In this study, more than half (52.4%) of the respondents reported that they had a history of fall within the last 12 months whereas 68% of the respondents had reported a history of chronic disease. The associated comorbidities are shown in Table 2.

Table 2: Health-related information of the respondents

Characteristics (N = 103)	Number	Percent
History of fall within 12 months		
Yes	54	52.4
No	49	47.6
Having chronic diseases		
Yes	70	68.0
No	33	32.0
Disease types		
Hypertension	47	67.1
Dyslipidemia	16	22.9
Arthritis	15	21.4
Diabetes	15	21.4
Chronic obstructive pulmonary disease	10	14.3
Benign prostatic hyperplasia	10	14.3
Cardiac disease	9	12.9
Hypothyroidism	6	8.6
Taking regular medication		
Yes	67	65.0
No	36	35.0
Type of medicine#		
Anti-hypertensive	45	67.2
Anti-hyperlipidemic agents	17	25.4
Anti-diabetic agent	15	22.4
NSAIDS	14	20.9
Anticholinergic	10	14.9
Alpha-blockers	10	14.9
Diuretic	8	11.9
Others (Thyroid hormone etc.)	9	13.4
Having vision problem		
Yes	77	74.8
No	26	25.2

#Multiple Responses

Table 3 indicates the level of risk of fall among elderly.

Table 3: Respondents' risk level of fall

Risk Level of all	Number	Percent
High risk (TUG score ≥ 13.5)	63	61.2
Low risk (TUG score < 13.5)	40	38.8
Total	103	100.0

In this study, respondents aged 75 - 79 years were at higher risk of fall than those aged 70 - 74 years which was statistically significant ($p = 0.001$). Association of the respondents' level of risk of fall with socio-demographic variables are represented in Table 4.

Table 4: Association of level of risk of fall with socio-demographic variables (N = 103)

Socio-demographic variables	Score		Chi-square test value	p-value
	High risk	Low risk		
Age (Years)				
70 - 74	25 (46.3%)	29 53.7%)		
75 - 79	38 (77.6%)	11 (22.4%)	10.565	0.001*
Sex				
Male	33 (54.1%)	28 (45.9%)	3.1145	0.076
Female	30 (71.4%)	12 (28.6%)		
Family type				
Nuclear family	8 (53.3%)	7 (46.7%)	0.453	0.501
Joint/extended family	55 (62.5%)	33 (37.5%)		
Educational status				
Could read and write	20 (47.6%)	22 (52.4%)		
Could not read and write	43 (70.5)	18 (29.5)	5.478	0.019*

*Chi-square test; p value ≤ 0.05 = significant

The relationship between the risk of fall with the different health related variables are shown in Table 5.

Table 5: Association of risk of fall with health-related variables (N = 103)

Health-related variables	Score		Chi-square test value	p-value
	High Risk	Low Risk		
History of fall within 12 months				
Present	44 (81.5%)	10 (18.5%)	19.724	0.000*
Absent	19 (38.8%)	30 (61.2%)		
Chronic disease				
Present	44 (62.9%)	26 (37.1%)	0.263	0.608
Absent	19 (57.6%)	14 (42.4%)		
Vision problem				
Present	50 (64.9%)	27 (35.1%)	1.825	0.177
Absent	13 (50.0%)	13 (50.0%)		
Under medication				
Yes	43 (64.2%)	24 (35.8%)	0.733	0.392
No	20 (55.6%)	16 (44.4%)		

*Chi-square test; p value ≤ 0.05 = significant

DISCUSSION

Fall is considered as the common cause of injuries among the older population. Falls can lead to serious health consequences such as pain, bruising, lacerations, fracture and intracranial bleeding and death in severe cases. Because of a high prevalence of chronic health problems and age-related physiological changes among elderly, even a relatively mild fall is dangerous to them. Recovery from fall injury is often delayed, which leads to increased risk of subsequent falls through deconditioning. Falls are a major threat to the quality of life of aging populations causing decline in functional status, physical activities and social status.[11–13]

In this study, more than half (52.4%) of the respondents were at the age of 70 - 74 years (Mean age = 73.83, SD = 3.094). With advancing age, degenerative changes in the musculoskeletal and neuromuscular systems can affect complex motor performance thereby increasing the risk of falls among elderly.[14] This study showed that 61.2% of the respondents were at high risk of fall and only 38.8% were at low risk. Similar result was found in the study conducted among 98 elderly people of Bharatpur, Nepal, where 59.2% of the older adults were at a high risk of fall and 40.8% were at no risk of fall.[9] Much higher percentage (80.3%) of elderly were at risk of fall in similar study conducted among 117 older adults in Devghat, Nepal.[15] Present study finding is similar to the study conducted in Iran among 537 elderly people where 67% of the elderly were at risk of falling.[16] Many factors can expedite the occurrence of falls among elderly. These factors might be biological and psychosocial changes associated with aging. Physiological changes with ageing lead to reduction in the density of the long bones and spine, thereby increasing chances of fracture after fall injury.[17]

In the present study, a significant direct correlation was found between risk of fall and age of the respondents. This finding is similar to the findings of the studies conducted in Chitwan, Nepal, Iran and Thailand which showed a statistically significant association between age and risk of fall.[9,16,18] Current study showed statistically significant association of risk of fall at present who had previous history of fall within 12 months. This finding is supported by the studies from Brazil as well as Malaysia.[7,19] As the risk of fall is high with increasing age and having previous history of fall within 12 months, they need close supervision and support from their caregivers. Likewise, there was statistically significant association between risk of fall and educational status which is also supported by the study done in Kerman, Iran.[16]

Health related possible risk factors of falls in the elderly include chronic health problems, medication use, cognitive impairment and sensory deficits.[20] In the present study, 68% had reported a history of chronic disease. The major types of chronic diseases were hypertension (67%), dyslipidemia (22.9%), arthritis (21.4%) and diabetes (21.4%) and majority (65.0%) were taking medicines for these conditions. But this study found no significant association of risks of fall with chronic disease and use of drugs. Contrary to this finding, a

Finnish study revealed that the number of chronic diseases is related with risk of recurrent falling where recurrent fallers had a higher number of diseases compared to non-fallers.[21] Another study identified that polypharmacy rather than number of comorbidities was associated with fall risk.[22] These discrepancies among studies may have resulted due to different study settings. Chronic conditions such as arthritis, cardiovascular disease, diabetes, and vision and hearing loss can often lead to falls because these conditions lead to chronic pain, exercise intolerance, or physical inactivity resulting in decreased range of motion, flexibility and strength which increases the risk of fall.

This study has some limitations. It is a study limited to only one area of Birtamod-2, Nepal and elderly people of specific age group (70 - 79 years). Hence, it is difficult to generalize the results from this study.

CONCLUSION

Elderly people aged 70 to 79 years are generally at high risk of fall. Their age is associated with the increased risk of fall. Previous history of fall (within 12 months) tend to influence the current risk of fall among them. Elderly people who cannot read and write are at high risk of fall. The presence of chronic diseases, vision problem and medications are not associated with the risk of fall among them.

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