Functional Ability and Risk of Fall among Older Adults in Pokhara

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ABSTRACT

Introduction: Risk of fall is threat to the older adults with limited mobility and capabilities, and can reduce their ability to remain independent, decrease their well-being and lower quality of life. The objective of the study was to assess the functional ability and risk of fall among older adults in Pokhara.

Methods: A quantitative, cross-sectional, descriptive research design was used to conduct this study in all geriatric homes of Pokhara. The study population comprised older adults aged 60 years and above residing in different geriatric homes in Pokhara. Probability sampling was employed to collect data from 112 older adults between 14 August and 10 September 2022. Data were collected by the researcher using a structured interview schedule and an observation checklist. Functional ability was measured using the standardized tool, the Katz Index of Independence in Activities of Daily Living. Risk of fall was assessed using the Timed Up and Go test. Data was entered into EpiData version 3.1 and exported to SPSS version 16 for analysis. Data analysis was performed using descriptive statistics, including frequency, percentage, mean, and standard deviation. The Chi-square test was used to assess the association between selected variables and risk of falls.

Results: The findings of the study revealed that among 112 older adults, 61.6% of older adults had full function ability whereas 38.4% of older adults had moderate impairment of functional ability. Nearly half (43.8%) of older adults had a high risk of falls and 56.2% had no risk of falls. There was a significant association between risk of fall with age ($p<0.001$), gender ($p<0.001$), education ($p<0.001$), perceived health problems ($p<0.003$), history of falls ($p=0.03$), use of gait assistive devices ($p<0.001$), and functional ability($p<0.001$).

Conclusion: Considerable proportion of older adults have high risk of fall, age, gender, and functional ability tend to influence the risk of fall. Hence, screening programs should be conducted to identify those at risk and preventive programs should be launched to reduce falls and fall-related injuries among older adults.

Keywords: Functional ability, older adults and risk of fall.

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INTRODUCTION

Ageing refers to physiological changes we experience during our lifespan.[1] Though natural, ageing can be both healthy and unhealthy as it impacts functional ability.[2] During ageing age-related bodily changes occur in older adults such as water loss, loss of muscle and bone mass, and alterations to

the musculoskeletal and neuromotor systems.[3] As a result of these changes, older people are more likely to limit or decrease their muscle strength, flexibility, balance, reaction speed, and sense function.[4]such as muscle strength, can bring with them an increased risk of falls and subsequently greater risk of losing independence. These declines have substantial impact on an individual's functional ability. However, the precise relationship between falls risk and physical functionality has not been evaluated. The aims of this study were to determine the association between falls risk and physical functionality using objective measures and to create an appropriate model to explain variance in falls risk. Thirty-two independently living adults aged 65–92 years completed the FallScreen, the Continuous-Scale Physical Functional Performance 10 (CS-PFP10). Therefore, ageing related changes reduced functional abilities, which are the major causes of falls among the older adult. Over 142 million older individuals in the world were unable to meet all their basic daily needs, because of a decline in functional ability. Thus, it is a major public health concern globally.[2]

The prevalence of falls in the geriatric population is very high as millions of older adults in the world suffer falls each year. It is estimated that every one out of four older people suffer from fall each year.[5] The data from low-income South Asian countries, including Nepal, revealed a 5.2% non-fatal fall injury prevalence and an 8.8 % fatal fall injury prevalence.[6] Some of these injuries result in disability, increasing the need for long-term care and institutional support. Therefore, falls in older adults impose a significant economic burden on the health care systems.[5]

In daily lives of older adults, many factors can facilitate or promote the occurrence of falls.[7] The risk of fall increases according to the presence of the number of risk factors in the interaction. A study conducted in the United Arab Emirates showed that incidence of fall increased from 8% among those with no risk factors to 78% among those with four or more risk factors which occurred while performing activities of daily living.

Risk of falls is threat to the older adults with limited mobility and capabilities, and can reduce their ability to remain independent, decrease their well-being and lower quality of life. A study conducted in Bharatpur showed that more than half of the older adults were at risk of fall.[9] A study conducted in old age home at Devghat found that 80.3% older adults had a risk of fall. These people living more independently at the shrine on their own had a high risk of fall in their old-age home. The high risk of falls in old-age homes was attributed to the older adults being frequently resilient and seeking not to depend on others; they often attempted to perform most of their tasks themselves.[10]as it grows there is also increase chance of fall. A descriptive cross sectional study was carried out to assess functional status and fall risk among older adults. Total 117 older adults were selected by using enumerative sampling technique. Face to face interview method was used with 'Katz Index of Independence in Activities of Daily Living' to assess functional status and Time Up and Go (TUG) A better quality of life of the older adults can be achieved through individualized care, reducing the risk of falls and maintaining the functional ability.[11]

Functional ability and the risk of falls among the older adults in Nepal remains one of the least-studied public health issues. Since falls and fall-related injuries can be reduced and are preventable, having a better knowledge of risk of fall mitigate them is hugely important. This study attempts to bridge this gap to some extent by assessing the functional ability and risk of fall among older adults. Therefore, the study aimed to assess the functional ability and risk of fall among older adults in Pokhara.

METHODS

A cross- sectional study design was used to assess the functional ability and risk of fall among older adults in Pokhara. There were five community run geriatric homes in various wards of Pokhara Metropolitan City according to the information provided by Pokhara Metropolitan office. They were Radha Krishna Ashram, Pokhara Aged Shelter, Batsalya Ashram, Harihar Ashram, Krishna Ashram. The study population was consisted of older adults both male and female 60 years and above residing in different geriatric homes of Pokhara metropolitan city. Those older adults who were severely ill, bedridden, unable to communicate, complete vision loss and cognitive impaired were excluded in this study.

Sample size was calculated by using Cochran's formula[12] based on 59% prevalence of risk of fall,[9] 0.05% significance level and 5% acceptable sampling error. Calculated sample size was 372. According to the data of Pokhara Metropolitian office, there were 160 older adult adults living in geriatric homes in Pokhara. Sample adjustment was done by using Cochran's Modified formula for finite population. Thus, calculated sample size was 112. Probability proportionate to Size (PPS) sampling was done from geriatric homes by calculating sampling fraction . Required sample was selected from different geriatric home with simple random sampling with lottery method without replacement. Lottery method was done until desired sample was obtained from each geriatric home.

Structured Interview schedule and observation checklist was used to collect data for study. The first part of the instrument consisted of sociodemographic characteristics of the older adults. The second part consisted of questions related to health status and behavioral characteristics. The third part consisted of question and observation checklist related to functional ability. Functional ability was measured by using structured standard tool "Katz Index of Independence in Activities of Daily Living (Katz ADL).[13] The tool measured adequacy of performance in the six functions of Activities of Daily Living (ADL) i.e. bathing, dressing, toileting, transferring, continence, and feeding. Older adults scored yes/no for independence in each of the six functions. A score of 6 indicates full function, 4 indicates moderate impairment, and 2 or less indicates severe functional impairment. The fourth part consisted of observation checklist related to risk of fall. Risk of fall was observed by using Time Up and Go (TUG) test.[14] The risk of fall was measured by calculating the total time of older adults obtained from TUG test and status of risk of fall was classified into two categories as no risk of fall and high risk of fall. No risk of fall was defined as an older adult who took less than 12 seconds in TUG test. High risk of fall was defined as an older adult who took greater than or equal to 12 second in TUG test.

Data was collected after getting ethical approval from Institutional Review Committee (IRC) of Institute of Medicine with [Ref no: 47(6-11) E2 079/80] for ethical clearance and geriatric homes of Pokhara. A written informed consent was taken from the older adults after explaining the purpose of the study to them. Older adults' confidentiality was maintained. The safety of the older adults was ensured by accompanying them while they performed the test. After the completion of data collection, collected data was checked, reviewed and organized daily for its accuracy and completeness. The obtained data were edited, coded and entered into the computer using the software Epi-data 3.1 and transferred into Statistical Package for Social Science (SPSS 16) for further analysis. The data was analyzed using descriptive and inferential statistics. Descriptive statistics (such as mean, frequency, percentage and standard deviation) was used to describe the socio-demographic and other variables. Chi square test was used to find out the association between selected variables and risk of fall.

RESULTS

Out of 112 respondents, the mean age of older adults was 74.38 ± 9.10 years ranging from 60 to 105 years. Similarly, 56.2% were female and 74.1% belonged to upper-caste groups. Likewise, 99.1% followed the Hindu religion and 41.1% were widows/ widowers. Regarding educational status, 61.6% were illiterate,47.3% respondents stayed at geriatric home for five years and 46.4% respondents came to geriatric home by self (Table 1).

Talbe 1: Socio-demographic Characteristics of the Respondents (n=112)

Characteristics	Number	Percent
Age in years		
60-69	33	29.5
70-79	46	41.0
≥80	33	29.5
Mean ± SD= 74.38±9.10 years		
Gender		
Male	49	43.8
Female	63	56.2
Ethnicity		
Upper caste group	83	74.1
Relatively advantaged janajati	16	14.3
Disadvantaged janajati	11	9.8
Dalit	2	1.8
Religion		
Hindu	111	99.1
Buddhist	1	0.9
Marital status		
Widow/widower	46	41.1
Never married	28	25.0
Married	26	23.2
Divorced/Separated	12	10.7
Educational status		
Cannot read and write	69	61.6
Informal education	10	8.9
Basic level education	17	15.2
Secondary level education	13	11.6
Higher level education	3	2.7
Duration of stay at the geriatric home		
≤5 years	53	47.3
6-10 years	36	32.1
11-15 years	10	8.9
>15 years	13	11.6
People who brought to geriatric home		
Self	52	46.4
Relative	50	44.6
Organization	10	8.9

Table 2: Health Related Variables of the Respondents (n=112)

Variables	Number	Percent
Presence of chronic disease	58	51.8
Chronic disease (n=58)*		
Hypertension	31	41.3
Diabetes mellitus	15	20.0
Respiratory disease(COPD/Asthma)	15	20.0
Arthritis	7	9.3
Cardiac disease	5	6.7
Others (Hypothyroidism)	2	2.7

Variables	Number	Percent
Presence of perceived health problem	60	53.6
Perceived health problem (n=60)*		
Vision problem	28	33.3
Gastrointestinal problem	18	21.4
Musculoskeletal problem	18	21.4
Hearing problem	13	15.5
Urinary problem	4	4.8
Sleeping problem	3	3.6
Regular use of medication (n=58)	52	46.4
Use of gait assistive device	30	26.8
History of fall within 12 months	24	21.4

**Multiple response*

As shown in Table 2, More than half 51.8% of respondents had history of chronic disease. Among respondents having chronic disease 41.3% had hypertension. Likewise, 53.6% of respondents had other perceived health problems and among them 33.3% were having vision problems. Similarly, 46.4% of respondents used regular medication while 26.8% used gait assistive device. Likewise, 21.4% of respondents had history of fall within 12 months.

Table 3: Functional Ability of the Respondents in Different Aspects of ADLs (n=112)

Functional Ability	Independence		Dependence	
	Number	Percent	Number	Percent
Bathing	89	79.5	23	20.5
Dressing	98	87.5	14	12.5
Toileting	102	91.1	10	8.9
Transferring	109	97.3	3	2.7
Continence	89	79.5	23	20.5
Feeding	112	100.0	-	-

As shown in Table 3, 20.5% of respondents were dependent on others for bathing and 2.7% need help in moving from bed to chair.

Only 61.6% of respondents had full function whereas 38.4% of respondents had moderate impairment of functional ability. Similarly, 43.8% respondents had high risk of fall who took more than or equal to 12 second to complete time up and go test but 56.2% had no risk of fall who took less than 12 second to complete time up and go test (Table 4).

There was a significant association of status of risk of fall with age, gender and educational status (p<0.001) perceived health problems (p <0.003), use of gait assistive device (p<0.001) and history of fall (p<0.03) (Table 5).

Table 4: Functional Ability and Status of Risk of Fall of the Respondents(n=112)

Variables	Number	Percent	95%CI
Functional ability			
Full function	69	61.6	5.16- 5.53
Moderate impairment	43	38.4	
Severe functional impairment	-	-	
Status of risk of fall			
No risk of fall(<12sec)	63	56.2	11.78-13.71
High risk of fall(≥12sec)	49	43.8	
Min=6.85sec & Max=50 sec			

Table 5: Association between Status of Risk of Fall of the Respondents and Selected Variables (n=112)

Variables	Status of risk of fall		x^2	*p*-value
	No risk No (%)	High risk No (%)		
Age				
60-69	27(81.8)	6(18.2)	33.736	<0.001*
70-79	31(67.4)	15(32.6)		
≥80	5(15.2)	28(84.8)		
Gender				
Male	37(75.5)	12(24.5)	13.131	<0.001*
Female	26(41.3)	37(58.7)		
Ethnicity				
Upper caste group	49(59.0)	34(41.0)	1.011	0.315
Janajati /Dalit	14(48.3)	15(51.7)		
Marital Status				
Widow/widower	21(45.7)	25(54.3)	3.563	0.059*
Others	42(63.6)	24(36.4)		
Educational status				
Illiterate	27(39.1)	42(60.9)	21.403	<0.001*
Literate	36(83.7)	7(16.3)		
Chronic disease				
Yes	32(55.2)	26(44.8)	0.057	0.812
No	31(57.4)	23(42.6)		
Perceived health problem				
Yes	26(43.3)	34(56.7)	8.761	0.003*
No	37(71.2)	15(28.8)		
Regular use of medicine				
Yes	32(61.5)	20(38.5)	1.103	0.294
No	31(51.7)	29(48.3)		

Variables	Status of risk of fall		x^2	*p*-value
	No risk No (%)	High risk No (%)		
Use of gait assistive device				
Yes	5(16.7)	25(83.3)	26.089	<0.001*
No	58(70.7)	24(29.3)		
History of fall				
Yes	9(37.5)	15(62.5)	4.364	0.037*
No	54(61.4)	34(38.6)		

**chi square test significance (p<0.05 at 95% confidence level)*

Others-Married/ Never married /Divorced/Separated

TABLE 6: Association between Functional Ability and Status of Risk of Fall of the Respondents (n=112)

Functional Ability	Status of risk of fall		x^2	*p*-value
	No risk No (%)	High risk No (%)		
Full function	60(87.0)	9(13.0)	68.859	<0.001*
Moderate impairment	3(7.0)	40(93.0)		

**chi square test significance (p<0.05 at 95% confidence level)*

As shown in Table 6, there is significant association of functional ability (p <0.001) with status of risk of fall.

DISCUSSION

This study aimed to assess functional ability and risk of fall among older adults and found that 43.8% were at high risk of fall, while 56.3% had no risk. This prevalence is lower than findings from studies conducted in Bharatpur, Chitwan (59.2%)[9] and Devghat (80.3%)[10], but similar to a study from South Kerala, India (45%)[15]. In contrast, a study from a nursing home in Penang, Malaysia, reported a much lower prevalence (13.3%).[16] These variations may be attributed to differences in study settings, sampling techniques, tools, and sample sizes.

The present study also demonstrated a significant association between functional ability and risk of fall, which is consistent with studies conducted in Turkey, Japan, and by Lagana and Zarpas,[17,18,19] all of which reported that lower functional ability was associated with higher fall risk. However, this finding contradicts a study conducted in Brazil, which reported no significant association between functional ability and risk of fall,[11] possibly due to differences in assessment tools.

In this study, there was significant association between age, gender, education, perceived health problem, use of gait assistive device and risk of fall. This finding was supported by various other studies conducted on Nepal,India,Malaysia,Dubai ,[7,8,9,15,16] which reported similar results due to comparable settings, samples, and research tools.

CONCLUSIONS

The study concludes that more than half of the older adults have full functional ability and nearly half of the older adults have risk of

fall. Age, gender, education, perceived health problem, use of gait assistive device and history of fall tend to influence the risk of fall of older adults. Further, there is significant association between functional ability and risk of fall among older adults. Thus, this study recommended providing more emphasis to the risk factors while planning the screening program to rule out the risk of fall among older adults. Functional ability assessment should be done timely to minimize risk of fall. Management of geriatric homes should plan and intervene various strategies such as involvement of older adults in physical activities programs to prevent risk of falls.

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