

Original Research



Incidence, immediate consequences, associated factors and health-seeking behaviour related to falls among the elderly in Elapatha Medical Officer of Health Area, Sri Lanka

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Abstract

Introduction: Older adults are more vulnerable to falls, which are the most common cause of mortality and morbidity in the elderly. The consequences of falls and its health seeking behaviour will affect the quality of life of the elderly.

Objectives: To describe the incidence, immediate consequences, associated factors and health-seeking behaviour related to falls among the elderly in Elapatha Medical Officer of Health (MOH) Area

Methods: A community-based cross-sectional study was conducted in Elapatha MOH Area. Cluster sampling technique was used to select 510 elderly using probability proportional to the size of the population technique. Retrospective data on falls during the previous three months were collected using an interviewer-administrated questionnaire.

Results: Cumulative incidence of falls during the past three months was 127 (95% CI=100, 159) falls per 1000 elderly. Older age (75 years and above) (adjusted odds ratio (aOR)=3.4; 95% CI=1.4, 8.4) being a female (aOR=2.1; 95% CI=1.2, 3.8) and elders who were currently employed (aOR=3.6; 95% CI=1.9, 6.9) were positively associated with falls in binary logistic regression analysis. No significant associations were observed with the level of education, living alone and the marital status. The higher proportion of falls (n=38; 59.4%) were due to Hazardous environmental conditions. Injurious falls occurred in 35.9% (n=23) of cases. Most (n=12; 41.4%) of the fall victims had received Western treatment.

Conclusions & Recommendations: There was a higher reported incidence of falls among the elderly population specially among the female gender and the elders who were currently employed. Thus, there is a need for strengthening of awareness programmes on prevention of falls among elderly population and incorporation of elderly risk assessments in the available national screening programmes is a timely need.

Keywords: falls, elderly, health-seeking behaviour

Introduction

Rapid population ageing is predicted in Sri Lanka. According to 2012 Census, only 12.4% of the total population belonged to 60 plus age category (1). As per the standard population projections, Sri Lankan elderly population is expected to double to 24.8% by 2041 (2). Injuries are the fifth leading cause of death in elderly people (3). Most of these fatal injuries are related to falls, thus considered the most serious and frequent home accident faced by elders (4-6). A study conducted in Wattala MOH Area found that falls can be ranked first among the common home accidents among people aged 60 years and above (7).

Falls are commonly defined as, “inadvertently coming to rest on the ground, floor or other lower level, excluding intentional change in position to rest in furniture, wall or other objects”, which occur because of complex interaction of risk factors. These risk factors can be broadly categorized as biological, behavioural, environmental, and socioeconomic factors (8).

Falls incidences are different from country to country; and increase with age (8). Falls incidence among those aged 65 and above ranges from 28-35% each year, while among elders who are aged 70 years and above, it ranges from 32-42% each year (9-14). In India, the frequency of elderly falls measured over six months was 14% (15). Incidence of falls among elders aged 65 years and older in Barbados, Chile, Japan, and Korea is 21.6%, 34%, 13% and 20% per year, respectively (16-18). A study conducted among elders in the district of Colombo showed that the incidence rate of falls was 492 per 1000 person-years (19).

Fear of falling and depression can occur following repeated falls. Even when there is no injury following a fall, loss of self-confidence, social withdrawal, and loneliness can occur (20). The economic impact and healthcare costs due to falls are significantly high to the family, community, and the society as well (8). Kumara & Samaratunge (2016) have shown that Sri Lankan households with more than one elderly person and located in rural or estate setting have to pay on average higher out-of-pocket payment for

health care. Therefore, prevention of falls and other injuries is of utmost important to prevent further increase in this amount (21).

Health seeking behaviour of older people and their caregivers following falls may depend on various socio-demographic, economic and cultural factors. Even though most non-injurious falls (75-80%) are never reported to health professionals (20), even a minor fall in older persons may end up in a fracture due to weakness of the bones, resulting in permanent immobility that could lead to significant economic costs for health care and loss of productivity of individuals or caregivers leading to a financial burden.

In Sri Lanka, almost all the studies conducted on falls among the elderly had been done in Colombo or a suburban setting. Apart from one study (5), there is lack of published literature on falls among elderly in rural settings in Sri Lanka. According to the Health Situation in the South-East Asia Region 2001-2007 Report, there will be more older people in rural areas compared to urban areas (22). Therefore, it is necessary to gather relevant information on falls among the elderly in rural communities, as the socio-economic characteristics vary among elders living in rural and urban areas. Obtaining specific data will be more relevant than the generalized data, when planning interventions to prevent falls among elders.

Methods

This community-based cross-sectional study was conducted in 2014 in the MOH area of Elapatha. According to the socio-demographic data of this area, almost all are Sinhalese (23). Elderly persons above the age of 60 years who were permanent residents of Elapatha MOH Area for the past six months or more and able to understand and communicate in Sinhala language were included in this study. Elders who were cognitively impaired (Mini-mental score <17) or elders who were bedridden or institutionalised were excluded.

The sample size was 510, which was calculated using the standard formula for a descriptive study (24).

Since there was lack of published literature on the incidence of falls among elderly in rural setting of Sri Lanka, approximate value of proportion was taken as 50%. Cluster effect was taken as 1.2, and to compensate for the non-respondents, further 10% was added. Cluster sampling technique was used to select 17 clusters randomly with probability proportionate to size (PPS) technique from 20 Grama Niladhari (GN) divisions (23). Each cluster included 30 households. Within each selected cluster, the first household was selected randomly using an approximate central place of the main road and the direction selected by spinning a bottle. The house closest and to the left of the first house was visited next. The same principle was followed for subsequent residences. Within each house, eligible elderly was selected for the study. If an eligible participant was not available at the time of data collection, he/she was excluded from the study considering the feasibility factors, and if there were more than one eligible elder in that house, one participant was selected randomly.

A pre-tested, interviewer administered questionnaire prepared in Sinhala was used for data collection. The contents were prepared according to the objectives, after reviewing literature. Face and content validity of the questionnaire was assessed. The questionnaire consisted with following sub sections: Part one included socio-demographic and socio-economic information such as age, sex, ethnicity, religion, current marital status, highest educational level, employment status, family income, and living arrangement. Part two included information related to falls such as factors associated at the time of falls, immediate consequences, and health seeking behaviour following a fall. In this study, a fall was defined as an event when a person comes to rest unintentionally on the ground or other lower level, without any extrinsic force (e.g., forcefully pushed down, knocked down by a car). An injury was defined as damage to the tissues of the body (25). The incidence of falls was defined as a new event of falls which has occurred within three months prior to the study among elders in MOH area of Elapatha. An immediate consequence of falls was defined as physical, psychological, and social changes that occur following the last fall of respondents. Health

seeking behaviour of elderly following a fall was defined as any activity taken by the elderly following a fall e.g., taking treatment from a general practitioner, admission to government or private hospital, or taking Ayurvedic or any other treatment following the last fall. Binary logistic regression analysis and the adjusted odds ratios (aOR) were used to describe the associations between falls among elderly and their socio-demographic factors (Table 4).

Results

Response rate was 98.4% (n=502). Mean age of the study population was 66 (SD=4.4), which ranged from 60 to 83 years. All were Sinhalese. Majority were Buddhists (n=498; 99.2%), females (n=262; 52.2%) and married (n=390; 77.7%). Nearly half of the respondents only had primary education (n=221; 44%) with 84.5% (n=424) currently unemployed. Socio-demographic and economic characteristics of the respondents are described in Table 1.

Only 12.7% (n=64) of the elders reported having a fall within three months prior to the study, giving a cumulative incidence of 127 (95% CI=100, 159) falls per 1000 elderly. This incidence indicates only the single episodes of falls and falls event rate was 131 (95% CI=104, 163) per 1000 elders during past three months. Age-specific incidence of falls for elders 75 years and above was 276 per 1000 elders aged 75 years and above for three months duration. Sex-specific incidence of falls was 96 and 156 per 1000 elders for males and females, respectively (Table 2).

Significant associations of falls with socio-demographic factors are shown in bivariate analysis (Table 3) and in logistic regression analysis (Table 4). These were higher age (75 years and above) (aOR=3.4; 95% CI=1.4, 8.4) being a female (aOR=2.1; 95% CI=1.2, 3.8) and elders currently involved in a job (aOR=3.6; 95% CI=1.9, 6.9).

Thirty per cent (n=19) of falls had occurred due to lack of attention. More than one factor had contributed to falls in 25% (n=16) of the elderly. Also, 35.9% (n=23) of elders had injured following a

Table 1: Distribution of socio-demographic/ economic characteristics of the sample (N=502)

Characteristics	No.	%
Age		
60 – 64	210	41.8
65 – 69	197	39.2
70 – 74	70	13.9
75 – 79	23	4.6
80 and above	2	0.4
Gender		
Male	240	47.8
Females	262	52.2
Ethnicity		
Sinhala	502	100.0
Religion		
Buddhist	498	99.2
Christian	4	0.8
Current marital status		
Unmarried	13	2.6
Married	390	77.7
Divorced/Separated /Widow /Widower	99	13.7
Highest education level		
No Schooling	31	6.2
Grade 1- 5	221	44.0
Grade 6 -10	195	38.8
Up to GCE (Ordinary Level)	48	9.6
Up to GCE (Advance Level)	7	1.4
Current employment status		
Employed	78	15.5
Unemployed	424	84.5
Monthly family income		
≤ Rs. 10,000/=	183	36.5
> Rs. 10,000/=	242	48.2
Do not know	77	15.3
Living arrangement		
Lives alone	5	1.0
Lives with spouse	37	7.4
Lives with spouse and children	311	61.9
Lives with children	128	25.5
Lives with relations	21	4.2

fall, of whom 39.1% (n=9) had contusions only and 34.8% (n=8) both abrasions and contusions. The majority (n=37; 84.1%) had experienced only pain; 2 (4.5%) both pain and dizziness; and 4 (9.1%) both pain and drowsiness. Among those who had fallen, 21.9% (n=14) said they were afraid of falling again,

while 25% (n=16) had changed their daily activities following falls. However, majority (n=48; 75%) had said that falls did not change their lifestyle (Table 5). Of all fallers, 35 (54.7%) had not received medical treatment following the fall, and of those who had received treatment, 12 (41.3%) had taken Western treatment and 11 (38.0%) treated at home (Table 6).

Table 2: Age- and sex-specific cumulative incidence of falls among the study participants (N=502)

Characteristics	Age group (years)		Total
	60-74	75 and above	
Males			
Subjects	228	12	240
Falls	22	1	23
Cumulative incidence (95% CI)	97	83	96 (63,138)
Females			
Subjects	245	17	262
Falls	34	7	41
Cumulative incidence (95% CI)	139	412	156 (116, 204)
Total			
Subjects	473	29	502
Falls	56	8	64
Cumulative incidence (95% CI)	118 (92, 150)	276 (137, 458)	127 (100, 159)

CI=confidence interval

Table 3: Associations between falls and the selected socio-demographic factors (N=502)

Related factor	Fall		OR (95% CI)
	Yes	No	
75 years and above	8 (27.6%)	21 (72.4%)	2.8 (1.2, 6.7)
60 to 74 years	56 (11.8%)	417 (88.2%)	1.0
Female	41 (15.6%)	221 (84.4%)	1.8 (1.0, 3.0)
Male	23 (9.6%)	217 (90.4%)	1.0
Married	50 (12.8%)	340 (87.2%)	1.0 (0.5, 1.9)
Others*	14 (12.5%)	98 (87.5%)	1.0
Living alone	1 (2.0%)	4 (98.0%)	1.7 (0.2, 15.7)
Living with others**	63 (12.7%)	434 (87.3%)	1.0
Currently employed	19 (24.4%)	59 (75.6%)	2.7 (1.5, 4.9)
Currently unemployed	45 (10.6%)	379 (89.4%)	1.0
Grade 5 or less	40 (76.9%)	12 (23.1%)	1.8 (1.0, 3.0)
Above Grade 5	24 (9.6%)	226 (90.4%)	1.0

* Unmarried, divorced/Separated and widow/widower; ** Living with spouse, living with children, and living with relations
OR=odds ratio; CI=confidence interval

Table 4: Adjusted odds ratios for the association with elderly falls and the selected socio-demographic variables (N=502)

Variable	B	SE	aOR	95% CI	p value
Female gender	0.75	0.29	2.1	(1.2, 3.8)	0.01
Age 75 years or more	1.23	0.46	3.4	(1.4, 8.4)	0.01
Currently employed	1.29	0.33	3.6	(1.9, 6.9)	0.00

B=beta co-efficient; SE=Stranded Error, aOR=adjusted odds ratio; CI=confidence interval

Table 5: Distribution of immediate consequences among fall victims

Consequences	No.	%
Injury (n=23)		
Abrasion only	3	13.0
Contusion only	9	39.1
Abrasion and Contusion	8	34.8
Abrasion and Laceration	1	4.3
Abrasion and Fracture	2	8.7
Medical consequences (n=44)		
Pain only	37	84.1
Dizziness only	1	2.2
Pain and dizziness	2	4.5
Pain and faintishness	4	9.1
Psychological consequences (n=64)		
Not feeling fear again	50	78.1
Feeling fear of falling again	14	21.9
Social consequences (n=64)		
Continued with daily activities	48	75.0
Stopped doing daily activities	16	25.0

Table 6: Distribution of the place of treatment following an event of a fall (n=29)

Place of treatment	No.	%
Home remedy	11	38.0
Western treatment		
• General practitioner	8	27.6
• Government hospital (outpatient department)	2	6.9
• Government hospital (admitted)	2	6.9
Ayurvedic treatment		
• Private Ayurvedic practitioner	5	17.2
Government hospital (admitted) and Private Ayurvedic practitioner	1	3.4

Discussion

In this study, cumulative incidence of falls was 127 per 1000 elderly during last three months (95% CI=100, 159). The three-month cut-off was selected to reduce recall bias as there is evidence suggesting that a recall period of 1-3 months is acceptable (26). However, majority of the research done on falls among elderly have assessed the incidence for one-year periods indicating that the cumulative incidence rate of the present study is higher for three months, though the exact comparisons on research findings were not possible due to the difference in time of assessment.

Our study found that increasing age is significantly associated with falls. This finding is compatible with many studies (9, 11-12, 17, 19, 27-28). As a natural phenomenon, with the advancement of age, the body is getting weaker in the elderly. In addition to that, their balance and vision also get impaired. Therefore, the combination of these natural effects may be a possible explanation for this finding.

Even though our study showed that the female gender is significantly associated with falls, a study done previously in the district of Colombo had shown that gender is not significantly associated with elderly falls (19). Different studies have found different results on the effect of gender on elderly falls, but with the majority supporting that female gender is significantly associated with elderly falls (27-28). A study done in Korea found that currently unemployed elders are significantly at higher risk of getting falls, which was inconsistent with our study finding (27) and a few other studies (19, 28).

Majority of the elders had fallen outside the house and due to lack of attention, and with more than one factor contributing to falls in some elders. This suggests that most of the falls could have been prevented if the elders and caregivers were educated about the contributing factors of falls and the necessary lifestyle changes to prevent falls. Further, this study revealed that most of the elders who had

fallen were not injured and suffered only from contusions or pain following a fall. This could be one reason why most falls had not been reported to health care workers (6).

Even though most of the rural population preferred to get Western treatment (29) and visit to private clinics for acute medical illness in Sri Lanka (30), there is a belief among some people that Ayurvedic treatment is better for management of falls. In this study, we found that, out of the elders who had received treatment, most had taken Western treatment, but 38% (n=11) of elders had taken homemade remedies and treatment methods for a fall, which ranged from local application of oil to application of a variety of balms and taking simple analgesics (e.g., paracetamol). If this study had a larger sample size, there was a possibility of assessing whether there was a higher percentage of people seeking Ayurvedic treatment following initial Western treatment.

Conclusions & Recommendations

In this study, cumulative incidence of falls was 127 per 1000 elderly during last three months (95% CI=100, 159). As the incidence of falls among elderly is higher, it is recommended that a fall-risk assessment should be conducted among all older patients being admitted to hospital and screening for risk of falls to be conducted at primary health care institutions to prevent falls among elderly.

The current study revealed that elders who were over 75 years of age, female and currently employed were at significantly higher risk of falls, highlighting the most vulnerable persons among the elders for falls. Further, most of the falls are preventable, as most had occurred due to hazards in the environment. Therefore, it is recommended to educate elders and caregivers on the prevention of falls. Community-based awareness programmes are necessary to address these issues, and a community level system should be implemented to review the home environment for the safety of elders.

Public Health Implications

- The incidence of falls among the elderly is an important but a neglected issue, especially in rural settings of Sri Lanka.
- Falls among the elderly can lead to adverse physical and psycho-social health outcomes that in turn could affect their quality of life.
- Majority of falls among the elderly can be prevented by conducting awareness programmes and assessing their risk of falls.
- Timely interventions and incorporation of the same to national screening system are crucial in the prevention of falls among the elderly.

Authors Declarations

Competing interests: Authors declare that they have no conflicts of interests.

Ethics approval and consent to participate: Ethics approval was granted by the Ethics Review Committee of the Postgraduate Institute of Medicine, University of Colombo (reference number: ERC/PG/004/2014/21).

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Author contributions: BMIG conducted the research as principal investigator. RDSR contributed as the technical supervisor of the research project.

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