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Risk factors for domestic falls in elders in Sri Lanka.

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Abstract

Introduction: This research was undertaken to determine the risk factors for domestic falls of elders above age of 60 years among who were admitted to the accident service unit of a Teaching Hospital in Sri Lanka.

Methods: It was a case control study involving 100 cases and 100 Controls carried out in accident Service Unit and Orthopaedic wards of Colombo South Teaching Hospital. Interviewer administrated questionnaire was used to collect data after gaining verbal consent. Collected data was analysed by Statistical package for the social sciences.

Results: In the bivariate analysis, the statistically significant risk factors were wearing spectacles (OR-0.44, 95% CI: 0.25-0.78), having cataract of one or both eyes (OR-3.62, 95% CI: 2.00-6.58), difficulty in walking (OR-2.20, 95% CI: 1.09-4.44), previous history of falls after age of 50 years (OR-2.36, 95% CI: 1.27-4.39), wearing foot wear inside the house (OR-4.24, 95% CI: 2.28-7.90) and a wet floor.

Conclusion: The identified risk factors in our study are potentially modifiable. Environmental assessment would help to identify and prevent potential hazards, favouring mobility and safety of the patient.

Keywords: Domestic falls, Risk factors, Sri Lanka, Elders.

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Introduction

Each year, one in every three adults age 65 years and older fall. Among older people this is the leading cause of fatal and non-fatal injuries [1]. In 2010, 2.3 million nonfatal injuries among older adults were treated in emergency departments and more than 662,000 of these patients were hospitalized [2]. Those who incur a serious injury never fully recover and many lose their ability to function independently for the rest of their lives. Twenty to thirty percent of people, who fall, suffer moderate to severe injuries such as, hip fractures or head trauma [3]. Falls are the most common cause of traumatic brain injuries [4]. Many people, who fall, even if they are not injured, develop a fear of falling [5]. This fear may cause them to limit their activities, which lead to reduced mobility and loss of physical fitness, and in turn increase their actual risk of falling [6].

In a recent study in the university of Yale, researchers identified hazards in the house of 1100 people who were 72 years or older. After following the study participants for three years, the researchers compared the number of falls with the kinds of household hazards they initially identified. It was revealed that household hazards did not affect the number of falls people had. Instead they found a person's health may have more to do with how frequently they fall and injure themselves [7].

The factors causing domestic falls and their severity in causing the damages need to be studied. This study was conducted to determine the risk factors causing domestic falls and to describe the morbidity associated with domestic falls [8-10].

Methods

A case control study was conducted in an Accident Service Unit of a Teaching Hospital in Sri Lanka. A case was defined as a males or a females with a domestic fall and of above the age of 60 years. Fallen from height, fall outside the house, occupational falls, assaults and those elders who had met with a Road traffic accidents were excluded. Controls were persons of same sex and same age range who was admitted to the same ward but with no history of fall at home. Hundred cases and hundred controls were selected with the above criteria. This study was performed during 2014-2015. An interviewer administered questionnaire was used to collect information from the cases and controls. The interviews were performed by the investigators themselves this reducing interviewer bias. Frequencies and Bivariate analysis was performed. Odds Ratio with 95% Confidence Intervals was obtained. The ethical clearance was obtained from the Ethics Review Committee of the Faculty of Medical Sciences, University of Sri Jayewardenepura.

Results

The Among the 100 cases of with a history of domestic fall, and the 100 controls with no history of falls, wearing spectacles was fund to have be a protective factor for falls and was also found to be statistically significant (OR 0.44 (0.25, 0.78)). Having cataract of the eye was found to have 3 times the risk of having a fall which was also found to be statistically significant. Difficulty in walking and having a previous history of fall after the age of 50 years were also found have twice the times of having a risk which was also found to be statistically significant (Table 1).

Table 1. Personnel and environmental risk factors for domestic falls.

		Case (%)	Control (%)	OR (95% CI)
Wearing spectacles	Yes	42 (42.0)	62 (62.0)	0.44 (0.25-0.78)
	no	58 (58.0)	38 (38.0)	
Cataract in one or both eyes	Yes	56 (56.0)	26 (26.0)	3.62 (2.00-6.58)
	No	44 (44.0)	74 (74.0)	
Epilepsy	Yes	2 (2.0)	1 (1.0)	2.02 (0.18-22.64)
	No	98 (98.0)	99 (99.0)	
Diabetes mellitus	Yes	50 (50.0)	48 (48.0)	1.08 0.62 -1.89)
	No	50 (50.0)	52 (52.0)	
Hypertension	Yes	61 (61.0)	50 (50.0)	1.56 (0.89-2.74)
	No	39 (39.0)	50 (50.0)	
Osteoporosis	Yes	12 (12.0)	5 (5.0)	2.59 (0.88-7.65)
	No	88 (88.0)	95 (95.0)	
Malignancy	Yes	8 (8.0)	4 (4.0)	2.09 (0.61 -7.17)
	No	92 (92.0)	96 (96.0)	
Psychiatric illness	Yes	3 (3.0)	3 (3.0)	1.00 (0.20 -5.08)
	No	97 (97.0)	97 (97.0)	
Lower limb deformity	Yes	20 (20.0)	11 (11.0)	2.02 (0.81-4.48)
	No	80 (80.0)	89 (89.0)	
Difficulty in walking	Yes	28 (28.0)	15 (15.0)	2.20 (1.09-4.44)
	No	72 (72.0)	85 (85.0)	
History of previous domestic falls after age of 50 years	Yes	40 (40.0)	22 (22.0)	2.36 (1.27-4.39)
	No	60 (60.0)	78 (78.0)	

Considering the physical environment of the house, wearing foot ware inside the house was found to have 4 times the risk of having a fall, whereas having a dry floor is a preventable factor for fall (Table 2). Even though the tile floor was found to be a risk factor it was not found to be statistically significant as opposed to cement floors and concrete floors, which were found to preventive factors but not found to be statistically significant.

Table 2. Factors affecting the Living environment.

Factor		Case (%)	Control (%)	OR (95% CI)
Completed construction of the house	Complete	92 (92.0)	85 (85.0)	2.03 (0.82 - 5.03)
	Incomplete	8 (8.0)	15 (15.0)	
Wearing foot wear inside the house	Yes	53 (53.0)	21 (21.0)	4.24 (2.28 - 7.90)
	No	47 (47.0)	79 (79.0)	
Usual condition of floor	Dry	64 (64.0)	86 (86.0)	0.29 (0.14 - 0.58)
	Wet	36 (36.0)	14 (14.0)	
Tile floor	Yes	49 (49.0)	39 (39.0)	1.50 (0.86 - 2.64)
	No	51 (51.0)	61 (61.0)	
Cement floor	Yes	47 (47.0)	54 (54.0)	0.76 (0.43 - 1.32)
	No	53 (53.0)	46 (46.0)	
Concrete floor	Yes	4 (4.0)	7 (7.0)	0.55 (0.16 - 1.95)
	No	96 (96.0)	93 (93.0)	

Among the cases with a history of fall, 88% had a fracture, and the rest of the 22% had either a laceration or a contusion. As shown on Tables 2 and 3, the risk factors could have prevented 53% of fracture neck of femur, 25% of fracture of distal radius and 10% of vertebral fractures (Table 3).

Table 3. Frequency of fractures.

Injury types	No (%)

Fracture of neck of femur	53	60.23
Fracture of distal radius	22	25
Head injury	9	10.23
Fracture of humerus	3	3.41
Femur shaft fracture	3	3.41
Vertebral fracture	9	10.23
Shoulder dislocation	1	1.14
Elbow dislocation	2	2.27
Ulnar fracture	6	6.82
Fibular fracture	1	1.14

Discussion

The older population in Sri Lanka is increasing. Injuries due to falls are the leading cause of fatal and non-fatal injuries among the older population. Among the falls domestic falls are very common. With aging elders lose physical and mental strength which causes impairment of balance.

This paper shows that aging is not only a complex blending of physiological, behavioural, and social changes but that the environmental changes are also needed at both the level of the individual and at the level of the community. The best model that would match this study would be the ecological model. As for any traditional epidemiological model, this ecological model also has the three elements of the "agent," "host," and "environment".

However there are times where the demands of the environment exceed the individual's ability [11-14]. Environmental docility as this is referred to be such situations in which personal competence declines and behavior is increasingly affected by characteristics of the environment [15]. This study shows such situations where the physical environment of the house affects the elders leading to an outcome of falls, which may debilitate and even lead to death of the elders. One of such factors is the occurrence of wearing of foot wear inside the house.

In contrast to environmental docility, environmental proactivity is where the elders increase their personal competence by enhancing their ability to make use of environmental resources and achieve a more positive outcome. One such protective factor that was shown in the results was the occurrence of having a dry floor, which lead to a decrease risk in falls.

A study done in Kerala, India in 2005 also found that the vision impairment and having impairment of gait and balance is a risk factor for falls in older people. In this study having cataract of the eye, which impairs vision was found to be a risk factor for fall. The limitation in this study was the subjective screening of diseases such as cataract, among the cases and controls. Although proper footwear was found to provide safety in elders from fall [16], it was found to be a risk factor in our study.

Considering other diseases such as epilepsy, osteoporosis, diabetes, psychotic illnesses, hypertension, cancer as risk factors for domestic falls, as they have influence in balance and consciousness, none were considered as risks.

The identified risk factors in our study are potentially modifiable. The importance of environmental modification with regards to prevention of falls is also highlighted. Domestic hazards, such as an incomplete construction and slippery wet floors may increase prevalence of falls. Environmental assessment would help to identify and prevent potential hazards, favouring mobility and safety of the patient. It must be also emphasized that the home care is a necessity in homes with elders.

As per the Act number five of 2011 of the Protection of the Rights of Elders of Sri Lanka, it is stated that the diversity of the living conditions of the elders is deemed fit. However, disabled and elderly living conditions in Sri Lanka are still at an infancy stage. The National Charter and National Policy on elders were adopted by the Cabinet in 2006 has 17 strategies laid down. Unfortunately none of the 17 strategies point towards a healthy physical environment. The National Secretariat published Standards for Homes for the aged in 2004 with the aim of enhancing the quality of services provided to elders. This is in place for home for aged, but not at an individual level.

With the increasing population of elders in Sri Lanka, the policies should be redefined and put in place for a safer environment for elders.

Many studies implement a geriatric programme which uses a multidimensional approach to improve the quality of life of elders. Such approaches should take into consideration the risk factors for fall, which if prevented could lead to improved quality of life and wellbeing of the elderly population.

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