

Assessment of Risk Factors for Falls among Elderly People in the Home Environment

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1 INTRODUCTION

Health concerns among elderly are multiple and complex which includes medical and psychosocial problems. Falls are one of the major problems in the elderly and are considered to be one of the “geriatric giants” leading to a significant proportion of morbidity (Vassallo *et al.*, 2005). Falls and consequent injuries are major public health problems that often require medical attention. Coleman *et al.* (2004) state that falls has been a common incident among elderly population and a major cause of morbidity and mortality in persons 65 years or older, with as many as one in three community dwelling elders reporting a fall. In Sri Lanka, population over 60 years old in 2000 was 9.2 percent, and people aged 60 years and above reaching almost 30 percent by 2050, with rapid increase of the share of the very old (World Bank, 2008). According to many studies various risk factors including personal, environmental and medical factors affects falls among elders all over the world. Most of these falls are associated with one or more identifiable risk factors and research has shown that attention to these risk factors can significantly reduce the rate of falling (Rubenstein *et al.*, 2016). Prevention and modification of these risk factors has been recently targeted.

Patil *et al.* (2015) conducted a community-based cross-sectional study with a sample of 416 elderly persons to

identify the risk factors for falls among elderly. Finally the authors identify that those with foot problems (71.4%), underweight (77.7%), abnormal gait (51.4%), Obesity (50%), difficulty with steps or stairs (45.3%), habit of smoking (45.1%), alcohol consumption (43.1%), difficulty in getting on or off toilet (42.7%) and wearing loose slippers (63.8%) were at higher risk of fall. In India, Ravindran and Kutty (2016) studied 251 cases and 250 controls with persons aged 60 years and above and revealed that steps or stairs and slippery nature of the floors, accentuated by the presence of water, slippery cloth, or polythene bags on floors and greasy ointment smeared on the foot were directly involved in injurious falls. Campbell, Barrie and Spears (1989) conducted a community based prospective study with a sample of 761 subjects and highlighted that decreased levels of physical activity, stroke, and arthritis of the knees and impairment of gait, total number of drugs and drugs liable to postural hypotension and muscle weakness were associated with an increased risk of falling.

Falls among elders are very common and often a devastating problem, causing a tremendous amount of morbidity, mortality and hospitalization (Patil *et al.*, 2015). Many people, who fall, even if they are not injured, become afraid of falling (Pinheiro *et al.*, 2010). This fear may cause a person to cut down on their

activities of daily living. When a person is less active, they become weaker and this increases their chance of falling. In addition, many complications like reduced physical activities, pressure ulcers, joint stiffness and adverse events related to medication administration can occur due to falls. As falls and consequent injuries are an enormous burden to individuals, society and our health care system it is of paramount importance to give research attention for this issue of falls among elders to reduce the burden in general. Therefore it is very important to examine the risk factors for falls among elders in the home environment. Hence the main aim of this study was to examine the risk factors for falls among elders in the home environment. The study was further guided by the following specific objectives: to examine the personal factors related to falls among elderly people, to examine the environmental factors related to falls among elderly people, and to examine medical factors related to falls among elderly people.

This study was carried out in the National Hospital of Sri Lanka in the Colombo district. This study identified common risk factors for falls among elders in their home environment. The findings of this study helped to get broader understanding of factors related to old people's falls in the home environment. This understanding will help health care professionals to take remedial actions to reduce or prevent fall incidences among the older population thereby increasing their mobility and reducing mortality rates of these population groups.

Moreover the study findings were a good source of information for home care givers to identify the risk factors for falls and to protect elderly people from identified risk factors because many of those are potentially remediable. Ultimately the findings will further help to increase the quality of life of elderly people.

2 METHODOLOGY

Quantitative research approach and descriptive research design was selected for this study. Study was conducted at the Accident Service, National Hospital of Sri Lanka. Researcher collected data from elders who fall in the home environment. But the patients who are admitted to the hospital were the only possible accessible sample to collect data. Therefore, the study sample was elders who were admitted to the Accident Service, National Hospital of Sri Lanka following a fall at home.

Convenience sampling method was used for this study and 200 subjects were selected. Data collection was done by using a questionnaire. The response rate was 100%. According to the timeframe data were collected from late February to late March of 2017. Institutionalized and critically ill participants were excluded. The content validity was gained by a comprehensive literature review and assessed by a subject expert. Reliability of questionnaire was test by test - retest method. Data Analysis was done using descriptive statistics and Microsoft Excel 2010 software.

Ethical approval was obtained from the ethical committee of the National Hospital of Sri Lanka in Colombo. Permission to collect data from the patients was obtained from the Director of National Hospital of Sri Lanka.

Throughout this study introduction of investigators, distribution of information letters to participants and receiving informed consent were performed prior to data collection for guaranteeing their confidentiality. To identify the subjects only a serial number was assigned to the questionnaire. Volunteer participation was encouraged by informing that they can refuse or resign from study at any time without any risk.



3 RESULTS AND DISCUSSION

Data consisted of four parts, demographic data, personal risk factors, environmental risk factors and medical risk factors for falls among elders. Among 200 participants, 65.5% were in 65–69, 27% were between 70 and 75, 16.5% were in 75–79, and 18% were 85 or above years of age group, respectively. Higher proportions of females (52%) were noted compared to males (48%) and majority is Sinhalese (53.5%). And those who live in the urban sector were 60.5% and in the rural sector was 30.5%. And 18% of them were living alone. Findings revealed that 28% elders were currently employed. And 43.5% had secondary education while 21.5% achieved higher education. 61.5% of them had a monthly income of 10,000 rupees or more.

When considering personal related factors, significantly higher fall rate was seen among elders who restricted their activity due to fear of falling (66%), persons without exercise (81.5%), those who wear long dresses (56%) and those with risk taking behaviour (57%) (Figure 1). This result is similar to three studies (Aoyagi *et al.*, 2008; Patil *et al.*, 2015 and Demetriades *et al.*, 2005) done in Japan, India and Latin America respectively. Chu *et al.* (2005) highlighted that use of walking aid is an extremely common finding for fall in China which is contrasting with the findings of this study as not using a walking aid was a risk factor for fall in this study.

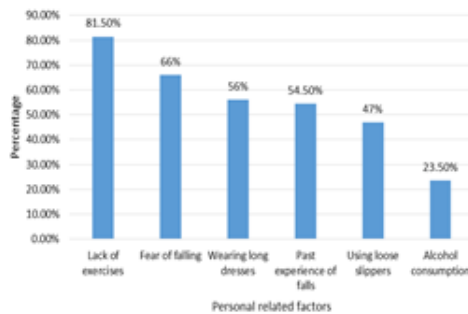


Figure 1: Personal factors related to falls among elders

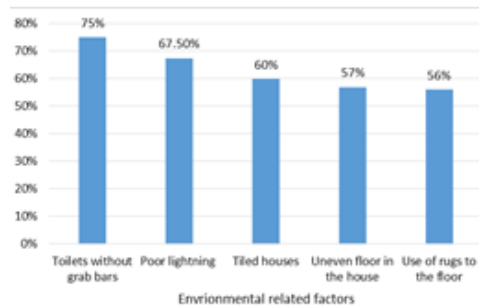


Figure 2: Environment related risk factors related to falls among elders

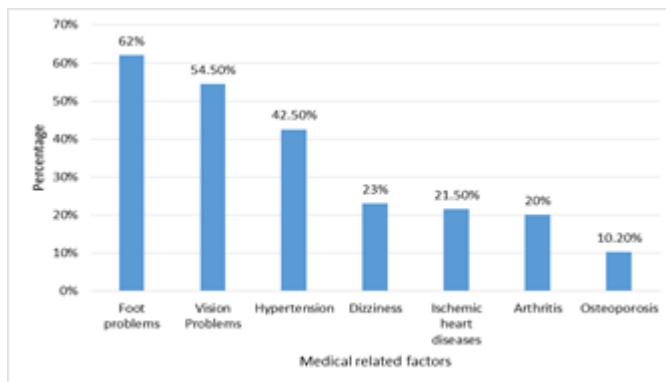


Figure 3: Medical related risk factors for falls among elders

As regards environmental factors for falls, toilets without grab bars (75%), poor lighting (67.5%), tiled houses (60%) and uneven ground (57%) were the most common risk factors in the home environment in this sample (Figure 2). Similar findings were noticed by a recent study conducted in Brazil and United Kingdom (Pinheiro *et al.*, 2010; Masud and Morris, 2001). And most falls occur on level surfaces (56.5%) within commonly used rooms such as bed rooms, kitchen and at the immediate home surroundings.

Findings revealed that 12% were not using any medication, 30% of them used 1 to 3 medications, 54.5% used four medications and 61.5% used more than four medications. This agrees with the studies done separately in Brazil, Netherlands and Sri Lanka respectively (Rozenfeld. *et al.*, 2003; de Jong, Vander Elst, and Hartholt, 2013; Ranaweera *et al.*, 2013). It was observed that the rate of falls among the study subjects with medical factors varied from 21.5% (ischemic heart diseases) to 62% (foot problem). The diseases associated with recurrent falls were foot problems (62%), vision problems (54.5%) and hypertension (42.5%). Investigators from USA and Rio de Janeiro also suggested that elders with diabetes and hypertension have an increased risk of falling (Schwartz *et al.*, 2002; Pinheiro *et al.*, 2010).

4 CONCLUSIONS AND RECOMMENDATIONS

According to the findings of this study majority of the falls in the elderly are due to personal (past history of falls, reduced activity due to fear of falling, lack of exercise, risk taking behaviours, loose slippers, long dresses), environmental (slippery and uneven floors, rugs, not having stair railings, not having grab bars in the bathroom and poorly lit homes) and medical factors (diabetes, hypertension,

vision problems, foot problems and arthritis) which are predictable and hence they are preventable. Most falls are caused by a combination of risk factors. The more risk factors a person has, the greater their chances of falling. Healthcare providers can help cut down a person's risk by reducing these fall risk factors.

As the recommendations regular exercise program for elders should be conducted to improve strength, gait and balance and for the patients with gait and balance disturbances, specific assistive devices should be introduced to prevent falls. Care-takers need to be educated for early detection of risk factors among elders. Disease conditions such as diabetes, hypertension, vision problems, foot disorders and all these conditions should be prevented, treated, or managed better. Public health initiatives are required to raise awareness in older people and their care-takers of the importance of regular eye examinations and use of appropriate prescription glasses. Screening and modification of environmental hazards should be encouraged in the community to protect elders by preventing falls. Intervention strategies to address these modifiable risk factors may be beneficial in reducing fall among elderly population. Finally the efficacy of each of these interventions in reducing falls needs further investigation.

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