Burden and Consequence of Fall among India elderly : Evidence from longitudinal Ageing Study in India

Introduction

Falls is considered as second leading cause of unintentional injury death and major contributor of disability adjusted life years (DALY) lost each year. Globally 0.6 million individual die due this unpresented risk and around 37 million population required sever medical attention. World Health Organisation cited that population aged 60 and more year population are the major contributor of the fall related fatalities. More than half of this fall related fatalities occurred in the west pacific and south Asian countries, where the elderly population is rising. So this is utmost need of the situation addressed the challenge of fall among elderly population.

India, with second largest populous country across the globe, has a growing elderly population. Recent evidences suggest that India's elderly population is 104 million which is projected to be doubled by 2036. This dramatic rise in elderly population presents serious impending health, social and economic challenges such as rising burden of mortality and morbidity due to rising burden of non-communicable diseases, other physical and mental disability, living arrangements and medical care and expenditure etc. Among the other implication, fall among elderly remained neglected public health discourse.

Falls and fractures are common and serious preventable problems encountered by elderly population throughout the world and are an important cause of morbidity and mortality. However the reason of fall among elderly are sparse. Irrespective of age, many socio-economic factors are cited as a major contributor of fall among the elderly. Though both the gender are in risk of falling the literature suggest that there is a higher risk of men to be suffered from the fatal fall while females suffered from not-fatal falls. Apart from this, occupations and working condition of the elderly, poverty, crowding at house, alcohol and substance use are the major socio-economic reasons which the affect the fall among elderly. Apart from there are some medical conditions such as neurological disorder, cardiac attack, poor mobility, cognition, and vision and hearing problems are the major reason of fall among the elderly.

Fall among elderly in India is considered as a very low epidemiological concern which is sparsely researched due to unavailability of national level data source. Some studies conducted in the community and some studies have in old age homes. The primary objective of our study was to report the incidence of falls using a recently released national level survey of elderly. The secondary objective was to identify factors that can predict a risk for future falls in community-dwelling elderly.

Methodology

Data

Our data derived from the first wave of Longitudinal Ageing Study in India, 2017-18, which is the first longitudinal study for the elderly conducted across the states and union territories of India. The LASI is India's first and the world's largest study that provides a longitudinal database for the elderly population provide the estimations at broad domains such as social, health and economic wellbeing etc. This survey was conducted by, International institute for population science (IIPS), Mumbai in the aegis of the Ministry of Health and Family Welfare (MoHFW), Government of India. This is a collaborative project between the International Institute for Population Sciences (IIPS), Harvard T. H. Chan School of Public Health (HSPH), and University of Southern

California (USC) and financially supported by MoHFW, National Institute on Aging (NIA/NIH), USA and United Nations Population Fund (UNFPA), India.

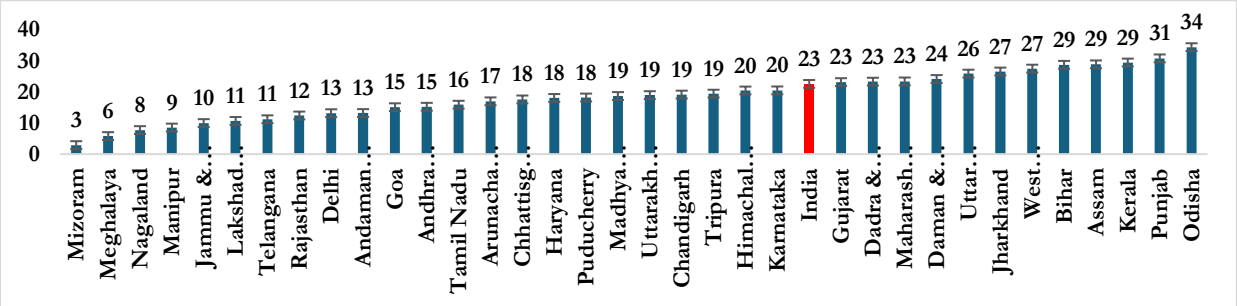
The survey used the multistage stratified random samples to collect the sample from the 72,250 individuals aged 45 and above and their spouses from 42,949 households, including all states and union territories (UTs) of India except Sikkim. The questionnaire of the survey was drafted in the local languages and the information was collected by the trained investigators using the Computer Assisted Personal Interview (CAPI) method. Study design and the protocol are published elsewhere.

The main outcome variable for the study is the fall among the elderly in India. These particular variables have been calculated from two questions. First, the questions was about the major injuries i.e. "In the past two years, have you sustained any major injury". If the responded said "Yes", then a further questions on reasons of the major injury was asked i.e. "What was the cause of that injury?". The response for these questions are "Traffic Accident", "truck by person or object" "Fire, flames, burn, electric Shock" "Drowning", "Poisoning" "Animal attack", "fall" and "Other"/ The respondents who reported "fall" as reason for injury are considered as 1 i.e. suffered from fall or "0" otherwise. The respondent who reported no injuries or injuries for other reasons except falls, were asked a direct question, "In the past two years, have you fallen down?" The respondents who reported "yes" are considered as 1 i.e. suffered from fall. For those who reported a fall, a follow up questions was asked about the number of times of fall were. Moreover a binary response was recorded for the consequences of fall such as major injury needs medical treatment and bone or joint fractures etc.

First used descriptive analyses to characterize older people to access the prevalence of falls among the elderly in India and its differential across the various socio-economic and demographics character tics. Differences between groups were established using chi-squared test. Multivariate logistic regression analyses were then performed to determine individual, household, and health factors associated with falls. More this analysis also repeated to understand, how the different types of eye diseases are associated with falls among elderly. The results of the logistic regression were presented as the adjusted odds ratio (AOR) as it is controlled for all other confounding variables. The Intra-class correlation coefficient (ICC) and the variance inflation factor (VIF) was calculated to understand the multi-collinearity among the independent variables. The estimates are adjusted for the survey sampling using the "svy" command used in STATA. The whole analysis was carried out using the STATA 16 software.

Results

Figure 1: Prevalence of fall among the elderly (60+) in states of India, 2017-18 (N=31464).



***N represents sample size for India.**

Figure 1 presents the prevalence of fall among elderly in the states of India. At national level around a quarter of elderly (23%) had fall problem. Among the states, Odisha had higher prevalence of fall (34%) followed by Punjab (31%), Kerala, Assam and Bihar (29% each) and remarkably lowest in Mizoram (3%), followed by Meghalaya (6%), Nagaland (8%) and Manipur (9%). It was clearly shown that the lower percentage of fall problem in north-east region.

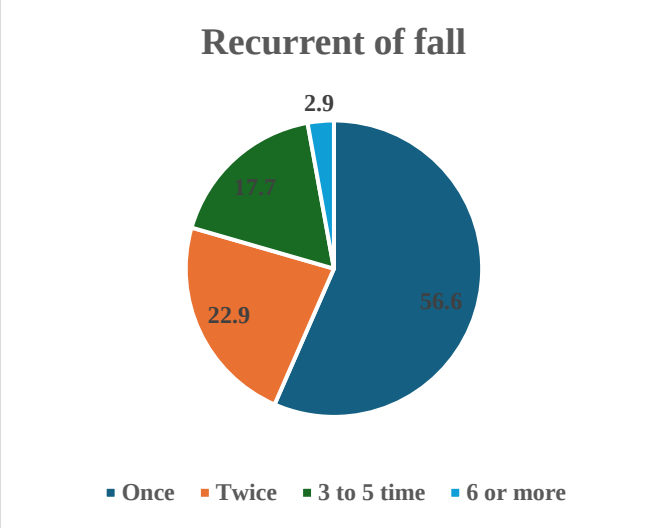
Table 1: Prevalence of falls in the elderly by background characteristic in India, 2017-18.

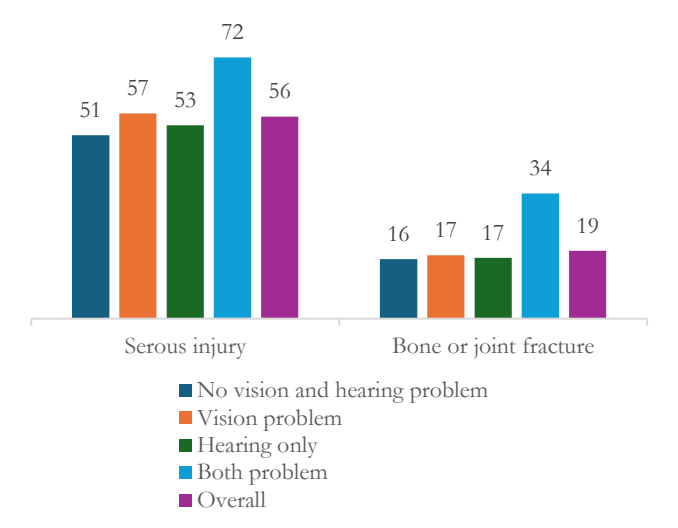
Background characteristics	Total Sample (N)	Fall sample (n)	Fall (in %)	CI	Chi-square (p)
Age group (in years)					
60-69	18,974	3,674	21.5	20.9-22.1	40.3***
70-79	9,101	1,864	23.1	22.2-23.9	
80+	3,389	816	28.3	26.8-29.8	
Sex					
Male	15,098	2,608	19.6	19.0-20.3	153.6***
Female	16,366	3,746	25.5	24.9-26.2	
Marital Status					
Unmarried	50	421	11.5	8.6-14.4	119.7***
Currently married	3,726	16,194	20.6	20.0-21.1	
Divorced/separated	2,578	8,495	26.7	25.8-27.5	
Education					
No schooling	16,889	3,625	23.6	22.9-24.2	124.8***
Less than 5 years	3,781	863	27.1	25.6-28.5	
5-9 Completed	6,017	1,163	20.9	19.9-21.9	
10 or more years	4,777	703	18.3	17.2-19.4	
Living arrangement					
Living alone	1,622	370	27.2	25.0-29.4	21.8***
Living with spouse only	6,215	1,139	20.8	19.7-21.8	
Living with family	23,627	4,845	22.9	22.4-23.5	
Place of residence					
Rural	20,725	4,517	23.8	23.3-24.4	96.5***
Urban	10,739	1,837	20.1	19.3-20.8	
Vision and Hearing Impairment					
No Impairment	10,850	2,405	20.6	19.9-21.3	91.3***
Vision Impairment only	11,894	3,160	23.2	22.5-23.9	
Hearing impairment only	644	184	26.1	23.1-29.1	
Both vision and hearing loss	1722	605	31.1	29.2-33.0	
Depressive symptom					
No	21,889	4,168	22.5	21.0-22.1	68.1**
Yes	8,506	1,980	25.1	24.9-26.7	
Diabetes					
No	26,543	5,317	21.9	22.0-23.0	4.7*
Yes	4,838	1,035	24.9	23.9-26.4	
Hypertension					
No	20,614	3,957	21.9	21.3-22.5	40.9***

Yes	10,768	2,396	24.9	24.1-25.8

* p<0.001 ** p<0.005 p<0.010; its represents the p values after chi-square test.
N and n are unweighted

Recurrent of fall





The study also estimated that about 44% of elderly have fallen around twice and more an many if them suffered from the serious injury. This study will find the impact impact of multimorbidity, visual problems, and its association with the fall.

Discussion and Conclusion

The current study provides details of fall episodes experienced by Indian elderly. Approximately one in five elderly subjects in this age group reported a fall during the study period. There appears to be a sex-based difference in the proportion that fell with one in four elderly women falling compared with one in six men during the follow-up. The results also suggest a dose–response relationship between age and falls with more subjects falling in older age groups compared with relatively younger groups. In addition, every fourth person who fell reported one or more falls following the index fall episode during the study period.

One in five elderly are prone to fall again in the same calendar year. Female sex, movement disorders including parkinsonism, arthritis, dependence in ADL, living alone during daytime and a history of falls in the previous year appear to predict a fall in the following year. Any future intervention programme targeting a reduction in falls among the elderly in India s. Such studies should focus on the modifiable risk factors such as living alone at home during daytime, movement disorders and arthritis as identified by the current study. We need to encourage mechanisms that may reduce dependence of the elderly. Attention should also be given to encourage both physical and social activities among elderly subjects.

The current study comes up with evidence that pain mediates the association of sleep problems and falls, related injuries, and multiple falls among older Indian adults. Both sleep problems and pain are modifiable risk factors that need attention for fall prevention strategies.