

To study the determinants of falls, fractures and frailty in elderly attending HSK hospital and research centre Bagalkot – an observational study

Sachin V Desai¹, Santhoshkumar R Naik^{2,*}, Ashok S Dorle³

¹Assistant Professor, ²Post Graduate, ³Professor and Head, Dept. of Community Medicine, S.N.M.C and HSK and RC Bagalkot, Karnataka, India

***Corresponding Author:**

Email: santhoshkumarnaik@gmail.com

Abstract

Introduction: Population ageing is a global phenomenon. Ageing is a physiological process that starts from birth, continues throughout life and ends with death. In India, according to the census 2011, there are nearly 104 million elderly persons. 53 million are females and 51 million are males. Assessment of falls and the determining factors leading to falls gives us the corrective measures to be taken to avoid falls among elderly.

Objective: To study the determinants of falls, fractures and frailty among elderly visiting OPD/IPD in a tertiary care HSK hospital in Bagalkot.

Materials and Methods: An observational study conducted in HSK hospital, among 60 Elderly on falls, fractures and frailty visiting IPD/OPD. Information on socio-demographic data, history of falls, fractures and the determinants of falls, fractures and frailty details were collected with a pre-designed, pre-tested, structured questionnaire. Chi square test was applied to look for the association between the determinants and age and gender.

Results: Among 60 elderly populations 50 (83.33%) were between 60-74 years age and 10 (16.66%) were above 75 years age. Among 50, 38 (63.33%) were females and 22(36.66%) males. Hypertension, vertigo, giddiness, use of walker, showed statistically significant association between age and the determinants of falls. Also, other determinants like, falls during transferring; falls due to imbalance, slips also had association.

Conclusion: Falls are very common among the elderly. The findings provide us with an opportunity to understand the risk factors still better, and need for rehabilitation, implement policies to reduce the risk of falls leading to fractures and frailty.

Keywords: Elderly, Determinants, Falls & Fractures, Frailty.

Introduction

“Population aging is a triumph of humanity but also a challenge to society”. Globally, the number of persons over 60 years is growing at a faster pace than any other age group. The number was estimated to be 688 million in 2006, now projected to grow to almost a billion by 2050.¹ In India, according to population census 2011, there are nearly 104 million elderly persons. 53 million females and 51 million are males. There is rise in elder population in India too as from 5.6% in 1961 to 8.6% in current scenario. Generally, aging, though; reflects the longer life, partly healthier lives of the elder persons, at the same time it is associated with chronic and degenerative multisystem and functional disorders leading to disability and limiting the quality of life. Along with this, as people age, there are chances to become frailer, thereby increased chances of deterioration with decreased recovery from this frailty. Although, there is agreement that frailty is a much useful concept for clinical researchers, no complete definition available. But accordingly, it has been defined as per the need and different ones are available in the literature depending on the features used to describe it. So, various operational definitions are available to explain the syndromic nature of the condition making the things more complex. The prevalence of frailty among elderly ranges from 33% to 88% depending on the criteria used.

Elderly can be classified according to the grouping done by ageing as starting from young old (60-74years), old (75-89 years), very old (90-99 years), and centenarians (>100 years).² With the rapidly increasing population aging in western societies, frailty is set to reach the epidemic levels in coming few decades. In India, though frailty is much higher than expected, no such studies and data are available.

Frailty is defined as the loss of a person’s ability to withstand minor environmental stresses because of reduced reserves in the physiological function of several organ systems. In functional terms, it is defined as dependence on others for activities of daily living (ADLs),^{3,4} bathing, dressing, feeding, continence, toileting, and mobility. The term ‘frail’ is contemplated to identify vulnerable elderly people at high risk of adverse outcomes including falls, morbid disability, hospitalization and mortality. The most widely accepted criteria are those of Fried et al, who define Frailty Syndrome⁵ as including three or more of the following: weakness, slow walking, speed, self-reported exhaustion, low physical activity, and unintentional weight loss.

Aging in the people leads to decreased strength, vision, proprioception, leading to reduced balance and altered gait leading to falls. 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.

The five giants of geriatric⁶ identified as – immobility, instability (falls), incontinence, intellectual impairment and iatrogenic. Among these, falls amount to be a major problem in the elderly; causing injuries, dependence, psychological difficulties, and social isolation. According to the centres for disease control and prevention (CDC), falls are the leading cause of injury among adults over the age of 65, and each year one in three older adults, report having had a fall.

20%-30% of injuries among the elderly are due to falls, and also contributes to 10%-15% of all emergency department visits. Falls is also responsible for 50% of injury-related hospitalization among people of 65 years and above⁷

Elderly are more susceptible to falls and related injury because of a high prevalence of clinical diseases (e.g. osteoporosis) and age-related physiological changes (e.g. slowed protective reflexes) that make even a relatively mild fall particularly dangerous. Also, recovery from fall injury is often delayed in older persons, which in turn increases risk of subsequent falls through reconditioning.

Falls in elderly can occur due to many reasons. In internal and external environment can pose as a risk factor for falls in elderly. Many other studies have shown that falls are dependent on many epidemiological and socio-demographic factors. There are lack of studies and research to identify the areas of key concern and to plan policies to address the issues. In most of the cases, falls are preventable. Prevention of falls is of utmost importance because they lead to considerable mortality, morbidity and suffering for older people and their families, and incur social costs due to hospital and nursing home admissions. Thus, identifying the risk factors and initiating plans of care to address these factors, falls can be prevented which will help in understanding their causal relationship and hence plan the preventive measures. This study was conducted in a tertiary care hospital with an objective to assess the determinants of falls, fractures and frailty in elderly visiting OPD/IPD in a tertiary care HSK hospital in Bagalkot.

Materials and Methods

The present observational study was carried out in out-patient and in-patient wards of Orthopaedics, Medicine, Surgery, Psychiatry, ENT, Ophthalmology departments of SNMC HSK Hospital Bagalkot. The study was done for a period of two months from July 2017 to August 2017. Elderly visiting OPD/IPD in a tertiary care hospital were included in the study. Taking prevalence of falls in elderly as 32% from reviewed literature by Tinetti ME et al.,⁸ the required sample came out to be 60. Systematic random sampling was adopted to select the cases for the study from the hospital. Elderly 60 years and above visiting the OPD/IPD of above mentioned departments with present and or past history of falls/fractures or is under a

caregiver were considered eligible for the study. Likewise, elderly under the required age who did not give consent for the study as well as those having metabolic bone disorders or any other congenital deformities were not taken for the study.

Each of the respective OPDs/IPDs was visited by the interviewer and interviewed the selected study participants using the pretested structured questionnaire in their own vernacular language after obtaining the consent. Permission to conduct the study was taken from the Institutional Ethics Committee. Socio-demographic details were taken; socio-economic status was assessed using modified B.G. Prasad Classification. Information about self-reported or physician diagnosed chronic health conditions, medication use, and current use of alcohol or tobacco was recorded. To know or confirm the use of medication by participants, they were asked to show the medicines or blister packs. Medical records, if available also seen.

History of presence or absence of risk factors for falls, fractures assessed. History of falls in the past 12 months was asked. Details regarding fall such as time and place of fall, severity, resulting the injury, part of the body injured, disability, hospitalization and treatment were recorded.

General physical examination and vitals addressed. Assessment of vision, hearing, functional disability and balance was done. For assessing vision, Snellen chart was used. For hearing assessment, the WHO grades of hearing impairment⁹ were used and Grades 2, 3, and 4 were considered as hearing impairment. For assessment of gait, get up and go test was used while body balance was assessed by Romberg's test.⁹

Components assessed in studying the determinants of falls were –

1. Health status at the time of fall – It was assessed as either presence or absence of these morbidities: Hypertension, Parkinson's disease, joint pain, memory loss/cognitive impairment, diabetes mellitus, vertigo/giddiness, H/O fractures, depression, seizures, antihistamines
2. Mobility aids during falls, in older adults
Assessed as used or not – Walking stick, Walker, Staff personnel (in case of presence of care giver)
3. Activity during the time of fall
Assessed using these set of questions during which lead to fall – Bathing, housework, climbing stairs, transferring, ambulation
4. Location of fall –
Place of fall assessed – Bathroom, outside house, other rooms inside the house, street/road, threshold at the door entrance
5. Causes of falls –
Reasons for falls assessed structurally by interview – Hypertension, dizziness, imbalance, slips, trips,

- vehicular accidents, if no other cause could be specified
6. Injuries sustained due to fall –
Types of injuries assessed – Abrasion, contusion, fractures, dislocation of joints, sprains
 7. Treatment received – First aid, hospital admission, OPD consultation
 8. Fears of falls, thus restriction of normal daily activities- Assessed the level of activity.

Operational Definitions

Falls: An event that results in a person coming to rest inadvertently on the ground or floor or other lower level

Substance abuse: Consumption of tobacco/alcohol was taken into consideration for at least 3 days in a week.

Knee pain/osteoarthritis: Current knee pain or physician-diagnosed osteoarthritis in the knee joint.

Disability: Inability or limitation in performing socially defined activity and roles expected of individuals within a social and physical environment. It included any impairment, activity limitation, and participatory restriction.

Statistical Analysis: All the collected data was entered in the MS Excel 2007, and statistical analysis was done using IBM SPSS software version 20 (trial version). Descriptive analysis was done, and the association was found between the dependent and independent variables using chi-square test and $p < 0.05$ was taken as significant.

Results

Among 60 geriatric participants, 50 (83.33%) were young old (60-74 years age) and 10 (16.67%) were old elderly (>75 years age). Among 50 young old participants males were 36% and females 64%. Similarly, 36% males and 40% females in old elderly participants most of them were illiterate (63.33%), and 10% were educated up to high school. 55% were in Class IV socio economic class and 45% were in Class V socio economic Class. Most of them were in 3 generation family (70%). Only 5% were in nuclear family.

In studying the determinants of falls; when their association was assessed with age, 28% young old and 60% old elderly had fall with hypertension. 52% of the old elderly had joint stiffness that was the reason for

their fall. 72% young old and 90% of the old elderly were having vertigo making it as a reason for their falls. Antihistamines as a factor for fall were 04% and 10% among young old and old elderly participants. Not using walker as a one of the mobility aids (cane/walking stick, walker, and staff/personnel) lead to fall among 76% of young old and 100% of old elderly and is statistically significant.

Geriatric study participants had fall in one or more activities like 66.67% during ambulation followed by involving in housework (38.33%), then, bathing, transferring each 5%, 3.33% during climbing stairs.

10% of the old elderly were having bath at the time of fall. Whereas, 10% of the young old had fall in bathroom 50% of the young old sustained fall inside the house in other rooms, followed by 42% outside the house. 20% on the street/road and 18% each sustained fall at threshold of the door entrance and vehicle related. Among the old elderly, 60% had fall in other rooms inside the house, followed by 40% outside the house, 20% each on the street/road and threshold at door entrance.

Among young old participants, imbalance was main cause for falls (68%; $p = 0.009$), followed by slips (60%), dizziness (34%). Hypertension as a morbidity leading to fall was seen among 18% young old participants and is statistically significant ($p = 0.005$).

There were injuries sustained following falls among the study participants; among young old, 54% sustained fractures, followed by sprains (46%), and 18% dislocation of joints and 10% with contusions. Among old elderly, 50%

Out of 60 study participants, previous history of falls was observed in 32 (53.3%). When repeated history or a past history of fall was analyzed across various determinants, it was found that; vertigo, giddiness, dizziness, imbalance among the study participants had association with repeated history of fall. Whereas, though hypertension a common comorbidity lead to fall (73.3%) did not show statistical significance. Antihypertensive drugs used by the study participants, might have caused imbalance or dizziness or vertigo which leads to fall along with age related degenerative changes in the brain of geriatric study participants.

Table1: Socio-demographic variables of study participants

Variables	Male (%)	Female (%)	Total (%)
Age			
Young old (60-74 years)	18 (36)	32 (64)	50 (100)
Old elderly (>75 years)	04 (40)	06 (60)	10 (100)
Education			
Illiterate	11 (28.9)	27 (71.1)	38 (100)
Primary School	05 (31.2)	11 (68.8)	16 (100)
High School	06 (100)	00 (00)	06 (100)
Occupation			

Farmer	17 (94.4)	01 (5.6)	18 (100)
Mechanic	01 (100)	00 (00)	01 (100)
Labourer	02 (100)	00 (00)	02 (100)
Housewife	00 (00)	36 (100)	36 (100)
Retired supervisor	01 (100)	00 (00)	01 (100)
Weaver	01 (50)	01 (50)	02 (100)
Socio-Economic Status			
Class IV	13 (39.4)	20 (60.6)	33 (100)
Class V	09 (33.3)	18 (66.7)	27 (100)
Type of family			
Joint	19 (34.5)	36 (65.5)	15 (100)
Nuclear	02 (33.3)	02 (66.7)	03 (100)
3-Generation	01 (42.2)	00 (00)	42 (100)
Type of house			
Kuccha	02 (15.3)	13 (86.7)	15 (100)
Pucca	01 (33.3)	02 (66.7)	03 (100)
Semi-pucca	19 (42.2)	23 (54.8)	42 (100)
Marital Status			
Married	17 (50)	17 (50)	34 (100)
Widow/widower	05 (19.2)	21 (80.8)	26 (100)

Table 2: Age with determinants of falls

Age with Determinants of falls	Young old		Old elderly		P value	
	N	(%)	N	(%)		
Health Status at the time of fall						
Hypertension (giddiness)	Yes	14	28	06	60	0.057
	No	36	72	04	40	
Parkinson's disease	Yes	01	02	00	00	0.544
	No	49	98	10	100	
Joint pain (STIFFNESS)	Yes	24	48	26	52	0.908
	No	05	50	05	50	
Memory loss	Yes	05	10	01	10	1.000
	No	45	90	09	90	
Diabetes Mellitus (peripheral neuropathy)	Yes	05	10	01	10	1.0000
	No	45	90	09	10	
Vertigo/Giddiness	Yes	36	72	09	90	0.194
	No	14	28	01	10	
H/O fractures	Yes	14	28	02	20	0.593
	No	36	72	08	80	
Depression	Yes	01	02	00	00	0.652
	No	49	98	10	100	
Seizures	Yes	00	00	01	10	0.055
	No	50	100	09	90	
Antihistamines	Yes	02	04	01	10	0.468
	No	48	96	09	90	
Mobility aids during falls						
Cane/Walking stick	Yes	20	40	06	60	0.246
	No	30	60	04	40	
Walker	Yes	12	24	00	00	0.026*
	No	38	76	10	00	
Staff/Personnel	Yes	23	46	06	60	0.418
	No	27	54	04	40	
Activity during the time of fall						
Bathing	Yes	02	04	01	10	0.468
	No	48	96	09	90	

Housework (obstacles)	Yes	19	38	04	40	0.906
	No	31	62	06	60	
Climbing stairs	Yes	01	02	01	10	0.267
	No	49	98	09	90	
Transferring	Yes	00	00	03	30	0.001*
	No	50	100	07	70	
Ambulation	Yes	34	68	06	60	0.628
	No	16	32	04	40	
Location of fall						
Bathroom	Yes	05	10	00	00	0.167
	No	45	90	10	100	
Outside house	Yes	21	42	04	40	0.907
	No	29	58	06	60	
Other rooms inside the house	Yes	25	50	06	60	0.562
	No	25	50	04	40	
Street/Road	Yes	10	20	02	20	1.000
	No	40	80	08	80	
Threshold at the door entrance	Yes	09	18	02	20	0.882
	No	41	82	08	80	
Vehicle related	Yes	09	18	00	00	0.058
	No	41	82	10	100	
Causes of falls						
Hypertension	Yes	09	18	06	60	0.005*
	No	41	82	04	40	
Dizziness	Yes	17	34	05	50	0.345
	No	33	66	05	50	
Imbalance	Yes	34	68	10	100	0.009*
	No	16	32	00	00	
Slips	Yes	30	60	04	40	0.246
	No	20	40	06	60	
Trips	Yes	02	04	00	00	0.389
	No	48	96	10	100	
Vehicular accidents	Yes	06	12	00	00	0.128
	No	44	88	10	100	
Injuries sustained due to fall						
Abrasions	Yes	07	14	00	00	0.098
	No	43	86	10	100	
Contusions	Yes	05	10	00	00	0.167
	No	45	90	10	100	
Fractures	Yes	27	54	05	50	0.817
	No	23	46	05	50	
Dislocation of joints	Yes	09	18	01	10	0.514
	No	41	82	09	90	
Sprains	Yes	23	46	01	10	0.022*
	No	27	54	09	90	
Treatment received						
1 st aid	Yes	45	90	10	100	0.167
	No	05	10	00	00	
Hospital admission	Yes	43	86	10	100	0.098
	No	07	14	00	00	
OPD consultation	Yes	46	92	10	100	0.218
	No	04	08	00	00	
Fears of falls						
Restriction of daily activities	Yes	27	54	06	60	0.727
	No	23	46	04	40	

Table 3: Gender with determinants of falls

Determinants		Male		Female		P value
		N	(%)	N	(%)	
Health Status at the time of fall						
Hypertension (giddiness)	Yes	07	31.8	12	34.2	0.850
	No	15	68.2	25	65.8	
Parkinson's disease	Yes	00	00	01	2.6	0.337
	No	22	100	37	97.4	
Joint pain (STIFFNESS)	Yes	13	59.1	16	42.1	0.205
	No	09	40.9	22	57.9	
Memory loss	Yes	04	18.2	02	6.3	0.116
	No	18	81.8	36	94.7	
Diabetes Mellitus (peripheral neuropathy)	Yes	03	13.6	03	7.9	0.482
	No	19	86.4	35	92.1	
Vertigo/Giddiness	Yes	14	63.6	31	81.6	0.122
	No	08	36.4	07	18.4	
H/O fractures	Yes	08	36.4	08	21.1	0.196
	No	14	63.6	30	78.9	
Depression	Yes	01	4.5	00	00	0.154
	No	21	95.5	38	100	
Seizures	Yes	00	00	01	1.7	0.337
	No	22	100	37	97.4	
Antihistamines	Yes	01	4.5	02	5.3	0.902
	No	21	95.5	36	94.7	
Mobility aids during falls						
Cane/Walking stick	Yes	12	54.5	14	36.8	0.182
	No	10	45.5	24	63.2	
Walker	Yes	04	18.2	08	21.1	0.788
	No	18	81.8	30	78.9	
Staff/Personnel	Yes	14	63.6	15	39.5	0.071
	No	08	36.4	23	60.5	
Activity during the time of fall						
Bathing	Yes	01	4.5	02	6.3	0.902
	No	21	95.5	36	94.7	
Housework (obstacles)	Yes	06	27.3	17	44.7	0.180
	No	16	72.7	21	55.3	
Climbing stairs	Yes	01	4.5	01	2.6	0.696
	No	21	95.5	37	97.4	
Transferring	Yes	01	4.5	02	5.3	0.902
	No	21	95.5	36	94.7	
Ambulation	Yes	17	77.3	23	60.5	0.185
	No	05	22.7	15	39.5	
Bathroom	Yes	01	4.5	04	10.5	0.399
	No	21	95.5	34	89.5	
Outside house	Yes	11	50	14	36.8	0.319
	No	11	50	24	63.2	
Other rooms inside the house	Yes	09	40.9	22	57.9	0.205
	No	13	59.1	16	42.1	
Street/Road	Yes	06	27.3	06	15.8	0.290
	No	16	72.7	32	84.2	
Threshold at the door entrance	Yes	04	18.2	07	18.4	0.982
	No	18	81.8	31	81.6	
Vehicle related	Yes	06	27.3	03	7.9	0.047*
	No	16	72.7	35	92.1	
Causes of falls						

Hypertension	Yes	05	22.7	10	26.3	0.757
	No	17	77.3	28	73.7	
Dizziness	Yes	08	36.4	14	36.8	0.970
	No	14	63.6	24	63.2	
Imbalance	Yes	15	68.2	29	76.3	0.492
	No	07	31.8	09	23.7	
Slips	Yes	13	59.1	21	55.3	0.773
	No	09	40.9	17	44.7	
Trips	Yes	01	4.5	01	2.6	0.696
	No	21	95.5	37	97.4	
Vehicular accidents	Yes	04	18.2	02	6.3	0.116
	No	18	81.8	36	94.7	
Injuries sustained due to fall						
Abrasions	Yes	05	22.7	02	5.3	0.046*
	No	17	77.3	36	94.7	
Contusions	Yes	04	18.2	01	2.6	0.038*
	No	18	81.8	37	97.4	
Fractures	Yes	09	40.9	23	60.5	0.142
	No	13	59.1	15	39.5	
Dislocation of joints	Yes	02	9.1	08	21.1	0.213
	No	20	90.9	30	78.9	
Sprains	Yes	09	40.9	15	39.5	0.913
	No	13	59.1	23	60.5	
Treatment received						
1 st aid	Yes	18	81.8	37	97.4	0.038*
	No	04	18.2	01	2.6	
Hospital admission	Yes	19	86.4	34	89.5	0.720
	No	03	13.6	04	10.5	
OPD consultation	Yes	21	95.5	35	92.1	0.607
	No	01	4.5	03	7.9	
Fears of falls						
Restriction of daily activities	Yes	07	31.8	26	68.4	0.006*
	No	15	58.2	12	31.6	

Table 4: Analysis of association between repeated history of fall and various determinants

Determinants		Repeated history of fall			p value		Comments
		Yes		No			
		N (32)	%	N (28)	%		
Vertigo	Yes	21	70.0	09	30.0	0.010*	$\chi^2 = 6.696$
	No	11	36.7	19	63.3	0.019	
Sedatives	Yes	01	33.3	02	66.6	0.276	$\chi^2 = 0.508$
	No	31	54.4	26	45.6	0.594	
HTN	Yes	11	73.3	04	26.7	0.073	$\chi^2 = 3.214$
	No	21	46.7	24	53.3	0.084	
Joint pain	Yes	15	51.7	14	48.3	0.809	$\chi^2 = 0.058$
	No	17	54.8	14	45.2	1.000	
Memory loss	Yes	03	50.0	03	50.0	0.863	$\chi^2 = 0.030$
	No	29	53.7	25	46.3	1.000	
DM	Yes	03	50.0	03	50.0	0.863	$\chi^2 = 0.030$
	No	29	53.7	25	46.3	1.000	
Vertigo/giddiness	Yes	29	64.4	16	35.6	0.003*	$\chi^2 = 8.929$
	No	03	20.0	12	80.0	0.006	
H/O fractures	Yes	04	25.0	12	75.0	0.008*	$\chi^2 = 7.037$
	No	28	63.6	16	36.4	0.010	
Antihistaminic	Yes	02	66.7	01	33.3	0.635	$\chi^2 = 0.226$

	No	30	52.6	27	47.4	1.000	
Dizziness	Yes	16	72.7	06	27.3	0.022*	$\chi^2 = 5.249$
	No	16	42.1	22	57.9	0.032	
Imbalance	Yes	28	63.6	16	36.4	0.008*	$\chi^2 = 7.037$
	No	04	25.0	12	75.0	0.010	

Discussion

In the study, a total of 60 geriatric participants were there. 50 participants (83.33%) were in the age group 60-74 years, and 10 (16.67%) were above 75 years age. Among them, 22 (36.67%) were males and 38 (63.33%) were females. Among 50 young old (60-75 years age), males were 18 (36%) and females were 32 (64%), whereas among 10 old elderly (>76 years age) males were 04 (40%) and females were 06 (60%); which is similar to a study done by Kolli SS et al¹⁰ in Vijaypur in 2015 showed that among 50 participants with history of fall, 28 (56%) were females and 22 (44%) were males. Results from study done by Patil SS et al⁷ in 2011 in Bangalore, Karnataka revealed that among 416 participated elders, 88.4% were in 60-75 years age similar to the current study. And 9.2%, 2.4% respectively between age groups of 76-85 years and >85 years. 64.4% females as compared to 35.6% males similar to the current study.

Among the study participants, 32 (53.3%) had repeated falls from the current study, where as a study done in Assam (2013) by Agarwalla R et al,⁶ showed 41.9% had at least 1 episode of fall and 14% had repeated fall. 29.8% elderly had previous history of fall as per the study done by Patil SS et al⁷ in Bangalore, 2011. There was no significant difference in fall rate of 31.3% females and 27.02% males ($p>0.05$) which is in contrast to the current study showing fall rate of 15% among males and 23% females and is not significant ($p>0.05$). Whereas, the study done by Kolli SS et al¹⁰ in Vijaypur in 2015 revealed 12% patients had previous history of fall.

According to the study done by Patil SS et al⁷ in Bangalore, 2011 showed that outdoor falls were 57.2% as compared to indoor falls 42.8%. Among the outdoor falls 63.3% falls were observed on footpath. Among indoor falls, 30.1% falls were in the bathroom, followed by 22.6% falls while using stairs. Current study showed that among falls outdoor and indoor came to be 50% each. And among outdoor falls, 92% were outside house on the footpath. Among indoor falls, 28.57% had fall in bathroom.

In the current study, majority of falls had occurred in the evening (41.67%), followed by 26.67% in the morning, 18.33% in the afternoon and 13.33% in the night. In contrast to this a study done by Patil SS et al⁷ in Bangalore, 2011 revealed majority i.e., 67 (54%) of the elderly had falls in the morning, followed by 41 (33.2%) in the evening, 15 (12%) in the afternoon and only 1 (0.8%) in the night.

In the current study, Hypertension as a cause for fall found significant from the current study among old

elderly (60%). There are 33.3% geriatric study participants having hypertension and were on treatment, when compared to a study conducted by Chinnakali P et al,¹¹ Puducherry India 2016, has prevalence of hypertension as 40.5%. In the current study, hypertension among the history of repeated falls were 52.3% and is not statistically significant. Similarly, a study conducted by Kolli SS et al¹⁰ in Vijaypur in 2015 showed that all 6 of the participants having history of repeated falls were having hypertension.

Vehicle related or fall from vehicle while transferring has found significant among elderly males (27.3%). First aid is the main treatment received after fall is found from the current study (97.4%). Restriction of the daily activity seen more among female geriatric study population from the current study (68.4%) in the current study.

In the current study, there are 64% elderly female and 60% of very elderly female. Among the illiterates in the study population, there are 71.1% females, which coincides with the statistics given in Elderly India 2016 (71.5%).¹² Similarly, among marital status of married, there is 50% distribution each for both males and females, again coincide the data with the statistics given in Elderly India 2016.

Conclusion

The present study shows the falls, causes for falls, and its consequences in the form of one or the other injuries like abrasions, contusions, fractures, dislocations and sprains increasing the morbidity status of the elderly. It also leads to decreased activity, loss of independence, leading to psychological distress, fear and restriction of daily activities. There is a need for rehabilitation of the elderly. Regular health checkups camps needed. Also focus to be on the determinants of falls, fractures and frailty. Emphasis has to be given on the environmental aspects like housing, with clutters, inadequate lighting, threshold at the entrance of the house, avoiding the slippery floor in the house, keeping the rails on the side walls while climbing stairs, also rail in the toilets to be encouraged to avoid falls in the elderly. Elderly become frail as the days passes off.

Recommendations: It is from the current study; proper rehabilitation is necessary. Awareness of the health check-up camps needed. Proper use of mobility aids to avoid falls and education regarding the same.

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References

1. World Health Organization. WHO global report on falls prevention in older age. 2007. World Health Organization. 2015:1-7.
2. Suryakantha AH. Community medicine with recent advances. 4th ed. New Delhi: Jaypee the Health Sciences Publisher; 2017. p. 775.
3. Fillit H, Butler RN: The frailty identity crisis. *J Am Geriatr Soc* 2009,57(2):348-352.
4. Try this: Best Practices in Nursing Care to Older Adults, The Hartford Institute for Geriatric Nursing, New York University, College of Nursing, www.hartfordign.org.
5. Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol A BiolSci Med Sci* 2001;56:M146-M156.
6. Agarwalla R, Saikia AM, Pathak R, Islam F, Borah M, Parashar M. A Cross Sectional Study on Assessment of Falls in Community Dwelling Elderly of Assam. *Nil J Community Med* 2016;7(5):368-371.
7. Patil SS, Suryanarayana SP. Circumstances and Consequences of Falls in Community-Living Elderly in North Bangalore Karnataka. *Journal of Krishna Institute of Medical Sciences (JKIMSU)*. 2015 Oct 1;4(4).
8. Tinetti ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. *New England journal of medicine*. 1988 Dec 29;319(26):1701-7.
9. Sirohi A, Kaur R, Goswami AK, Mani K, Nongkynrih B, Gupta SK. A study of falls among elderly persons in a rural area of Haryana. *Indian J Public Health* 2017;61:99-104.
10. Kolli SS et al. Clinical profile of the elderly. *Scholars Journal of Applied Medical Sciences (SJAMS)* 2017;5(2C):513-516.
11. Chinnakali P, Mohan B, Upadhyay RP, Singh AK, Srivastava R, Yadav K. Hypertension in the elderly: prevalence and health seeking behavior. *North American journal of medical sciences*. 2012 Nov;4(11):558.
12. National Sample Survey Office. Elderly in India. Minist Statistics Program Implementation, Government of India [Internet]. 2016;1-95. Available from: http://mospi.nic.in/sites/default/files/publication_reports/Disabled_persons_in_India_206.pdf