

**THE RISK, RISK FACTORS AND IMMEDIATE
CONSEQUENCES OF FALLS AMONG OLDER
PERSONS IN THEIR HOME ENVIRONMENT
IN THIRUVANANTHAPURAM**

A THESIS PRESENTED BY

REKHA M RAVINDRAN

TO

THE SREE CHITRA TIRUNAL INSTITUTE FOR
MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM

Thiruvananthapuram

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE AWARD OF

DOCTOR OF PHILOSOPHY

2017

DECLARATION BY THE STUDENT

I, Rekha M Ravindran here by certify that I had personally carried out the work depicted in the thesis entitled, “The Risk, Risk Factors and Immediate Consequences of Falls among Older Persons in Their Home Environment in Thiruvananthapuram.”

No part of the thesis has been submitted for the award of any other degree or diploma prior to this date.

05/11/2017

Rekha M Ravindran

CERTIFICATE OF THE GUIDE

Dr V Raman Kutty,
Professor and HOD,
Achutha Menon Centre for Health Science Studies,
Sree Chitra Tirunal Institute for Medical Sciences and Technology,
Trivandrum.

This is to certify that Rekha M Ravindran in the Achutha Menon Centre for Health Science Studies of this Institute has fulfilled the requirements prescribed for the Ph.D degree of the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum. The thesis entitled, “The Risk, Risk Factors and Immediate Consequences of Falls among Older Persons in their Home environment in Thiruvananthapuram” was carried out under my direct supervision. No part of the thesis was submitted for the award of any degree or diploma prior to this date. Clearance was obtained from the Institutional Ethics Committee for carrying out the study.

Signature

05/11/2017

Acknowledgement

I take this opportunity to acknowledge the efforts of numerous persons who have contributed to successful completion of this project. First and foremost, I would like to thank my guide, my inspiration and my mentor Dr V Raman Kutty who has stood by me through thick and thin. On this arduous journey, he was the one who provided the vision and corrected the course whenever I stumbled. Sir, I am indebted to you. Your wisdom and pragmatism were vital for me in all the phases of the project.

Dr K R Thankappan, the Head of the Department and my Doctoral Advisory Committee (DAC) member has always encouraged me and has been a support for me throughout my period in AMCHSS. I remember with gratitude the help you had extended to me in my studies as well as my career with your references. Without your suggestions and advice I couldn't have made this happen. Thank you Sir, for your kindness.

Dr P Sankara Sarma, is my DAC member and teacher. He was always available to answer questions that perplexed me. Things that appeared impossible to me were made possible with his guidance. He is highly regarded for his gentleness and wisdom. He will always be an inspiration to me.

Dr Vijaya Kumar who is my DAC member, in spite of his busy schedule found time to attend my seminars and gave important suggestions to guide me through the right path.

Dr Sundari Ravindran was always a motivation. She encouraged me whenever it was important for me. Her firmness was an inspiration to me whenever I drifted

from my goals. Her suggestions and advice were critical in the conception of the study and completion of the project.

Dr Biju Soman was the one who provided me the sample frame for the community study. In spite of his busy schedule, he found time to provide me the data and relevant details for locating the individuals from the data collected as part of Athiyannur Sree Chitra Action project. Without his help this would not have happened. He raised important questions which were crucial for the smooth conduct of the study. Your efforts are highly appreciated. Thank you Sir!

Dr Mala Ramanathan helped me at different stages of my qualitative study. Without her I would not have done it. She motivated me whenever I talked to her. I salute her wisdom. Thank you madam for your help.

Dr Kannan Sreenivasan is a well-wisher of mine. His advice and encouragement were vital in completing the Thesis in time.

Dr Ravi Varma has always been there as a friend and as a teacher. His critiques were helpful in defending my work on several occasions.

Ms Jissa, is a person to whom I can always turn for help. She helped me without any hesitation whenever I approached her even while she was doing some other important work.

The Director of Medical Education, Principal of The Medical College, Thiruvananthapuram, and Head of the Departments of Surgery, Neuro Surgery and Orthopaedics departments gave me the permission to conduct part of the study in Medical College Thiruvananthapuram. Special thanks to Dr Gopakumar, Head of

the Department, Department of Orthopaedics. Other faculty in these departments helped me and guided me to complete the study. The nursing staff and other employees in these wards were very helpful and supportive. Without their cooperation, nothing would have been possible.

Dr GK Mini and Archana AR helped me in difficult situations of the study. Their contribution was substantial. My friends Dr.Yamini Thankachy and Elezebeth Mathews have contributed in the making of the thesis. Their affection and support were important for me in this endeavour.

It will be unfair not to acknowledge the support and affection of my PhD colleagues Uma V Shankar, Neena Elezebeth Philip and Sreejini J, the office assistant Ms Jayasree and all other project staff who made my AMCHSS life a pleasant one.

Volunteers Ms Jaya Kumari and Ms Ajitha Kumari helped me with the data collection. Their contacts and information regarding the community were an advantage for the smooth conduction of community survey. Their confidence and initiative was crucial in the conduction of the study. This study would not have happened without them.

I extend my sincere gratitude to ASCEND research network for providing me the fellowship and an opportunity to interact and make contacts with international faculty. I thank Dr Brian Oldenberg and Dr KR Thankappan for giving me the chance to be the part of this wonderful network. The suggestions and inputs given by the faculty and the team were very crucial in the conception and conduction of the study.

Last and not the least I would like to thank each and every participant of my study. Those senior citizens provided me the data for my study and enriched me with their experiences. The interactions not only helped me complete the study but it altered my attitude and outlook towards many important issues. Many of them are no more in this world. May their souls rest in peace!

TABLE OF CONTENTS

Declaration by student	<i>i</i>
Certificate of guide	<i>ii</i>
Approval of thesis	<i>iii</i>
Acknowledgements	<i>iv</i>
List of Figures	<i>x</i>
List of Tables	<i>xi</i>
Abbreviations	<i>xiii</i>
Synopsis	<i>xv</i>
Chapter 1: Introduction	1
Chapter 2: Literature review	10
2.1 What is Ageing?	10
2.2 Ageing of a population	10
2.3 Definition of older elderly person or older person	11
2.4 Ageing: the global picture	12
2.5 Ageing in India	13
2.6 Patterns of morbidity among the older persons in India and Kerala	14
2.7 Falls among older persons	15
2.8 Falls among older persons in India	17
2.9 Definition of falls	19
2.10 Classification of falls	21
2.11 Consequences of falls	25
2.12 Location of falls	27
2.13 Activity during falls	28
2.14 Cause of falls	29
2.15 Time of falls	30
2.16 Cost of falls	31
2.17 Determinants of falls and related injuries	32
2.18 Prevention and control of falls	51
2.19 Intervention strategies	53
2.20 Conclusion	56

Chapter 3: Methodology	58
3.1 Phase I: The preparatory phase	58
3.2 Phase II: Cross sectional survey	60
3.3 Phase III: Hospital based incident case control study	64
3.4 Phase IV: Observation	72
3.5 Ethical concerns	74
Chapter 4: Results	75
4.1 Results of preparatory phase	75
4.2 Results of cross sectional survey	83
4.3 Results of case control study	931
4.4 Observation	110
Chapter 5: Discussion	120
Chapter 6: Summary and conclusion	138
Bibliography	146
List of publications from the thesis	
Appendix	
Guidelines for in depth interview among doctors	A.1
Guidelines for in depth interview among older persons	A.2
Guidelines for FGD among older persons	A.3
Information and consent form: Cross-sectional survey	A.4
Interview schedule: Cross-sectional survey	A.5
Information and consent form: Case control study	A.6
Interview schedule: Case control study	A.7
Information and consent form: Observation	A.8
Observation guidelines	A.9
Information and consent form: Cross-sectional survey (Malayalam)	A.10
Interview schedule: Cross-sectional survey module (Malayalam)	A.11
Information and consent form: Case control study (Malayalam)	A.12
Interview schedule: Case control study (Malayalam)	A.13
Information and consent form: Observation (Malayalam)	A.14
Observation guidelines (Malayalam)	A.15

List of figures

Figure No.	Caption	Page
1	Four phases of the study	<i>xvii</i>
2	World population aged 0-4, 0-14 and above 60 years	11
3	Location and activity up to the moment of fall	29
4	The mechanism of falls	33
5	Flow diagram showing determinants of falls and injuries	34
6	Proportion of injuries on different parts of the body	86
7	Follow up of cases: schematic representation	109
8	Qualitative content analysis coding framework	111

List of Tables

Table No.	Title of the table	Page
1	The factors identified in Phase 2 and 3 classified as modifiable and non-modifiable	<i>xxii</i>
2	Number and proportion of older persons in India (2001-2051)	13
3	Proportion of older population in Kerala (1961-2051)	14
4	Frequency of falls among older persons in high income countries	16
5	Frequency of falls among older persons in low and middle income countries	17
6	Frequency of falls among older persons in India	18
7	Environment hazards assessed	49
8	Characteristics of Athiyannur grama panchayat	61
9	Risk factors for falls: Provider's view	77
10	Strategies for prevention of falls: Provider's view	79
11	Measures adopted by the family for prevention of falls	82
12	Basic sample characteristics of survey participants	84
13	Proportion of fallers by age and sex in community survey	85
14	Cause of falls of the survey participants	86
15	Activities during fall in the community survey	87
16	Distribution of location of falls of the survey participants	88
17	Association of falls with characteristics of subjects	89
18	Correlates of fall among the survey participants	90
19	Association of frequency of falls with number of risk factors	91
20	Basic sample characteristics of cases and controls	94
21	Distribution of cause of injurious falls segregated by sex	95
22	Activity during falls	96
23	Place of fall	97

24	Reasons for delay in getting treatment	98
25	Risk factors for injurious falls: Socioeconomic factors	101
26	Risk factors for injurious falls: Environmental factors	102
27	Risk factors for injurious falls: Behavioural factors	103
28	Risk factors for injurious falls: Biological factors	104
29	Risk factors for injurious falls: Pathological factors	104
30	Risk factors for all injuries: Multivariate logistic regression model	105
31	Risk factors for hip fractures	106
32	Comparison of risk factors for all injuries, hip fractures and other injuries	107
33	Comparison of circumstances of all falls and injurious falls	107
34	Summary of findings of observation	118

List of Abbreviations

AAAM	: Association for the Advancement of Automotive Medicine
ADL	: Activities of Daily Living
AIS	: Abbreviated Injury Scale
ANA-NDNQI	: American Nurses association- National Data of Nursing Quality Indicators
BMI	: Body Mass Index
CI	: Confidence Interval
COAD	: Chronic Obstructive Airway disease
COPD	: Chronic Obstructive Pulmonary disease
DM	: Diabetes Mellitus
FAI	: Frenchay Activities Index
FICSIT	: Frailty and Injuries: Cooperative studies of Intervention Techniques
FOF	: Fear of fall
GARS	: Groningen Activity Restriction Scale
LOC	: Loss of consciousness
MIPAA	: Madrid International Plan of Action on Aging
NCD	: Non communicable diseases
NCRB	: National Crime Records Bureau
NIMHANS	: National Institute for Mental Health and Neuro Sciences
NPHCE	: National Programme for Health care of Elderly
NSSO	: National Sample Survey Organization
OR	: Odds ratio
PA	: Physical Activity
SSRI	: Selective Serotonin Reuptake Inhibitors
UK	: United Kingdom

UN : United Nations
UNESCO : The United Nations Educational, Scientific, and Cultural Organization
UNESCAP : United Nations Economic and Social Commission for Asia and the Pacific
UNFPA : United Nations Population Fund
USA : United State of America
Vit : Vitamin
WHO : World Health Organization
WHR : World Health Resolution

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SYNOPSIS

Globally the proportion of older persons is growing faster than that of any other age group. Developed countries are now facing the stage of epidemiologic transition where the mortality of the adults is mainly due to chronic non-communicable diseases and injuries. Injuries are the fifth leading cause of death among older persons. Falls are the second leading cause of unintentional injury death worldwide. Fifty percent of the fall related deaths are among those aged 60 years and above. Seventy percent of these deaths are in low and middle income countries. In developed countries, one in every three older persons above the age of 65 years falls every year. Out of these 10-20% results in major injuries that may lead to disability, long term confinement to bed and even death. Twenty five percent of older persons who sustained a hip fracture died within a year. The evidence from developed countries shows that direct and indirect costs for fall related injuries among older persons are huge and can be averted by cost effective interventions. The resource constrained health systems in developing countries are not equipped to manage the growing problems of older persons in the coming years, especially falls.

In India the population aged 60 years and above increased from 76 million in the year 2001 to 104 million in 2011 constituting 8% of the population. Kerala is the fastest aging state in India with a proportion of 12.6% of older persons. It is also much ahead of other states in epidemiologic transition. The trend in epidemiologic transition in Kerala is similar to some of the developed nations as the health indicators are at par with them. The overall development of the state exposes the population to a highly urbanised environment which is conducive for high prevalence of risk factors of non-communicable diseases. This has also exposed

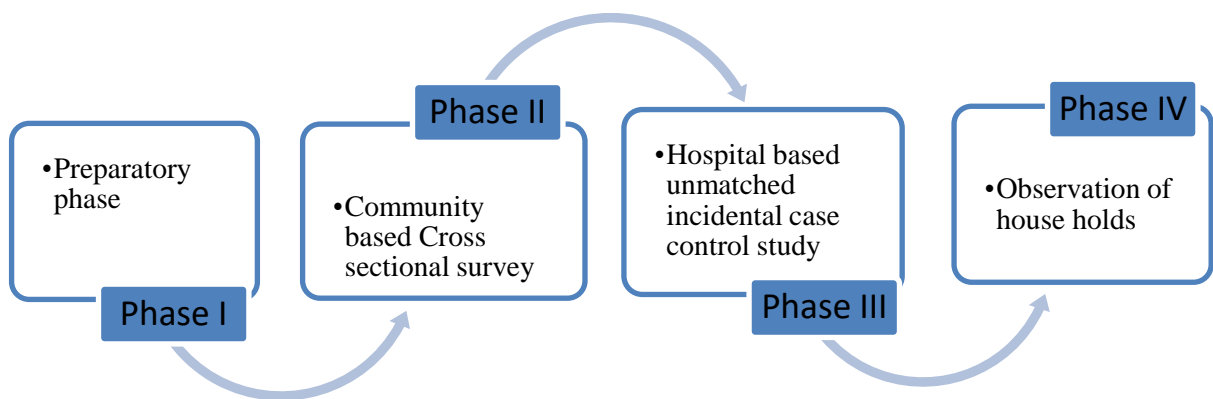
them to high risk of unintentional injuries through changes in the built environments and high volume of road traffic.

The age related physiological changes, presence of co-morbidities, multiple medications, delayed functional recovery along with the unfriendly surroundings they live in increase the vulnerability of older persons for falls. Fall related injuries are hindrance to the “healthy aging” of an individual and undermines the “Aging well” agenda of WHO. The general negligence towards problems of older persons is reflected in case of falls, where falls are considered a normal part of aging. Non communicable diseases like cardiovascular diseases and diabetes gained policy attention only when they started affecting the productive age group. The research in the area of injuries is at present confined to road traffic injuries where younger population is frequently involved. A few studies in India and Kerala conducted using convenience samples indicated a high frequency of falls among older persons. Data based on well conducted studies on the magnitude of this problem, its consequences and correlated social and cultural factors are limited in India and Kerala. This study is an attempt to fill that gap at least partially.

Objectives of this study were to find out the frequency of falls among community dwelling older persons in a rural setting of Thiruvananthapuram district in previous one year and to find out the risk factors for fall related injuries that led to hospitalisation among older persons. The study also attempted to observe and assess the built environment factors to identify potential hazards within and around the house that precipitated falls and modified the consequences of falls.

The clinical-agent-host-environment paradigm and the epidemiological transition theory are used as the theoretical framework for this study

Fig 1: Four phases of the study



Phase I: An extensive review of the literature was done to identify the gaps in the published information. A formative research including in depth interviews were conducted among community dwelling older persons, older persons hospitalised for fall related injuries and the providers. Focus group discussions among the older persons living in the community were also done.

Phase II was a cross-sectional survey among older persons (60 years and above) to estimate the frequency of all falls among them. Athiyannur grama panchayat of Thiruvananthapuram district, capital district of Kerala, was the study setting. Based on published information the frequency of falls were 45% among older women in Thiruvananthapuram. We anticipated a lower frequency of 35% among men as reported by earlier studies for sample size estimation. With a precision of seven percent on both sides and 95% confidence interval, the sample size calculated was 178. To compensate for the deaths, migration and refusal to participate, twenty percent oversampling was done. Thus 214 older persons were randomly selected

from the list of older persons for the whole grama panchayat. After applying the exclusion and inclusion criteria and excluding those who were unavailable due to death or migration, 202 older persons were interviewed finally which was little more than the required sample size. We collected information on falls for the last one year by interviews with the older persons using a pretested structured and validated interview schedule during November 2012 to February 2013.

Phase III was an unmatched incident case control study among the hospitalised older persons admitted at Thiruvananthapuram Medical College hospital in the departments of Surgery, Orthopaedics and Neurosurgery. The objective of this phase of the study was to identify the risk factors for injuries following falls that required hospitalisation as it was evident from the cross sectional survey that not all falls resulted in injuries and hospitalisation. With 95% confidence level that an expected odds ratio of 1.75 detected was real and 80% power to detect this population, 220 cases and 220 controls in 1:1 ratio were required. During the study period (March 2013 to August 2013) 251 cases and 250 controls were recruited. Incident cases of 60 years and above admitted to the above said departments with injuries following falls during the study period were recruited as cases. Those who were of the same age group, admitted to the same wards during the same period with complaints other than injury were recruited as controls. A pretested validated structured interview schedule was used for recording data. The cases were followed up over telephone to assess their reported functional status at the end of one year.

Phase IV was a qualitative observation of households of older persons to identify the potential hazards within and outside their houses. It was decided to visit and inspect

the dwellings of older persons assuming that older persons spent maximum time inside and around their homes. Structural changes they made after the falls to prevent further falls or to accommodate the injuries following the falls were also observed from the perspective of the injuries sustained and the outcome of the injuries. The households of the persons who had falls due to extrinsic causes (slipping and tripping) within their houses or just outside their houses were only selected. A home hazard checklist which was customized for our setting was used for recording data

The analysis of quantitative data were done using SPSS version 20 and that of observational study was done manually. Multiple logistic regression was done to adjust for confounding variables while arriving at the final model in both the studies. In the case control study, multinomial logistic regression was done to compare three groups, hip fractures, other injuries and controls. The level of significance was set as $p < 0.05$.

The findings of the preparatory phase revealed that falls among older persons were important in our setting in terms of the long term sequel of the injuries. The economic burden to the family and the burden to the health system were also considerable. The whole process helped to design the subsequent phases of the study and to choose the study variables.

The results of cross sectional survey showed that 26.7% (95% CI: 20.6-32.8) of the older persons had at least one event of fall in the preceding 12 months. This translated into an incidence rate of 3.05 falls (2.41-3.81) per 100 person months. There were a total of 74 falls involving 54 individuals. Women constituted 52% of

the sample. Twenty percent of the fallers fell twice and seven percent fell thrice in one year. Of the total falls, 42% required medical attention, 58% sustained injuries including 10% of fractures out of which three percent were that of hip. Slips and trips were the frequent causes of fall. Falls happened more while walking on level floor. Majority of older persons fell outdoors (77%). Lower limb was frequently injured (44%). Eighteen percent of the fallers failed to recover their pre-morbid condition of fall. The fallers experienced physical, mental and social changes after the fall. After adjusting for age and sex, the factors significantly associated with any falls among older persons were presence of any morbidity, history of previous fall and lack of formal education.

In the case control study, proportion of women was high among cases when compared to controls. The mean age and mean income of cases were also significantly high when compared to controls. Hip fractures were the frequent injury which led to hospitalization (94%) and were more among women. Tripping and slipping were the common cause for falls that led to hospitalization. Out of the 251 cases, 160 (63.8%) were due to extrinsic causes (slips and trips) and 83 falls (33%) were due to intrinsic causes (fainting, legs gave way, giddiness). Walking was the most frequent activity during falls. Multiple falls were reported by 33% of women in last five years. Age above 70 years, previous history of fall, vision impairment, and respiratory ailments were independent intrinsic risk factors for injurious falls. Single status, use of walk aid, flooring with marble, mosaic or tiles were independent extrinsic risk factors for injurious falls. The independent risk factors for hip fractures identified were lack of formal education, single marital status, and age above 70

years, history of previous falls, impaired vision, respiratory ailments, using walk aid and flooring with marble, mosaic or tiles. Impaired vision was the only factor found to be significant for other injuries following falls. Around three percent of the cases died within one month during the initial hospitalisation. Out of the 129 cases that were followed up over the phone, 37 persons (28.7%) died premature within one year following fall.

Several hazards were identified inside and around the houses. Not many houses had a proper or an independent access to a motorable road. The areas around the houses were often slippery with algae, irregular or had tripping hazards like heaps of firewood, tools and materials used for construction. Almost all the houses were at a level different from the ground and had two or three steps on both sides of the house. There were problems regarding the uniformity of the height of the steps, stability, visibility, evenness and finishing of the steps. The type of flooring ranged from mud to marble. Door mats with no grip backing and therefore slippery on a smooth floor were recognized as a potential tripping hazard. The location of bathrooms was usually away from bedrooms and at a different level from the rest of the house. Bathrooms were hazardous with slippery floors, difficult to reach things and without any demarcation as dry and wet areas. Lighting was a problem within the house, inside the toilet and bathrooms.

This study documented that falls are an important health hazard among home dwelling older persons in Kerala, a state where proportion of older persons are fast growing. Fall related injuries were often serious. Based on the frequency of falls obtained in our study, we estimated that around two million older persons of Kerala

might have fallen at least once in the year 2011-2012 in the entire State of Kerala. (According to the Census 2011, there were 7.4 million older persons in Kerala). Among those who fell, around 1.6 million persons might have had fall related injuries out of which almost 700,000 would have had fractures including 110,000 fractures of hip. The number of older persons who might sustain falls can rise to around 3.2 million in the year 2051 if there are no measures for prevention of falls. The number of hip fractures will rise to almost 180,000. (As per the projections the number of older persons by the year 2051 will be around 11.9 million). This study could identify several modifiable risk factors for fall related injuries among older persons in Thiruvananthapuram and some of them were specific to this setting.

Table 1: The factors identified in Phase 2 and 3 classified as modifiable and non-modifiable

Phase II: Cross sectional survey		Phase III: Case control study	
Modifiable	Non-modifiable	Modifiable	Non-modifiable
No formal education	History of previous falls	Impaired vision	Age>70 yrs
Any morbidity		Respiratory ailments	History of previous falls
		Using walk aid	Single status
		Living in house with marble /tiles/mosaic floor	

It could also document several potential hazards present at the houses of older persons which led to falls and injury. The study also showed a high mortality rate among the older persons seriously injured by falls. All the findings were at par with

studies from several developed countries. The findings can be generalised to whole of Kerala as these factors

There is a lack of recognition of falls among older persons as a public health problem in India and Kerala, the main reason being dearth of reliable estimate of burden of the falls and related injuries. This study tried to estimate the frequency of falls, fall related injuries and hip fractures among older persons in a period of 12 months among the community dwelling older persons in Kerala. Since our health systems are not prepared to contain this catastrophe, these findings will be useful to initiate advocacy to invite policy attention for prioritizing the fall related injuries among older persons as a major public health issue. This study identified the consequences of falls, recognize some of the modifiable risk factors for injurious falls and document some potential hazards within and around houses.

These findings are relevant as several modifiable risk factors have been identified that can be intervened and modified. The findings can be generalised to the whole of Kerala as the human development index (HDI) of Thiruvananthapuram district, where the studies have been conducted is similar to the average score of 0.773 in the state. Authorities have to consider the possibilities of interventions in this area as it will be helpful in preventing injury related morbidity, mortality and disability following falls among older persons. Improving the vision of older persons is a single intervention that can be carried out at once under the program for control of blindness. This study can aid as a basic document for strategizing activities to appeal for elderly friendly injury free houses, roads and other buildings. These findings will help in developing further studies to investigate other modifiable risk factors for

injurious falls and planning research to identify the role of interventions specific to our setting. A thorough costing study is essential to assess the burden of fall related injuries to the health system to devise cost effective interventions. The state of Kerala is regarded as a harbinger of India's future in terms of chronic non-communicable diseases. Hence the findings are relevant for all the Indian states aging rapidly.

INTRODUCTION

Chapter 1

INTRODUCTION

Older persons constitute a group which is growing faster than any other age group globally (WHO 2008). The number of older persons was 840 million in 2013 constituting 11.7% of the total global population (WHO 2008; UN 2013). The figures have doubled since 1980 (WHO 2012). By 2050, the number of older persons will reach two billion constituting 21.1% of the world population. This will be more than the number of children under the age of 14 years (WHO 2012; WHO 2014). More than 80% of the older people in the world will be living in low and middle income countries by the same year (WHO 2012). In India the population of elderly (60 years and above) increased from 76 million in the year 2001 to 104 million in 2011 (Prakash 1999; Johnson 2006; Census 2011). It is expected to rise to 296.6 million making up to 20% of the total population by 2050 (Rajan 2006).

Older persons deserve special attention as they face a variety of day to day problems. These include failing health and general debility, diminution of vision and hearing, emotional problems due to separation or loss of loved ones, social and financial insecurity, vulnerability, conflict between generations and loss of respect for the aged. Urbanisation, globalisation and industrialisation have affected older persons in different ways. As per the reports of NSSO 60th round, which dealt with the morbidity, health care and condition of the aged in India, 67% of rural and 64% of urban depend on others for their day-to-day maintenance. It also showed that 77 (per 1000) of the aged population in rural area and 84 (per 1000) of the aged population in urban cannot move and are confined to bed or home (NSSO 2006). The migration of the younger generation out of the country or within the country or within the state itself in search of better career or investment has transformed

the lives of the older persons in different ways. Many of them are left alone in their homes, lack care from their children and suffer from loneliness even though there is increased financial security (Zachariah et al. 2000). Considerable changes have taken place in the family composition, structure and values for the elderly. The care of older persons has turned out to be a challenge due to the breakdown of the joint family system and the rise in the number of younger women entering the job market (Moli 2004). “The unreserved love, respect, power and authority the older people used to enjoy in rural extended traditional family is being gradually becoming extinct in India in recent years” (Prakash 1999). Simultaneously the rise in the prevalence of chronic diseases and injuries and other illnesses among the older persons prolong the care required by them (Moli 2004).

Injury is the fifth leading cause of death in elderly adults globally (Rubenstein 2006, Myers et al.1996). Most of the fatal injuries are related to falls. In US and Australia injury ranks as the sixth cause of death and morbidity in older people (Bergland & Wyller 2004). Among the injury deaths of adults aged 65 years, falls contribute at least two thirds of the total. (Rubenstein 2006; Kannus et al. 2005(a); Carter et al. 1997). Seventy five percent of the deaths due to falls happen among 13% of the older adults above the age of 65 years in US (Rubenstein 2006).

Falls are considered one among the four “geriatric syndromes” among the older persons, the others being urinary incontinence, delirium and frailty (Inouye et al. 2007). Falls among older persons are common and a significant public health problem around the world. Every year, 25 to 30% of older adults over 65 years living in the community, sustain falls (Prudham & Evans 1981; Tinetti et al. 1988; Campbell et al. 1990; Blake et al. 1988; WHO 2008).The frequency of falls increases with advancing age and frailty (WHO

2008). Due to the ageing process several functions and reactions as well as the coping mechanisms of the body deteriorate (Injuries among elderly n.d). When compared to a young person an older person takes a long time to recover from the injuries due to the delay in the recovery process (Injuries among elderly n.d).

Falls lead to medical and economic consequences (Akyol 2007). They frequently result in long standing complications like injuries, chronic pain, disability, fear of falling, reduced quality of life, prolonged hospital admission and death among older persons (Scott et al. 2010). Common injuries following falls are fractures mainly hip fractures, severe head injuries, joint distortions and dislocations, spinal cord injuries, soft-tissue bruises, contusions and lacerations (Kannus et al. 2005(a); Carter et al. 1997; Runge & Schacht 2005; Bleijlevens et al. 2010). Injuries such as fractures especially of hip generally require hospitalization, costly interventions including surgeries with implants and rehabilitation. After the fall injuries, the duration of hospital stay ranged from 4 to 15 days (WHO 2008). Quite often they led to functional limitations that may finally result in long term care including institutionalization (Todd & Skelton 2004).

Falls usually result from complex interaction of several risk factors and circumstances, out of which many are modifiable (Runge & Schacht 2005; WHO 2008). They can be classified broadly into intrinsic and extrinsic causes. In another approach, they can be classified into four: namely biological, behavioral, environmental and socioeconomic factors (WHO 2008). Age, gender, race are some examples of non-modifiable biological factors (WHO 2008). Behavioral factors include potentially modifiable factors which are associated with human actions, emotions or daily choices (WHO 2008). Environmental factors include one's physical surroundings and the neighbouring environment. These

include factors within and outside the home (WHO 2008). Socioeconomic factors include education, housing, social interaction and others (WHO 2008).

The development in all sectors of life has brought in changes in the day to day life of the older persons as well as the environment in which they spend their lifetime. The transformation from an agrarian life to a more mechanized living has augmented the potential for injuries for an older person at work. The increased use of vehicles for transport has increased the injury possibilities to the passengers as well as the pedestrians. The transition in the housing patterns (e.g., multilevel buildings, use of marble and tiles for flooring even in the bathrooms and toilets) has introduced a new set of threats to the older persons by increasing their proneness to injury. At the same time the opportunities to be physically active which can actually decrease their susceptibility to injury has declined drastically due to several reasons. New means of transport and increase in the number of vehicles disproportionate to the expansion in road facilities (Sahoo 2011), introduction of entertainment media like television, change in the type of work and lack of space for physical activity due to the development of real-estate market are some of them. Urbanization also demands acquisition of new skills in daily living like negotiating staircases, crossing a busy road, using indoor toilets and bathrooms which many in the developing world may not be used to.

As the population ages, the problems related to falls and fractures are estimated to grow and create a bigger challenge to the health care systems. In the coming years the burden is going to rise; the health systems will find it difficult to negotiate this burden. Injuries are already identified as a major public health problem in all the age groups in most of the

developed countries. They have started gaining attention in the developing countries as well. The magnitude, extend and characteristics of injuries are yet to be explored.

In the year 1992, United Nations (UN) General Assembly 47/5, in connection with the tenth anniversary of the adoption of the International Plan of Action on ageing, adopted “Proclamation on Ageing” and decided to observe the year 1999 as International Year of Older Persons (UN 1992; Political declaration and Madrid international plan of action on ageing 2002). In response to this announcement, India developed “The National Policy on Older Persons” in the year 1999. Several documents form the basis of the global policy guidelines to motivate different governments to design and implement their own policies. The Madrid Plan of Action and the United Nations Principles for Senior Citizens adopted by the UN General Assembly in 2002, the Proclamation on Ageing and the global targets on ageing for the year 2001 adopted by the General Assembly in 1992, the Shanghai Plan of Action 2002 and the Macau Outcome document 2007 adopted by United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) are some of them based on which the National Policy on Senior Citizens 2011 was developed (The Ministry of Social Justice and Empowerment 2011). The commitment of the Government of India to the concerns of older persons is evident from the fact that it is a signatory to all these documents.

The International Plan of Action on Ageing adopted at the second World Health Assembly (WHA) on ageing in Vienna in the year 2002, has guided the development of important policies and initiatives related to issues of older persons (UN 2002). The document published by UN on the International Plan of Action on Ageing, under the priority direction II, discussed “advancing health and well-being into the old age”, which deals

with health promotion and well-being throughout life. The second objective of this issue was development of policies to prevent ill health among older persons. Some of the actions mentioned for achieving this objective stressed implementation and reinforcement of safety standards for preventing unintentional injuries including falls at all ages directly and indirectly.

- (a) “Rigorously implement and reinforce, where applicable, national and international safety standards that aim at preventing injuries at all ages” (UN 2002).
- (b) “Prevent unintentional injuries by developing a better understanding of their causes and by undertaking measures to safeguard pedestrians, implementing fall prevention programmes, minimizing hazards, including fire hazard in the home, and providing safety advice” (UN 2002).
- (c) “Develop statistical indicators at all levels on common diseases in older persons to guide policies aimed at preventing further illness in this age group” (UN 2002).
- (d) “Encourage older persons to maintain or adopt an active and healthy lifestyle, including physical activity and sport” (UN 2002).

Way ahead of this meeting, Government of India could foresee the problems of older population even when it had only seven percent as older population. The government devised the National Policy on Older Persons in 1999. Being a signatory to Madrid International Plan of Action on Ageing (MIPAA), it is committed to ensure that all the people age and live a dignified life from a human rights perspective. Further the National Policy on Senior Citizens was adopted in the year 2011. Even though the National Policy for Senior Citizens is comprehensive, there is no mention of health promotion aspects for

enabling active aging of older persons in the context of falls. The convergence of different departments in providing services for active aging is also lacking in the document. There is no mention of injury prevention following falls in this policy directly, the mention of expansion of National Program for Health Care of Elderly (NPHCE), strengthening of preventive, curative, rehabilitative, restorative and palliative services, and initiation of national and regional institutes of ageing under health care introduces opportunities for including injury prevention into the main agenda of improving health. The program does not ensure universality of care as accessibility is one of the problems faced by older persons. However fall prevention can be integrated in to this program without much burden to health system.

There are no surveillance mechanisms available to report injuries in India. The only database reporting injuries in India is National Crime Record Bureau (NCRB), which collects information on road traffic injuries, crime, violence, suicides, natural disasters wherever there is police intimation. Data from NCRB, 2013 showed that 1511 older persons lost their lives due to falls in 2013 (NCRB 2013). For every person who lost his/her life there will be more persons who have sustained falls. A lot of such cases go underreported due to several reasons (Injuries among elderly n.d). Only those with serious injuries might turn up in hospitals for care and management. A few may not reach the hospital due to inaccessibility or may die on the way or go for some locally available options. The death certificates may not mention about the falls even if the death occurred due to some delayed complications of falls. An injury surveillance programme coordinated and implemented by National Institute for Mental Health and Neuro Sciences (NIMHANS) at Bangalore, showed that 360 individuals above 60 years died due to

injuries in 2007, in Bangalore city (Injuries among elderly n.d). For every person dead there were eight persons who attended hospitals for care and management.

A few studies in India indicated a high frequency of falls among older persons (Johnson 2006; Joshi et al. 2003; D'souza et al. 2008; Thripathy et al, 2015). Data based on well conducted studies on the magnitude of this problem, its consequences and correlated social and cultural factors are limited in India and Kerala. The state of Kerala in India has the largest proportion of elderly population (12.6%) which is predicted to increase to 37% in 2051 (Census 2011; Johnson 2006; Johnson & Rajan 2006). Kerala is going to face the challenges associated with the rising older population even before the other states in India because of its advanced stage in the epidemiological transition (Peters et al. 2003). We require a clear understanding of the magnitude, nature and risk factors of falls to plan innovative measures for prevention of falls among older persons. This study looks at the risk, risk factors and immediate consequences of falls among older persons in their home environment in Thiruvananthapuram district of Kerala state in an attempt to fill the gap in the literature at least partially.

Chapter two of this dissertation is an elaborate review of available evidence on the incidence and frequency, the definitions, consequences, risk factors and prevention of falls among older persons. Chapter three describes the design and methodology followed in the different phases of the study. Chapter four reports the results of the phase one, phase two, phase three and phase four of the study. Chapter five include a comprehensive discussion of all the findings. Chapter six summarises and concludes the whole study.

Major aim of the dissertation

The broad aim of the dissertation was to investigate the magnitude of problem of falls among older persons, identify the predisposing and precipitating factors for falls that require hospitalization and explore the consequences of injurious falls at the end of one year.

Specific Objectives

1. To estimate the frequency of falls among older persons (adults 60 years of age and above) living in the community in a rural setting of Kerala, in a period of one year.
2. To identify the risk factors for falls that require hospitalization among older persons admitted to the Medical College Hospital, Thiruvananthapuram following injury from fall.

LITERATURE REVIEW

Chapter 2

LITERATURE REVIEW

2.1 What is ageing?

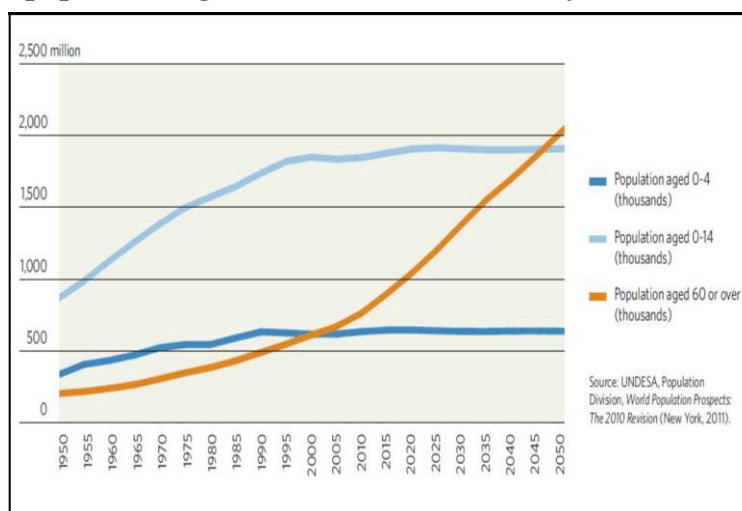
“The ageing process is of course a biological reality which has its own dynamic, largely beyond human control” (WHO 2015). As mentioned in the article “What is ageing, Rose defined ageing as “a persistent decline in the age-specific fitness components of an organism due to internal physiological deterioration” in his book *Evolutionary Biology of Ageing* in 1951 (Rose et al. 2012). “Ageing is characterized by a progressive loss of physiological integrity, leading to impaired function and increased vulnerability to death” (López-Otín et al. 2013). “Ageing is a natural process of growth and development that starts at birth and ends by death” (Sheela & Jayamala 2008). “Old age can be described as changes happening with time in a person's physical, biological and psychological capabilities and their consequences in the individual's role in the economy and the society” (Rajan & Misra 1995). “It is usually associated with reduction in the efficiency of the organs of the body due to physiological alteration” (Sheela & Jayamala 2008). In Ayurveda, old age is considered as a “natural disease” which is irreversible with any kind of treatment (Rao 2005).

2.2 Ageing of a population

“Population ageing is the change in age structure where the population has an increasing proportion of older people (those aged 65 years and older) in comparison to the proportion of children (those aged 15 years and younger) and is a consequence of sustained low fertility and increasing life expectancy” (Pink 2008). “The process whereby older individuals become a proportionately larger share of the total population” (UNFPA & Helpage International 2012). “Ageing of population (also known as demographic ageing,

and population ageing) is a summary term for shifts in the age distribution (i.e., age structure) of a population toward older ages” (Gavrilov Heuveline 2003). “Population ageing refers most commonly to an increase in the percentage of all extend persons who have lived to or beyond a certain age” (National Research Council (US) Panel on a Research Agenda and New Data for an Ageing World 2001). The United Nations defined ageing of population as “the rapid growth of the population aged 60 years and older” (UN 2013). Population ageing is the most important consequence of demographic transition. It is the result of decreasing fertility rates, decreasing infant, child and other mortality rates and increasing life expectancy. This phenomenon is contributed by the overall socioeconomic development and several public health policies, but poses several challenges to the society and public health in terms of socioeconomic and health consequences.

Fig 2: World population aged 0-4, 0-14 and above 60 years



Source: UNFPA & Helpage International 2012

2.3 Definition of older person or elderly

As the concept of “old” has different meanings in different societies, no common definition is available (UNFPA & Helpage International 2012). The definition of

older person varies with countries and it reflects the social class differences or functional ability related to the workforce. It may be a reflection of the current political and economic situation (WHO 2015). In Africa, the elderly can be those who are above 50 or 55 years (WHO 2015). The chronological age of 65 years is accepted as the definition of an older person in most of the developed countries. Most often it is associated with the age at which a person starts receiving pension. The cut off age United Nations has agreed is 60+ years even though they have not defined older person (UN 2013). People above sixty years are considered “old” in many of the gerontological literature in India, but 65 years in developed countries. For all practical and official purposes in India, those who are aged 60 years and above are considered senior citizens. The National Policy for Senior Citizens defined older persons as those who are 60 years and above (The Ministry of Social Justice and Empowerment 2011). The decomposition of the elderly population by age and their categorization as "young old" (60-74 years of age) and "old old" (75 years and older) provides additional information on issues concerning the older persons (Zachariah & Rajan 1997).

2.4 Ageing: the global picture

Globally, the number of older persons has tripled in last fifty years. It may even grow several times in the next fifty years. The twenty first century is witnessing a gradual transition to an ageing population all over the world. In 1950, the number of persons aged 60 or over throughout the world was 205 million. The figure has gone up to about 810 million in 2012 (UNFPA & Helpage International 2012). In 1950, only three countries had more than 10 million people 60 years or older; in 2012, there were 15 countries with 10 million elderly (UNFPA & Helpage International 2012). By 2050 there will be 33 countries with more than 10 million older persons (UNFPA & Helpage International

2012). The global population of elderly (above 60 years) is projected to expand by more than three times to reach 2 billion by 2050 (UN 2001).

The entire world is ageing but the pace at which the ageing is taking place is different in different regions (UNFPA & Helpage International 2012). Developing world is ageing faster than the developed world (UNFPA & Helpage International 2012). Two thirds of the world's older population live in the developing world in 2013. By 2050, around 80% of the older population will be from the developing countries (UN 2013).

2.5 Ageing in India

In India, the second most populous country, the population of older persons (60 years and above) has increased from 25 million in 1961 to 104 million in 2011. The proportion of the older persons to the whole population was 8% in 2011 (Census 2011). The proportion of the female older population was higher than that of male older population. According to projections, the male and female proportions will be 20.2% and 22.4% respectively by the year 2050 (Zachariah & Rajan, 1997).

2.5.1 Older persons in India

Table 2: Number and proportion of older persons in India (2001-2051)

	2001	2011	2021	2031	2041	2051
Number in million	77	96	133	179	236	301
Proportion	7.5	8	9.9	11.9	14.5	20

Source: Rajan, 2006, Census 2011

2.5.2 Older persons in Kerala

The demographic transition in Kerala started early compared to the rest of India. It is characterized by low death, birth and fertility rate and a higher life expectancy and subsequent greater proportion of older adults. The fast pace of epidemiological and demographic transition in Kerala resulted in a high proportion of old age population. In India, Kerala has the highest proportion (12.6%) of elderly. According to the 1961 census, the number of older persons (>60 years) was just 1.0 million; by the time of the 2011 census their numbers increased to 4.2 million. There has been more than 300% increase in the number of older persons between 1961 and 2011 which is much higher than the increase in general population (Census 2011). It has been predicted that the proportion of old age population will be 15.6% in 2021; in 2051 it will go up to 37% (Government of Kerala 2006; Johnson and Rajan, 2006).

Table 3: Proportion of older population in Kerala (1961-2051)

1961	1971	1981	1991	2001	2011	2021	2051
5.8	6.23	7.6	8.77	9.79	12.6	15.63	37

Source: (Government of Kerala 2006; Census 2011, Johnson & Rajan 2006)

2.6 *Patterns of morbidity among the older persons in India and Kerala*

The World Health Report (1999) gives the main causes of mortality in India as non-communicable diseases (48%), communicable diseases (42%) and injuries (10%). According to the World health survey conducted by WHO in 43 countries, there were 44% (95% CI: 40.8-47.3) disability among Indian population.

Depression, musculoskeletal disorder, hypertension, gastrointestinal problems, diabetes mellitus and neurological problems were the commonest health problems among older persons in a study done in Karnataka (Kamble et al. 2012). Anaemia, dental problems,

Hypertension, Chronic obstructive airway disease (COAD), Cataract, and Osteoarthritis were the commonly reported morbidity in a study done by Joshi (Joshi et al. 2003).

The available studies report a high morbidity among the aged (Dilip 2002). A few studies among the aged population done in Kerala indicate that the main health issues among the older people include chronic problems such as diabetes, heart disease, hypertension chronic bronchitis, arthritis and joint pain; other health problems include loss of memory or forgetfulness, sleep problems, lack of energy, chest pain and stomach problems (Kumar et al. 1994; Johnson & Rajan, 2006).

Hypertension was the most prevalent health problem reported among older persons in a rural setting. Diabetes mellitus and hypertension were the common problems found among the men and women respectively in an urban setting. (Mini 2009). According to Johnson and Rajan (2006) falls and fractures were a significant issue among older adults in Kerala. Prevalence of disabilities was also high.

2.7 Falls among older persons

Falls are a major public health problem among older persons. Every year, 25-35% of older persons above the age of 65 years living in the community and 32-42% of those above the age of 75 years sustain falls (Blake et al. 1988; Jensen et al. 2002; Johnson 2006; Kannus et al. 2005(a); Masud & Morris 2001; Nevitt et al. 1989; Prudham & Evans 1981; Tinetti et al. 1988; Tinetti & Williams 1997). Out of the older persons who fell, half fell multiple times in a year. (Nevitt et al. 1989) In half of those who fell it resulted in serious injuries (Bleijlevens et al. 2010; Kannus et al. 2005(a); Carter et al. 1997; Runge 2005). Falls are the leading cause of hospitalisation among older persons in Canada (Public Health Agency of Canada 2014). As the population ages, the problems related to falls and fractures are

estimated to grow and create a bigger challenge to the health care systems. It was noted that the rate of death due to falls rises with age among those who are 75 years or older (Sattin 1992).

Table 4: Frequency/ Incidence of falls among older persons in high income countries

Country	Study	Type of study	Reference period	Participants	Setting	Incidence/ frequency
Sweden	Von Heideken Wågert et al. 2009	Prospective	6 months	above the age of 85 years	Population based	40% 2.17 falls per PY
USA	Stevens et al. 2012	Retrospective	One year	≥65 years	Medicare beneficiaries	22%
USA	Stevens et al. 2006	Retrospective	One year	≥65 years	National vital statistics system	33.7%
Netherlands	Tromp et al. 2001	Prospective	One year	≥65 years	Community dwelling	33%
Australia	Bradley et al. 2007	Retrospective	One year	≥65 years	Home dwelling	467/100000
Japan	Mizukami et al. 2013	Retrospective	One year	≥65 years	Population based	16% of men & 22% of women
Taiwan	Wu et al. 2013	Retrospective	One year	≥55 years	Community, hospital, 2010	21%
Taiwan	Chen et al. 2008	Retrospective	6 months	≥65 years	Veterans home	8.2%
China	Chu et al. 2005	Prospective	One year	≥65 years	Population based	19.3% 270/1000 person years
Canada	Sibley et al. 2014	Retrospective	One year	≥65 years	Community dwelling	19.8%
Finland	Kannus et al. 1999	Retrospective	1970-1995	≥50 years	National hospital discharge register (hospitalised patients)	494/100,000 to 1398/100,000

Table 5: Frequency/ Incidence of falls among older persons in Low and middle income countries

Country	Study	Type of study	Reference period	Participants	Setting	Incidence/frequency
Nigeria	Bekibele & Gureje 2010	Retrospective	12 months	≥65 years	Community dwelling	23%
Bangladesh	Rahman et al. 1998	Retrospective	15 days	≥60 years	Community dwelling	46%
Pakistan*	Bachani et al 2011	Retrospective	3 months	≥60 years	Community dwelling	8.5/1000 population 12.8% & 492/1000 PY
Sri Lanka	Ranaweera et al. 2013	Prospective	4 months	≥65 years	Community dwelling	21.6% in Bridgetown, Barbados to 34.6% in Santiago, Chile
Latin American and Carribean countries	Reyes-Ortiz et al. 2005	Retrospective	12 months	≥60 years	Community dwelling in 7 cities as part of SABE# study	

*fall resulted in injury

#Health wellbeing and ageing in Latin America and the Carribean (the SABE project)

2.8 Falls among older persons in India

Unintentional injuries were the cause of death among 7.6% of the population in all age groups in a study done at Tamil Nadu (Bose et al. 2006). According to reports from NIMHANS, Bangalore, 5-8% of deaths and hospitalisations were among the older persons. In their studies road traffic injuries were the leading cause of injury deaths among the older persons followed by falls and burns. It shows that 360 individuals above 60 years died due to injuries in 2007, in Bangalore city. In the same period 2643 elderly people were brought to hospitals with an injury. For every person dead there were eight persons who attended hospitals for care and management. Road traffic injuries were the reason for the 58% of the cases who

sought medical attention, followed by falls which contributed to 16% (Injuries among elderly n.d).

Falls were identified as one of the leading causes for injury hospitalization as well as deaths among Indians aged 60 years and above (Injuries among elderly n.d; Jagnoor et al. 2012). We could identify only a few studies from India on falls among the older people.

Table 6: Frequency/ Incidence of falls among older persons in India

Place of study	Study	Type of study	Reference period	Participants	Setting	Incidence/frequency
Kerala	Johnson et al, 2006	Cross sectional	12 months	63 and 82 women, 60 years and above living in long term care centres and in community respectively		64% among older women in long term care setting and 45% among community dwelling
Chandigarh	Thripathy et al, 2015	Cross sectional	12 months	300 participants 60 years and above	Rural,urban and slum	31%
Karnataka	D'zouza et al, 2008	Cross sectional	2 years			38%
Northern India	Joshi et al, 2003	Cross sectional	12 months	200 participants 60 years and above	Urban population of Chandigarh and rural population of Haryana	51.5%
Telangana	Sharma et al, 2017	Cross sectional	12 months	562 older persons 60 year and above	Rural	13 %
Haryana	Sirohi et al, 2017	Cross sectional	12 months	456 older persons	Rural	36.6%

2.9 Definition of falls

As mentioned in a review most studies defined falls as unintentional and with some form of contact with the ground (Masud & Morris 2001). According to one of the earlier definitions, “falls result when the vertical line which passes through the centre of mass of the human body comes to lie beyond the support base and correction does not take place in time” as quoted by them from earlier studies (Masud & Morris 2001). Being a mechanical definition, this is not helpful in a fall study to elicit the fall event from the respondent.

Some studies have excluded falls due to road traffic accidents, falls due to syncope or any other acute intrinsic event like stroke or epilepsy as the factors leading to falls may be different in these falls (Jensen et al. 2002). The Kelloggs International working group on prevention of falls among older persons defined falls as “Unintentionally coming to the ground or some lower level other than as a consequence of sustaining a violent blow, loss of consciousness, sudden onset of paralysis as in stroke or epileptic seizure” in 1987 (Gibson et al. 1987). Later several studies used similar or adaptations of this definition depending on the focus of the study. Kellogg’s definition is appropriate for identifying falls due to abnormalities in sensory-motor and balance control. Therefore a few researchers used broader definitions to include falls due to giddiness and syncope. In one of the most cited studies, Tinetti defined falls as “an event which results in a person coming to rest unintentionally on the ground or other lower level, not as a result of a major intrinsic event or overwhelming hazard” in 1988 thus excluding falls that resulted from other illness or seizures or road traffic accidents. 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.” (Not forcefully pushed down or knocked down by a car), thus including

falls due to loss of consciousness, epileptic seizures, giddiness and syncope and falls due to slips and trips (Tinetti et al. 1988; Ranaweera et al. 2013).

To include all types of falls, a few other definitions were developed. “When you land on the floor or other lower level (such as stairs or a piece of furniture) by accident” (Davis et al. 1997). “Fall can be defined as an event, in which the person unintentionally came to rest on the ground or floor, regardless of whether an injury was sustained.” Thus, this definition includes falls that resulted from acute illness or epileptic seizure and any incidents that resulted in the person found lying on the floor irrespective of whether there is an injury or not (Masud & Morris 2001). “Falls were defined as untoward events which resulted in the subject involuntarily coming to rest on the ground” (Wild et al. 1981). Nevitt’s definition involved a “person falling all the way down to the floor or ground or falling and hitting an object like a chair or stair” (Nevitt et al. 1989). Another study defines falls as “Unintentionally coming to rest on the ground floor or other lower level. This also includes some kind of stumbles” (Ory et al. 1993). Falls were defined as an event that resulted in “unintentionally coming to rest on the ground or a lower surface” by Duckham (Duckham et al. 2013). The American nurses association-National data base of National Quality Indicators (ANA–NDNQI) provides an all-inclusive definition, “An unplanned descent to the floor (or extension of the floor, e.g., trash can or other equipment) with or without injury. All types of falls are included, whether they result from physiological reasons or environmental reasons” (Currie 2008). Sattin explained falls as a “syndrome which represents symptoms and signs of disordered function in a disordered environment” (Sattin 1992). According to Sattin, using the terms “fall injury event” for those falls that resulted in at least one anatomical injury and “fall injury” for the type of anatomical injury sustained during the fall might reduce ambiguity while explaining falls and injuries (Sattin 1992). However most of the studies have not stated the definition they used for ascertainment of the fall cases. In this study, the definition used is an all inclusive definition

as defined by WHO: “A fall is defined as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level” (WHO 2007) All types of falls are included, whether they result from physiological reasons or environmental reasons.

2.10 Classification of falls

Falls may be precipitated by extrinsic or intrinsic causes. Intrinsic factors are those of physiologic origin or falls due to host factors and extrinsic factors are the environmental or related hazards or falls due to environmental factors (Sattin 1992).

Usually falls are reported as none, single, recurrent or multiple. Most studies consider the two fall groups as one as compared against the non-faller group. But there are studies that considered the non-faller and the single faller group as one and compared against the recurrent fallers (Lord et al. 2003). According to them, it is possible that multiple fallers have more physiologic impairments and chronic conditions when compared to single fallers (Lord & Dayhew 2001, Nevitt et al. 1989).

In a study done by Jensen and group, an injury due to falls was classified according to the Abbreviated Injury Scale (AIS) as Minor, Moderate and Serious (Jensen et al. 2002). The AIS incorporates current medical terminology providing an internationally accepted tool for ranking injury severity (AAAM 2011).

- Minor : Injuries limited to superficial wounds and bruises
- Moderate : Intermediate level injuries like vertebral and wrist fractures
- Serious : Major fractures such as hip fractures and other femoral fractures

In another study, fractures, joint dislocations, and lacerations requiring sutures were considered major injuries. Lacerations without sutures, bruises, abrasions, sprains, and other minor soft tissue injuries were considered minor injuries.

Incident reports in the acute care setting use the following ANA–NDNQI fall-related injuries categories:

None : Indicates that the patient did not sustain an injury secondary to fall

Minor : Indicates those injuries requiring a simple intervention

Moderate : Indicates injuries requiring a simple intervention

Major : Require surgery, casting, further examination (e.g., neurological injury)

Deaths : Refers to deaths that results from injuries following falls

Injurious falls were defined as falls resulting in some kind of physical injury for which persons attended the Accident & Emergency department. The injurious falls were classified into four depending on the fall location and activity up to the moment of the fall.

Type 1: Indoor falls in the hall and bathroom, during lavatory visit

Type 2: Indoor falls (at other locations than the hall and bathroom), during activities of daily living (ADL).

Type 3: Outdoor falls near the home, predominantly during ADL

Type 4: Outdoor falls away from home, occurring during mobility-related activities

Majority of the falls took place outdoors. Type 1 fallers were the most inactive group with the lowest Frenchay Activity Index (FAI) score and highest Groningen Activity Restriction Scale (GARS) score. Type 4 fallers who fell away from their homes were active and of younger age group and had more favourable scores on the GARS.

In a study done by Davies and Kenny in 1996 patients were classified according to the explanation of the recent fall and the number of previous falls.

Explained fall : a simple slip, trip or environmental hazard resulting in the fall

Unexplained fall : no apparent cause of fall (Davies and Kenny 1996).

Recurrent falls : three or more falls.

Explained loss of consciousness: Myocardial infarction, stroke, haemorrhage, drug overdose and status epilepticus are some of the reasons for explained loss of consciousness. The diagnosis of loss of consciousness (LOC) was made at or within seven days of presentation.

Unexplained LOC: LOC remained unexplained after routine assessment or investigation.

International classification of diseases, 10th edition explained trauma due to falls with the ICD codes W 01 to W 19. All manifestations of falls were included whatever is the outcome. (WHO 2015)

- W01-Fall on same level from slipping, tripping and stumbling
- W03-Fall on same level due to collision with, or pushing by, another person
- W04-Fall while being carried or supported by other persons
- W06-Fall involving bed
- W07-Fall involving chair
- W08-Fall involving other furniture
- W09-Fall involving playground equipment

- W10-Fall on and from stairs and steps
- W11-Fall on and from ladder
- W13-Fall from, out of or through building or structure
- W14 Fall from tree
- W17- Other fall from one level to another
- W18-Other fall on same level
- W19-Unspecified fall

2.10.1 Falls within hospital can be classified into three categories:

Accidental falls (derived from extrinsic factors, such as environmental considerations), anticipated physiologic falls (derived from intrinsic physiologic factors, such as confusion), and unanticipated physiologic falls (derived from unexpected intrinsic events, such as a new onset syncope or a major intrinsic event such as stroke).

2.10.2 Falls in long term care centres

It was identified from several studies that older persons in long term institutional care are more prone to falls. When compared to community dwelling older persons, the frequency of falls and the frequency of falls leading to medical attention were always high.(Luukinen et al. 1995) Around 57% of the older men and 56% of the older women fell at least twice in six months. (Luukinen et al. 1995) Fifty percent of the patients in long term care centres suffered at least one fall every year and about half of those who fall do so repeatedly (McClure 2008).

2.11 Consequences of falls

Falls result in medical and economic consequences among older persons. (Akyol 2007) An older person suffers extensive morbidity, longstanding pain, functional impairment, disability, and even death following falls (Akyol 2007, Fuller 2000). Among the community dwelling older adults, half of all the falls lead to injuries, out of which almost half are minor injuries, (Nevitt et al. 1989, Tinetti et al. 1988). Falls often result in major injuries including head injuries, soft tissue injuries, fractures and dislocations in 10 -15% of older individuals (Fuller 2000; Alexander et al. 1992). Injuries like fractures can lead to disabilities and even deaths. The estimates vary widely depending on the population under study.

Hospital stay of an older person admitted to a hospital following falls is almost twice as long as those who are admitted for other complaints (Akyol 2007; Fuller 2000). Studies show that any illness or injury that leads to hospitalisation result in disability among older persons in spite of their physical frailty (Gill et al. 2004). Those who fall, experience greater functional decline in activities of daily living, physical and social activities (Stel et al. 2004).

Pulmonary embolism was the cause of 13% of the deaths due to falls among the older persons. The association of death with pulmonary embolism increased with age (Sattin 1992). Permanent disability in those surviving initial hospitalization, range from 32% to 80% (McClure 2008). According to Butler et al, 71% recovered from the injury reasonably well. However there was no relation between the fall types and severity of the falls (Butler et al. 1996).

2.11.1 Hip fracture

Hip fracture is the leading cause that required hospitalisation immediately after falls among older persons (Fuller 2000). They led to premature death, reduced quality of life and high levels of morbidity. Fractures add up to 75% of all major injuries and hip fractures account for one to two percent of all fractures in older persons (Akyol 2007; Fuller 2000). However 90% of hip fractures are related to falls and occur mostly among those who were above 70 years (Fuller 2000; Graafmans et al. 1996; Nevitt et al. 1989; Tinetti et al. 1988).

Hip fracture is definitely one of the most serious and life threatening complications of falls. A quarter of the older persons who had undergone a hip fracture die within six months of the injury (Fuller 2000). There is 10 to 15% decrease in life expectancy and a significant reduction in quality of life following hip fracture among the survivors. Among community-dwelling individuals with fall-related hip fractures, between 25% and 75% do not recover their pre-fracture level of function, in ambulation or activities of daily living (ADL) and remain at high risk for falls and a second fracture (Kannus et al. 2005(a)). Most of the older persons require assistance in getting up following the fall. This may lead to further morbidity like hypothermia, dehydration, bronchopneumonia and pressure sores (Tinetti et al 1993; Wild et al. 1981).

2.11.2 Fear of fall

“Falls break bones, self-esteem and activity” (Runge & Schacht 2005). Not all falls result in injury or death. But most falls leave a psychological impact called fear of fall (FOF) in older persons (Fuller 2000). This leads to restriction of one’s own movement and activities and reduction in social interactions. This will further lead to subsequent dependence,

decreased mobility, followed by functional decline and further falls (Fuller 2000). About two third of the respondents experienced some fear of falling, and about half of them avoided activities as they were afraid of falls (Butler et al. 1996). Fear of falling may lead to decreased quality of life and mobility (Arfken 1994). It may lead to further falls in a year (Mane 2014; Scheffer et al. 2008). The prevalence of reported fear of fall as presented in a review ranges from 3% to 85%, probably due to the difference in the methods of measurement (Scheffer et al. 2008).

A study done in Karnataka, India report a prevalence of 33.2% FOF as (Mane et al. 2014). History of previous fall was an independent risk factor for developing fear of fall in most of the studies (Mane et al. 2014; Scheffer et al. 2008). Age and female sex was found to be other risk factors. FOF is multifactorial and potentially modifiable (Boyd & Stevens 2009; Mane et al. 2014; Scheffer et al. 2008).

2.12 Location of falls

Bjelievens classified fallers according to the location of falls (Bleijlevens et al. 2010). Among independent older persons living in the community, around half of the falls happened within their homes and immediate surroundings. The rest happened outside their homes or away from their homes. According to Campbell, more women fell inside the homes when compared to men who generally fell outside the house, in the garden (Campbell et al. 1990; Duckham et al. 2013; Berg & Mills 1997; Masud & Morris 2001). Women fell frequently in the kitchen when compared to men. Their falls indoors resulted in more injuries when compared to men (Campbell et al. 1990). Bathrooms were considered as the most dangerous location for falls (Carter et al. 1997). More than half of

the falls happened indoors specifically bathrooms in a study done in India (D'souza et al. 2008). Around 30% of the falls happened on the roads (D'souza et al. 2008).

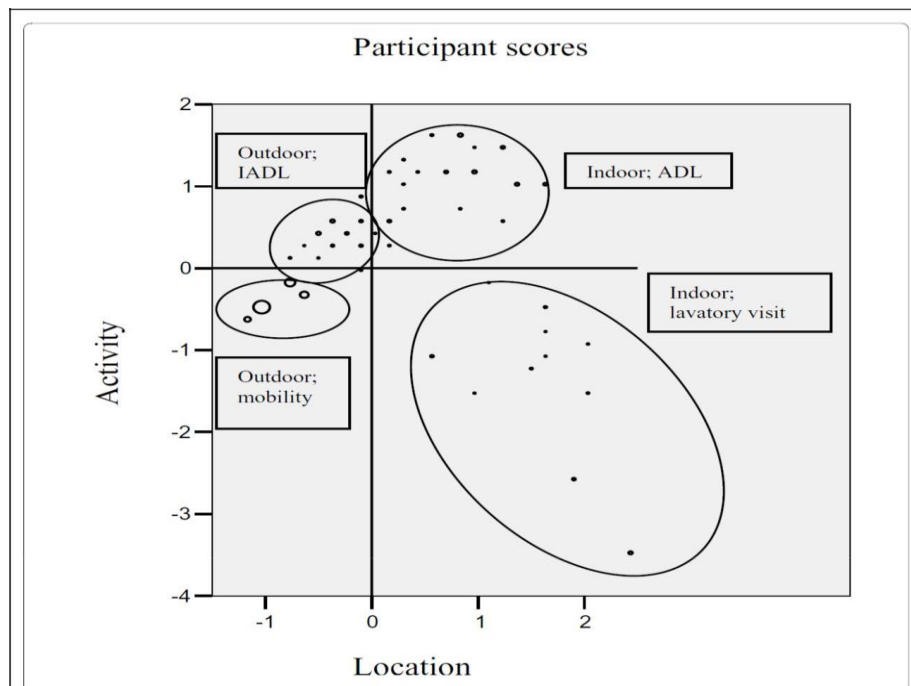
Older persons above the age of 75 years fall mostly indoors when compared to those below the age of 75 years (Bath & Morgan 1999). Frail persons fall indoor whereas active people with compromised health status fall outdoors (Bath & Morgan 1999). One third to two third of falls among the Chinese older persons occurred indoor in living, dining and bedrooms (Kwan et al. 2011). Majority of the outdoor falls occurred on the streets or on the sidewalks (Kwan et al. 2011). According to Wild, most falls occurred in the bedroom and the kitchen (Wild et al. 1981). Japanese people above the age of 65 years fall frequently outdoors when compared to indoors (Mizukami et al. 2013).

2.13 Activity during falls

Falls occurred during activities that changed one's centre of gravity (Tinetti et al. 1988). The activities that slightly displace the centre of gravity of a person are standing still, performing activities of daily living and walking (Tinetti et al. 1988). The activities that moderately displace the centre of gravity are getting up or sitting down, bending over or trying to reach for and stepping up or down (Tinetti et al. 1988). Engaging in sports, climbing ladders chairs and other objects change the centre of gravity distinctly (Tinetti et al. 1988). Wild identified that falls happened during change of position; for example, rising from bed, chair, toilet, while climbing stairs, and walking on irregular surface. (Wild et al. 1981). Falls were more frequent while walking (Berg & Mills 1997; Skalska et al. 2013; Adebisi et al. 2009; D'souza et al. 2008). Walking requires synchronisation of several bio-mechanical components of the body. These include the flexibility of the joints

of the leg, proper and intense and timely action of the muscle, adequate sensory input of vision, proprioception and vestibular system (Rubenstein 2006).

Fig 3: Location and activity up to the moment of fall



Source: (Bleijlevens et al. 2010)

2.14 Cause of falls

According to Wild, falls commonly result from faults in insight, weakening of responses and abnormalities in support (Wild et al. 1981). Slipping and tripping were the frequent cause of falls followed by misplaced steps and loss of balance. (D'souza et al. 2008; Adebiyi et al. 2009; Blake et al. 1988; Campbell et al. 1990; Berg & Mills 1997). Slips happen frequently on wet floors in bathrooms or near it, while mopping floor. Slippery surfaces like cemented surfaces with algae grown during rainy season, outside the house or on the road. Smooth flooring using glossy tiles and polished marble or granite also pose threat to the older persons (D'souza et al. 2008).

Trips often happened on thresholds, irregular floor or road, carpet edges, defects like crevices on the floor or road and some objects on the floor or road (D'souza et al. 2008). The changes that take place in the walking gait of an older person due to ageing, result in the decrease in the height of the "recovery foot" during the "swing phase of gait" that could raise their vulnerability to trip (Berg & Mills 1997; Gensen & Wahley 1990). Quoting Gensen and Wahley, Berg stated that it is not the reduced height through which the older person lift their feet that is detrimental, but the "reduced recovery clearance" is what is important in determining falls among older persons (Berg & Mills 1997; Gensen & Wahley 1990).

To retain stability and to avoid fall during a slip, body adjusts by shifting weight at the hip. As one ages, this "hip strategy" is replaced by "step strategy" where a fall is averted by a rapid step. This will lead to complete loss of ability to correct in time as one age. Fainting, dizziness or light headedness was also reported as a frequent cause of falls (Wild et al. 1981; Rubenstein 2006). There can be symptoms of different conditions like cardiovascular diseases, hyperventilation, orthostasis, drug side effect, anxiety or depression (Rubenstein 2006). Falls due to extrinsic causes were more common than falls due to intrinsic causes among the Japanese older persons (Mizukami et al. 2013). Common cause of falls among males were slips whereas among females were trips (Berg & Mills 1997).

2.15 Time of fall

Falls frequently happened during the day time only 20% happening at night (Wild et al. 1981; Campbell et al. 1990). More than half of the falls happened in the morning which is the time for maximum activity as reported by D'souza but according to Berg and Mills,

falls occurred in the afternoon when the older persons were alone in the house (D'souza et al. 2008; Berg & Mills 1997). More falls happened during winter when the snow can make the outdoors slippery and hazardous for tripping (Berg & Mills 1997).

2.16 Cost of falls

Considerable proportion of the injured older persons is hospitalized following falls (Tinetti et al. 1988). The total health costs attributable to fall related injuries in adults older than 65 years is expected to increase three fold in the next 50 years (McClure et al. 2005). Out of the total health system costs in Australia in 1993-1994, 31% were spent on unintentional falls which was more than double the health system costs for motor vehicle crashes (McClure et al. 2005). The life time cost of injurious falls was more than \$1 billion per year for the family or community in Australia. The life time cost covers indirect costs like lost productivity due to inability or untimely death (Bradley & Harrison 2007).

Stevens estimated the incidence and direct medical costs for fatal and non-fatal fall injuries among US older adults. Direct medical costs totalled \$0.2 billion for fatal and \$19 billion for non-fatal related fall related injuries among people aged 65 years or more (Stevens et al. 2006). The medical expenditure for women who made up 33% of the population, were 2-3 times higher (Stevens et al. 2006). Fractures were the most frequent and most expensive injury (Stevens et al. 2006). The economic burden of fall related injuries stresses the need for effective intervention. According to Fuller more than 250,000 older Americans sustained fractured hips, the cost for the health system being \$10 billion (Fuller 2000; Sattin 1992). In U S A, 44% of the direct cost of hip fractures was due to hospitalization. In 2008, direct medical costs for fall related injuries were US \$ 23.3 billion

and fall related costs in UK were US \$ 1.6 billion (Ambrose et al. 2013). These are predicted to increase up to US \$ 55 billion by 2020.

In the year 1999, 647721 older persons above the age of 60 years attended the accident and emergency services (A&E) and there were 204424 admissions in United Kingdom for fall related injuries (Scuffham et al. 2003). Twelve percent of the 60-64 year age group, 18% of the 65-69 year age group, 25% of 70-74 year age group and 39% of the 75 year and above age group attended the A&E services (Scuffham et al. 2003). A total of 981 million pounds was estimated as the cost of falls in UK population above 60 years (Scuffham et al. 2003). The cost of falls for the above 75 year age group constituted around 66% of the total cost (Scuffham et al. 2003). The highest share of the total cost was for inpatient admissions followed by the long term care (Scuffham et al. 2003). There are no available estimates for cost of falls from India or other developing countries.

2.17 Determinants of falls and related injuries

According to the current thinking, injuries are not regarded as “accidents”, but thought to be predictable consequences of people's action within a risky environment (WHO 2002). Falls could be studied as any other medical condition with a relationship between the person (the host), the agent and the environment, the agent being energy, most often in the form of mechanical energy (Sattin 1992). They can also be a possible symptom of a disease or side effect of a drug as some studies have identified acute illnesses and drug side effects as important precipitating factors (Kallin et al. 2002).

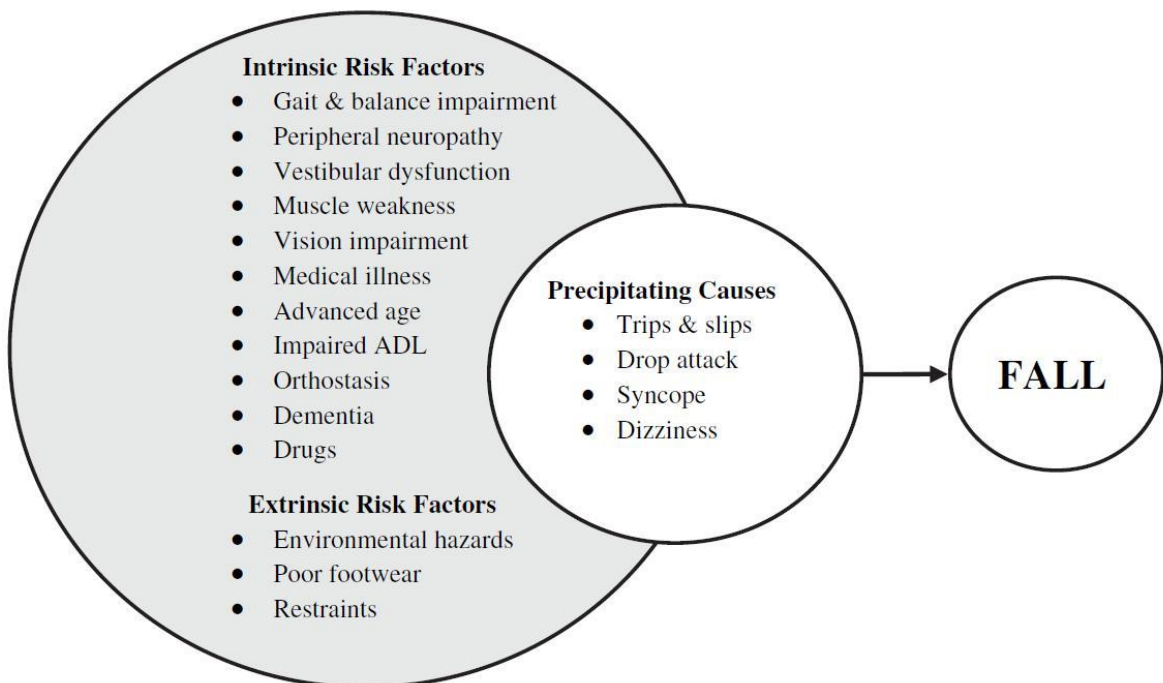
Falls are multifactorial (Graafmans et al. 1996; Runge & Schacht 2005). Around 400 risk factors have been identified for falls (Masud & Morris 2001). They can be classified broadly into intrinsic and extrinsic causes. The respondents may report an extrinsic cause,

an intrinsic cause or a combination of an extrinsic and intrinsic cause for the falls (Graafmans et al. 1996; Shanthi & Krishnaswamy 2005).

Fall can be considered as a consequence of interaction between extrinsic, intrinsic and behavioural factors (Greany & Di Fabio 2010). As the number of risk factors increases the risk of falls also increases (Nevitt et al. 1989; Tinetti et al. 1988).

The most consistent factors that have been found to be independent risk factors for falls are lack of muscle power or muscle strength of lower extremities, postural incompetence, impairments of vision, taking multiple medications, taking certain group of fall related drugs or cognitive impairment (Runge & Schacht 2005).

Fig 4: The mechanism of falls

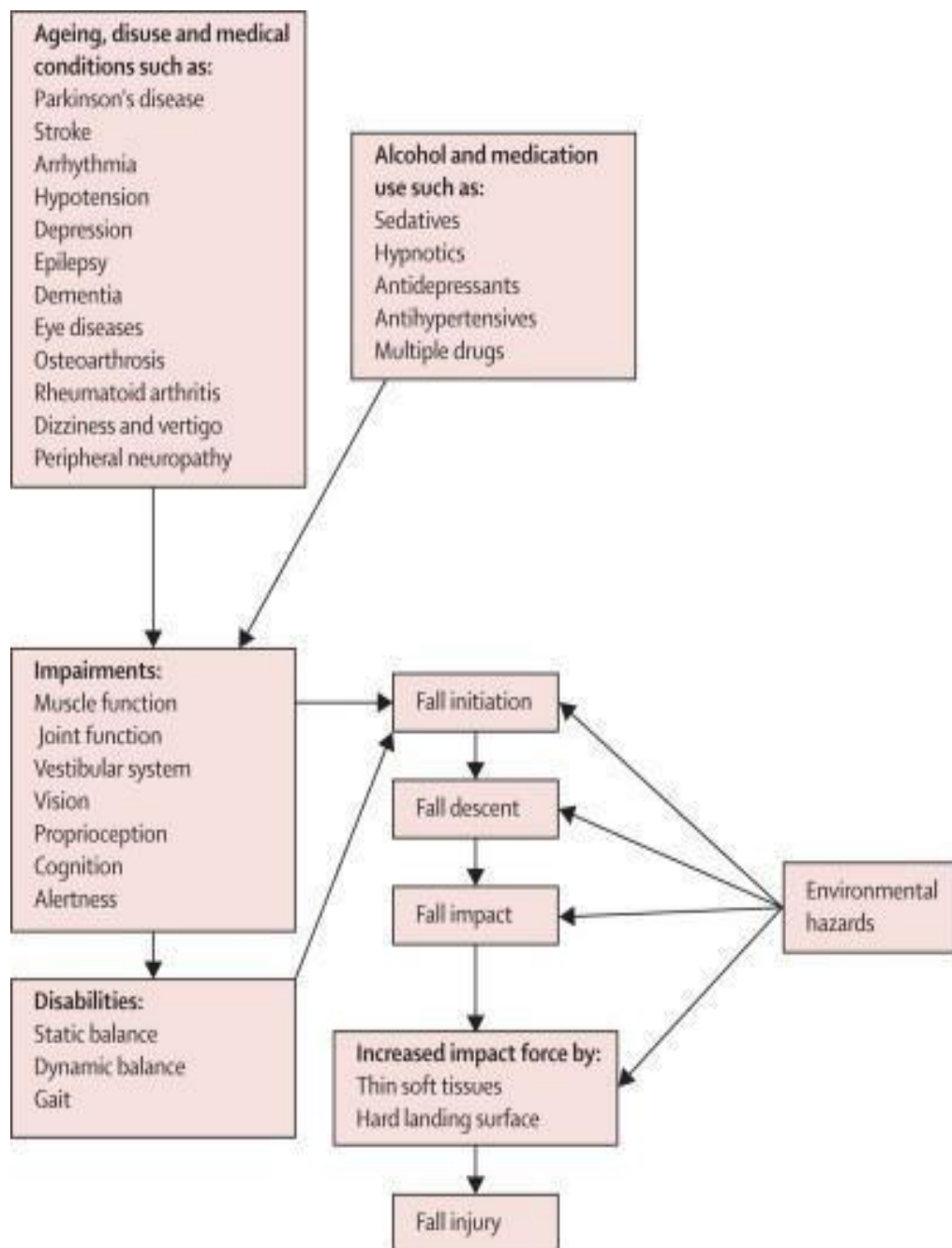


Source: Rubenstien and Josephson 2006

Age, gender and race are some examples of non-modifiable biological factors (WHO 2008). Behavioral factors include potentially modifiable factors which are associated with

human actions, emotions or daily choices (WHO 2008). Environmental factors include ones' physical surroundings and the neighbouring environment. These might be factors within and outside the home (WHO 2008). Socioeconomic factors include education, housing and social interaction. (WHO 2008).

Fig 5: Flow diagram showing determinants of falls and injuries



Source: Kannus et al. 2005(b)

2.17.1 Intrinsic factors

Intrinsic factors include biological, nutritional and behavioural factors. Changes associated with ageing, co-morbidities and medications also act internally. Biological factors include age and sex. Changes associated with ageing include factors such as ability to perform ADL, gait abnormalities, postural imbalance, inability to adapt to the changing environment and poor reflexes, Nutritional factors include calcium and vitamin D deficiency, frailty, changes in body weight, increased or decreased BMI, co-morbidities like Alzheimer's disease and dementia, Parkinson's disease, arthritis or rheumatic disorders, diabetes mellitus, cardiovascular diseases, depression, sleeping disorders, poor pulmonary function or chronic obstructive lung diseases, vision and hearing impairments are considered as factors that increase fall risk. Multi-morbidity or presence of two or more illness also raises the risk for falls. Intake of anti epileptic, antihypertensive, anti-inflammatory, sedatives and hypnotics are considered to raise the risk for falls. Behavioural factors such as lack of physical activity, alcohol intake, risk taking behaviour elevate the risk for falls. Psychological factors like fear of falls also increase the risk for falls.

2.17.1.1 Biological risk factors

2.17.1.1.1 Age

The functional reserve of an individual decreases as a result of normal changes due to ageing (Akyol 2007). These functions comprise vestibular, proprioceptive and visual functions. Cognition and musculoskeletal functions are also important (Akyol 2007). The incidence of falls rises steeply with age in older persons (Graafmans et al. 1996; Prudham & Evans 1981). Up to half of the older persons above the age of 85years living in the community fall every year (Lehtola et al. 2006) when compared to one in three persons

among those who are between 65 and 74 years. Nevitt found that older persons above the age of 80 years were at a higher risk

of falls (Nevitt et al. 1989). The chance of falling and injuries due to falls increase as one age due to both physiologic and pathologic changes (Ambrose et al. 2013). The term “time critical” refers to the time available for maintaining or recovering balance in case of disturbance of upright balance or in an attempt to arrest a fall (Schultz et al. 1997). There is loss of strength with age. The isometric strengths peak at the age of 25 years and decline thereafter. There is approximately one third loss of strength by age of 65 years. (Haywood & Getchell 2009). With age the muscle mass shrinks which can lead to reduced strength (Berry & Miller 2008). In some studies the fall rate among men were high till the age of 79 years; after 80 years females frequently die due to falls when compared to men (Li et al. 2013).

2.17.1.1.2 Sex

Women suffered 40-50% higher rates of fall when compared to their counterparts (Blake et al. 1988; Shanthi & Krishnaswamy 2005; Sattin 1992). Hospitalization rates were more by 80% when compared to males (Stevens & Sogolow 2005). Fracture rates were twice as men (Stevens & Sogolow 2005). There are several reasons why women and men have different consequences following falls. Women fall different from men and different parts of the body absorb mechanical energy differently; head in men and hip in women (Sattin 1992). Hip fracture rates are more among women that may result in long term morbidity, disability and reduced quality of life (Stevens & Sogolow 2005). This can be attributed to the reduced bone mass among women due to osteoporosis (Sattin 1992). Bone mass peaks at the age of 30 years and declines thereafter by 0.5% in males and one percent in females; rapid loss of bone density is found in women five years following menopause (Riggs et al.

1981). The strength of females in all ages is less by one third when compared to males of the corresponding age (Haywood and Getchell 2009). Males had a higher risk of sustaining fractures than women in private homes as well as institutions (Koski et al.

1996). Fatal falls are common among men when compared to women who had more non-fatal falls (Stevens and Sogolow 2005). Perhaps men are more likely to involve in high risk activities and they are more physically active than women (Stevens & Sogolow 2005). Sex differences in the frequency of falls were not found in few of the studies (Berg & Mills 1997; Campbell et al. 1990; Nevitt et al. 1989; Tinetti et al. 1988). With advancing age the differences are shown to level off in both the sexes (Prudham & Evans 1981). Older females have one and a half to two times more chances of fall when compared to males of the same age.

2.17.1.2 Comorbidities

2.17.1.2.1 Stroke

Neurological conditions like stroke were associated with falls among Japanese men (Mizukami et al. 2013). Difficulties with visual and spatial orientation, loss of balance either secondary to cerebellar involvement or loss of peripheral sensation following stroke could be the reason for recurrent falls among older women (Lamb et al. 2003).

2.17.1.2.2 Parkinsonism

Older persons with history of Parkinson disease are twice at risk of multiple falls when compared to their counterparts (Nevitt et al. 1989). The rigidity, bradykinesia, orthostasis and in some cases cognitive impairment that develop in Parkinsonian patients are the cause for the higher risk for falls (Berry & Miller 2008, Nevitt et al. 1989).

2.17.1.2.3 Impaired vision

Impaired vision was significantly associated with falls (Prudham & Evans 1981; Tinetti et al. 1988). Depth perception is damaged in people with reduced visual acuity (Nevitt et al. 1989). This is very important in maintaining stability of the posture and also in negotiating obstacles (Nevitt et al. 1989; Lord et al. 2007). Impaired vision was independently associated with falls according to Kallin (Kallin et al. 2002). In a prospective study done by Lord and Dayhew, visual impairment specifically impaired depth perception came out as an important risk factor for falls among older persons (Lord & Dayhew 2001).

2.17.1.2.4 Dementia

Dementia is an important risk factor for falls among the elderly possibly due to the lack of safety consciousness (Tinetti et al. 1988). Dementia was significantly associated with any falls, but not with those that resulted in serious injuries (Orces 2013). Pre clinical Alzheimer's disease predisposes older adults to falls (Stark et al. 2013). A negative correlation with memory and frequency of falls were seen among older adults in Delbaere study (Delbaere et al. 2012).

2.17.1.2.5 Arthritis & musculoskeletal disorders

Musculoskeletal disorders like osteoarthritis of knee joints, rheumatoid arthritis, joint deformity, cervical and lumbar spondylosis and myopathy secondary to hypothyroid state were common among the medical conditions causing falls (Shanthi & Krishnaswamy 2005). Osteoarthritis is the cause for joint pain, reduction in the mobility range of the joints and strength of muscle (Lord et al. 2006; Mizukami et al. 2013). Osteoarthritis of the hip or knee reduces the ability to ploy around objects on the way (Berry & Miller 2008). Older persons with arthritis are twice at risk of sustaining multiple falls (Nevitt et al.

1989). Osteoarthritis of knee was an independent correlate for fall in last 24 hours in a study among community dwelling older adults in Denmark (Larsen et al. 2004).

2.17.1.2.6 Foot deformities

Tinetti and Blake found that reported foot problems were significantly associated with falls among older persons above 65 years (Blake et al. 1988; Tinetti et al. 1988). Foot problems like bunions, deformities of toe and nails, ulcers, pain of the lower limbs while walking worsen balance problems and falls among older persons. (Dionyssiotis 2012).

2.17.1.2.7 Chronic lung diseases

Poor pulmonary function has been diagnosed as a risk factor for injurious falls. Older persons with chronic lung diseases were more prone to falls (Nevitt et al. 1989; Sibley et al. 2014). Though the mechanism through which chronic obstructive pulmonary disease (COPD) act on falls is not fully understood, it has been assumed that dysfunction of the skeletal muscle and cerebral hypoxia are the reasons for increased falls among older persons with COPD (Sibley et al. 2014). The mechanism of falls due to chronic lung problems is well explained by Roig (Roig et al. 2009).

2.17.1.2.8 History of falls

Older persons with a history of fall or an injurious fall in the previous year are likely to suffer multiple falls in the follow up period (Nevitt et al. 1989; Krishnaswamy & Usha n.d.; Dionyssiotis 2012). “Falls in last one year” was identified as a risk factor for falls among older persons in a nested case control study in Colombo (Ranaweera et al. 2013). Usually the same primary causes lead to the repeated falls; it can also be a sign of progression of the disease or a fresh acute problem (Rubenstein & Josephson 2006). The older persons with history of falls had a high prevalence of risk factors when compared to those without history of fall which can be reason for an increased frequency of falls among

them (Tinetti et al. 1988). Older persons with history of three or more falls in the previous year, those who need help with ADL, those with restricted mobility and those with history of arthritis and Parkinsonism were at a higher risk of recurrent falls (Blake et al. 1988; Shanthi & Krishnaswamy 2005). Recurrent male and female fallers were prone to minor injuries, where as non-recurrent fallers succumbed major injuries due to fall. There was no difference in the circumstances and consequences of falls between one time fallers and recurrent fallers (Berg & Mills 1997).

2.17.1.2.9 Insomnia

Falls are common among older persons with sleep problems (Hill et al. 2007). Insomnia was found to cause more falls than hypnotics among older persons (Iinattiniemi et al. 2009). Lack of sleep at night might worsen the ability of the individual to accomplish the activities during day time due to multiple reasons like tiredness, daytime sleepiness, irritability, inability to concentrate, attention deficit, memory problems, deterioration of professional performance and social contacts (Rodrigues et al. 2014).

2.17.1.2.10 Diabetes mellitus

Falls are common among diabetic older adults. (Malabu et al. 2014; Maurer et al. 2005). There are contradicting reports regarding hypoglycaemic control and falls in older individuals (Malabu et al. 2014). While some studies support strict hypoglycaemic control, the others negate the need to maintain a strict control of hypoglycaemia in older individuals. In the process of ageing, transformation takes place in several pharmacokinetic and pharmaco-dynamic parameters (Ginsberg et al. 2005). There are different ways diabetes can lead to falls. The osmotic effect on the lenses due to the hyperglycaemia or hypoglycaemia can cause blurring of vision which can precipitate falls (Malabu et al. 2014). When compared to non-diabetics, diabetic patients showed a high

prevalence of vision impairment (Malabu et al. 2014). Orthostatic hypotension secondary to autonomic neuropathy can increase risk of falls (Malabu et al. 2014). Apart from hypoglycaemia, long term complications of diabetes like neuropathy, retinopathy and chronic ulcers predispose to falls among older individuals by different mechanisms (Malabu et al. 2014; Maurer et al. 2005). Recent guidelines for treatment of diabetes mellitus reminds the practitioners the importance of treatment of hyperglycaemia which is already well understood, but can result in dehydration and falls. There has been enough attention towards exposing older persons to hypoglycaemia, by overtreatment of hyperglycaemia, but the undertreated hyperglycaemia is still important in old age considering it as a cause for dehydration, electrolyte abnormalities, urinary incontinence, dizziness, falls and overall poor outcome. (Dardano et al. 2014)

2.17.1.2.11 Hypertension

Hausdorff and group identified that increase in blood pressure might have an adverse effect on the balance and gait (Hausdorff et al. 2003). They also found that this effect is chronic and continuous (Hausdorff et al. 2003).

2.17.1.2.12 Depression

Patients with neurological conditions like stroke, Alzheimer's disease, Parkinson's disease and dementia commonly show signs of depression. The limited mobility and deteriorated balance in these patients along with depression cause falls (Ambrose et al. 2013). Depression is usually seen as an independent risk factor for falls among older persons in developing countries (Hestekin 2013).

2.17.1.2.13 Urinary incontinence

Older persons with incontinence of urine are likely to sustain multiple falls (Nevitt et al. 1989). It was identified as an independent and significant risk factor for falls among older

persons in a survey by Orces (Orces 2013). Among older men as well as women urinary incontinence was associated with more falls (De Rekeneire et al. 2003). Perhaps the distraction due to incontinence aggravates the postural instability (De Rekeneire et al. 2003).

2.17.1.2.14 Osteoporosis

Osteoporosis is a factor which adds to causation of fractures. Post-menopausal women are at a higher risk of sustaining hip fractures. Forty percent of postmenopausal women can develop some type of osteoporotic fracture in their life time (Runge and Schacht 2005). Perhaps lower nutritional status may lead to osteoporosis and thus lead to major injuries due to falls (Koski et al. 1996). An elderly femur can break even with a fall from a standing height (Runge & Schacht 2005).

2.17.1.2.15 Multi-morbidity

An individual was defined as having multi-morbidity if they had two or more chronic conditions (Sibley et al. 2014). As the number of illnesses increases, the risk of falling increases linearly among older Canadians (Sibley et al. 2014). When compared to those with no chronic disease, rate of falls was higher among those who had any chronic illness (Sibley et al. 2014).

2.17.1.3 Medication

Use of medication was identified as a most common and potentially modifiable risk factor for falls among older persons (Berry & Miller 2008). However it appears difficult to differentiate the effect of the disease from effect of medication on falls (Larsen et al. 2004). Antidepressants predispose to falls more than depression (Kallin et al. 2002). Due to their central depressant effect, psychotropic medications (benzodiazepines, antidepressants, sedative hypnotics, anticonvulsants and neuroleptics) were found to

have two fold increased risk for falls (Shanthi & Krishnaswamy 2005). According to Zeimer, the grouping of all psychotropic medications into one will not help in drawing useful conclusions (Zeimer 2008). Among the psychotropic drugs, antipsychotic drugs were found to be the most potent predictors for falls among old old adults (Iinattiniemi et al. 2009). Benzodiazepines were found to increase the risk of falls among women (De Rekeneire et al. 2003). Hypoglycaemic drugs were identified as risk factors for falls in some studies. Whether the falls are due to the diabetic neuropathy of the patients or due to the hypoglycaemic effect of these drugs that causes the fall is not clear (Berry & Miller 2008). A study done by Nelson found that strict hypoglycaemic control can lead to falls among frail older adults (Nelson et al. 2007). Drugs improving the peripheral circulation like digitalis causes orthostatic hypotension and gait disturbances. The use of calcium blockers like verapamil and nifedipine, cardiovascular medications like diltiazem, drugs for improving peripheral circulation, anti-inflammatory and anti-diabetic drugs lead to injurious falls among elderly (Koski et al. 1996).

2.17.1.3.1 Polypharmacy

Older persons taking at least four daily prescription drugs were more prone to falls (Mizukami et al. 2013; Wu et al. 2013). According to a review by Hammond and group, the definition “Use of four or more medications” was the commonest definition used for polypharmacy (Hammond & Wilson 2013). Earlier it was considered as an independent risk factor for falls, but the recent advances suggest that the poly-pharmacy alone may not result in falls (Hammond & Wilson 2013). It is the type of medication that is important than the number of medications (Hammond & Wilson 2013). However studies showed that the multiple medications result in adverse drug reactions, interactions between the drugs, electrolyte imbalance, reduced drug clearance rates, and compromised balance which

eventually lead to falls (Lai et al. 2010). According to Baranzini et al, poly-pharmacy was not the risk factor for fall related injuries; use of seven drugs or more were associated with injuries only with the presence of a drug that increases fall risk (Baranzini et al. 2009).

2.17.1.4 Changes associated with ageing

2.17.1.4.1 Reduced strength

Measurements of physical capacity especially performance based measurements are strong predictors of risk of falling among older persons (Bergland & Wyller 2004). The strength, endurance and muscle power of a person deteriorate after the age of 30 years which lead to a global reduction of the physical function. Therefore the activities of daily living become difficult and later impossible. In sedentary individuals these changes start early. Due to the reduction in the general physical functions a slip or a trip can turn into a fall easily. Reduced power, poor sensation, deformity or disability of lower limbs is very critical in the causation of falls (Dionyssiotis 2012; Todd C & Skeleton D 2004).

Lower-extremity muscle weaknesses, peripheral neuropathy, difficulties in gait were the most important risk factors for injurious falls (Rubenstein 2006; Cho et al. 2012; Koski et al. 1996). The walking abilities of elderly people should be maintained and chronic diseases leading to peripheral neuropathy should be treated adequately (Koski et al. 1996). Poor muscle strength in the lower extremities was an independent risk factor for injurious falls and falls leading to minor injuries among the older population (Rubenstein 2006; Cho et al. 2012). In a study by Rekeneire, stronger men and weaker men fell more. Men with mid quintile of the leg muscle strength fell comparatively less times (De Rekeneire et al. 2003).

2.17.1.4.2 Hand grip

Older persons with low grip strength were more at risk of falls (Nevitt et al. 1989; Blake et al. 1988). There was a strong correlation between the grip strength of the right hand with falls among the older persons above 60 years in a study done in Egypt (Wahba et al. 2013). According to a study by Stel and group, hand grip strength is a very simple measure and can be used to predict falls instead of leg extension strength which is a very sophisticated measure (Stel et al. 2003). The general muscle strength including the strength of lower extremities can be assessed by hand grip strength (Blake et al. 1988).

2.17.1.4.3 Postural imbalance

Impaired balance is a risk factor for falls leading to minor injuries in the total population and falls leading to major injuries among older persons (Tinetti et al. 1988). The musculoskeletal, neurological and cardiovascular factors as well as medications affect the maintenance of upright position (Koski et al. 1996). Measurements of physical capacity especially performance based measurements are strong predictors of risk of falling among older persons (Bergland & Wyller 2004). The ability of a patient to stand up from a chair and to perform a tandem walk are two simple tests that can be easily done to assess a patient's multiple fall injury risk (Nevitt et al. 1989). To perform these two tests, a combination of neuro-muscular competencies is required (Nevitt et al. 1989).

The association of falls with increased sway was measured by Overstall and group who found that sway increases with age among men and women. At all ages women swayed more than men (Overstall et al. 1977). Increased sway was found in older persons who fell due to loss of balance and in older women who fell due to drop attacks, turning the head, rising from a chair or bed (Overstall et al. 1977). It can be assumed that there is a physiological decline in the postural control as age increases or due to disease of central

nervous system (Overstall et al. 1977). Any disease or increased sway may not necessarily lead to tripping as it can happen to anyone. (Overstall et al. 1977) Conditions like osteoarthritis might affect the balance of the individual leading to falls (Khalaj et al. 2014)

2.17.1.4.4 Frailty

Older persons with weakness or difficulties with balance are considered frail. There was no uniform or proper definition for frailty. Frailty is defined as “a clinical syndrome that is causally related to, but distinct from, disability and comorbidity” (Woods et al. 2005). Shrinking, sarcopenia, weakness, poor endurance, slowness and low activity levels were considered as the characteristics of frailty (Woods et al. 2005). A „U“ shaped correlation between body mass index (BMI) and frailty was identified (Sheehan et al. 2013). Older persons with a BMI < 18.5 and BMI > 30 were more likely to be frail (Sheehan et al. 2013).

2.17.1.4.5 Body mass index (BMI)

There are conflicting views about the relationship between BMI and risk of falls. Some studies show that as BMI increases risk for falls increases whereas some others show the reverse results. We can assume that there is a “U” shaped relationship between BMI and risk of falls. BMI was lower among those who sustained fractures (Shanthi & Krishnaswamy 2005). Older persons with high BMI were less likely to fall when compared to those with low BMI (Sheehan et al. 2013; De Rekeneire et al. 2003). Older persons with a small mid arm circumference were prone to sustain falls, especially women (Koski et al 1996). Poor nutritional status is associated with increased risk for injurious falls and falls leading to major injuries but not for falls leading to minor injuries (Koski et al. 1996). A study done by Rekeneire showed that as BMI increases the fall risk decreases. In fact some alterations that happen in the body to compensate the increased BMI, such as more tentative gait pattern, slower walking velocity and increased base of support increase

the stability of the individual thus reducing falls (De Rekeneire et al. 2003). According to Tinetti, the injuries were severe following falls among older persons with high BMI (Tinetti et al. 1995). Fjeldstad in a study, stated that older adults with high BMI, who have deposition of fat around the abdomen are likely to fall when compared to those with a lower BMI (Fjeldstad et al. 2008). A study done by Jeon, showed that older adults with high BMI are less likely to be active and therefore they have a high chance of developing fear of fall (Jeon 2013).

Himes found that the relation between the body weight and the fall risk was linear (Himes & Reynolds 2012). As weight increases, the fall risk also increases. But this relation was not found in the case of body weight with fall related injuries. The fat deposits over the body parts most susceptible to injuries may act as a protecting phenomenon (Himes & Reynolds 2012).

2.17.1.5 Behavioural risk factors

2.17.1.5.1 Physical activity

There is again a “U” shaped relation between physical activity and risk of falls. The most active and the least active persons are at high risk. Lack of physical activity led to injuries. “Frail and Injuries: Cooperative Studies of Intervention techniques” (FICSIT) trials has reported a drop in the incidence of falls among the older persons who underwent physical activity training including endurance training, balance training and Tai chi in a prospectively followed up study (Province et al. 1995). It has also been noticed in a Cochrane review that exercise training reduces the fall risk of older individuals (Gillespie et al. 1996). However older persons who were physically active sustained more falls according to a retrospective study by Orces (Orces 2013). On the other hand, as reported by Dionyssiotis and group, sedentary individuals fall often when compared to active

persons (Dionyssiotis 2012). Sometimes those who fall tend to limit their activity and further due to deconditioning or disuse may cause irreversible atrophy of the muscles in and around the joint (Dionyssiotis 2012; Todd & Skeleton 2004).

2.17.2 Extrinsic factors

Extrinsic factors are external factors that act from outside and can increase the probability of falls. They include environmental hazards that act on different phases of falls from the phase of initiation to the phase of injury. The environmental hazards include built environment factors like type and features of housing, neighbouring environment and the workplace. These can precipitate the falls or modify the outcome of falls by influencing the different phases of fall. Other factors that can influence the risk for falls are the type of foot wear and use of walk aid. Extrinsic factors also include socioeconomic factors like income, education and living arrangements. Social deprivation is also considered a risk factor for falls and fractures.

2.17.2.1 Built environment risk factors

Extrinsic factors or environmental hazards contribute to 33-50% of falls, but are modifiable (WHO 2007; Todd & Skeleton 2004; Dionyssiotis 2012). Presence of environmental hazards contributes to falls among older persons at home (Lord 2006). These include the hazards inside and outside the dwellings of older people. In a study to assess the prevalence of environmental safety hazards and to identify the locations and types of environmental safety hazards in the homes of older persons, twenty percent of homes inspected were hazard-free, 80% had at least one hazard, out of which 39% had >5 hazards and nearly 5% had >15 hazards (Carter et al. 1997). However the presence of environmental hazards alone cannot lead to falls, rather falls happen when there is an interaction between the physical ability of the older person and the exposure to the

environment (Lord et al.2006). The environmental factors can be persistent or variable. Persistent factors are those that are part of the building or that are unlikely to change (Sattin 1992). Carter looked at the prevalence of environmental hazards present in the dwellings of older persons. The following parameters were assessed in each house.

Table 7: Environment hazards assessed

Room or area	Hazards assessed
General household	Poor lighting (too dim) Lighting too bright Light switches hard to reach/find No night light(s) Carpets/floor coverings torn or in poor condition Rugs that slip Slippery floors Furniture or clutter obstructing walkways Cupboards/shelves too high Cupboards/shelves too low Taps hard to reach or to turn on/off Unstable chairs or tables Chairs without armrests or with low backs Extension cords across walkways Unsafe electrical appliances
Kitchen	Dials on stove difficult to see
Bathroom/toilet/laundry	Bathtub/shower recess slippery Bathtub/shower recess without grab rails Soap, shampoo, etc, not accessible Hob on shower recess Glass doors not safety glass Medicine cabinet poorly lit Toilet without grab rails Toilet seat too low Toilet with inward opening door Location of toilet in house Toilet located outside
Stairs	Too steep Too long In need of repair Step edges hard to see Proper handrails not present Handrails unstable or not secured Handrails not long enough Inadequate lighting
Outside	Sloping, slippery, obstructed or uneven pathways Steps, landings, verandas, patios or entrances slippery when wet

Source: Carter et al. 1997

Even though there were too many differences detected in the number of hazards at homes of fallers compared to non-fallers, homes of people with a recent hip fracture were more hazardous than those of people without a hip fracture in a case control study done to assess the environmental hazards at homes of fallers and non-fallers (Clemson et al 1996). Bathrooms were identified as the most dangerous rooms in nearly half of the houses of older persons (Carter et al. 1997). Absence of handrails and presence of uneven floors were identified as hazards by Isberner and group (Isberner et al. 1998). Vinyl on the floor of the bathroom was an independent correlate of falls among older adults (Larsen et al. 2004). Other environmental or extrinsic factors that lead to falls were poor lighting, loose rugs, assistive devices, clothing and footwear (D'souza et al. 2008).

Evci and group in 2006, tried to identify characteristics and safety points of the residents of elderly and the impact of those on the risk of elderly to develop falls (Evci et al. 2006). Older adults over 60 years were included in the study with the help of a questionnaire and a home safety check list. Two safety point scales were used to identify the risk. Accidents were 1.7 times more in older adults who lived on the third floor or higher and two times higher in houses that had four or less rooms (Evci et al. 2006). Twenty three percent of fallers used mobility aids when compared to ten percent of non-fallers who used it (D'souza et al. 2008). Descent was found more dangerous in older persons using stairs than ascent (Akyol 2007). First and last steps of a staircase are crucial in causation of falls (Akyol 2007). Outdoor falls more frequently happened at kerbs and steps (Akyol 2007).

2.17.2.2 Footwear

The foot wear has an important role in maintaining the balance and stability of older people (American Geriatric Society et al. 2001). Using footwear without soles indoors was

found as an independent correlate of fall (Larsen et al. 2004). Athletic shoes were associated with lesser falls whereas foot wear with high heels and with less area of contact with the surface of the floor were associated with more falls (Berry & Miller 2008).

2.17.2.3 Social and Economic Risk Factors

Court-Brown and group looked into the relation between social deprivation and incidence of fragility fractures (Court-Brown et al. 2011). Extent of social deprivation was studied using the Carstairs score (a Z-score created from each postcode based on overcrowding, male unemployment, low social class and car ownership.) This score has been used extensively for assessing the deprivation in many studies. The incidence of fragility related falls increased with age. There was dramatic rise in fracture incidence with social deprivation in males and females of different ages (Court-Brown et al. 2011). The result suggests poorer male health in middle age and old age in socially deprived deciles (Court-Brown et al. 2011).

Older persons with an educational level lower than primary school are at a higher risk for falls when compared to those with higher education. The lack of resources to gain information and therefore the resulting lack of knowledge regarding the preventive measures of fall results in high incidence of falls among older persons (Li et al. 2013).

2.18 Prevention and control of falls

In a community setting falls happen frequently, are of high risk, and cost intensive (Hester & Wei 2013). With the available evidence there is an urgent need for prevention programs that address the multiple risk factors of falls among older persons at different levels with an interdisciplinary approach. Fall being a complex event caused by interaction between intrinsic and extrinsic factors, the interventions need to be specific and multidimensional.

As the risk factors are multiple and of different categories, different strategies are warranted for controlling the different risk factors. Prevention and control of co-morbidities is one strategy to prevent falls among older persons. Surgical correction of cataract, physical rehabilitation for improving the muscle strength and removing or altering some hazardous features of housing, like removing the door thresholds and eliminating different levels within the house can reduce the risk for falls. Providing better lighting, fixing railing for stairs and grab bars inside the toilets and walkways are some of the protective measures for prevention of falls as mentioned in different studies. Promoting safety equipments like hip protectors and associated devices like antiskid mats are also useful in preventing falls.

A randomized trial from Finland showed a risk reduction of fractures by over 60% in 72-74 year old women with impact exercise (jumping and balance training) for 30 months (Kannus et al. 2005(b)). According to Fairhall, a 12 month multifactorial intervention provided by an interdisciplinary team tailored to each participant could reduce risk factor for falls with marked progress in mobility, strength and balance measures (Fairhall 2013).

Physical activity promotion was found effective in reducing falls when implemented alone or as part of multi factorial intervention (Rubenstein & Johnson 2006). According to a review of the interventions by Rubenstein and Johnson, the interventions including modification of the house alone did not reduce falls but multi factorial interventions with modification of the house definitely reduced falls (Rubenstein & Josephson 2006). A study which evaluated the effect of an exercise-related fall-prevention program concluded that screening to identify individuals at high risk for falls would be necessary for a successful fall-prevention program. Further research to identify the most accurate, yet easy-to-use

risk assessment instrument would be necessary to move these efforts forward (Hester & Wei 2013).

2.19 Intervention strategies

2.19.1 Fall prevention: single-intervention strategies

These include studies where only one type of intervention is given to all the participants in the intervention group. Several studies have tried different strategies.

2.19.2 Home hazard assessment and modification

Assessment of home hazards and modification that is professionally prescribed for elderly people with a history of falling may reduce the risk of falling by one third (Jensen et al. 2002). Environmental hazards in common areas were reduced by rearranging furniture that cause a risk for falling, quickly wiping wet areas on the floor, and clearing snow from the entrance to the facility (Jensen et al. 2002). Adjustments were made in the residents' accommodations like removal of loose carpets and repair of doorsteps, provision of grip bars, new beds, and firm mattresses, furniture changes and improved lighting, in the bedroom and bathroom (WHO 2004).

2.19.3 Feet and footwear review

It is suggested to advise older people to wear shoes with a thinner and harder sole to optimize foot position (Menant et al. 2008). To further prevent slips they should be advised to wear shoes with tread sole and a treaded bevelled heel (Menant et al. 2008).

2.19.4 Promoting physical activity and balance training

In a review of randomized control trials, it was found that physical activity and balance training reduced risk of falls and fall related injuries among older people. Studies have confirmed that strength and balance training can reduce the risk of both injurious and non-

injurious falls by 15 to 50% among the older adults in the community in a cost-effective way (Carter et al. 2001; Gillespie et al. 2012; Tinetti 2003; Kannus et al. 2005(b)). Personalized as well as group exercise programmes were found to be effective in prevention of falls especially programmes targeted to

improve balance (Kannus et al. 2005(b)). The different interventions that can be included under this group are gait, balance and functional training, strength and resistance training, Tai- chi, square stepping and general physical activity training (Gillespie et al. 2012). The programmes for strength and balance training can improve many risk factors of falling such as muscle strength, flexibility, balance, coordination, proprioception, reaction time, and gait even in very old and frail people (Kannus et al. 2005 (b); Li et al. 2013, Low 2008).

2.19.5 Vitamin D and calcium

A 50% reduction in risk of falling was noticed in a randomized controlled trial of elderly women with Vitamin D supplementation along with calcium for 12 weeks due to improvement in muscle strength and dynamic musculoskeletal performance (Bischoff et al. 2003; Kannus et al. 2005(b)). It is a single intervention technique which is found to be effective in a community setting (WHO 2007). Apart from the role in calcium and bone absorption, vitamin D has an important role in improving musculoskeletal performance (Kannus et al. 2005(b)).

2.19.6 Medication review

Use of fall related drugs like neuroleptics, benzodiazepines, tricyclic antidepressants, (Selective Serotonin Reuptake Inhibitor (SSRI) antidepressants and cortisone increases the

risk of falling. A randomized trial shows 66% of risk reduction with gradual withdrawal of psychotropic drugs (Kannus et al. 2005(b); Hill & Wee 2012).

2.19.7 Expedited cataract surgery

Speeding cataract surgery in patients waiting for surgery has reduced the rate of falling by 34%, when compared to those waiting for surgery (Harwood et al. 2005). The pooled data from a systematic review by Desapriya found that there is seven times increase in the visual acuity after the expedited cataract surgery when compared to routine cataract surgery (Desapriya et al. 2010).

2.19.8 Cardiac pacing

Patients suffering from cardio inhibitory carotid sinus hypersensitivity may develop hypotension, bradycardia, paroxysmal asystole, syncope, and subsequent falls. According to Kenny et al, there was almost two third reduction in the percent of falls and 70% reduction in injuries following falls among those who underwent cardiac pacing (Kenny 2001).

2.19.9 Cognitive or behavioral interventions

Cognitive and behavioral interventions were given as a part of complex interventions and a few studies concentrated on cognitive or behavioral interventions alone which included: risk assessments and counseling, and a falls prevention education programme. Effectiveness when used alone is unknown but useful if used along with the complex interventions (NICE guidelines 2013).

2.19.10 Multiple-intervention strategies

More than one main type of intervention is implemented in multiple intervention strategies (Gillespie et al. 2012). The potential risk factors of all the participants are assessed

independently and they are assigned different strategies of intervention based on the risk factor assessment (Gillespie et al. 2012). Multiple intervention strategies can prevent falls in elderly adults by 20–45% by controlling intrinsic and extrinsic risk factors (Kannus et al. 2005(b); Gillespie et al. 2012; American Geriatric Society et al. 2001; Tinetti et al. 1994). Multiple intervention strategies include components such as strength, balance, and gait training, improving transferring and ambulation with or without the use of aids, footwear improvements, investigation and management of untreated medical problems, medication review and adjustment, vision tests and correction, hip protectors, patient and staff education about fall prevention, fall risk alert cards; post-fall assessments, and environmental and home risk assessment and management.

2.19.11 Protection of susceptible sites

Frail older people are particularly at risk of falling when getting out of bed. The common cause of hip fracture is a sideways fall with direct impact on the greater trochanter Kannus (2005(b). Hence a specially designed device, hip protector was developed to protect the hips, so that the force and energy of the impact are attenuated and diverted away from the greater trochanter. The safe hip protector developed by Lauritzen and colleagues has been found to be effective in preventing fractures (Lauritzen 1993). A disadvantage of hip protectors is that they only work when worn. The compliance is doubtful as they may be uncomfortable.

2.20 Conclusion

Older persons are a vulnerable group of the population who require utmost care and concern due to the transition taking place in the social, economic, political, demographic and epidemiological situation. The biological and physiological changes in their bodies along with the co-morbidities, medications they take and the environment they live in put

them at risk of developing falls and related injuries. These injuries make them even more vulnerable and dependent due to the resulting disabilities. The economic burden of these injuries directly and indirectly is huge for their family and the social network which supports them. There has been considerable research done in these areas from other countries. Their experience shows that falls among the elderly are preventable; there are interventions which have proven effective. The heterogeneity of the studies reviewed shows the complexity of falls. It is evident that comparison of different studies is difficult. This makes recommendations for prevention difficult. The paucity of data in this area is the road block for devising preventive measures against falls among older persons in developing countries like India. This study attempts to bridge this gap for Kerala, a southern state of India that has a sizeable older population.

METHODOLOGY

Chapter 3

METHODOLOGY

Study consisted of multiple methods with quantitative and qualitative components which were carried out in four phases in different settings.

3.1 Phase I: The preparatory phase

3.1.1 Study type

The preparatory phase: This phase was carried out to design the main study, formulate the subsequent phases and to choose the potential variables for the study. This was a formative research including in depth interviews and focus group discussions (FGD). In depth interviews were conducted among older persons living in the community and those who were hospitalised for fall related injuries. The providers were also interviewed to collect information regarding their knowledge and perceptions concerning falls among older persons and the burden to the health system from fall related injuries among older persons. FGDs were conducted among older persons living in rural and urban settings

3.1.2 Study setting

In depth interviews were carried out among older persons aged sixty years and above, living in Athiyannur block panchayat of Thiruvananthapuram district in their households.

Older persons hospitalised for complaints of fall related injury were identified from the Orthopaedics ward of Government Medical College Hospital, Thiruvananthapuram and interviewed there.

Doctors working in the departments of Orthopaedics, Surgery, and Neurosurgery departments in different private and government hospitals with in Thiruvananthapuram city were interviewed at their work places.

One of the two focus group discussions was done in the Athiyannur block panchayat of Thiruvananthapuram district. The other one among older persons who lived in a residential area of Pothujanam lane with in Thiruvananthapuram city was done at the office of their residential association.

3.1.3 Sample size

Information was collected from 12 older persons in the community, seven hospitalised older persons and ten providers. Focus group discussions had twelve (four men and six women) and nine (two women and 7 men) participants in the rural and urban setting respectively.

3.1.4 Sample selection procedures

For the in depth interviews and focus group discussions, older persons aged sixty years and above were considered and conveniently recruited from the community and hospital setting. Providers were the doctors working in Orthopaedics, Surgery and Neurosurgery departments of private or government hospitals with not less than five years of experience. Those who did not consent were not included.

3.1.5 Data collection procedure

In depth interviews among older persons were open ended using clear cut guidelines to assess their knowledge regarding falls among older persons, the factors that led to falls, and the prevention activities they have adopted at their homes to prevent fall if any. They were asked about their perception on falls as a public health problem. Information on the

falls, the factors led to injuries following fall were collected from those admitted in the hospital apart from the information collected from older persons lived in the community through in depth interviews. The investigator also collected information on potential factors that precipitated falls, the consequences of fall related injuries on the family and health system and the measures adopted by them to prevent falls.

Doctors were asked about the type of injuries among older persons they had come across in their practice, their perception regarding falls as a public health issue among older persons, the magnitude of falls they have come across, the burden of fall related injuries to the health system, and measures for prevention.

An open ended approach was adopted for conduction of focus group discussions based on a clear cut guideline.

3.1.6 Data analysis

Analysis of this data was done manually. Initially the interview and FGD notes were transcribed. In the next step, coding was done to generate numerous category codes. Later repeating codes were divided, subdivided and grouped to form large themes. Repeating ideas and deviation from the common pattern were also identified.

3.2 Phase II: Cross sectional survey

3.2.1 Study type

Cross sectional survey: This was done to estimate the frequency of falls among community dwelling older persons in the 12 months prior to the survey. Even though a prospective study was the best to identify the incidence of falls among older persons living in a community, resource constraints dictated this design.

3.2.2 Study setting

The cross sectional survey was carried out among older persons living in Athiyannur grama panchayat, one of the grama panchayats selected by lottery method from the five grama panchayats of Athiyannur block panchayat. It is a rural setting in Thiruvananthapuram district of Kerala, India.

Table 8: Characteristics of Athiyannur grama panchayat

District	Thiruvananthapuram
Block	Athiyannur
Area in Sq Km	12.44
No of wards	17
No of house holds	7166
Population	26973
Men	13032
Women	13941
Male/female ratio	1069
Population Children (0-6yrs)	2278 (1120 boys/1158girls)
Scheduled population	3599
Total literacy	85.5
Literacy (Men)	86.8
Literacy (Women)	84.2

3.2.3 Sample size

Based on the prevalence of falls of 38% among older adults (>60 years) in the Indian state of Karnataka (D'souza, Shringapure, & Karol, 2008), the sample size was estimated at 192 with 95% confidence. Anticipating a 10% loss to follow-up, the final sample size was

fixed as 212 older adults. From the list of 3,111 older adults in Athiyannur panchayat (Soman, 2014), we randomly selected 212 older adults.

3.2.4 Sample selection procedures

3.2.4.1 Sample frame

A list of all residents (compiled as part of an earlier study), was available for all the five grama panchayats of Athiyannur block panchayat. From the main list, a list of older persons was prepared for Athiyannur grama panchayat, which served as sample frame for the study. Since the original list was compiled six years prior to our data collection, the persons who were 54 years at the time of data compilation were selected for this purpose. (Unpublished data of Athiyannur Sree Chitra Action Cohort collected from the field practice area of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala, India 2006-2007).

3.2.4.2 Inclusion criterion

Older persons sixty years or above, living in the geographical area of Athiyannur grama panchayat, in their homes were included.

3.2.4.3 Exclusion criterion

Older persons who did not consent or couldn't comprehend and respond to the questionnaire due to any neuropsychological problems were excluded from the study due to ethical reasons. Those who were bed ridden for last one year were excluded as they were different from mobile older persons in the exposure. Those who were residing in old age homes or any such institutions were excluded as they were a separate group with different characteristics when compared to those hailing from a community.

3.2.4.4 Working definitions

Older person: An individual who had completed 60 years and above at the time of data collection.

Fall: “A fall is defined as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level” (WHO 2007) All types of falls are included, whether they result from physiological reasons or environmental reasons

3.2.5 Data collection procedures

A structured, pretested validated interview schedule was administered to the participants by the investigator along with two trained volunteers who were identified

from the same locality. Socio-demographic characteristics, history of falling in last 12 months, falls profile and morbidity profile were elicited. Self-reported data were collected in a face to face interview in the period November 2012 to February 2013. Based on the address from the list, we approached the houses of all 212 older adults and found that eight had died and two had migrated to other places. The remaining 202 older adults consented to participate in this study. With the help of trained community volunteers from the same locality, all the selected older adults were approached between November 2012 and February 2013 by one of the authors (RMR), a medical doctor trained in public health.

3.2.6 Study variables

Details on socio-demographic characteristics, morbidity, medications, and the number of falls in last 12 months as well as preceding five years were recorded by self-reports from all the participants. Details on the circumstances and context of fall, medical care availed, the time taken to return to pre-morbid functional status and changes following the falls were elicited from those who reported falls.

3.2.7 Data analysis

Frequencies and proportions were calculated for categorical variables and means with standard deviations were calculated for continuous variables. Chi-square tests were used to analyse categorical data. Regression analysis was done finally for adjusting the confounders.

The factors that were significantly associated with falls in bivariate analysis with a p value of less than 0.10 and were not highly correlated statistically and logically with each other were selected for inclusion in the multivariate model. They were adjusted with age and sex in forward stepwise logistic regression to obtain the final model.

3.3 Phase III: Hospital based incident case control study

3.3.1 Study type

To identify the risk factors for falls that required hospitalisation with injury among older persons, an unmatched incident case control study was done. Case control method is ideal to study multiple risk factors for diseases or events; among the case control designs, incident case control design allows us to compare cases and controls with similar person-time experience. Thus the odds ratios generated will be estimates of the incidence density ratios for the respective risk factors, which is ideal. It also allows study of multiple potential causes of a disease. Considering the limited funds and time allowed, case control study was the best alternative to accomplish the cited objective.

3.3.2 Study setting

Case control study was done among older persons admitted to the Orthopaedics, Surgery and Neurosurgery wards of Government Medical College Hospital, Thiruvananthapuram.

It is a tertiary care hospital and training centre, which caters to patients from the southern districts of Kerala and Kanyakumari district of Tamil Nadu.

3.3.3 Sample size

With 95% confidence level to detect an expected odds ratio of 1.75 and 80% power to detect this difference in the underlying population, 220 cases and 220 controls in 1:1 ratio were needed.

3.3.4 Sample selection procedures

3.3.4.1 Population

All the patients above sixty years admitted to three departments of Medical College Hospital (Surgery, Orthopaedics and Neuro surgery) during the study period (March 2013 to August 2013)

3.3.4.2 Inclusion criteria for cases

Individuals of 60 years and above admitted to the wards of Surgery, Orthopaedics and Neurosurgery departments of Medical College Hospital, Thiruvananthapuram with complaints of injuries following falls during the study period.

3.3.4.3 Exclusion criteria for cases

Older persons living in old age homes or any such settings were excluded from the study. Those who were admitted with complaints of injuries following road traffic accidents and fall suspicious of domestic violence were excluded as they were a different set of injuries with different risk factors. Those who could not give informed consent or could not comprehend or respond to the questionnaire due to neuropsychological disorders were also excluded. Those who had sustained falls more than one month prior to the date of data collection were excluded considering recall bias. Those who were severely ill and admitted to intensive care units following fall related injuries were excluded for ethical reasons

3.3.4.4 Case ascertainment

Individuals satisfying the inclusion and exclusion criterion for cases with complaints of falls that require hospitalisation as per the working definition were recruited from the wards of Orthopaedics, Surgery and Neurosurgery departments during the study period. The newly admitted cases that satisfy the case definition were identified in consultation with the doctors in charge of the wards and were recruited by applying the inclusion and exclusion criterion. The confirmed cases were interviewed once they were stabilised after the surgery or on the day or previous day of discharge.

3.3.4.5 Inclusion criterion for controls

Individuals, 60 years or above admitted to the wards of Surgery, Ortho and Neurosurgery departments of Medical College Hospital, Thiruvananthapuram during the study period with complaints other than injury.

3.3.4.6 Exclusion criterion for controls

Older persons admitted in the same hospital in the same wards with complaints other than injuries but those who have sustained fall related injuries that required hospitalisation in the last one year were excluded from the study to avoid selection bias. Older persons residing in old age homes were exempted as cases, hence exempted as controls as well. Those who did not consent or cannot respond to the questionnaire in a proper manner or who were severely ill were also excluded from the study.

3.4.3.7 Selection of controls

Controls were recruited simultaneously with the cases. All the older persons admitted to the wards of Orthopaedics, Surgery or Neurosurgery departments during the study period satisfying the inclusion and exclusion criteria were recruited as controls without matching.

In a hospital based control, the source population does not correspond to the population of the geographic area, but only to the people who seek treatment at the same hospital. But it will represent the source population better than the general population controls. Being a public tertiary care centre and training hospital, the hospital chosen for the study had a wide outreach area and the feasibility of getting a comparable sample from the field was minimal. Therefore it was decided to go for hospital based controls, considering the time and fund deficit.

3.3.4.8 Matching

No matching was done for selection of controls as it was felt that matching would add to the time cost. Alternatives like post stratification and regression analysis were used in this study to adjust for the bias and confounding.

3.3.4.9 Working definitions

Injurious falls were defined as falls that resulted in injuries that required hospitalisation for at least 24 hours.

3.3.4 Data collection procedures

A structured pretested validated interview schedule was used to collect information from the cases and controls. Socio-demographic characteristics, history of falling in last 12 months, falls profile, morbidity profile, drug history and environmental characteristics were elicited. The questions regarding falls, their details and cost of treatment were skipped for controls. Self-reported data were obtained in a face to face interview at the bedside. The investigator and two trained volunteers collected the information from the participants.

The cases were contacted over telephone to enquire their self-reported functional status at the end of one year after the injurious falls. Only those who had a functioning contact number were contacted. The volunteers were trained to contact them over the phone and document the responses for a set of three or four questions. The functional status of the older person at the time of the call, what percentage of the pre-fall status they have achieved by this time, the time taken to get back to the pre-fall status if already attained, if dead, the cause for death, the functional status at the time of death, and the cost for the treatment were elicited

3.3.5 Variables

Outcome or dependent variable was falls requiring hospitalisation. Exposure variables were divided broadly into intrinsic and extrinsic factors depending on the direction in which these factors operated. Those acting internally were called intrinsic and those acting externally were called extrinsic factors.

3.3.5.1 Intrinsic factors

According to the manner in which the factors interact with the system, intrinsic factors can be divided further into biological, nutritional, pathological, behavioural, changes associated with ageing and the medications.

Age and sex were the biological factors documented. Ability to perform activities of daily living was the only variable measured from the group changes associated with ageing. Diet history and change in body weight were included as nutritional factors. Chronic diseases like diabetes, hypertension, vision impairment, psychiatric and neurological conditions, chronic respiratory diseases, Parkinson's disease, musculoskeletal disorders, cardiovascular diseases and visual defects were recorded. Detailed history of drug intake

was also gathered from all the participants. Behavioural factors like physical activity, alcoholism and smoking were recorded. The history of falls in the previous year and last 5 years were elicited. The details of falls and injuries, the circumstances of falls, the treatment availed and the cost of the injuries was gathered from the cases alone.

3.3.5.2 Extrinsic factors

Data on socioeconomic factors such as monthly income, type of ration card, previous occupation, marital status and other living arrangements and education were documented. Built environment factors such as type and features of housing and neighbouring environment were collected. Use of walk aid was also ascertained.

3.3.5.3 Protective measures

The measures taken by the older persons themselves or their family members for prevention of falls were looked into. Details on alteration to the features of housing including fixing railings for the stairs, providing better lighting inside the rooms and the stairs, fixing grab bars in toilets and walkways, dry/ wet separation of the bathrooms were probed.

3.3.5.4 Possible bias and potential confounders

Recall bias: The investigator tried to overcome recall bias by including only incident cases and cases that have had falls in last one month. Controls were also selected as they were admitted.

Interviewer bias: Proper training was given to the volunteers who collected the data. Close monitoring and supervision and interim training were conducted to minimise the interviewer bias.

Misclassification bias: There were guidelines for selection of both cases and controls with strict inclusion and exclusion criteria which were followed throughout the study. Controls with history of hospitalisation due to falls were excluded from the study.

Selection bias: A selection bias called Berksonian bias can occur in case control studies using hospital controls. This cannot be ruled out as some of the known exposures directly affect hospitalisation. As per available literature, co-morbidities of an older person are known causes for falls among older persons. As the controls we selected were admitted in the hospital with any illness other than fall related injuries, spurious relations between the exposure and the disease can arise. We cannot state that the rate of admission to hospital for those persons with the disease is equal to those without the disease as we do not know the rates of admission for all the conditions.

Multiple control groups could have been a method to prevent this bias, but time and cost constraints prevented us from doing it. In order to check this bias in our study, those factors that can spuriously affect the results were not considered for building the final regression model. Stratification and regression analysis were also done to adjust for this.

Potential confounders: Age, sex, education and income were identified as potential confounders. Regression analysis would have taken care of these potential confounders.

3.3.6 Data analysis

Frequencies and proportions were calculated for categorical variables and means with standard deviations were calculated for continuous variables. Chi-square tests were used to analyse categorical data. All the variables were checked for collinearity by chi-square

tests. Stratification was done at different levels to adjust for non- matching, confounding and bias. Regression analysis was done finally for adjusting the confounders.

All the variables were classified into biological, pathological, socioeconomic, behavioural and environmental factors based on the way it interacted with injurious falls. The final model was arrived in three steps.

In the first step, chi square test was done for all the independent variables against the dependent variable, injurious falls. The factors that showed level of significance below 0.1 were logically selected for second step of modelling within each subgroup.

In the second stage a filtering was done to avoid Berksonian bias. All the factors that can directly and indirectly lead to hospitalisation of controls in Surgery, Neuro surgery and Orthopaedics wards were excluded from the model building. These include all the morbidities excluding respiratory diseases and vision impairment that are unlikely to get admitted in these wards. The factors such as intake of certain medicines and intake of four or more medications were also excluded. Five separate logistic regression models, one for each group of predictors, were built using the „enter“ method. From these, all predictors which showed a significance level of 0.10 or above were selected for creating the final model.

All the selected variables were included in a forward stepwise logistic regression to arrive at the final model, using 0.05 for the level of significance for retaining a predictor. Age and sex were retained in the model for adjustment regardless of significance level.

At the end of third stage, we resorted to multinomial regression analysis to identify the risk factors separately for hip fractures and other injuries.

3.4 Phase IV: Observation of households

3.4.1 Study type

Observation of households: It was difficult to elicit details of the location of fall from a person by self-report alone. Presuming that older persons spent maximum time inside and around their homes, the dwellings of older persons were inspected. We adopted a qualitative approach using non-participant observation to identify the potential built-environment risk factors that precipitated falls and/or modified the outcome of falls among older persons at Thiruvananthapuram district of Kerala. Structural changes they have made after the falls to prevent further falls or to accommodate the injuries following the falls were also observed in the perspective of the injuries sustained and the outcome of the injuries.

3.4.2 Study setting

Observation was restricted to households within Thiruvananthapuram district for convenience even though there were cases from other districts like Pathanamthitta, Alappuzha and Kanyakumari district of Tamilnadu.

3.4.3 Sample selection procedures

The households of those older persons who were enrolled as cases in the hospital based case control study alone were considered for observation. Out of this, the households of only those who had falls due to extrinsic causes (slipping and tripping) within their dwellings or just outside were included in the study. Those individuals who had falls away from home, workplace, at some other house or office were excluded. The selected persons were contacted over the phone for their consent and directions to reach the home. Some of them were excluded at this stage as they were not staying at the houses where they sustained injuries. Only those persons who had completed six or more months post fall

were selected for observation. This was to make sure that there was enough time to make any alterations to the house if required. Few of them were dead by the time we attempted contact. Households of dead persons were also included for observation in case permission from one of the responsible persons who belonged to the household was feasible. The households that belonged to those who did not consent for the study when contacted initially over phone were excluded.

3.4.4 Data collection procedures

Non participant observation was carried out as a three stage funnel process. Beginning with descriptive observation we carried out broad scope observation to get an overview of the household setting. Written informed consent was obtained from the older person or any other responsible person in the household if the person was dead. The investigator and two trained volunteers visited each household and filled in the checklist by using a consensus based decision for responses. The features of housing, presence and absence of tripping hazards and potential hazards that could cause slipping were assessed on the basis of a pretested validated check list. The alterations done if any to prevent falls were also noted. The observation of the households was continued till we attained saturation of information.

3.4.5 Data analysis

Analysis of observational data was done manually. We did manifest level (basic level) content analysis for the categorization and summarization of observation data (no comments or theories as to why or how we observed). It involves the inductive coding process. Observation notes were transcribed into an observer commentary. Coding was done to generate simplest variations in patterns. Later codes were classified (axial coding) and grouped to form large themes by a process of comparing outcomes and linkages

(selective coding) by using constant comparison method. Repetitions and variations from the common pattern were also identified.

3.5 Ethical concerns

Ethical clearance was obtained from the Institutional ethics committee of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram and Human ethics committee of Medical College Hospital, Thiruvananthapuram. Proper written informed consent was obtained from the respondents before the interview. Only those who consented without any coercion were included in the study. During the visit to households in the community, there were chances of encountering older people who were victims of domestic violence and those who were deprived of care and attention. The investigator decided to refer such cases to the concerned Medical officer of the local Primary Health Centre with the consensus of the panchayat member of the concerned ward. However, there was no instance where this became necessary. Interviews of the cases and controls in the hospital were carried out after the completion of the treatment and just before discharge after ensuring the respondent's emotional readiness to answer the questions in order to minimize the discomfort for them. The data was only accessible to the principal investigator and her guide. The principal investigator was solely responsible for retaining the confidentiality of the data obtained. The information obtained was used exclusively for research purpose.

RESULTS

Chapter 4

RESULTS

4.1 Preparatory Phase

4.1.1 Information from providers

4.1.1.1 Burden of falls among older persons to the health system

According to the doctors of Medical College Hospital Thiruvananthapuram, older persons constitute to 10-40% of the total patients attending the casualty or outpatient departments (OPD) of Orthopaedics, Neuro surgery and Surgery. Out of this 30-50% of those who attended the Orthopaedics department, 10-15% of those who attended Neurosurgery departments and 10% of those who attended the Surgery department came with complaints of injury. Out of the injuries of older persons who attended the Orthopaedics department, 80% were attributable to falls; this proportion was only 30% in the case of Surgery and Neurosurgery departments.

As reported by the doctors, fractures and head injuries were the frequent injuries due to falls among older persons who sought medical attention in OPDs and casualties of Orthopaedics department. Most common fractures were Colle's (60-70%), compression fracture of spine (15%), hip (15-20%) and shoulder/neck of humerus (10%). Hip fractures were the commonest injury that required admission.

In Orthopaedics department, there were six units, with one admission day each in a week. Sunday's admission was covered on rotation. Every admission day an average of five to six hip fractures were admitted. Each unit gets one surgery day per week for major surgeries. According to the doctors, the whole theatre time was dedicated for fixing up hip fractures among older persons as they can only do a maximum of four surgeries a day. To

undergo general anaesthesia, older people require thorough work up. They were retained in the wards until they were fit if they were found to have abnormal values or other morbidities. Rarely were they sent home with traction or any other conservative line of management. The recovery results after hip fractures are best with early mobilization of older persons. Unless the patient is mobilized immediately after the injurious falls chances for survival deteriorates as old people will die due to other complications. On an average there was a waiting period of seven to ten days for the surgery to be done.

Even in Medical College Hospital, where the treatment is supposed to be free, a patient has to spend an amount of INR 5000/- to 8000/- for hemi-arthroplasty of hip as per information provided by the doctors. This is usually spent for buying the implants and medicines that are not available in the hospital. Apart from this the expenses for transport, food and opportunity costs of the bystander make it huge.

4.1.1.2 Potential risk factors

Based on the information conveyed by the doctors, the following are the risk factors for falls among older persons. They were classified into five different headings for the ease of explaining.

Table 9: Risk factors for falls: Provider's view

Category	Risk factors
Sociodemographic characters	Female gender, poor socioeconomic status
Changes associated with ageing	Poor muscle and bone strength, restricted mobility, gait/balance problems, poor floor reaction time, spastic problems, coordination problems
Behavioural	Poor nutrition, physical inactivity
Comorbidity	Stroke, memory loss, extra pyramidal symptoms, movement disorders, white matter vascularity, seizures, tumours, ataxia, neuropathies, vestibular dysfunction
Medication	Anti-hypertensive drugs, anti-parkinsonian drugs and sedatives are some of the drugs that can cause orthostatic hypotension Steroids, β blockers, diuretics aggravates osteoporosis. Anti-platelet therapy causes intra cerebral bleed even with trivial injuries complicating the outcome.
Environmental	slippery floors, stairs, crowding of furniture, nothing to hold on during falling

4.1.1.3 Consequences of falls and related injuries

As informed by the Orthopaedicians, almost half of the patients with fall related injuries resume their normal life, a quarter of them were disabled for the later part of their life and another quarter lost their lives within one year due to delayed complications. Older persons died frequently due to delayed complications of injuries such as bedsore, deep vein thrombosis, pneumonia and urinary tract infection. Even mild infection can cause disorientation and confusion among older persons. In a few instances, there were implant failures and patient did not walk again. As reported, prognosis depends on several factors such as co-morbid conditions, degree of motivation, social support, psychological problems, motivating bystanders and element of depression. Proper after care with rehabilitation and motivation is a factor for improving the outcome of fall related injuries.

4.1.1.4 Prevention of falls

According to the doctors who treat older persons, falls were preventable and should be prevented especially in Kerala, as the proportion of older persons is on the rise and the family systems are changing. Moreover the cost of these injuries to the health systems as well as the families is high. The suggestions provided by the doctors were categorised into different stages of an injury event such as pre-event, event and post event.

Table 10: Strategies for prevention of falls: Provider’s view

Levels of prevention		Strategies
Pre event	Awareness and screening	Awareness regarding the importance of prevention of falls among older persons in the public. Sensitisation of health providers and health workers Sensitisation of the whole system Screening bone density should be made mandatory for patients above 50 years
	Medication	Exposure to sun to replenish Vitamin D stores Calcium + Vitamin D supplementation
	Treatment of co-morbidity	Vision should be checked and correction has to be done if necessary Treatment and control of co morbid conditions including active treatment of Osteoporosis.
	Environmental modification	Modification of the houses where elderly live: fixing handle bars in bathrooms, avoiding multiple levels and staircases, improve lighting, making the floors non slippery, providing proper walking aids and hip protectors to protect the hip of osteoporotic individuals
Event	Behavioural	Promote physical activity Ensure access to health care for the older persons, especially to those who live alone to prevent delay in seeking medical help.
	Access based	Priority should be given to older persons in the OPD and casualty. Free health services for older persons
Post event	After care and rehabilitation	Training for the bystanders for providing after care Improve access and quality of rehabilitation services for older persons to make them fully functional after the injuries.

4.1.2 Information from older persons

4.1.2.1 Circumstances of fall

Out of the 12 older persons who were interviewed from the community, only four persons had a history of fall in last one year. The seven hospitalised persons were admitted with several fall related injuries. Majority of them had falls inside and around the houses. Three

of the men who were still going for work fell at their workplaces. Tripping, giddiness, loss of consciousness, losing balance, slipping were some of the reasons for falls reported by the respondents. Some of them fell on the same level while walking and some from a different level. Some fell from a height while some of them fell from a level not too high. Environmental factors were at least partially responsible for few of the falls. Falls happened during the time of unscheduled power failure in two instances. Two ladies fell while trying to sit on a plastic chair when the chair slipped away. Some of them had co-morbidities and some were taking medicines. Most of the falls happened during the day time and towards evening.

4.1.2.2 Risk factors for falling

Majority of the older people who fell did not know why they were falling and thought that it was part of ageing. Many of them thought that it was due to carelessness that they were falling. According to them, as one ages, one must be more careful while walking around. But majority felt that falls among older persons were fatal. According to one person, the giddiness some persons experience while getting up, made them fall. Few stated that tiled and marble floors in the bathroom were the cause of falls among older persons these days.

The older persons, who did not fall, did not recognise falls as an issue of older persons, although some of them had some balance problems. They were not sure of the risk factors for falls, though some of them mentioned falls in bathrooms due to the wet slippery floor. Obstacles present on the floor where one walk was pointed out to be a cause for fall.

In conclusion, the older persons identified mainly environmental factors as risk factors for falls among them. The wet and slippery floors and obstacles on the floor were considered

risk factors for falls. Giddiness among older persons were also identified as a cause for falls.

4.1.3 Results of Focus group discussions

4.1.3.2 Circumstances of falls among older persons

None of the participants of the FGDs experienced falls in the last one year or past few years. Therefore there were not many experiences to share. Generally falls were not thought as a significant issue among older persons. However the participants expressed their concern about falling in the later part of discussion. According to most of those who participated in the FGD conducted in the urban setting, the common place of fall for older persons was bathroom, because of the tiled or marble floor. According to them, if there was nothing to hold for support in the bathroom, the risk of fall and related injuries increases.

4.1.3.3 Efforts taken to prevent falls at home

As one of his friends fell in the bathroom and was bed ridden, one of the respondents fixed a rope in the bathroom as a support to rise from the commode. He also fixed grab bars on the walls for support while taking bath. Few others have identified some places inside the bathrooms where they generally hold for support such as the shower tap. Some were over cautious while walking and carried an umbrella for support instead of a walking stick.

4.1.3.4 How to prevent falls

Even though the participants were concerned about falling and stated that they need to take care of themselves without falling, most of them did not realize that falls were preventable. Still they could come forward with some of the preventive measures.

Table 11: Measures adopted by the family for prevention of falls

Setting for prevention	Strategies
Structural modifications at home	Strong railings for stairs to hold while climbing up/down the stairs Steps more comfortable than slanting surfaces.
Structural modifications outside houses (on the road)	Building proper foot paths Provision to facilitate older persons to cross the road safely
In public transport vehicles	Seat reservation for older persons
Social support	It is very important to have neighbours with a good will to prevent consequences of falls, especially in Kerala, where older persons are living alone in independent houses.
Policy intervention	System to reach out to those who live alone or whoever in a need.

4.1.5 Conclusion

The providers were concerned about the issue of falls and further consequences. As reported by them, hip fractures were important due to the mortality and prolonged morbidity due to disability. In the coming years the public health care system is going to face challenges in providing services to its senior citizens due to the rise in number of cases attending the hospital. The hospitals should be well equipped to facilitate hemi-

arthroplasty. Besides surgeons should have a minimum expertise to perform such surgeries. There are not many hospitals in the public sector that can afford to provide this care. Private hospitals that can provide this care charges the patients heavily.

The older persons who did not fall did not consider falls as a threat. They considered falls as unfortunate accidents due to carelessness. Moreover those who fell did not know that falls were preventable. There was a general belief that if an older person fall there are meagre chances for him or her to survive long. On the other hand most of them had an “it will not happen to me” attitude towards falls. This showed the general lack of recognition of falls as a health hazard to older persons.

The information obtained from the formative research indicated the need of further research regarding falls among older persons in this locality to identify the real magnitude of falls among older persons, risk factors for falls and strategies for prevention. The review of literature emphasized these findings. Based on this it was decided to do a cross sectional survey in the community to estimate the frequency of falls, a hospital based case control study to identify the risk factors for injurious falls and observation of households to identify potential environmental risk factors. The formative research helped to identify few variables to devise tools for the cross sectional survey, case control study and observation of households.

4.2 Results of Cross sectional survey

In this section the results of the cross sectional survey on the frequency of falls in the community and their consequences is being reported.

A total of 202 older persons responded to the survey questionnaire. Mean age of the sample was 69.5 ± 7.2 years (ranged from 60 to 99 years). Women constituted 54.5%

(110/202) of the sample. Mean age of males was 70.93 ± 6.99 years and that of females was 68.37 ± 7.20 years. Around nine percent of the older persons (11.8% (13/110) of women and 5.4 percent (5/92) of men) lived alone, 23% lived with their spouse or sibling or a relative whereas 68% lived in joint family. More than 50% of the women were widowed.

Majority of the older persons (80%; 87% of the men and 69% of women) had some income either as part of their professional pension, wages of employment or social pension like Indira Gandhi National Old age pension, Indira Gandhi National Widow pension and Pension for agricultural labourers. The sample characteristics are given in Table 11.

Table 12: Basic sample characteristics of the survey participants

		Males (%)	Females (%)	
Socio demographic characters		N=92	N=110	Total (%)
Age	60-69 years	37 (40.2)	71 (64.5)	108 (53.5)
	≥ 70 years	55 (59.8)	39 (35.5)	94 (46.5)
Education	No formal education	19 (20.7)	31(28.2)	50 (24.8)
	Formal education	73 (79.3)	79 (71.8)	152 (75.2)
Marital Status	Currently married	75 (81.5)	44(40)	119 (58.9)
	Others	17 (18.5)	66 (60)	83 (41.1)
Monthly income	<5000 INR	71 (77.2)	101 (91.8)	170 (85.1)
	≥ 5000 INR	21 (22.8)	9 (8.2)	32 (15.9)
Economic	Dependent	13 (14.1)	27(24.5)	40 (19.8)
Independence	Independent	79 (85.9)	83(75.5)	162 (80.2)

Fifty four older persons had at least one fall within a period of twelve months preceding the interview (26.7%; 95% CI: 20.6-32.8). A total of 74 falls were reported in the reference period for those 54 persons. Thus the estimated incidence rate was 3.05 falls (95% CI: 2.41-3.81) per 100 person months. An increasing frequency of falls with increasing age was seen, even though statistically this trend was not significant. There was a significant trend in the frequency of falls with increasing age among women.

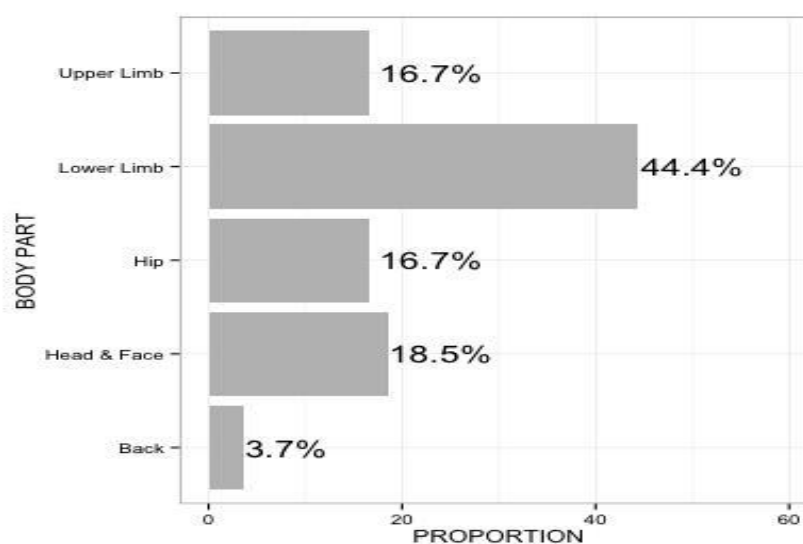
Table 13: Proportion of fallers by age and sex in community survey

	Males*	Females#	All\$
Age Group	N =92(%)	N=110 (%)	N=202(%)
60-64	3(15.8)	5(13.5)	8(14.3)
65-69	6(33.3)	9(26.5)	15(28.8)
70-74	7(31.8)	8(50.0)	15(39.5)
75-79	4(17.4)	5(35.7)	9(24.3)
80+	4(40.0)	3(33.3)	7(36.8)
All	24(26.1)	30(27.3)	54(26.7)

*p for trend (males) = 0.537; #p for trend (females) = 0.034; \$ p for trend (all) =0.057

Of the 54 persons, 43 persons (79.6%) fell once, 11 persons (20.4%) fell twice and four persons (7.4%) fell at least thrice. The maximum number of falls reported by one person was seven. Fifty eight percent (43/74) of the fallers were injured following the fall but only 42% (31/74) sought medical attention. Among the injured, the main injuries reported were fractures (16.3%; 7/43), bruises (41.9%; 18/43), minor cuts and lacerations (41.9%; 18/43). Hip fractures constituted seven percent of the total injuries (3/43).Proportion of injuries on different parts of the body is presented in Figure 5

Fig 6: Proportion of injuries on different parts of the body in community survey



Nearly half of the older persons, 43% (32/74) fell during the forenoon (6 am to 11.59 am), 40% (29/74) during afternoon, (12 noon and 5.59 pm) and 17% (13/74) during night (6 pm to 5.59 am). The Table 11 and 12 shows the cause of falls and the activity during falls respectively.

Table 14: Cause of falls of the survey participants

Causes	Male (N=28)	Female (N=46)	Total (N=74)
Slipping	8 (28.6)	11(23.9)	19 (25.6)
Fainting	8 (28.6)	10 (21.8)	18 (24.3)
Tripping	5 (17.9)	10 (21.8)	15 (20.3)
Lost balance while walking	4 (14.2)	11(23.9)	15 (20.3)
Legs gave way	2 (7.1)	2 (4.3)	4 (5.4)
Don't know/Not sure	1(3.6)	2 (4.3)	3 (4.1)

Table 15: Activity during fall in the community survey

Activity during fall	Male (N=28)	Female (N=46)	Total (N=74)
Walking	16 (57.1)	25 (54.4)	41(55.4)
While getting up/sitting on a chair/cot	3 (10.7)	5 (10.9)	8 (10.8)
While working in a kitchen/backyard	2 (7.2)	5 (10.9)	7 (9.5)
While going to toilet/taking bath	2 (7.2)	4 (8.7)	5 (6.8)
While climbing the stairs	1 (3.6)	0 (0)	1 (1.4)
While standing/talking	1 (3.6)	4 (8.7)	5 (6.7)
Others	3 (10.7)	3 (6.5)	6 (8.1)

We could not identify the cause of fall in four percent of cases. Among the others more than half (52%; 37/71) of the falls could be attributed to intrinsic causes and the remaining 48% (34/71) to extrinsic causes. The extrinsic causes identified were slipping and tripping and the intrinsic causes identified were fainting, losing balance while walking and legs giving way. The distribution of location of falls is illustrated in Table 13.

Table 16: Distribution of location of falls

Place of fall N (%)		Proportion of falls N (%)		
		Total	Male	Female
Inside the house N=17/74 (23.0)	Bedroom	5 (29.4)	2 (28.6)	3 (30)
	Bathroom	4 (23.6)	2 (28.6)	2 (20)
	On the way to bathroom	3 (17.6)	1(14.2)	2 (20)
	Other rooms	5 (29.4)	2 (28.6)	3(30)
Outside the house	Garden	8 (19.5)	1 (7.7)	4(7.7)
	Courtyard	31 (75.6)	4(30.7)	23 (88.5)
	Road	12 (75.0)	1(7.7)	6 (66.7)
Away from home N=16/74 (21.6)	Other buildings	1(6.3)	1(14.3)	0 (0)
	At work	2 (12.4)	6 (85.7)	2 (22.2)
	Others	1 (6.3)	1(14.3)	1(11.1)

*Each subcategory adds to 100%

More than three quarters (77%; 57/74) reported falling outdoors. Out of these, the majority fell outside the house (55.4%) and the rest at remote locations from the house. Fall inside the house was mainly inside the rooms and on the way to bathroom. Five out of the seven fractures occurred as a result of a fall due to an extrinsic cause. Table 14 compares proportion of falls in different groups with and without the risk factor.

Table 17: Association of falls with characteristics of subjects

Characteristics		Proportion in the sample N=202 (%)	Falls in each category N=54 (%)	Unadjusted OR (95% CI)
(i)		(ii)	(iii)	(iv)
Age	≥70 years	94 (46.5)	31 (33.0)	1.82 (0.97-3.4 2)
	< 70 years	108 (53.5)	23 (21.3)	Ref
Sex	Women	110 (54.5)	30 (27.3)	1.06 (0.57-1.99)
	Men	92 (45.5)	24 (26.0)	Ref
Formal education	No	50 (24.6)	20 (40.0)	2.31 (1.17-4.58)
	Yes	152 (75.4)	34 (22.4)	Ref
Marital status	Single	83 (41.1)	21 (25.3)	0.88 (0.47-1.67)
	Married	119 (58.9)	33 (27.7)	Ref
Monthly income	<5000 INR	170 (84.1)	45 (26.4)	1.21 (0.52-2.83)
	≥5000 INR	32 (15.9)	9 (28.0)	Ref
Economic dependence	No	40 (19.8)	14 (35.0)	0.61 (0.29-1.28)
	Yes	162 (80.2)	40 (24.6)	Ref
On antihypertensive	Yes	70 (34.7)	22 (31.4)	1.43 (0.75-2.72)
	No	132 (65.3)	32 (24.2)	Ref
On hypoglycaemic	Yes	54 (26.7)	12 (22.2)	0.72 (0.35-1.50)
	No	148 (73.3)	42 (28.4)	Ref
On any medication	Yes	128 (63.4)	38 (29.7)	1.53 (0.78-2.99)
	No	74 (36.6)	16 (21.6)	Ref
On ≥4 medications	Yes	39 (19.3)	12 (30.8)	1.28 (0.60-2.75)
	No	163 (80.7)	42 (25.8)	Ref
H/o previous falls	Yes	69 (37.7)	26 (37.7)	2.27 (1.19-4.30)
	No	133 (62.3)	28 (21.0)	Ref
Any morbidity	Yes	159 (78.7)	49 (30.8)	3.39 (1.26-9.12)
	No	43 (21.3)	5 (11.6)	Ref
≥ 2 illness	Yes	110 (54.5)	34 (30.9)	1.61(0.85-3.05)
	No	92 (45.5)	20 (21.7)	Ref
Visual deficit	Yes	47 (23.3)	15 (31.9)	1.39 (0.68-2.84)
	No	155 (76.7)	39 (25.2)	Ref
Respiratory problems	Yes	28 (13.9)	9 (32.1)	1.36 (0.57-3.21)
	No	174 (86.1)	45 (25.9)	Ref
Cardiovascular diseases	Yes	31 (15.3)	8 (25.8)	0.95 (0.40-2.26)
	No	171 (84.7)	46 (26.9)	Ref
Hypertension	Yes	88 (43.6)	26 (29.5)	1.29 (0.69-2.40)
	No	144 (56.4)	28 (17.5)	Ref
Dyslipidaemia	Yes	39 (19.3)	16 (41.0)	2.29 (1.09-4.77)
	No	163 (80.7)	38 (23.3)	Ref
Diabetes Mellitus	Yes	73 (36.1)	21 (28.7)	1.18 (0.62-11.95)
	No	129 (63.9)	33 (25.6)	Ref
Knee pain	Yes	26 (12.9)	13 (50.0)	3.29 (1.41-7.66)
	No	176 (87.1)	41 (23.3)	Ref

Figures in parenthesis in column (ii) indicate percentages of subjects in different categories.

Figures in parenthesis in column (iii) indicate percentages of fallers within each category.

Out of the participants 63% (128/202) were on some regular medication. The medicines could be broadly categorised into anti-hypertensive, cardiovascular drugs, oral hypoglycaemic, insulin, anticoagulants, lipid lowering drugs, bronchodilators, anxiolytics, antacids, non-steroidal anti-inflammatory drugs, vitamins, antiepileptic, hormone replacement, diuretics, antibiotics, antihistamines and others. Most of them were taking a combination of drugs. The maximum number of medicines one person took was eight. There were no significant differences between the fallers and non-fallers in the drug intake. Table 15 shows the multi-variate logistic regression analysis findings of the correlates of fall adjusted for age and sex.

Table 18: Correlates of fall: age sex adjusted results of multivariate logistic regression analysis

Variables	Proportion of falls (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Education			
No formal education	40.0	2.31 (1.17-4.58)	2.12 (1.02-4.40)
Having formal education	22.4	Ref	Reference
Having any morbidity			
Yes	30.8	3.39 (1.26-9.12)	3.45 (1.24-9.58)
No	11.6	Ref	Reference
History of previous falls			
Yes	37.7	2.27 (1.19-4.30)	2.26 (1.15-4.44)
No	21.1	Ref	Reference

We looked for the presence of the three correlates (lack of formal education any morbidity and history of previous falls) obtained in the final model, either alone and or along with the other two in the sample subjects. Four groups were identified with none, one, two or three of these risk factors. The frequency of falls in each group was inspected.

It was found that the frequency of falls increased with the number of risk factors with a statistically significant trend as illustrated in Table 16.

Table 19: Association of frequency of falls with number of risk factors

Risk factors	Fallers	Non fallers	P for trend
No risk factors (23)	2 (8.7)	21(91.3)	
One risk factor (87)	13 (14.9)	74 (85.1)	< 0.001
Two risk factors (60)	23 (38.3)	37 (61.7)	
Three risk factors (32)	16 (50)	16 (50)	

Out of those who fell, 20.4% (eleven persons) fell twice, 7.4% (four persons) fell thrice. The maximum number of falls for any one person in last 12 months was seven. Almost three-fourths (8/11) of the recurrent fallers were women. The recurrent fallers together had 31 falls in the last one year. Outdoor falls were common among them. Maximum falls (45%; 14/31) happened outside the house (in the compound or garden) followed by falls on the road (19.3%; 6/31). Indoor falls happened mainly in the bedroom or toilet while going to toilet. Extrinsic causes (slipping and tripping) caused 55% (17/31) of the falls, whereas intrinsic causes (lost balance, fainting and legs gave way) caused 45% (14/31) falls. Some of them had a combination of extrinsic and intrinsic causes. At least five recurrent fallers had repetitive falls at the same place due to the same cause. Out of the eleven recurrent fallers eight persons (73%) had to seek medical attention after the most recent falls.

Thirty eight percent of the participants (26/69) who give history of at least one fall in last 5 years sustained a fall in last 12 months. One of the fallers gives history of 10 falls in

last 5 years. Thirty one percent (49/159) of the participants who had three or more co-morbidities sustained a fall in last 12 months. Most of the elderly are taking some kind of medications for chronic diseases. Thirty one percent (12/39) of the participants who were taking four or more medications fell in the last

12 months compared to 26 percent (48/163) of those who were taking less than four medications.

All the hip fractures were managed by open reduction and fixation of an implant. Closed manipulative reduction was done for other fractures followed by prolonged immobilization. For managing the cuts and lacerations suturing was done often. The others were prescribed medications or physiotherapy according to their symptoms. Among those who were not injured (31/74), 10% (3/31) reported pain and 32% (10/31) reported mild discomfort that restricted activities at least for one or two days following the fall and rest of them did not report any complaints. Out of the 54 persons who fell, three persons (5.5%) cannot move without help following the fall. Twenty percent (11/54) of the subjects, who fell experienced some kind of physical limitation (difficulty/discomfort) even months after the fall. Eleven percent (6/54) of the fallers felt physically less confident in walking alone. Weakness of the limb was complained by 5.5% (3/54).

The fallers experienced mental and social changes after the fall. Twenty eight percent (15/54) of the fallers experienced fear of fall, nine percent (5/54) felt depressed, seven percent (4/54) felt less confident in walking alone and six percent (3/54) felt insecure after the fall. The rest did not experience any change.

Out of the 54 fallers, four persons including those who were totally dependent felt socially isolated. One person complained that her family cannot socialize due to the continued care

they had to provide her. Another person felt guilty for not being able to properly care for her intellectually impaired son due to the limitations after the fall.

4.3 Results of Case control study

There were 251 cases and 250 controls. All the subjects (cases as well as controls) lived with their family or relatives. The age of the cases ranged from 60 years to 95 years with a mean of 71.6 ± 9.13 years; that of the controls ranged from 60 years to 89 years with a mean of 67.02 ± 6.27 years. The mean monthly income of the households of cases was 4092 ± 5 INR (300 INR to 50000 INR) where as that of controls was 3023.40 ± 3 INR (300 INR to 20000 INR). The characteristics of the samples are given in the Table 17.

Sixty percent of cases and 65.6% of controls were receiving some kind of social pension at the time of data collection. Indira Gandhi National Old age Pension, Indira Gandhi National Widow Pension, Farmer's pension, Fisherman's pension, Coir society pension and Cashew society pension were the commonest. Nearly two percent (3/251) of the cases and three percent (5/250) of the controls were still in government service and received salary. Almost nine percent (22/251) of the cases and 5.2% (13/250) of the controls worked in informal sector. Four percent (10/251) of cases as well as controls (11/250) were self-employed and self-sufficient.

Table 20: Basic sample characteristics of cases and controls

Variables	Description	Cases N=251 (%)	Controls N=250 (%)	P value
Sex	Males	86 (34.3)	129 (51.6)	< 0.001
	Females	165 (65.7)	121 (48.4)	
Age	60-70	131 (52.2)	195 (78)	< 0.001*
	71-80	79 (31.5)	47 (18.8)	
	≥81	41(16.3)	8 (3.2)	
SES [#]	Low	201(80.1)	222 (88.8)	0.019*
	Middle	48 (19.1)	25 (10)	
	High	2 (0.8)	3 (1.2)	
Economic independence	Independent	164 (65.3)	156 (62.4)	0.594
	Dependent	87 (34.7)	94 (37.6)	
Marital status	Married	113 (45.0)	169 (67.6)	< 0.001
	Unmarried/ Separated	138 (55.0)	81 (32.4)	
	Illiterate	68 (27.1)	41 (16.4)	
Educational level	No formal education	37 (14.7)	37(14.8)	0.021*
	Lower Primary	80 (31.9)	77 (30.8)	
	Upper Primary	30 (12)	49(19.6)	
	High School	27 (10.8)	40 (16)	
	Higher Secondary and above	9 (3.5)	6 (2.4)	
Own house	Yes	159 (63.3)	192 (76.8)	0.003
	No	59 (23.5)	30 (12.0)	
Economical support	With kids	33 (13.2)	28 (11.2)	0.222
	Children	167 (66.5)	169 (67.6)	
	Spouse	24 (9.6)	37 (14.8)	
	Siblings	7 (2.8)	2 (0.8)	
	Relatives	4 (1.6)	5 (2.0)	
	Others	3 (1.2)	1 (0.4)	
Ration card	None	46 (18.3)	36 (14.4)	0.60
	APL	95 (37.8)	89 (35.6)	
No: of children	BPL	156 (62.2)	161 (64.4)	0.007
	≤3 children	140 (55.8)	169 (67.6)	
Family size	>3 children	111(44.2)	81 (32.4)	0.856
	≤5 members	188 (74.9)	189 (75.6)	
	>5 members	63(25.1)	61(24.4)	

* P for trend

Low SES= <5000, Middle=5000-15000, High= >15000

Majority of the injuries that resulted in hospitalisation were hip fractures. Ninety five percent of the women and 93% of the men among the cases were admitted for hip fractures

following falls. Around six percent of the men and three percent of the women sustained head injuries. Injuries of the spine and fractures of other bones

constituted the rest of the injuries in both sexes. Lower limb was most frequently injured (44%). Out of the total injuries, 126 injuries among women and 66 injuries among men were confined to lower limbs, majority of them being hip fractures. Upper limb injuries were the next higher. Thirty one injuries among men and 13 injuries among women were of the upper limb. Head injuries were 12 among men whereas among women there were only seven. Ribs and cervical vertebra were involved in six men and eight women.

Majority of the cases (74%; 186/251), fell on the same level (men: 66%; 57/86; women: 78%; 129/165). Fifteen percent fell from a height (men: 27% (23/86); women: 9% (15/165)). The rest were during a transfer from the existing position for e.g. trying to get up from a chair or cot. Most of the falls from a different level among men were from a considerable height (87%; 20/23) whereas among women only 40% (6/15) of the falls were from a different level (fall from buildings, terrace, falls into the well are some examples). Sixty percent of falls from a different level among women were on the steps.

Table 21: Distribution of cause of injurious falls segregated by sex

Cause of injurious fall	Male (N=86) (%)	Female (N=165) (%)
Tripped	21 (24.4)	47 (28.5)
Slipped	38 (44.2)	54 (32.7)
Fainted	13 (15.1)	32 (19.4)
Lost balance	7 (8.1)	15 (9.1)
Legs gave way	1 (1.2)	2 (1.2)
Felt giddy/dizzy	2 (2.3)	11(6.7)
Don't know/not sure	4 (4.7)	4 (2.4)

A variety of reasons led to injurious falls which can be classified broadly into intrinsic and extrinsic. Intrinsic falls were largely reported as fainting, syncopial attacks and giddiness. Twenty nine percent of the injurious falls were due to intrinsic causes (women: 36% (50/165) men: 26.7% (23/86)). Sixty seven percent of the injurious falls due to intrinsic causes were among those who were 70 years and above.

Extrinsic factors were the evident cause for 66% (160/243) of the injurious falls. In 27% (65/243) of the injurious falls, intrinsic factors alone were the cause. In seven percent (18/243) of injurious falls, a combination of both extrinsic and intrinsic factors was identified. There was only one fall that could be related to the effect of alcohol. One fall was clearly a case of failure of walk aid. There was an instance of fall as a result of electrocution. Animals were involved in five out of the 251 falls (either tripped on the rope or dragged by the roped animal). On two occasions, branches of trees and in another occasion, jackfruit fell on the older persons to initiate a fall. In two cases the older person fell as a result of some greasy ointment smeared on the plantar surface of the feet. In 10% of the events steps or stairs were directly involved in falls.

Table 22: Activity during falls

Activity during falls	Male N=86 (%)	Female N=165 (%)
Walking	33 (38.4)	62 (37.6)
While going to toilet	5 (5.8)	27 (16.4)
Transferring position out of chair or cot	9 (10.4)	25 (15.1)
Climbing stairs	5 (5.8)	12 (7.3)
While taking bath	2 (2.3)	5 (3)
Standing/talking	5 (6)	5 (3)
Doing work at kitchen or backyard	10 (11.6)	21 (12.8)
Others	17 (19.7)	8 (4.8)

Majority of the injurious falls (66%; 165/251) happened during the day time (6am to 6 pm) (Men: 70%; women 64%). The rest happened during the night. The time since last food intake before fall were recorded. Majority of the cases were in the 0-8 hour period (80.4%; 181/225). Around 18.4% (41/225) were in the 8 to 16 hours interval (women: 21%; men: 14%). Three cases (1.2%) had their food 16 hours before falls, suggesting hypoglycaemia as a cause of fall.

Table 23: Place of fall

Place of fall	Male (N=86) (%)	Female (N=165) (%)
1b. Inside the bathroom	2 (2.3)	10 (6)
1c. On the way to bathroom	1 (1.2)	13 (7.9)
1d. Climbing up/down stairs	(0)	2 (1.2)
1e. In the kitchen	(0)	22 (13.3)
1f. In the dining room	1 (1.2)	2 (1.2)
1g. Other rooms	9 (10.5)	10 (6)
Total falls inside the house	24 (28)	87 (52.8)
2a. Walking up/down a stairs or steps	3 (3.5)	7 (4.2)
2b. In the courtyard	9 (10.5)	36 (21.8)
2c. In the garden	(0)	2 (1.2)
2d. In the compound	1 (1.2)	19 (11.5)
Total falls outside the house	28 (32.6)	64 (38.7)
3a. On the road	19 (22)	12 (7.3)
3b. In another person's house	3 (3.5)	0 (0)
3c. In an office/other building	(0)	2 (1.2)
3d. At the workplace	12 (14)	0 (0)
Total falls away from home	34 (39.5)	14 (8.5)

Thirty six percent (31/86) of the males and 64.2% (106/165) of the females, among the fallers were taking at least one regular medication for one of the chronic disease. Out of

this 13 /31 men (42%) and 43/106 women (40.5%) missed their regular medications on the day of fall.

Among the 31 males, who were taking medicines regularly, medication was changed recently for 13 men (42%) and the dosage was altered for 4 (13%). Among the females on regular medication, the medication was changed recently for 40 persons (37.7%) and the dosage was changed for 24 persons (22.6%).

Almost 22% of the fallers lost their consciousness following the fall, but recovered in few minutes. Out of those who fell unconscious immediately after fall, 55% were 70 years and above. More than 82% of the fallers sought medical attention immediately after the fall. The rest of them had several reasons for not going to hospital immediately. The reasons are given in the Table 21. There were no gender specific reasons for not attending the hospital.

Table 24: Reasons for delay in getting treatment

Reasons	Male (N=86)		Female (N=165)	
	(%)		(%)	
Did not feel serious	9	(50)	14	(54)
Nobody at home	3	(16.7)	3	(11.5)
Financial reasons	1	(5.6)	1	(3.8)
No one responsible	2	(11)	3	(11.5)
No male person responsible	3	(16.7)	5	(19.2)

More than 94% of the men and 95% of the women sought treatment in modern medicine while the rest attended alternative medicine at the time of emergency.

Almost 47% of the fallers approached the nearest government facility (hospital/CHC/PHC), 29% approached private hospitals, 20% approached the Medical College Hospital (MCH) directly and four percent approached the nearest general practitioner for medical attention immediately after the fall.

Since the facilities attended were not equipped enough, around 43% (86/202) of the fallers were referred to Medical College hospital immediately after taking the X-ray and diagnosing the fractures. Of them, 35% (71/202) were given only medicines (probably analgesics) from the first hospital they attended and were referred. Dressing and first aid were given for 5.9% (12/202) before referral. Suturing was done for 11 persons (5.4%). Fractures were reduced by closed manipulative reduction for two people (one percent) but were sent to Medical College hospital for other complications. Four persons (two percent) underwent surgical procedures in the peripheral hospital but were sent to MCH for the complications developed.

Off springs mainly took the responsibility of taking the older persons (73%; 182/251) to the hospital after the fall. Spouses took care of 12% (29/251). Neighbours came to help in six percent of the cases. (11/251), siblings called in three percent (7/251). Total strangers came to help in three percent (8/251) of cases.

Only 33% (82/251) used ambulance service. Almost 48% of the ambulance users availed the 108 ambulance service. Thirty eight percent of the fallers used taxi. Auto-rickshaws were used by 26%. Seven people used their own vehicle.

The task of collecting information on the cost of the treatment and hospitalisation was not easy. The patients hardly knew anything about the expenses. The bills or receipts were seldom organised and well-maintained. As payments were done by different persons, the

bills and receipts were with different persons. Several payments were done without any receipt or voucher. Still we could gather some information regarding the variation in the expenses from one person to another.

The Comprehensive Health Insurance Scheme (CHIS) cards were very useful for at least a few. Out of the 251 cases only 77 persons (30%) had CHIS cards and availed the facility. The treatment cost and medicine cost were covered by the insurance coverage. It also covered the implants and surgical equipment required for the surgery. They had to spend for the food and transport alone. A few patients were excluded from their family card as only five members in a family were eligible for inclusion and the older persons were not enrolled by the head of the family.

Twenty one women (12.7%) and four men (4.7%) had history of falls in last 12 months and 55 women (33.3%) and 15 men (17.4%) had history of fall in last five years. Out of the 21 women who fell in last one year, seven persons had fractures (4 Colle's fracture, two both bone fracture forearm, one lower end of tibia). Out of these 21 women 17 had sought medical attention and thus had an opportunity to come in contact with the health system. But only five of them were given any advice to prevent falls in the future and some advice to increase muscle strength.

Table 25: Risk factors for injurious falls: Socioeconomic factors

Characteristics	Cases N=251 (%)	Controls N=250 (%)	Crude OR (95% CI)
Monthly income	≥5000 INR50 (19.9)	28 (11.2)	1.97 (1.20-3.25)
	<5000 INR201 (80.1)	222 (88.8)	Ref
Economic dependence	Independent164 (65.3)	156 (62.4)	1.14 (0.79-1.64)
	Dependent87 (34.7)	94 (37.6)	Ref
Marital status	Single138 (55.0)	81 (32.4)	2.55 (1.77-3.66)
	Married113 (45.0)	169 (67.6)	Ref
Formal education	No68 (27.1)	41 (16.4)	1.89 (1.23-2.93)
	Yes183 (72.9)	209 (83.6)	Ref
Own house	No92 (36.7)	58 (23.2)	1.92 (1.30-2.83)
	Yes159 (63.3)	192 (76.8)	Ref
Ration card	APL95 (37.8)	89 (35.6)	1.10 (0.77-1.58)
	BPL156 (62.2)	161 (64.4)	Ref
CHIS* card	No174 (69.3)	134 (53.6)	1.96 (1.36-2.82)
	Yes77 (30.7)	116 (46.3)	Ref
No: of children	>3 children111 (44.2)	81 (32.4)	1.64 (1.14-2.37)
	≤3 children140 (55.8)	169 (67.6)	Ref
Family size	>5 members63 (25.1)	61 (24.4)	1.04 (0.69-1.56)
	≤5 members188 (74.9)	189 (75.6)	Ref

*Comprehensive Health Insurance Scheme

Table 26: Risk factors for injurious falls: Environmental factors

Characteristics		Cases N=251 (%)	Controls N=250 (%)	Crude OR (95% CI)
Multiple levels	Yes	232 (92.4)	239 (95.6)	1.78(0.83-3.82)
	No	12 (4.7)	11(4.4)	Ref
Slippery floor(Marble, tile or mosaic)	Yes	42 (16.7)	26 (10.4)	1.73 (1.03-2.92)
	No	209 (83.3)	224 (89.6)	Ref
Presence of staircase	Yes	23 (9.2)	17 (6.8)	1.38 (0.72-2.66)
	No	228 (90.8)	233 (93.2)	Ref
Presence of furniture as tripping hazard	Yes	19 (7.6)	8 (3.2)	2.48(1.06-5.77)
	No	232 (92.4)	242 (96.8)	Ref
Presence of door thresholds	Yes	141 (56.2)	110 (44)	1.63(1.15-2.32)
	No	110 (43.8)	140 (56)	Ref
Presence of any other tripping hazard	Yes	21 (8.4)	13 (5.2)	1.67(0.81-3.40)
	No	230 (91.6)	237 (94.8)	Ref
Grab bars fixed on walkways	No	218 (86.9)	221 (88.4)	0.87 (0.51-1.48)
	Yes	33 (13.1)	29 (11.6)	Ref
Any modification done to prevent falls	No	218 (86.9)	223 (89.2)	0.80(0.47-1.38)
	Yes	33 (13.1)	227 (10.8)	Ref
Bedroom lighting	No	11(4.4)	9 (3.6)	1.23 (0.50-3.02)
	Yes	240 (95.6)	241 (96.4)	Ref
Light switch easily accessible in bedroom	No	168 (66.9)	171 (68.4)	0.94 (0.64-1.36)
	Yes	83 (33.1)	69 (31.6)	Ref
Bathroom away from the bed	Yes	98 (39.2)	87 (34.9)	1.20 (0.83-1.73)
	No	153 (60.8)	163 (65.1)	Ref
Bathroom at a different level	Yes	148 (59.2)	129 (51.8)	1.35(0.95-1.92)
	No	103 (40.8)	121 (49.2)	Ref
Switch at the entrance of the bathroom	No	89 (35.5)	95 (38.2)	0.89 (0.62-1.28)
	Yes	162 (64.5)	155 (61.8)	Ref
Bathroom well lit	No	179 (71.3)	181 (72.7)	0.93 (0.63-1.38)
	Yes	72 (28.7)	69 (27.3)	Ref
Dry wet demarcation of bathroom	Yes	33 (13.1)	44 (17.7)	1.42 (0.87-2.31)
	No	218 (86.9)	206 (82.3)	Ref
Floor of bathroom (cement or red oxide)	Yes	60 (26.8)	47 (21.0)	1.38 (0.89-2.13)
	No	164(73.2)	177 (79.0)	Ref
Walk aid	Yes	40 (15.9)	19 (7.6)	2.31 (1.29-4.11)
	No	211 (84.1)	221 (92.4)	Ref
Way to the entry of the house smooth	No	68 (27.1)	45 (18.0)	1.69 (1.11-2.59)
	Yes	183 (72.9)	205 (82.0)	Ref
Other tripping hazards around the house	Yes	58 (23.1)	30 (12)	2.20 (1.36-3.57)
	No	193 (76.9)	220 (88)	Ref

Characteristics		Cases N=251 (%)	Controls N=250 (%)	Crude OR (95% CI)
Walkways around the house free of obstacles	No	162 (64.5)	173 (69.2)	0.81 (0.56-1.18)
	Yes	89 (35.5)	77 (30.8)	Ref
Any slippery surfaces around	Yes	50 (19.9)	33 (13.2)	1.64 (1.01-2.64)
	No	201 (80.1)	217 (86.8)	Ref
Steps outside	Yes	76 (30.3)	60 (24)	1.38 (0.93-2.04)
	No	175	190	Ref

Table 27: Risk factors for injurious falls: Behavioural factors

Characteristics		Cases N=251 (%)	Controls N=250 (%)	Crude OR (95% CI)
Ever user tobacco	Yes	74 (29.5)	85 (34.0)	0.81(0.56-1.18)
	No	177 (70.5)	165 (66.0)	Ref
Current user tobacco	Yes	44 (17.5)	41 (16.4)	1.08 (0.68-1.73)
	No	207 (82.5)	209 (83.6)	Ref
Current user Alcohol	Yes	22 (8.8)	16 (6.4)	1.41 (0.72-2.74)
	No	229 (91.2)	234 (93.6)	Ref
Milk intake	< 5 days	202 (80.5)	211 (84.4)	0.76 (0.48-1.21)
	≥ 5 days	49 (19.5)	39 (15.6)	Ref
Vegetable and fruit (V&F)intake	< 7 days	85 (33.9)	76 (30.4)	1.17 (0.81-1.71)
	= 7 days	166 (66.1)	174 (69.6)	Ref
(V&F)intake < 2 servings daily	< 2 servings	121 (48.2)	75 (30.0)	2.17 (1.51-3.13)
	≥ 2 servings	130 (51.8)	175 (70.0)	Ref
Fish intake	Yes	124 (51.5)	104 (43)	1.41 (0.98-2.01)
	No	127 (48.5)	146 (57)	Ref
Change in body weight	< 2 days	30 (12.0)	20 (8.0)	1.56 (0.86-2.83)
	≥ 2 days	220 (88.0)	230 (92.0)	Ref
Physical activity	Yes	119 (47.4)	134 (53.6)	0.78 (0.55-1.11)
	No	132 (52.6)	116 (46.4)	Ref
Physical activity/week	< 150 mins	55 (21.9)	39 (15.6)	1.52 (0.96-2.93)
	≥ 150 mins	196 (78.1)	211 (84.4)	Ref
Frequency of meals	< 150 mins	174 (69.3)	149 (59.6)	1.53 (1.06-2.21)
	≥ 150 mins	77 (30.7)	101 (40.4)	Ref
Frequency of meals	< 2 meal/day	13 (5.2)	4 (1.6)	3.36 (1.08-10.45)
	≥ 2 meal/day	237 (94.8)	246 (98.4)	Ref

Table 28: Risk factors for injurious falls: Biological factors

Variables	Risk factors	Cases N=251 (%)	Controls N=250 (%)	Crude OR (95% CI)
Sex	Females	165 (65.7)	121 (48.4)	2.05 (1.43-2.93)
	Males	86 (34.3)	129 (51.6)	Ref
Age	≥ 70	144 (57.4)	74 (29.6)	3.20 (2.21-4.63)
	< 70 years	107 (42.6)	176 (70.4)	Ref
Age of menopause* (N=286)	≤ 47 years	113 (68.5)	72 (59.5)	1.48 (0.91-2.41)
	>47 years	52 (31.5)	49 (40.5)	Ref

*only for women

Table 29: Risk factors for injurious falls: Pathological factors

Variables		Cases N=251 (%)	Controls N=250 (%)	Crude OR (95% CI)
Vision impairment	Yes	107 (41.8)	29 (11.6)	5.48 (3.46-8.69)
	No	144 (58.2)	221 (88.4)	Ref
Respiratory diseases	Yes	31 (12.4)	15 (6.0)	2.21 (1.16-4.20)
	No	220 (87.6)	235 (94.0)	Ref
Cardiovascular diseases	Yes	30 (12.0)	29 (11.6)	1.03 (0.60-1.78)
	No	221 (88.0)	121 (88.4)	Ref
Renal diseases	Yes	4 (1.6)	4 (1.6)	1.00 (0.25-4.03)
	No	247 (98.4)	246 (98.4)	Ref
Neurological diseases	Yes	5 (2.0)	3 (1.2)	1.67 (0.40-7.08)
	No	246 (98.0)	247 (98.8)	Ref
Endocrine	Yes	4 (1.6)	8 (3.2)	0.42 (0.15-1.65)
	No	247 (98.4)	242 (96.8)	Ref
Hypertension	Yes	107 (42.6)	87 (34.8)	1.39 (0.97-2.00)
	No	144 (57.4)	163 (65.2)	Ref
Dyslipidemia	Yes	24 (9.6)	17 (6.8)	1.45 (0.76-2.77)
	No	227 (90.4)	233 (93.2)	Ref
Diabetes	Yes	77 (30.7)	87 (34.8)	0.83 (0.57- 1.21)
	No	174 (69.3)	163 (65.2)	Ref
Complications of Diabetes	Yes	3 (1.2)	12 (4.8)	0.24 (0.07-0.86)
	No	248 (98.8)	238 (95.2)	Ref
Sleep disorders	Yes	9 (3.6)	3 (1.2)	3.06 (0.82-11.45)
	No	242 (96.4)	247 (98.8)	Ref
Knee pain	Yes	3 (1.2)	2 (0.8)	1.5 (0.25- 9.06)
	No	248 (98.8)	248 (99.2)	Ref
Cancers	Yes	5 (2.0)	20 (8.0)	0.23 (0.09-0.63)
	No	246 (98.0)	230 (92.0)	Ref
h/o falls in last 12 months	Yes	25 (10.0)	7 (2.8)	3.84 (1.63-9.05)
	No	226 (90.0)	243 (97.2)	Ref

Variables	Cases N=251 (%)	Controls N=250 (%)	Crude OR (95% CI)
h/o falls in last 5 years	Yes 70 (27.9)	29 (11.6)	2.95 (1.83-4.74)
	No 181 (72.1)	221 (88.4)	Ref
Multi-morbidity ≥ 2 illness	Yes 129 (51.4)	101 (40.4)	1.56 (1.10-2.22)
	No 122 (48.6)	149 (59.6)	Ref
Polypharmacy ≥ 3 medicines	Yes 37 (14.7)	27 (10.8)	1.43 (0.84-2.43)
	No 214 (85.3)	223 (89.2)	Ref
On Antihypertensive	Yes 59 (23.5)	62 (24.8)	0.93 (0.62-1.40)
	No 192 (76.5)	188 (75.2)	Ref
On Hypoglycemic drug	Yes 38 (15.1)	51 (20.4)	0.70 (0.44-1.11)
	No 213 (84.9)	199 (79.6)	Ref
On Statins	Yes 15 (6.0)	12 (4.8)	1.26 (0.58-2.75)
	No 236 (94.0)	238 (95.2)	Ref
On Bronchodilators	Yes 13 (5.2)	7 (2.8)	1.90 (0.74-4.84)
	No 238 (94.8)	243 (97.2)	Ref
On Antacids	Yes 17 (6.8)	4 (1.6)	4.47 (1.48-13.47)
	No 234 (93.2)	246 (98.4)	Ref

Table 30: Risk factors for all injuries: Multivariate logistic regression model

Risk factors	Case (%)	Control (%)	Crude OR (95% CI)	Adjusted OR (95% CI)	
Age	≥ 70 years	144 (57.4)	74 (29.6)	3.20(2.21-4.63)	2.25(1.46-3.46)
	< 70 years	107 (42.6)	176(70.4)	Ref	Ref
H/o falls in last 12 months	Yes	25 (10.0)	7 (2.8)	3.84(1.63-9.05)	2.76(1.08-7.08)
	No	226 (90.0)	243(97.2)	Ref	Ref
Vision impairment	Yes	107 (41.8)	5.48(3.46-8.69)	4.49(2.77-7.30)	
	No	144 (58.2)	Ref	Ref	
Marital status	Single	138 (55.0)	81 (32.4)	2.55(1.77-3.66)	1.97(1.31-2.97)
	Married	113 (45.0)	169 (67.6)	Ref	Ref
Marble, tile or mosaic floor	Yes	42 (16.7)	26(10.4)	1.64 (1.01-2.64)	2.37(1.31-4.32)
	No	209 (83.3)	224(89.6)	Ref	Ref
Door threshold	Present	141 (56.2)	1 (44)	1.63(1.15-2.32)	1.52 (1.01-2.29)
	Absent	1 10 (43.8)	4 (56)	Ref	Ref

Table 31: Risk factors for hip fractures

Risk factors		Hip #%	Control%	Crude OR (95% CI)	Adjusted OR (95%CI)
Marital status	Single	104(61.2)	81(32.4)	3.29(2.19-4.93)	2.43(1.34-4.43)
	Married	66(38.8)	169(67.6)	Ref	Ref
Formal education	No	53(31.2)	41(16.4)	2.31(1.45-3.68)	1.92(1.08 -3.41)
	Yes	117(68.8)	209(83.6)	Ref	Ref
Age	≥ 70 years	60(35.3)	74(29.6)	4.36(2.88-6.61)	2.56(1.55-4.23)
	< 70 years	110(64.7)	176(70.4)	Ref	Ref
H/o falls in last 12 months	Yes	23(13.5)	7(2.8)	5.43(2.27-12.97)	4.01(1.44- 11.22)
	No	147(86.5)	243(97.2)	Ref	Ref
Vision impairment	Yes	73(46.5)	29(11.6)	6.62(4.10-10.80)	5.39(3.10-9.34)
	No	91(53.5)	221(88.4)	Ref	Ref
Respiratory ailments	Yes	25(14.7)	15(6.0)	2.70(1.38-5.29)	2.37(1.08-5.24)
	No	145(85.3)	235(94.0)	Ref	Ref
Using walk aid	Yes	36(21.2)	19(7.6)	3.27(1.80-5.92)	2.29(1.13- 4.62)
	No	134(78.8)	231(92.4)	Ref	Ref
Marble, tile or mosaic floor	Yes	31(18.2)	26(10.4)	1.92(1.10-3.37)	2.91(1.41-6.00)
	No	139(81.8)	224(89.6)	Ref	Ref

The common risk factors for all injuries and hip fractures are highlighted in the tables 27 and 28. Age above 70 years, history of falls in last 12 months, impaired vision, not living with spouse and marble, tile or mosaic floor were found to be common risk factors for all injuries as well as hip fractures specifically. Vision impairment was the only risk factor that came out to be significant for injuries other than hip fractures with an adjusted odds ratio of 3.36 with a 95% CI of 1.79-6.31 when applied in a multinomial regression model.

Table 32: Comparison of risk factors for all injuries, hip fractures and other injuries

Risk factors	All injuries	Hip fractures	Other injuries
Single marital status	√	√	-
No Formal education	-	√	-
Age ≥ 70 years	√	√	-
H/o falls in last 12 months	√	√	-
Impaired vision	√	√	√
Respiratory ailments	-	√	-
Using walk aid	-	√	-
Slippery floor	√	√	-
Door threshold	√	-	-

Table 33: Comparison of circumstances of all falls* and injurious falls#

Features	All falls	Injurious falls
Body part injured	Lower limb	Hip
Cause of fall	Slips (25.6)	Slips (32.7)
Activity during fall	Walking	Walking
Place of fall	Around the house (55%)	Inside the house (44%)
Time of fall	6 am to 6 pm (83%)	6 am to 6 pm (65.8)
Correlates	Any morbidity, falls, lack of education	history of Single status, age ≥ 70 years, impaired vision, history of previous falls, slippery floor, door threshold

*Data from cross sectional survey # Data from cross sectional survey

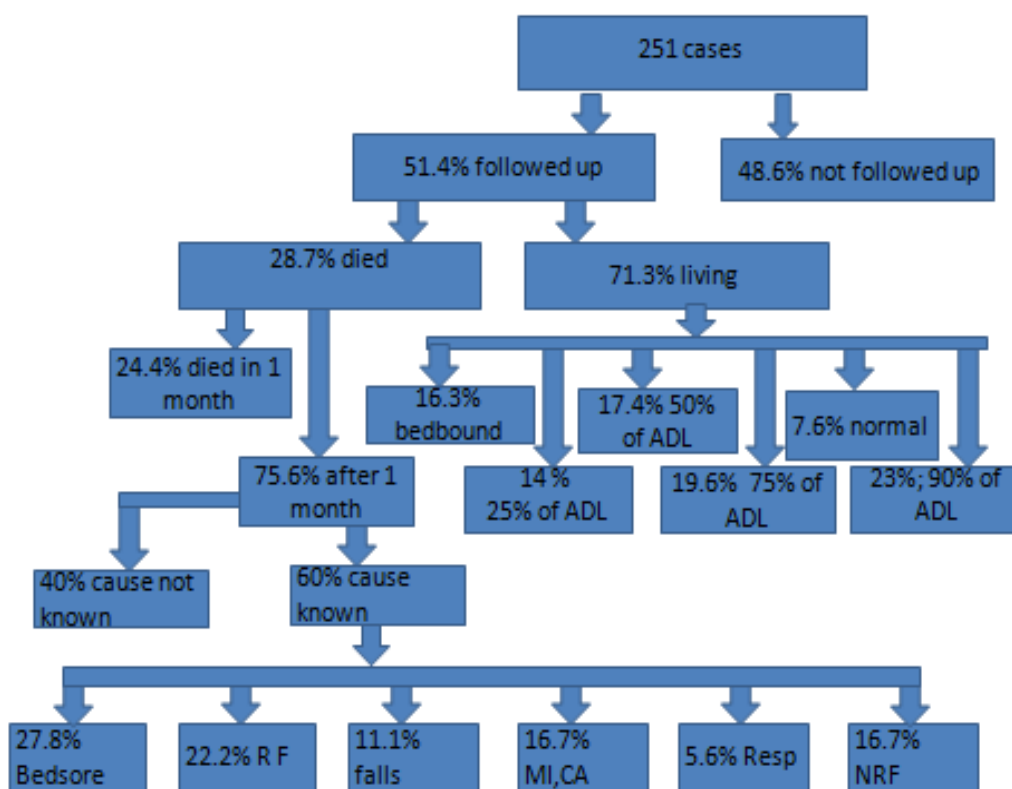
4.3.1 Consequence of fall related injuries

Around seven persons (3%) among the cases died within one month of the initial hospitalisation. They were followed up post injury to assess their functional status at one year. Out of the 251 cases, phone numbers of 195 cases were available. Only 129 cases could be contacted over the phone at the end of one year. Thirty seven persons (28.7%) died premature within one year after the falls.

Out of the seven persons who died in the first month of the fall, within the hospital, three developed myocardial infarction (MI) during surgery or immediately after surgery, were admitted in Intensive care unit (ICU) and died thereafter. One person was ventilated after the surgery developed renal failure and died in ICU. One of them fell from the bed after discharge from the hospital, developed head injury, went into coma and died in ICU. Other two persons died suddenly in the ward, probably due to cardiac arrest. From the information obtained from the care takers of the older persons who died after the initial month following falls, we could elicit the causes of death in 18 cases. Three of the deaths were not directly related to falls. But the rest were delayed complications of the falls. Four persons probably developed renal failure after the falls and surgery. The history was suggestive of renal shut down following septicaemia after wound infection. Five persons had bed sore and died due to its sequel. Two persons fell again in their houses after which they died suddenly. One person developed respiratory problems and died of breathing difficulty, probably pneumonia. One person developed chest pain and died in hospital, indicative of myocardial infarction (MI). Two persons died symptoms suggestive of cardiac arrest. A few of them were bed bound after the falls and were not taking proper food. Some of them were disoriented before death and died eventually after couple of days. Perhaps they had some electrolyte imbalance.

Fifteen persons were completely dependent and bed bound after falls (11.6%). Thirteen persons (10%) regained up to 25% of their pre fall status and a few of them required assistance for their ADL even after one year of falls. Out of this five persons were wheel chair bound (38%). Sixteen older persons were 50% back to normal (12.4%) and 18 persons 75% back to normal (13.9%). Twenty six persons (20%) could regain 90% of their pre-fall status but some had complaints of pain, discomfort or oedema. Seven persons were completely back to normal (5.4%). Twenty persons started using walk aid after the falls in fear of fall (16%). Total 25 persons complained of pain (19%), seven persons complained of oedema (5.4%). Only nine persons reported fear of fall (7%). Five persons were disoriented (4%). Seven persons complained of developing hypertension, diabetes mellitus or heart disease after the event (5.4%).

Fig 7: Follow up of cases: schematic representation



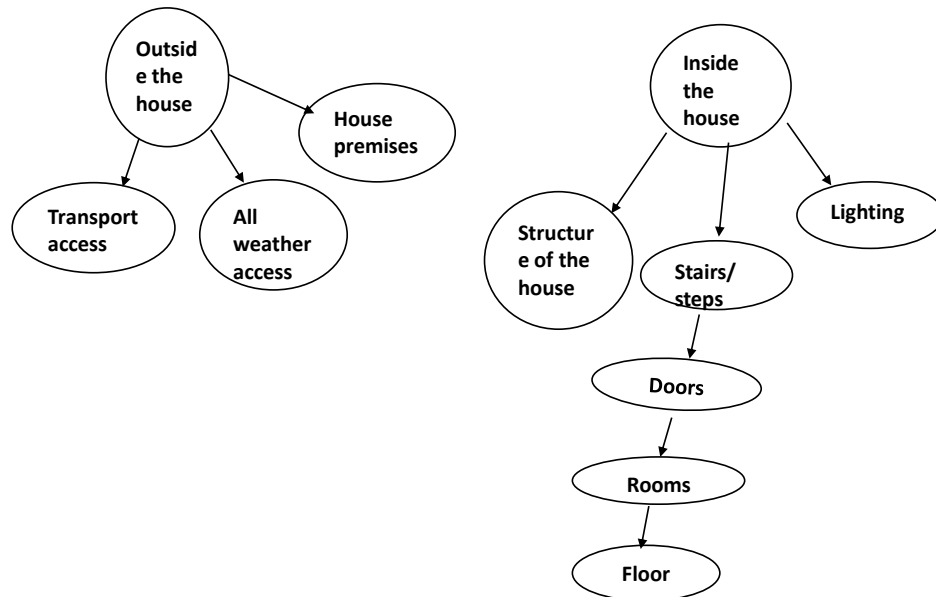
4.4 Results of Observation of households

In this section the results of observation of households of older persons who fell within and outside their homes and the potential household hazards identified in their homes are being reported. The structural alterations made by the households to prevent further falls of older persons and to accommodate the disability following falls are also described.

Fifteen households were observed, out of which 11 were of the women who fell. Nine persons who fell were above the age of 75 years. Five persons were dead by the time we contacted the household. Out of the five persons who died, three were above the age of 75 years and four were women and four persons suffered hip fractures. Three persons died within two weeks after the fall, one person survived two months and another person survived for seven months.

Out of the ten persons who survived, four persons had elbow fractures, two hip fractures, two spine fractures, one ankle fracture and one head injury. Twenty percent were bedbound, 20% recovered almost to their pre-injury status, being able to do about 90% of their activities they were doing before the fall. Twenty percent can do more than 50% of their pre fall activities where as another 20% could do only 10% of their pre fall activities. One person could move around in a wheel chair, and another person used a walker.

Fig 8: Qualitative content analysis coding framework



4.4.1 Access to motorable road

For the purpose of this study, a motorable road was defined as a road able to be used by motor vehicles, at least an autorikshaw. Few houses (26.6%) had ready access to a motorable road. Four households (26.6%) were at a distance of five metres, another four houses (2.6%) at a distance of 10-15 metres, and three (20%) of the houses, were at least a kilometre away from a motorable road. Two of the houses (13%) had no independent access to the road. They had to walk through somebody else's property to reach the road.

4.4.2 Access to bus

Only five houses (33%) had access to bus transport within half a kilometre (one within 15 metres and the four (26.6%) within 500 metres). The rest of the houses (64%) were at least

one kilometre away from a road with bus transport. The farthest house was five km away from a bus route.

4.4.3 Type of road

Most of them were kaccha, frequently irregular with loose mud and stones and at times narrow. The narrow roads in between the two compound walls were at times claustrophobic. After the occasional rains during the season, they were generally water logged and slippery with algae. There was vegetation on both sides of the road. Due to the particular terrain of the area, twelve houses (75%) were at a different level from the road and therefore the tracks to these houses were either sloping up or down.

4.4.4 Around the house

One third of the houses observed had a non-slippery regular surface around the house, either paved with interlocking tiles (terracotta) or filled with gravel/sand. In the other cases (67%) the areas around the house were either cemented or just left as such. They were frequently irregular and slippery with algae and water puddles. Some of the tripping hazards identified around the houses were ditches around a coconut tree, stones and logs, heaps of firewood, tools and materials used for construction.

Wells were the main water source for most of the houses. The wells were generally situated beside the house. Almost all the wells observed had side walls but in few cases (13%) they were too low to prevent a fall. None of them were closed at the top.

4.4.5 General features of the house

The houses varied in the size, shape, facility, design and safety. The floor area of the houses ranged from 300 square feet to 2000 square feet. Smaller the area, more was the

clutter. As the square feet area increased the amount of clutter decreased and appeared comparatively safe for the older persons.

Single storeyed houses were common. The number of bedrooms ranged from one to five. The rooms were small in size in most of the houses even though there were a few with spacious rooms. One of the houses was too old and dilapidated, with mud wall, cow dung smeared floor, coconut leaf roof, low and narrow with high door thresholds. Few houses were isolated with no houses in the neighbourhood.

4.4.6 The entrance to the house

All the houses were at a level different from the ground. They had two or three steps on both sides of the house. The maximum number of steps was four. All the double storeyed buildings had stairs inside, whereas single storeyed terrace buildings had access to the terrace from outside.

Regularity, uniformity and height of individual steps: The height, width and the steepness of the steps varied from house to house.

Stability: In one of the houses the lower foot step was substituted by two unstable hollow bricks. Another house which was in the process of construction, had a sand bag and some concrete pieces as a step.

Evenness: In some instances, steps were of diverse height. Sometimes they were too high or too low.

Finishing: Steps were damaged with crevices or broken edges in some houses, whereas in others they were smooth and polished.

Whether fixed with a handrail: Support for climbing the stairs were generally lacking.

Visibility: The distinction of the step from the floor was not evident in dim light as seen in some of the houses.

4.4.7 Doors

Doors were examined for the height, width, presence of thresholds, level on both sides of the door etc. Majority were of standard height and width. But few houses were old fashioned with low and narrow doors that were difficult for an older person to negotiate. Thresholds were present at all the doors in such houses and were often of different heights. But majority of the houses had thresholds at the front and backdoors. One of the houses had a threshold of at least one foot at the front and backdoor.

4.4.8 Rooms

Rooms were examined for the space, clutter, amount of furniture and tripping hazards. Most of the houses we observed had small rooms and had lot of furniture in them reducing the space for an older person to move around. Plastic chairs were used frequently by the older persons in their rooms. A stable or proper chair was deficient in almost all the houses. There was no provision to switch on the lights without getting up from the bed.

4.4.9 Floors

The type of flooring ranged from mud to marble. Three houses were tiled and one had marble floor. Some houses had mixed flooring. The other floors were either cemented plain or with black or red oxide. The floor was damaged at some places in one of the houses whereas in another house the marble floor was too smooth, both being threat to older person.

4.4.10 Roof

The roofs of the houses were observed to learn the variety of houses and to assess the economic status of the households. Roofs were considered hazardous in case of terrace buildings without a parapet wall. The roofing materials used was coconut leaf, sheet, tiles and concrete. One of the houses was thatched; four houses were covered with metal or plastic sheets. Four houses were tiled; four were terrace and two were a mix of tile and terrace. At least two of the houses did not have a parapet wall around the roof.

4.4.11 Lighting

Lighting of the rooms, halls and walkways were observed. Ideally, all the rooms should be well lit during day time without any artificial lights. None of the house achieved this standard. Generally, the main hall of the houses was insufficient. The walkways in some of the houses required artificial lights even during the day time.

4.4.12 Different levels inside the house

In some of the houses, different rooms were at different levels. In addition, each of these levels was further bounded by thresholds.

4.4.13 Potential tripping hazards

Almost all the houses had tripping hazards. Plastic chairs were one of the commonest threats. As these chairs are unstable and light, falls are more likely while trying to sit or get up from it. Furniture with legs pointing outwards posed a potential tripping hazard. Thresholds appeared as a threat, especially in cases where the levels on both sides of the threshold were different. Door mats with no grip backing and therefore slippery on a smooth floor were usually recognized as a potential tripping hazard. A polyester cloth was used instead of door mat in one of the houses with a smooth tiled floor. There were no

tripping hazards like low wires or low curtains. Sinks were inspected for any leaks, but we found none.

4.4.14 Bathrooms and toilets

The location of bathroom: Some bathrooms were away, outside the house up to 100 metres.

Type of commode: Majority of the houses had European commode. In households with more than one toilet, both Indian and European commodes were present.

Type and area of floor: The bathrooms were generally small with cemented or tiled floor. Some of the cemented floors were too slippery with algae.

The level of the bathroom with the rest of the house: In most cases the bathrooms were at a higher or lower level from the rest of the floor, both being risky for an older person.

Lighting: Two of the toilets that were outside and one of the attached bathroom had no lights inside. Visibility was limited even during the daytime. Even the ones with lighting were not bright enough at times. Instead of keeping the light switches outside the bathrooms, they were often found inside.

Separation of dry and wet areas: Concept of separation of dry and wet areas in the bathrooms was not visible in most houses. But one house had separate rooms for taking bath and a toilet.

Provision to sit and take bath: Some have made arrangements for the older person to sit and take bath.

Ease with which things can be reached: It was difficult for an older person to reach for items like soap and towel in some of the bathrooms. There was no provision to hold on during a fall in any of the toilet or bathroom.

4.4.15 Protective measures and alterations made after the falls

Some protective measures were consciously made in order to prevent further falls of older persons in their home. Mats were placed around the house on all the cemented surfaces to prevent falls in one of the houses. In other two houses, new carpets were placed on the walk ways and the bedroom on the way to the bathroom and the halls where the older person usually spent most of the time. The thresholds were removed in a house where the older person sustained a fracture. Bathroom (wet area) and toilet (dry area) were separated after the falls even though it was not a conscious effort. At least some have changed the structural features not to prevent further falls but mainly to accommodate the needs of the older person following the injury. The Indian commode was replaced by European commode for the convenience of the older person. Devices like walk aid and wheel chair were used to mobilize older persons after the fall. A rope functioned as a clutch for an older person to get up from bed as he is bedridden after the fall. It was interesting to observe that instead of making necessary alterations inside the attached bathroom with a tiled floor and European commode, where an older woman fell, an outside bathroom with cement floor and Indian commode around 15 metres away from home was modified for her to prevent further falls.

Table 34: Summary of findings of observation

Outside the house

Potential hazards identified	Structural changes made after falls
Road to the house:	Nil
<ul style="list-style-type: none"> • No access to a motorable road • No independent access to road • Irregular, slippery roads • Vegetation on both side of the roads 	
Around the house	<ul style="list-style-type: none"> • Mats laid around the house on the • cemented surface
<ul style="list-style-type: none"> • Tripping hazards like ditches around a coconut tree, stones, logs, heaps of firewood, • tools and materials used for construction • Slippery surfaces with algae and water puddles • Uneven surfaces 	
General features of the house	Nil
<ul style="list-style-type: none"> • Multiple storeys • Staircases • Small rooms • Clutter of furniture • No immediate neighbours 	
Entrance to the house	Nil
<ul style="list-style-type: none"> • Presence of steps to enter the house • Uneven, too high or too low and damaged steps • Unstable steps • Cracks or crevices on the steps • Smooth and polished steps • Nothing to hold on while climbing steps 	

Inside the house

Potential hazards identified	Structural changes made after falls
Floor <ul style="list-style-type: none"> • Marble and tiled floors • Mix of flooring materials • Floor in multiple levels • Damaged floors with cracks and crevices 	<ul style="list-style-type: none"> • Mats laid on the walk ways and main hall
Roof <ul style="list-style-type: none"> • No parapet wall around the roof 	Nil
Lighting <ul style="list-style-type: none"> • No light or insufficient light • Light switch not immediately outside the bathroom • Main hall and walk ways not well lit 	Nil
Other tripping hazards within the rooms <ul style="list-style-type: none"> • Plastic chairs • Furniture with outward directed legs • Door thresholds 	Door thresholds removed
Bedroom <ul style="list-style-type: none"> • Light switch not reachable from bed • No proper chairs to sit • Clutter 	Nil
Doors <ul style="list-style-type: none"> • Narrow and low doors • Different levels on both side of the door • Threshold 	Nil
Toilets <ul style="list-style-type: none"> • Toilet away from the house • Different level from the rest of the floor • No light switch at the entry • No light inside • No dry wet separation • Very small toilet/bathroom • Indian commode • Tiled floor • Cemented floor with algae grown • No provision to sit and take bath • Not easy to reach for things like soap and towel 	<ul style="list-style-type: none"> • European commode fixed • Dry wet separation made • Started using a bathroom with a cemented floor
Other preventive measures <ul style="list-style-type: none"> • Devices • Walk aid, wheel chair, mats, rope as a clutch 	

DISCUSSION

Chapter 5

DISCUSSION

The ageing of population, happening world-wide is a consequence of increase in life expectancy at birth and decrease in the mortality rate, birth rate and fertility rates. Whether the increase in life expectancy assures increase in years of life in good health and dignity or merely adds years with morbidity, disability and dependency to life is the persistent question. The major cause of disability and morbidity among the older persons are non-communicable diseases namely memory loss, urinary incontinence, falls and mental illness that are called “geriatric giants” (Krishnaswamy & Usha n.d.) Falls are important among them as the injuries and disabilities following falls are a huge burden to the health system due to the high cost for management and rehabilitation. The developed countries that have already started facing the phenomenon of ageing of population are more equipped to face the situation, whereas developing countries where ageing is fast catching up are hardly prepared. India, the second populous country in the world, has 8% of its population in the old category, which is projected to rise in the coming years. The Indian state of Kerala is leading the demographic transition in the country; here considerable number of older persons is living alone or with their spouses as a result of migration of the younger ones to a different state or country. Even in houses where older persons live with their children, there is nobody to look after them as more women are entering the work force. Therefore it is crucial for the older persons to be independent throughout their life time. Falls and related injuries disrupt the normal functioning of a household and increase the economic and psychological burden of the household as well as the Health system. Measures for

prevention of fall related injuries have not been attempted in developing countries as they are not considered a priority due to dearth of information in this regard.

This thesis attempted to determine the burden of falls in one year among older persons living in a community in their home environment, identify risk factors for fall related injuries that resulted in hospitalisation and recognise and assess the built environment factors that precipitated fall related injuries among older persons within their homes. The results brought out a high frequency of falls among older persons in a period of one year. It succeeded in identifying some of the modifiable extrinsic risk factors for injurious falls among older persons. This study assessed and analysed some of the potential built environment hazards within and outside the dwellings of older persons and examined the preventive measures adapted by the family to prevent future falls among older persons.

The frequency of falls among older persons in our study (26.7%) is comparable to the findings from studies done in developed countries (Tinetti et al. 1988; Prudham & Evans 1981; WHO 2008). The earlier study in Trivandrum, reported the frequency of falls as 45% among community dwelling older women (Johnson 2006). The rate we report among women is much lower (27.3%). This study is more representative, as we have drawn a random sample from the population; the earlier study was done in a non-representative sample.

According to some earlier studies the frequency of falls among men is low when compared to women (WHO 2007; Prudham & Evans 1981). However we could not establish a significant difference in the frequency of falls in the two sexes. This is similar to reports by Tinetti (Tinetti et al. 1988). Even though we could not demonstrate a significant increase in the overall proportion of falls with age in the total population as shown by

earlier studies, a significant trend was seen among women with increasing age as mentioned by Blake (Blake et al. 1988). However, with regard to falls resulting in injury, there was a significant difference in the proportion in both the sexes. This was apparent in the bivariate analysis, though it did not come up in the final model.

The proportion of fallers with recurrent falls in the reference period were low compared to other studies that have reported as high as 46% (Tinetti et al. 1988; Bueno-Cavanillas et al. 2000; Prudham & Evans 1981). The retrospective nature of the study and the recall period being one year may have resulted in under reporting. Fallers perhaps remember only serious falls and tend to forget the trivial falls. But the results are comparable with Lord and Dayhew who reported 21.7% of falls in a prospective study (Lord & Dayhew 2001). Twenty eight percent of the fallers who sustained injurious falls had history of falls in last five years and around 10% had a fall in last one year among the cases in our case control study.

Forty two percent of falls resulted in serious injuries that required medical attention; which is higher than other reports (Bergland & Wyller 2004). The proportion of fractures was also high when compared to earlier studies but lower than reported by Johnson (Tinetti et al. 1988; Bergland & Wyller 2004; Ambrose et al. 2013; Johnson 2006). Our study reports a high proportion of hip fractures compared to an earlier study (Ambrose et al. 2013). According to Gupta, osteoporosis which is a silently progressing metabolic bone disease is prevalent in India, which can explain the higher proportion of hip fractures in this sample (Gupta 1996).

Hip fractures were the frequent cause for hospitalisation, similar to findings of Fuller. They were more frequent among women. As evident from the findings the nature of falls

that resulted in hip fractures in men and women were different. When trivial falls could result in hip fractures among women, high impact falls like fall from a height, from buildings and into the well, led to hip fractures in men. It seems that due to the difference in the construct of the body, the hip absorbs most of the mechanical energy in the course of a fall leading to more injuries to hip among women (Sattin 1992). It can also be attributed to the reduced bone mass among women due to rapid loss of bone density (Sattin 1992; Riggs et al. 1981). Awareness incorporating osteoporosis and importance of its prevention is very essential among older women. Since osteoporosis starts in the middle age, awareness and prevention efforts should start right from the childhood at least among girls.

Majority of the fallers fell outside their house, on the courtyard, on the road or in the garden, similar to the findings of Bergland and Wyller (Bergland & Wyller 2004). Those who go for outdoor walk (to work, to market or shop) and were very active, fell at remote locations from house. Moderately active persons fell just outside their house, while walking or working in the backyard or garden. Majority slipped and fell while going to the toilet or bathroom situated outside the house. Those who fell inside were frequently those staying mostly indoors. According to Bleijlevens, more active elders fall at remote locations from home, less active people fall just outside the house and home bound people fall inside the house (Bleijlevens et al. 2010). Elderly friendly indoors and outdoors including roads and other buildings are vital to ensure active living of older persons.

Injurious falls also occurred more frequently outside the house. Women frequently fell and were injured within home and around, whereas men fell away from home at work place and on the roads similar to earlier studies (Campbell et al. 1990; Duckham et al. 2013;

Berg WP & Mills EM 1997; Masud and Morris 2001). Within homes, women fell and were injured frequently in the kitchen. Indoor falls resulted in more injuries among women (Campbell et al. 1990).

Our participants fell most frequently during the day time when they were at their peak of activity (daily routine) similar to reports by D'souza (D'souza et al.

2008). This is the time when most of the older people were alone as the youngsters need to be at work or school. Most of the fallers in our sample were alone while falling which has to be considered while planning interventions. Two thirds of the injurious falls also happened during day time (D'souza et al. 2008; Berg WP & Mills EM 1997). The proportion of injurious falls during night (6pm to 6 am) in this study (34%) was higher than the 20%, reported by Campbell (Campbell et al. 1990). Older persons frequently fell and sustained injuries due to intrinsic causes during night in their bedrooms.

In agreement with other studies walking was the most common activity during all types of falls including injurious falls (Tinetti et al. 1988; Bleijlevens et al. 2010; Berg & Mills 1997; Skalska et al. 2013; Adebisi et al. 2009). The intrinsic factors in combination with precipitating factors like slippery floors or tripping hazards might have triggered the falls on the same level. The lower rate of falls while climbing up or down the stairs could be due to the general tendency of older persons to avoid climbing stairs, either to avoid falls or because of inability to climb stairs. Walking is a complex process that involves harmonization of several functions of the body. This includes biological, mechanical and cognitive harmony (Rubenstein 2006). As mentioned by Rubenstein, poor flexibility of the joints, poor and slow response of the muscles and sensory system, defective vision, and deteriorating cognitive abilities of an older person can be the reason for falls and

subsequent injuries while walking. Moreover there is mild displacement of centre of gravity while walking which can lead to falls in an older person (Tinetti et al. 1988).

Extrinsic factors like slipping and tripping were the common cause of many falls. Slipping was the frequent cause for fall similar to reports by several earlier studies (Tinetti et al 1988; Blake et al 1988). It was also found that extrinsic factors were responsible for majority of the injurious falls especially in the young old group (60-70 years), Men slipped more often when compared to women. Slips were exclusively attributable to presence of an extrinsic risk factor. A smooth polished slippery floor, presence of oil or water on the surface of the floor and oil or grease on the plantar surface of foot were the common reasons inside the houses as reported by D'souza study (D'souza et al. 2008). The mode of adjustment of the body to avoid falls while one slip is different in an older person when compared to younger persons. In a younger person, the shift of body weight at the hip evades a fall, where as in an older person the fall avoidance is through a rapid step. Perhaps this mechanism is impaired in older individuals with a slow response of muscles and joints (Rubenstein 2006). Cemented surface with algae and loose mud immediately after rains were the usual reasons for slipping outside the house similar to an earlier study (D'souza et al. 2008).

Fainting, which was the commonest cause of intrinsic falls could be a syncopial attack, hypoglycaemic event, symptom of cardiovascular event or postural hypotension, drug side effect or anxiety. Interventions should target both the extrinsic and intrinsic risk factors prioritising the recurrent fallers.

Trips were generally due to the presence of an extrinsic factor combined with the changes that take place in the walking gait of an older person due to ageing (Berg et al.; Gehlsen &

Whaley 1990). Presence of thresholds, irregularity of the floor including cracks and crevices, carpet edges and wires and cables lying on the floor were some of the causes for tripping within houses. Irregularity of the roads, potholes, stones, roped animals and construction materials heaped on side of the roads were some of the factors outside the house (D'souza et al. 2008). The changes as a result of ageing will lead to the decrease in the height of recovery foot during the swing phase of the gait thus increasing the chances to trip over an obstacle (Berg et al, Gehlsen &

Whaley 1990). Perhaps the better muscle function among men when compared to women was the reason for the higher frequency of trips among women. According to Berg, „reduced recovery clearance“ is more important in determining falls among older persons rather than the height of recovery (Berg et al.; Gehlsen & Whaley 1990).

Majority of the injurious falls among the younger group (60-69 years) were as a result of extrinsic causes, which signifies the importance of modifying environmental factors in prevention of injurious falls. The general frailty and morbidity of the older persons as one age can be the reason for the higher proportion of intrinsic falls among older persons.

The proportion of the participants in the community study, reporting fear of falls was low when compared to earlier studies. (Rubenstein & Josephson 2006; Mane et al. 2014) The results are unsurprising as most of the fallers could recover from the falls almost completely even though the injuries were distressing and took some time to recover. The social support provided by the family, relatives and friends might have played a role in this setting. Interventions utilising the social support of the older persons will reap more results in a rural set up.

There was a significantly higher proportion of falls among those who reported knee pain in our community sample. Knee pain and swelling are major symptoms of arthritis which was a risk factor for recurrent falls as stated by Nevitt (Nevitt et al. 1989). The increase in risk of falls with arthritis can be attributed to the gait impairment and weakness associated with the changes in the joint due to arthritis (Rubenstein & Josephson 2006).

Falls were multi-factorial and a number of factors were involved in the causation, precipitation and modification of fall related injuries among older persons. Older persons lacking formal education had significantly higher proportion of falls when compared to their counterparts. Lack of formal education turned out to be an important risk factor for injurious falls in the case control study as well. Less than primary level education was a risk factor for falls among Chinese older persons (Li et al. 2013). Social deprivation results in disregard of an individual in different domains and platforms in life that will lead to lack of nutrition, lack of information, lack of access to health care and lack of opportunities for improving behavioural factors like physical activity. The lack of resources to gain information and therefore the resulting lack of knowledge regarding the preventive measures of falls resulted in high incidence of falls among older persons (Li et al. 2013). Social deprivation was considered as a significant risk factor for fractures among women (Pearson et al. 2004). Social welfare programmes targeting the underprivileged along with awareness campaign might be helpful.

Falls were common among those who reported any morbidity similar to earlier studies (Wallace et al. 2002; Vu et al. 2011). Any morbidity indicates the general frailty of the individual. The number as well as the pattern of chronic diseases influences the fall risk (Sibley et al. 2014). Perhaps, the disease condition along with the effect of medication

raises the risk for fall. Interventions should integrate prevention and control of the co morbidities.

Poor pulmonary function was detected as a risk factor for hip fractures in the case control study, similar to findings of Nevitt et al and Sibley et al (Nevitt et al. 1989; Sibley et al. 2014). Though the mechanism through which chronic obstructive pulmonary disease (COPD) acts on fall related injuries is not fully understood, it has been assumed that dysfunction of the skeletal muscle and cerebral hypoxia are the reasons for increased falls among older persons with COPD (Sibley et al. 2014).

Impaired vision was independently associated with injurious falls similar to earlier reports (Kallin et al. 2002; Prudham & Evans 1981; Tinetti et al. 1988). The depth perception is damaged in people with reduced visual acuity which is very important in maintaining stability of the posture and also in negotiating obstacles (Nevitt et al. 1989; Lord et al. 2007). In a prospective study done by Lord and Dayhew, visual impairment, specifically impaired depth perception came out as an important risk factor for falls among older persons (Lord & Dayhew 2001). As mentioned in Sattin, visual defects along with impairment in the depth perception were associated with a greater chance of fracturing hip (Sattin 1992). Detecting the common conditions for impaired vision like cataract and glaucoma among older persons and treating them early should improve vision and reduce falls.

Our finding that older persons with history of fall tend to fall again and sustain injuries was similar to earlier reports (Rubenstein & Josephson 2006; Tinetti et al 1988; Nevitt et al. 1989; Bueno-Cavanillas et al. 2000). Recurrent fallers, different from single fallers had

more functional disabilities and required help with activities of daily living (Nevitt et al. 1989). Older persons with a history of fall or an injurious fall in the previous year is likely to suffer multiple falls in the follow up period (Nevitt et al. 1989; Krishnaswamy & Usha n.d.; Dionyssiotis 2012). Falls in last one year was identified as a risk factor for falls among older persons in a nested case control study in Colombo (Ranaweera et al. 2013). Older persons with history of falls had a high prevalence of risk factors when compared to those without history of fall (Tinetti et al. 1988). This can be a reason for an increased frequency of falls among them. An older person with history of falls had inflexible, clumsy gait and lack of control over posture and body position (Sattin 1992).

Out of the eleven recurrent fallers in the community study, eight persons had to seek medical attention after the most recent falls before hospitalisation due to fall injury. Repetitive falls at the same place due to same extrinsic factors show lack of awareness regarding prevention of falls and lack of concern for the older persons in the family. This emphasise the importance of education and identification of risk factors for falls among the recurrent fallers considering them as high risk. Awareness programmes integrating modification of environmental risk factors and management and control of intrinsic factors will show results.

We did not find medication use associated with falls or injuries as reported by others (Tinetti et al. 1988; Prudham & Evans 1981). However other studies like Graafmans also did not establish a relationship (Graafmans 1996). Selection bias due to selection of hospitalised older persons with complaints other than injuries as controls could be a reason

for not obtaining a significant difference as both cases and controls found to be on medication.

Living with spouse had a protective effect against injurious falls. More than half of the older persons who sustained injuries in our sample were living alone. Those who live alone hardly receive immediate attention following falls, which might alter the severity of the injury and its recovery. The care and rehabilitation after the fall also suffer in this case. Studies have established the effect of marital status in the outcome of head and neck cancers. The “spouse surveillance” which works in the case of head and neck cancers might work in the case of falls as well. The presence of a spouse will facilitate early detection and treatment of any illness (Inverso et al. 2014). It increases the chances of the patient to visit the physician regularly and be compliant to the treatment (Inverso et al. 2014). Therefore presence of spouse can modify the risk for falls by controlling the comorbidities. Moreover the “spouse surveillance” may possibly detect problems related to the balance and gait at the earliest and assist and guard the person from fall related injuries. Perhaps living with spouse is an indicator of social support which is crucial in prognosis and recovery of several illnesses. This has to be kept in mind while devising interventions for a similar setting.

The chance of falling and injuries due to falls increase as one ages due to both physiologic and pathologic changes. This was confirmed in our study as in other reports (Ambrose et al. 2013). As part of normal ageing process, several functions of an individual begin to decline. (Injuries among elderly n.d.). Vision, hearing, ability to move around, ability to respond, reflex actions, concentration and coping abilities fade as one ages. Cognition and

musculoskeletal functions also decline (Akyol 2007). Isometric strengths peak at the age of 25 years and decline thereafter. There is approximately one third loss of strength by the age of 65 years (Haywood & Getchell 2009). With age the muscle mass shrinks which can lead to reduced strength (Berry & Miller 2008). The body organs become more susceptible for injuries (Injuries among elderly n.d.). The recovery process from an injury is also slow (Injuries among elderly n.d.). Up to half of the older persons above the age of 85 years living in the community fall every year (Lehtola et al. 2006). When compared to one in three persons among those who were between 65 and 74 years.

Not many studies have identified using walk aids or improper walk aids as a risk factor for falls. D'souza et al found a significant association of usage of walk aids with falls (D'souza et al. 2008). Almost all of the older persons who used a walk aid used branch of a tree or cane or bamboo stick as a walk aid. It is not sure whether the improper walk-aid or the physical and functional status of the individual who required a walk aid to walk were the reason for injurious falls. Walk aids could be a marker for weaker muscle strength leading to falls.

There were a lot of potential hazards present in the houses that can increase the risk of older persons to fall. According to Clemson et al, the houses of fallers were not different from non-fallers; rather falls happened when there is an interaction between the physical ability of the older person and the exposure to the environment (Lord 2006; Clemson et al. 1996). But according to Northridge, the risk of falls were more among active older persons in the presence of home hazards, when compared to frail persons (Northridge et al. 1995). Not all the houses observed had an independent and easy access to a motorable road. This

forced the older person to stay indoors for a majority of the time, which increased the time of interaction of house hold hazards with him/her.

A few of the older persons in our sample fell on the roads leading to the house. The irregularity, vegetation, puddles and algae definitely pose threat to the older persons. Due to the ups and downs in the terrain most of the houses were at a different level from the road and in some cases the steepness was too much that older persons found it difficult to climb up/down. To add to total hazard, there were algae and loose mud which made the surface even more slippery.

The immediate surroundings of a household with an older person should be free of hazards as they spend most of his or her time in and around his/her house. In most of the cases the fall had occurred at the immediate surroundings of the house where the toilet was away from house. In that case the older person has to pass through at least two level differences, one at the exit of the house and another at the entry of the toilet. In a few cases there were more than two such shifts in levels that had to be negotiated on the way to the toilet. The ability to lift leg through a height decreases when one grows old and this is one of the reason for tripping on obstacles. It is a practice to cement the surroundings of the house to level the ground or to prevent dust. But in our weather conditions with alternating rain and sunshine, algae tend to grow quickly on these cemented surfaces, leaving them slippery.

Absence of handrails and presence of uneven floors were identified as hazards by Isberner et al (Isberner et al. 1998). Vinyl on the floor of the bathroom was an independent correlate of falls among older adults (Larsen et al. 2004). Slippery floors and door sills

were found hazardous in our case control study as well. There are not many studies that have identified slippery floors as a risk factor significantly associated with falls. Slippery floors were significantly associated with falls among older persons in a study done at Thailand (Sophonratanapokin et al. 2012). Zecevic reported that older persons recognised slippery floors as a risk factor for falls, even though the literature is rather quiet on it (Zecevic et al. 2006). Slippery surfaces like cemented surfaces with algae grown during rainy season, outside the house or on the road and smooth flooring using glossy tiles and polished marble or granite pose threat to the older persons (D'souza et al. 2008). It appeared that the flooring material reflected the socioeconomic status of the household. Since polished and shiny floors with marble, granite or vitrified tiles were considered fashionable, people opted for these in spite of their cost. Even in houses where an older person had an injurious fall, they were not ready to compromise on the flooring material when they did some maintenance work after the falls. Instead they upgraded a less risky cement floor to a high risk tiled floor. Interventions blind to such beliefs and concepts will not be productive.

As defined in dictionary, door sill or threshold is a dividing piece of wood or stone, placed horizontally on the floor of a doorway. This helps to check free passage of hot air or cold air beneath the door thus controlling the coolness or warmth inside the room. It also prevent rain water from getting inside the house. It averts insects, rodents or reptiles from coming inside the house through the space beneath the door. The presence of door thresholds are considered auspicious according to the Vaastu beliefs and deliberated as element of “fulfilment, wholesomeness and stability” (Verman 2004). It was considered as a physical mark for entry and exit or “limit of a domain”. (Talking about interior designs 2014). Earlier in India, door thresholds were present for all the doors of a house. It is not

popular now a days or are restricted to the main front and back doors. Door sills or thresholds were identified as a risk factor for injurious falls in our study similar to the reports by a Korean study. The foot when striking a threshold trips and abruptly halts the body's centre of gravity which was in motion (Lim & Sung 2012). This will result in shifting the centre of gravity away from the area of body's support base leading to a fall (Lim & Sung 2012). This is also in agreement with other studies that reported the influence of environmental factors on falls among older persons (Lord et al. 2006; Rubenstein 2006). Door thresholds were identified as a potential home hazard in our observation study as well. Thresholds too low and too high pose added threat to older persons when compared to the one with a standard height. Some houses had thresholds of different heights at several doors, which were considered dangerous. Interventions comprising structural modifications should target removal or standardising the height of door thresholds. There were serious falls on the thresholds in our sample. All the doors had thresholds in old fashioned houses, but new houses have tried to avoid them retaining them in the front and back doors.

The most common modification suggested as intervention to prevent falls among older persons was removal of floor mats and use of anti-slip mats in bathrooms (Cumming et al. 1999). Not all the carpets and doormats used were appropriate. Carpets with rubber coating at the bottom are essential to prevent skidding in floors with modern flooring materials like marble and tiles. In some houses old clothes, even polyester clothes were used as door mats and which can be hazardous.

Hazards within the bedrooms were associated with falls according to Tinetti, whereas bathrooms were the most hazardous site according to Carter et al. (Tinetti et al. 1988;

Carter et al. 1997). The bathrooms observed were no different in terms of the hazards they posed for falls. Floor of the bathroom was significantly associated with falls among older persons in a study from Thailand (Sophonratanapokin et al. 2012). There were bathrooms with glossy tiled floors and there were no separation of dry and wet areas. The bathrooms were outside the house in many houses. The location of bathroom outside the house was significantly associated with falls in an earlier study (Sophonratanapokin et al. 2012).

Nevitt et al found that poor lighting and low chairs increased the risk falls among older persons (Nevitt et al. 1989). Lighting is very crucial in the precipitation of a fall event. Lighting of the bathroom was not dealt seriously in many situations. There were no lights inside the bathroom in some cases and if there was one, the switch of the light was placed elsewhere and not at the entry of the bathroom. All this shows lack of thought to safety and convenience given to such issues during the construction of the houses.

Generally there was a lack of adopting measures for prevention of falls among older persons, the most common reason being limited awareness about the special needs of older persons. The changes apparently came into place in some of the households after the falls of older persons as part of their economic tradition, but not as a conscious effort to modify the home to match the needs or ability of a person. Two elderly persons sustaining falls in exactly the same manner shows extend of carelessness exhibited in this regard.

The structural changes made to the house after the fall injury depends on the age of the older person and whether he or she is mobile inside the house or outside the house. If the injured person was dead or bedridden after the fall, there was no scope for changes in the structure of the house. There were no alterations in houses where the older person has recovered completely. Structural changes have taken place in cases where the older person

is disabled and their requirements have changed, or in other words, the structural changes if necessary are done when there is a change in sphere of operation. If the necessary change is retrograde in terms of socioeconomic status marker then such a change will not be made. For example, in a house where an older women slipped and fell inside an attached bathroom which had a tiled floor, an outside bathroom was prepared for her instead of changing the floor or taking other preventive measures in the bathroom inside. In another case, instead of making any alterations to the structure of the house, the older person was given a walk stick.

6.1. Limitations

The cross sectional study relied on the memory of the participants for eliciting the fall profile. No biological parameters, balance test, neurologic or musculoskeletal examinations were done to compensate for the self-reported data. The concern of temporality cannot be ruled out due to the cross sectional nature of the study. Falls were supposed to be high among institutionalised older persons. As there were no residential homes for older persons in this area during the study period our findings can be generalised to older adults living in their own homes in this specific population.

A prospective study would have been better for identifying the exposures, but time and resource deficit were the reasons to choose a retrospective design for the study. However this enabled us to study multiple risk factors in a short period. Selection of hospital controls was also a compromise. Again, the selection of hospital controls did not permit us to analyse the relation of co morbidities with injurious falls. Not recording the physical and age related changes like muscle strength and balance has to be accepted as a limitation due to the incident nature of the study. But the study helped us to elicit the profile and

details of injurious falls more or less accurately. Some important details might have missed by excluding seriously ill or dead persons as cases in view of ethical constraints.

The examiner bias while observing a household where an older person has sustained a fall cannot be ignored. There was no validated tool or check list specific to the setting for observing households for identifying potential hazards for falls. The tool we used for observation of households was an adaptation of another tool to our setting and validated. To some extent this study will help other researchers for devising such studies in the future.

SUMMARY AND CONCLUSION

Chapter 6

SUMMARY AND CONCLUSION

To our knowledge, this study is among the first its kind to report on the frequency and consequences of falls among the elderly in this part of the world. In the developed world the research in this area has moved on to clinical trials and comparisons of prevention strategies for falls among older persons, whereas there are no reports of proper estimate of falls among older persons from India or other developing countries. Moreover there has been no effort to identify the risk factors or devise prevention strategies from Kerala or India. Kerala, is unique among the Indian states, being distinguished by its better health indicators and highest proportion of older population. Recently problems of older persons, which is a group with a different set of requirements, have been slowly gaining attention of the policy makers. Our attempt in this study was to focus policy attention towards domestic injuries among older persons. In view of growing proportion of older persons in Kerala establishing morbidity burden due to falls among them assumes top priority as a public health task. Injuries are no more considered as mere accidents but are considered as any other unanticipated event initiated by a combination of factors associated with agent, host and environment acting at pre-event, event and post-event levels. This assumption gives us chance for prevention of injuries at different levels.

The preliminary phase of this study clearly pointed out the importance of falls as a public health problem among older persons in this setting. The dearth of information in this regard in this part of the world was evident from the literature review. The findings were useful in devising the tools for the main study.

The cross sectional survey demonstrated that falls constitute an important health problem among older population in rural Thiruvananthapuram. The human development index (HDI) of Thiruvananthapuram district is 0.773, which is similar to the average score of the state. Based on the frequency of falls obtained in our study, we estimated that around two million older persons fell at least once in the year 2011-2012 in the entire State of Kerala. (According to the Census 2011, there were 7.4 million older persons in Kerala). Among those who fell, around 1.6 million persons might have had fall related injuries; out of these almost 700, 000 would have had fractures including 110, 000 fractures of hip. The number of older persons who might sustain falls can rise to around 3.2 million in the year 2051 if there are no measures for prevention of falls. The number of hip fractures will rise to almost 180,000. (According to population projections the number of older persons by the year 2051 will be around 11.9 million). These numbers point to the gravity of the situation in Kerala, and its potential impact in the health care resources.

The cross sectional survey also documented the circumstances and consequences of falls among older persons. The information on the circumstances and mechanism of falls is important as it is essential to devise prevention measures in the future. Not all the older persons who fell were injured and not all those who were injured sought medical attention. Falls frequently resulted in trivial injuries and restriction of routine activities. Injuries following falls might turn fatal or leave them disabled for the rest of their life. The high proportion of fractures especially hip fractures led to longer periods of restricted mobility. The physical, psychological and social implications of the falls were important. History of previous falls, lack of formal education and presence of any morbidity were the major correlates identified for falls among older persons.

The case control study threw light on the risk factors for injuries following falls. The most common injury that led to hospitalisation was hip fractures. Extrinsic factors and intrinsic factors were responsible for the causation of fall related injuries either alone or together. The risk factors identified for all injuries were history of previous fall, age above seventy years, vision impairment, single marital status, marble, tiled and granite floors, and door thresholds. History of previous fall, age above seventy years, vision impairment, marble, tiled and granite floors, single marital status and using walk aid were the risk factors identified for hip fractures. Vision impairment was the only risk factor identified for injuries other than hip fractures that led to hospitalisation. The study showed a high mortality rate among the older persons seriously injured by falls.

This study could identify several modifiable environmental risk factors for fall related injuries among older persons in Thiruvananthapuram, some of them specific to this setting. This was confirmed by observation of households, which reported several potential hazards present at the houses of older persons which led to falls and injury. These hazards either precipitated the falls or modified the outcome of falls. These factors may be hazardous to different persons in different manner depending on their individual functional capacity. Bathrooms were generally hazardous with several potential tripping and slipping hazards. Tiled and marble floors were found slippery and dangerous. Lighting was a problem within the house, inside the toilet and bathrooms. Some preventive measures were adopted by the households after the falls of older persons. Structural changes to the fixed parts were seldom made. The cause of fall even if evident were not removed or reformed in most of the cases either due to lack of awareness, concern or resources. Structural changes that do not go along with the fashion norms or that reflect a lower economic status were never done.

The environment of an older person which he/she shares with his/her younger family members have grown dangerous over the years. A great transition has taken place in the materials and methods of construction of houses in the state. The innovations in the flooring material have given multiple choices at a diverse range of cost. In olden days mud and wood were largely used for construction. Coconut and palm leaves were used for roofing. The introduction of cement and steel has enabled the construction of stronger, fashionable multi-storeyed buildings with stairways. The place one lives in and spends most of the time should be convenient, comfortable and hazard free as every citizen has a right to a safe dwelling. India is a signatory to Madrid International plan of action which stressed on the responsibility of the societies to provide enabling and friendly environments to older persons to improve their health and welfare. The National Policy for Senior Citizens 2011, also emphasizes the importance of working towards an “inclusive, barrier free and age friendly society”. Our findings are not strikingly different from other parts of the world, thus emphasising the universality of the problem.

To some extent this study succeeded in estimating the magnitude, profile, circumstances and consequences of all falls among community dwelling older persons in one year in rural Trivandrum. It also identified some of the modifiable risk factors for injurious falls and recognised some built environment risk factors associated with injurious falls among older persons in Trivandrum. There are a few clear findings that can be used for planning prevention activities. Interventions can be planned based on the experiences of developed countries as the findings are similar. Sensitisation of families and older persons to this great risk is vital as lot of changes can be made at home to prevent falls .The results suggest that steps to improve vision and control chronic respiratory diseases will be crucial

in preventing falls. Modification of houses to make it elderly friendly will be another great priority.

Considering the rise in the proportion of older population and based on the results obtained in the study, I would like to discuss some recommendations of Madrid International Plan of Action on Ageing (MIPAA) in the context of the findings of the study that would help to translate them into action without much effort. Ill-health, financial dependence, illiteracy are three main issues that can adversely affect the quality of life of an older person. The better utilization of existing programmes for older persons and social welfare schemes can make things better for them.

Improving the health status of older persons

MIPAA envisions “Advancing health and well-being into old age”. Any activity that can prevent and control any co morbidity will reduce the fall risk of older persons. The National Programme for the Health Care of the Elderly launched by the Ministry of Health and Family Welfare was formed to provide preventive curative and rehabilitative services for the older persons at various levels of health care system. This ensures better access to health care for the older population. Improving the vision of the older person is vital in prevention of falls as well as improving one’s confidence and quality of life. Proper implementation of these programmes at least in the prioritized states will reap results.

Building stronger social and community support

The older persons not living with spouse were found to have higher risk for falls. This brings forward the importance of the support of the family and loved ones in the health of older persons. The maintenance and welfare of parents and senior citizens act (MWPSCA 2007) endorses the care of the parents and senior citizens as primary responsibility of the offspring and the family. Unfortunately the migration of younger generation in search of

better opportunities has adversely affected the care of the older generation. In such cases, the palliative care projects driven by the local self-governments and the community should be able to support.

Ageing well

The ageing well concept of WHO reinforces the need of health promotion throughout the life. This is also important in building economic independence and enhancing participation of older persons in the development process as advocated by MIPAA. As the proportion of older person increases, the working population is coming down proportionately. There should be measures to involve and utilize this huge manpower in the development process, in a mutually benefiting manner.

Enabling environment for the older persons

Another vision of the the National Programme for the Health Care of the Elderly is to build a framework to create an enabling environment for “a Society for all Ages” suggests a friendly environment to all ages to reduce unintentional injuries. This is also in line with the recommendations of MIPAA. Older persons need opportunities to live with dignity and not merely empathy.

Effective implementation of programmes for older persons

Effective implementation of all the programmes for older persons will indirectly improve the health of older persons and thus reduce the risk for falls, injuries and disability. This will ultimately improve the dignity of older persons as envisioned by MIPAA.

Policy oriented research

From the observation and information obtained by conversing with the older people and their care takers it seems that older persons were not considered part of the mainstream once the children take up their responsibilities. Therefore their needs were not considered a

priority unless there is a casualty. The National Policy on Senior Citizens 2011 emphasises “age friendly facilities and standards of universal design by Bureau of Indian Standards” for older persons. It would be wise to have a standard for housing materials and housing pattern so as to have elderly friendly dwellings. Further research is necessary to advance our awareness regarding fall hazards within and outside the houses as well as other buildings to work out a guideline which will be useful for constructing elderly safe houses and buildings. Eco-friendly and elderly friendly, safe and fashionable housing materials are to be developed and promoted in view of prevention of falls among older persons.

There is lack of recognition of falls among older persons as a public health problem in India and Kerala, the main reason being dearth of reliable estimate of burden of the falls and related injuries. The findings of this study will be useful to fill that gap at least to an extent. Thus it will be useful to initiate advocacy to invite policy attention for prioritizing the fall related injuries among older persons as a major public health issue. Since our health systems are not well equipped to contain this catastrophe, this can aid as a warning. Our findings will help in developing further studies to investigate other modifiable risk factors for injurious falls. Further studies to explore other risk factors are warranted to devise strategies for prevention of falls among older persons in Kerala. This will also help in planning research to identify the role of interventions specific to our setting. This study can aid as a basic document for strategizing activities to appeal for elderly friendly injury free houses, roads and other buildings. The checklist we used to identify the potential hazards can be used for planning strategic interventions. A thorough costing study is essential to assess the burden of fall related injuries to the health system, to devise cost effective interventions and to highlight the economic impact of falls on an individual, family and the health system to appeal for policy attention. The natural follow up of these

initial attempts should be randomised trials to assess the efficacy of individual, household and community interventions to prevent falls as well as the injury resulting from falls.

Recommendations

1. Ensuring cataract surgery for all the older persons through National program for control of blindness
2. Orienting the older persons and their family members regarding modification of their households to prevent falls.
3. Screening of older persons for identifying high risk individuals for falls and intervention through National Program for Care of Elderly and the envisaged Family Health Centres in Kerala
4. Prevention and control of co morbidities like COPD for prevention of falls
5. Environmental modification of indoors and outdoors to make it age friendly to ensure active ageing of older persons
6. Special focus on recurrent fallers
7. Improving social support for older persons through community participation
8. Improving access and quality of rehabilitation services through National Program for Care of Elderly and the envisaged Family Health Centres in Kerala
9. Training for the care takers to improve the quality of care of older persons for prevention of falls as well as to improve the prognosis post fall.

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APPENDIX

A.1

Guidelines for in depth interview among doctors

- What proportion of your patients is above 60 years?
- Common complaints among older persons?
- What proportion of your patients present with injuries?
- What are the common injuries among older persons?
- How often these injuries are fall related?
- How can you describe the distribution of severity? Minor/Major/severe
- What are the common risk factors for falls according to you?
- Where do the older persons fall frequently?
- How is the prognosis?
- What are the complications?
- What percentages of the patients go back to normal life?
- Are they given a priority in the casualty or OP?
- Are there any services specifically available to older persons? After fall?
- Is there any difference in the coping up with the situation among the patients based on the SES/decision making capacity/gender
- Are there any differences in the treatment options among older persons provided by you or opted by the relatives? Are there any gender disparity?
- According to you how does the expenses related to major falls, its management in the hospital and at home affect the patients?
- Do you think that falls and related injuries among older persons are preventable? Is it important why?
- Do you know about any programme/policy running successfully for prevention of falls among older persons?
 - In India
 - In Kerala
 - In other countries
- What can we do to prevent injuries among older persons?
- Do you think the system has a role in preventing falls among the older persons considering the cost
- How can the state take a role in this regard?

A.2

Guidelines for in depth interview among older persons

Age, sex

Occupation

Are you receiving any financial support? Pension/other allowance?

How the event occurred? Explain.

When? (year, month, day and time)

Explain the fall

- Loss of consciousness
- Ataxia
- Syncope
- Slips
- Hypoglycaemia
- Something to catch hold
- Obstacles on the way
- Lighting
- Vision
- Drugs
- Comorbidities
- Social status
- Decision making
- Menopause

What did you do first?

Was there any one to attend at the time of the event?

Whether taken to hospital, immediately? Which hospital?

What was the treatment obtained?

Any procedures done?

Do you know the risk factors for fall?

What do you expect from the system?

A.3

Guidelines for FGD among older persons

- What is old age?
- What are the common problems encountered during old age?
 - Physical
 - Mental
 - Social
 - Economic
- Are falls common among the older persons? How serious is this issue?
- Does everybody fall in the old age?
- Where do the older persons fall frequently?
- What are the reasons for falls when the age goes up?
- Are there any other reason contributing for falls among older persons?
- Has anyone or anyone known to you sustained a fall in the last one year?
- What are the immediate effects of falls?
- How does it affect one's quality of life after the event?
- What are the other consequences of falls?
 - Physical
 - Mental
 - Social
 - Economic
- What is called fear of fall?
- Do you think falls are preventable?
- How do you think we can prevent falls?
 - At the Household level
 - Immediate neighbourhood level
 - At the level of the health system
 - At the level of other departments of the government
- Has anybody or anybody known to you taken any efforts to prevent falls in your household?
- If at all we cannot prevent falls, is it possible to prevent the consequences of falls?
- Do you think the state has a responsibility in this regard?
- What do you expect?

A.4

The risks, risk factors and immediate consequences of falls among older persons in their home environment in Thiruvananthapuram

Information and consent form

You are invited to participate voluntarily in a survey as part of a research study conducted by Dr Rekha M Ravindran, a PhD Scholar of Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum, India as part of her PhD Dissertation. This study is planned to investigate the risk factors of falls among persons above the age of sixty years. Before agreeing to participate in this research study, it is important that you read the following explanation of the study that describes the purpose, benefits and risks and rights as a study subject.

Title of Research: The risks, risk factors and immediate consequences of falls among older persons in their home environment in Thiruvananthapuram

Principal Investigator and affiliation: Dr Rekha M Ravindran, PhD Scholar, AMCHSS, SCTIMST, Trivandrum.

Background of this study: Elderly is a group of the population which deserves special attention as they face a variety of health problems as well as socio economic and emotional insecurities in the day-to-day life. Fall induced injuries are one of the common causes of longstanding pain, functional impairment, disability and death among elderly. One out of every three elderly persons above the age of 65 years falls at least once every year. In half of all the cases it results in serious injury.

Why is this research study being done?: Information on the magnitude, risk factors and impact of any injuries in developing countries especially India is not clearly known because of paucity of data in this direction. Researches in this area to identify the risk factors of falls and subsequent injuries among elderly will help in formulating preventive measures and devise policies for an elderly friendly environment to reduce a significant amount of injury burden among the elderly.

Details of enrolment: You are asked to participate in this survey because you are above sixty years and are residing in Athiyannur Block Panchayat of Thiruvananthapuram district. If you choose to join, you will be asked some questions regarding your present health and falls in last one year, its causes and effects if you had any. This may take around 25 minutes.

Voluntary Participation/ Withdrawal from the Study:

Your participation in this research study is completely voluntary. You may choose or not choose to participate in the study. If you choose to participate in the study, you can withdraw from the study at any time without providing the investigator with a

reason. Your decision to withdraw from or not participate in the study will not affect you in any way. The Investigator may withdraw you from the study at any time, without your agreement.

Confidentiality

All results of the study will be kept confidential. You will not be individually identifiable in any publications or presentations resulting from this study. All information we have collected is coded and does not have your name associated. No one outside the research team will have access to that information.

Anonymity – Information collected from you will be recorded without your name. You will only be identified by a study ID number. Information collected by this survey will be detached from the consent forms.

Possible Side Effects and/or Risks

No risks are expected from participating in the survey. The only risk may be the discomfort if discussion on fall, subsequent injuries and its social, medical and environmental consequences make you uncomfortable.

Benefits of the Study – There will be no financial benefits to you for your participation in this study. Information that you provide may help us to have a better understanding of risk factors for falls among older adults above sixty years of age and this may be useful for devising prevention strategies for falls in the future.

Questions/ parties to contact

If you have any questions about this research study, you can contact Dr Rekha M Ravindran, Ph: 9400330847 or Dr Anoop Kumar Thekkuveetil, Member - Secretary of Institute Ethics Committee, Ph 0471 2520256/257 at any time. If you decide to take part in this research study, you must sign this form to show that you want to take part. You can keep a copy of this form for further reference.

Consent form

I have been given a chance to read and understand the consent form thoroughly. I understand that I can contact Dr Rekha M Ravindran at any point of time to ask questions regarding my participation in this research study and that I will be answered to my satisfaction.

I understand that my participation in this study is voluntary and I can quit at any time without any problem. I also understand that the investigator can decide at any point that I should no longer participate in the study.

If I have any questions about my rights as a subject in the study, I may contact Dr Rekha M Ravindran, PhD Scholar, AMCHSS, SCTIMST, Trivandrum, Ph: 9400330847.

I have read and understood the above information. I agree to participate in this study. I understand that I will be given a copy of this signed and dated form for my own records. I have initialed the boxes below to indicate my consent to complete the questionnaire.

Are you willing to participate? Yes No

Study Participant (Signature)

Date

Name

Person who explained or answered questions (Signature)

Date

Name

A.5

The risks, risk factors and immediate consequences of falls among older persons in their home environment in Thiruvananthapuram

Interview schedule

Identification code	
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1. Age _____

1. Male	2. Female	2. Sex
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I. Socioeconomic

3. Marital status

1. Unmarried	2. Married
3. Widow/widower	4. Divorcee/separated
5. Others specify	

4. What is the highest level of education achieved?

1. Illiterate	7. Diploma
2. No formal education	8. Degree
3. Up to 4 th std	9. Professional
4. Up to 7 th std	10. Post graduation
5. Up to 10 th std	11. Others specify _____
6. Higher secondary/12 th std	

5. Are you economically independent now?

1. Yes	2. Not completely	3. No <i>Go to Q8</i>
--------	-------------------	-----------------------

6. What is the source of your income (Check all that apply)

1. Salary	2. Remuneration for the work done	3. Pension
4. Investments/ Income from the property	5. Social assistance payments	6. Self employed
7. Support from relatives/friends	8. Agriculture	9. Others specify _____

7. What is the type of employment, if you are working now?

1. Government job	5. Self employed
2. Private job	6. Business
3. Skilled labour	8. Agriculture
4. Unskilled labour	9. Others specify _____

8. Are you living in your own house?

1. Yes	2. No	3. Others specify _____
--------	-------	-------------------------

9. If you are being supported economically who is supporting you?

1. Children	3. Spouse	5. Relatives
2. Siblings	4. Friends	6. Self
Others specify _____		

10. What is the monthly income of your family? _____

11. Number of children _____

12. Number of members in your family _____

13. Are you able to do all the activities of daily living on your own?

1. Yes	2. No
--------	-------

14. If No is there anybody to help

1. Yes	2. No
--------	-------

 you?

15. If yes to Q 14, who? _____

Details of falls in last 12 months (Chronologically from recent fall backwards) If there is no fall go to 28	Fall 1	Fall 2	Fall 3	Fall 4
16. Date of fall				
17. Time of fall				
18. Place of fall				

<u>18.1 Inside the house</u> 1.a In the bedroom 1.b Inside the bathroom 1.c On the way to bathroom 1.d Climbing up/down stairs 1.e In the kitchen	<u>18.2 Outside the house</u> 2.a Walking up/down a stairs / steps 2.b In the courtyard 2.c In the garden 2.d In the compound	<u>18.3 Away from home</u> 3.a On the road 3.b In another person's house 3.c In an office/other building 3.d At the workplace
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1.f In the dining room 1.g Other rooms 1.h Others specify_____	2.e Others specify_____	3.e Others specify_____
<u>18.4 Others specify</u>		

	Fall 1	Fall 2	Fall 3	Fall 4
19. Cause of fall				
1. Tripped , 2. Slipped 3. Lost balance 4. Legs gave way 5. Fainted 6.Felt giddy /dizzy 7. Not sure 8. Others specify				
20. Activity during which the fall occurred				
1. Walking 2. Climbing 3. Getting out of bed 4. Getting out of chair 5.While sitting on a bed or a chair 6. Sleeping 7. Taking bath 8. Sitting 9. Standing 10. Talking 11.Others specify				
21. Type of Injuries if any				
1. Pain 2.Cuts 3. Bruises 4. Sprain 5. Fracture 6. None 7. Others specify				
22. Body part injured (Specify)				
23. Medical attention sought 1. Yes 2. No				
24. Treatment undergone				
1. Nil 2. Medication alone 3. Dressing 4. Suturing 5. Closed Manipulative Reduction of fractures 6. Surgical procedures 7. Others specify				
25. Normalcy attained				
1. Immediately after fall 2. After few weeks 3. After few months 4. Not normal even now 5. Others specify				

26. Did the health providers advise you any measures to prevent falls when you sought medical care for any of the falls in the last 12 months?

1. Yes	2. No
--------	-------

27. Did the health providers advise you any measures to improve muscle/bone strength when you sought medical care for any of the falls in the last 12 months

1. Yes	2. No
--------	-------

28. Do you have any disability or limitation of movement?

1. Yes	2. No
--------	-------

29. If yes, is it following one of the falls mentioned above?

1. Yes	2. No
--------	-------

30. Can you explain how this particular fall has changed your life?

Mentally _____

_____ Physically _____

Socially _____

31. Have you been diagnosed with the following health problems now?		Yes/ No#	Medica tion if any\$	Duratio n of treatm ent	System of medici ne*
1	Vision impairment Specify _____				
2	Respiratory disorders, Specify _____				
4	Cardio vascular disorders, Specify _____				
5	Disorders of Digestive system, Specify _____				
6	Renal/Urinary tract ailments, Specify _____				
8	Neurological disorders, Specify _____				
9	Endocrinological disorders, Specify _____				
10	Musculoskeletal disorders, Specify _____				
12	Hypertension/ High Blood Pressure				

13	Dyslipidemia				
14	Diabetes				
15	Complications of Diabetes, Specify _____				
16	Osteoporosis				
17	Alzheimer's disease/Dementia,				
18	Psychological disorders Specify _____				
19	Cancers, Specify _____				
	Any other: _____				
#1. Yes 2. No					
§ Details if any are to be written in a separate sheet attached					
*1. Allopathy 2. Ayurveda 3. Homoeo 4. Sidha/Unani 5. Other Traditional 6. Others specify					

32. Are you taking any medicines regularly?

1. Yes

2. No

33. If Yes, details

Name of medicine	Dosage	Frequency	Duration

34. Have you attained menopause? (Ask only if the respondent is a female)

1. Yes

2. No

35. If yes at what age? _____

36. Have you had falls before 12 months in the last 5 years? (State the period) 1 Yes 2

No

37. If yes how many times _____

Thank you very much for your cooperation

A.6

The risks, risk factors and immediate consequences of falls among older persons in their home environment in Thiruvananthapuram

Information and consent form

You are invited to participate voluntarily in an interview as part of a research study conducted by Dr Rekha M Ravindran, a PhD Scholar of Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum, India as part of her PhD Dissertation. This study is planned to investigate the risk factors of falls among persons above the age of sixty years. Before agreeing to participate in this research study, it is important that you read the following explanation of the study that describes the purpose, benefits and risks and rights as a study subject.

Title of Research: The risks, risk factors and immediate consequences of falls among older persons in their home environment in Thiruvananthapuram

Principal Investigator and affiliation: Dr Rekha M Ravindran, PhD Scholar, AMCHSS, SCTIMST, Trivandrum.

Background of this study: Elderly is a group of the population which deserves special attention as they face a variety of health problems as well as socio economic and emotional insecurities in the day-to-day life. Fall induced injuries are one of the common causes of longstanding pain, functional impairment, disability and death among elderly. One out of every three elderly persons above the age of 65 years falls at least once every year. In half of all the cases it results in serious injury.

Why is this research study being done?: Information on the magnitude, risk factors and impact of any injuries in developing countries especially India is not clearly known because of paucity of data in this direction. Researches in this area to identify the risk factors of falls and subsequent injuries among elderly will help in formulating preventive measures and devise policies for an elderly friendly environment to reduce a significant amount of injury burden among the elderly.

Details of enrolment: You are asked to participate in this study because you are above sixty years and are admitted in the Medical College hospital. If you choose to join, you will be interviewed by the Principal Investigator. You will be asked some questions regarding your present health, falls if you had any, its causes and effects, the medicines you are taking, your habits, the built environment in which you live etc. This may take around 45 minutes.

Voluntary Participation/ Withdrawal from the Study:

Your participation in this research study is completely voluntary. You may choose or not choose to participate in the study. If you choose to participate in the study, you can withdraw from the study at any time without providing the investigator with a

reason. Your decision to withdraw from or not participate in the study will not affect you in any way. The Investigator may withdraw you from the study at any time, without your agreement.

Confidentiality

All results of the study will be kept confidential. You will not be individually identifiable in any publications or presentations resulting from this study. All information we have collected is coded and does not have your name associated. No one outside the research team will have access to that information.

Anonymity – Information collected from you will be recorded without your name. You will only be identified by a study ID number. Information collected by this interview will be detached from the consent forms.

Possible Side Effects and/or Risks

No risks are expected from participating in the survey. The only risk may be the discomfort if discussion on fall, subsequent injuries and its social, medical and environmental consequences make you uncomfortable.

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Questions/ parties to contact

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Consent form

I have been given a chance to read and understand the consent form thoroughly. I understand that I can contact Dr Rekha M Ravindran at any point of time to ask questions regarding my participation in this research study and that I will be answered to my satisfaction.

I understand that my participation in this study is voluntary and I can quit at any time without any problem. I also understand that the investigator can decide at any point that I should no longer participate in the study.

If I have any questions about my rights as a subject in the study, I may contact Dr Rekha M Ravindran, PhD Scholar, AMCHSS, SCTIMST, Trivandrum, Ph: 9400330847.

I have read and understood the above information. I agree to participate in this study. I understand that I will be given a copy of this signed and dated form for my own records. I have initialed the boxes below to indicate my consent to complete the questionnaire.

Are you willing to participate? Yes No

Study Participant (Signature)

Date

Name

Person who explained or answered questions (Signature)

Date

Name

A.7

The risks, risk factors and immediate consequences of falls among older persons in their home environment in Thiruvananthapuram

Interview schedule

Age _____

Identification code	
Phone number	

1. Male	2. Female	Sex
---------	-----------	-----

1. Socioeconomic

Marital status

1. Married	4. Divorcee/separated
2. Unmarried	5. Others specify _____
3. Widow/widower	

4. What is the highest level of education achieved?

1. Illiterate	7. Diploma
2. No formal education	8. Degree
3. Up to 4 th std	9. Professional
4. Up to 7 th std	10. Post graduation
5. Up to 10 th std	11. Others specify _____
6. Higher secondary/12 th std	

7. Are you economically independent now?

1. Yes	2. No Go to Q8
--------	-----------------------

8. What is the source of your income (Check all that apply)

1. Salary	5. Karshaka/widow/oldage Pension	9. Social assistance payments (from other organizations)
2. Daily wages	6. Self employed	10. Others specify _____
3. Pension from the previous employment	7. Agriculture	
4. Investments/ Income from the property	8. Help from relatives and friends	

9. What is the type of employment, if you are working now?

6. Pensioner	6. Self employed
7. Government job	7. Business
8. Private job	8. Agriculture
9. Skilled labour	9. No job
5. Unskilled labour	10. Others specify _____

7.1. What was your occupation at the young age? _____

10. Are you living in your own house?

1. Yes	2. No	3. Others specify _____
--------	-------	-------------------------

11. If you are being supported economically who is supporting you?

1. Children	3. Spouse	5. Relatives
2. Siblings	4. Friends	6. There is no need for that
12. Others specify _____		

13. What is the monthly income of your family? _____

10.1. Which ration card do you hold?

1. BPL 2. APL 3. No card

14. Number of children _____

15. Number of members in your family _____

16. Are you able to do all the activities of daily living on your own?

1. Yes	2. No
--------	-------

13.1. Explain your role in your household before the fall.

17. If No is there anybody to help you?

1. Yes	2. No
--------	-------

18. If Yes for Q14, who helps you? _____

3. Medical history

19. Are you admitted with complaints of falls?	1. Yes → 2. No → <i>go to Q36</i>	
20. Date of fall		
21. Time of fall		
22. Place of fall		
<u>19.1 Inside the house</u> 1.a In the bedroom 1.b Inside the bathroom 1.c On the way to bathroom 1.d Climbing up/down stairs 1.e In the kitchen 1.f In the dining room 1.g Other rooms 1.h Others specify _____	<u>19.2 Outside the house</u> 2.a Walking up/down a stairs or steps 2.b In the courtyard 2.c In the garden 2.d In the compound 2.e Others specify _____	<u>19.3 Away from home</u> 3.a On the road 3.b In another person's house 3.c In an office/other building 3.d At the workplace 3.e Others specify _____
19.4 Others specify _____		
20. Cause of fall	1. Tripped 2. Slipped 3. Lost balance 4. Legs gave way	5. Fainted 6. Felt giddy /dizzy 7. Not sure /Don't know 8. Others specify _____
21. Activity during which the fall occurred	1. Walking 2. While going to toilet/urinal 3. Getting out of cot/chair 4. While sitting on a cot/chair 5. While trying to sit on a cot /chair 6. Climbing stairs 7. While taking bath	8. Sleeping 9. Simply standing 10. While doing work in the kitchen 11. While doing some work in the backyard 12. While talking to some body 13. Others specify _____
21.1. At what time did you take food at last before the fall?		
21.2. Did you take your regular medicines as prescribed on the day of fall?	1. Yes 2. No 3. Others _____	

21.3. Were there any changes in medication or dose of medication recently?	<ol style="list-style-type: none"> 1. No there is no change in medication recently 2. Yes the medicines were changed/introduced recently 3. Yes the dosage was changed recently 4. Not on any medication 	
22. Type of Injuries if any	<ol style="list-style-type: none"> 1. Pain 2. Cuts 3. bruise / Contusion 4. Sprain 	<ol style="list-style-type: none"> 5. Fracture 6. None 7. Others specify_____
23. Body part injured (Specify)		
24. Loss of consciousness	<ol style="list-style-type: none"> 1. Yes 2. No 	
25. Did you seek medical care immediately?	<ol style="list-style-type: none"> 1. Yes <i>If yes, go to Q27</i> 2. No 	
26. What was the cause for delay in seeking medical care if any	<ol style="list-style-type: none"> 1. Did not feel that it is serious 2. Lost consciousness and nobody found out 3. Was unable to get up and inform others 4. There was no body at home 5. Financial reasons 6. Delay in getting the transport 7. No one responsible to take to the hospital 8. No male person to take to the hospital 9. Others specify_____ 	
27. System of medicine where treatment was sought first (if not MCH)	<ol style="list-style-type: none"> 1. Allopathy 2. Ayurveda 3. Homoeo 	<ol style="list-style-type: none"> 4. Sidha/Unani 5. Other Traditional 6. Others specify_____
28. Type of health centre/ hospital consulted first (if not MCH)	<ol style="list-style-type: none"> 1. General Practitioner 2. PHC 3. CHC 3. Private Hospital 4. District hospital 	<ol style="list-style-type: none"> 5. Pvt Multi Specialty hospital 6. Govt Tertiary care centres 7. Others specify_____
29. What was the treatment obtained for your complaint?	<ol style="list-style-type: none"> 1. Nil 2. Only medicines 3. Dressing 4. Suturing 	<ol style="list-style-type: none"> 5. Closed Manipulative Reduction of fractures 6. Physiotherapy 7. Surgical procedures 8. Others specify_____

30. Who helped you to access health care	1. Children 2. Siblings 3. Spouse 4. Other relatives	5. Neighbours 6. Nobody 7. Others specify____
31. Mode of Transportation to the hospital	1. Bus 2. Ambulance 3. Taxi	4. Train 5. Auto rickshaw 6. Others specify_____

4. Cost of treatment

32. How much money did you spend for treatment in this hospital till date for your present admission?

Treatment	Cost in Rs/-
Consultation	
Medicines	
Investigations (Blood, X-ray, ECG, Scan etc)	
Surgery	
Cost for bystanders (food and transport)	
Opportunity cost for bystanders	
Other procedures	
Transport	
Any other expenses (Specify)	
Total	

32.1 Do you have a CHIS card?

1. Yes 2. No 3. Other insurance
specify_____

33. If you have undergone a treatment for the same complaint before coming to this hospital, how much did that treatment cost you? _____

34. Are you getting the medicines you are taking now, from the hospital?

1. Yes , all the medicines →Go to Question 36
2. No, not all
3. No, none of the medicines are available here
4. Others specify _____

35. If No, Are you able to buy the medicines that are prescribed to buy from outside?

1. Yes	2. No	3. Others specify
--------	-------	-------------------

5. Past history

36. Have you had any falls in the last 12 months excluding the present one?
(Specify the dates while asking)

1. Yes	2. No If No go to Q 49	3. Not sure/ Don't remember
--------	------------------------	-----------------------------

Details of falls in last 12 months (Chronologically from recent fall backwards)	Fall 1	Fall 2	Fall 3	Fall 4
37. Date of fall				
38. Time of fall				
39. Place of fall				

<u>39.1 Inside the house</u> 1.a In the bedroom 1.b Inside the bathroom 1.c On the way to bathroom 1.d Climbing up/down stairs 1.e In the kitchen 1.f In the dining room 1.g Other rooms 1.h Others specify_____	<u>39.2 Outside the house</u> 2.a Walking up/down a stairs / steps 2.b In the courtyard 2.c In the garden 2.d In the compound 2.e Others specify_____	<u>39.3 Away from home</u> 3.a On the road 3.b In another person's house 3.c In an office/other building 3.d At the workplace 3.e Others specify_____
	<u>39.4 Others specify</u>	

	Fall 1	Fall 2	Fall 3	Fall 4
40. Cause of fall				
1. Tripped 2. Slipped 3. Lost balance 4. Legs gave way 5. Fainted 6.Felt giddy /dizzy 7. Not sure 8. Others specify				
41. Activity during which the fall occurred				
1. Walking 2. While going to toilet/urinal 3. Getting out of cot/chair 4. While sitting on a cot/chair 5. While trying to sit on a cot /chair 6. Climbing stairs 7. While taking bath 8. Sleeping 9. Simply standing 10.While doing work in the kitchen 11. While doing some work in the backyard 12. While talking to some body				

13. Others specify_____				
42. Type of Injuries if any				
1. Pain 2.Cuts 3. Bruises/Contusion 4. Sprain 5. Fracture 6. None 7. Others specify				
43. Body part injured (Specify)				
44. Medical attention sought 2. Yes 2. No				
45. Treatment undergone				
1. Nil 2. Medication alone 3. Dressing 4. Suturing 5. Closed Manipulative Reduction of fractures 6. Surgical procedures 7. Physiotherapy 8. Others specify				
46. Normalcy attained				
1. Immediately after fall 2. After few weeks 3. After few months 4. Not normal even now 5. Others specify				

47. Did the health providers advise you any measures to prevent falls when you sought medical care for any of the falls in the last 12 months?

1. Yes	2. No
--------	-------

48. Did the health providers advise you any measures to improve muscle/bone strength when you sought medical care for any of the falls in the last 12 months

1. Yes	2. No
--------	-------

49. Have you had falls before 12 months in the last five years? (Specify the dates while asking, excluding the falls already mentioned)

1. Yes	2. No
--------	-------

50. If Yes, how many times_____

51. Have you been diagnosed with the following health problems now?		Yes/ No#	Medi cation if any\$	Duration of treatmen t	System of medicin e*
1	Vision impairment Specify_____				
2	Respiratory disorders, Specify_____				
3	Cardio vascular disorders, Specify_____				
4	Disorders of Digestive system, Specify_____				
5	Renal/Urinary tract ailments, Specify _____				
6	Neurological disorders, Specify_____				
7	Endocrinological disorders, Specify_____				
8	Musculoskeletal disorders, Specify_____				
9	Hypertension/ High Blood Pressure				
10	Dyslipidemia				
11	Diabetes				
12	Complications of Diabetes, Specify_____				
13	Sleep disorders				
14	Osteoporosis				
15	Alzheimer's disease/Dementia,				
16	Psychological disorders Specify_____				
17	Cancers, Specify_____				
18	Any other:_____				
#1. Yes 2. No					
*1. Allopathy 2. Ayurveda 3. Homoeo 4. Sidha/Unani 5. OtherTraditional 6. Others specify					
\$ 1. Yes 2. No (Details if any are to be written in a separate sheet attached)					

52. Are you taking any medicines regularly?

1. Yes	2. No
--------	-------

53. If Yes, details

Name of medicine	Dosage	Frequency	Duration

54. Have you attained menopause? (*Ask only if the respondent is a female*)

1. Yes	2. No
--------	-------

55. If yes at what age? _____

6. Behavioural factors

Smoking habit

Have you ever smoked/ used any type of smokeless tobacco?

Cigarette	1. Yes	2.No
Beedi	1. Yes	2.No
Smokeless	1. Yes	2.No

If answered No for all the three products, go to Q 63. Any Yes, go to Q57

56. Do you currently smoke Cigarettes / Beedi /use any type of smokeless tobacco (at least once in last 30 days)?

Cigarette	1. Yes	2.No
Beedi	1. Yes	2.No
Smokeless	1. Yes	2.No

If answered No for all the three products, go to Q 59. Any Yes, go to Q58

57. If (any) Yes, the quantity of tobacco use

	In a day if you use it daily	In a week if you do not use it daily
No of Cigarettes		
No of Beedis		
Quantity of Smokeless tobacco		

58. How old were you when you started smoking/ using any type of smokeless tobacco? _____years

59. If you are an exsmoker/tobacco user how long (the duration in years/months) did you smoke/ used any type of smokeless tobacco? _____months
_____years

60. Did you stop the habit because of any medical reason 1. Yes 2. No

61. If yes, specify _____

Use of Alcohol

62. How can you describe your habit of drinking?

1. Current user
2. Ex user Go to Q 66
3. Non user Go to Q 68

63. In the last thirty days how many times have you consumed alcohol?

1. Almost every day
2. Once every two or three days
3. Once a week
4. Once or twice in last 30 days
5. I did not drink in the last 30 days

64. At times you drink, how much do you take in a day? _____quantity of
_____product

65. If you are an ex-user, is there any medical reason, for stopping the habit of drinking? _____

66. If yes, Please specify _____

7. Dietary pattern

	How many days in a week these food items are consumed	Quantity(servings) consumed /day on the days consumed
67. Dairy products (Milk, curd, cheese yogurt)		
68. Vegetables/fruits		
69. Fish		
70. Meat		

71. How many main meals do you eat daily? (breakfast, lunch, dinner)

1. 1meal
2. 2meals
3. 3 meals
4. Others specify_____

72. Are there any significant changes in the pattern of your food (Quantity, frequency or type of food) intake in the last six months?

1. Yes Please specify the change _____

2. No

3. Others specify _____

73. Are there any significant changes in your body weight in last six months?

1. Yes I have lost weight considerably

2. Yes I have gained weight considerably

3. No there is no change in my body weight

4. Others specify _____

8. Physical activity

74. Do you undertake any kind of physical activity regularly? 1. Yes

2. No

75. What kind of physical activity do you engage in?

	Activity	Duration (min)	No. of times/week
	Walking		
	Other Exercise		
	Household activity		
	Work related activity		
	Yoga		
	Others specify:		

76. Is there anybody who can join you for doing physical activity? 1. Yes 2. No

77. If yes, Who _____

9. Built Environment

Inside the house			
78. Type of floor	1. Mud 2. Cemented 3. Red Oxide	4. Mosaic 5. Terracota 6. Tiles	7. Marble/ granite 8. Others specify
79.1.a Type of roof of house	_____		
79. Multiple levels	1. Yes	2. No	3. Others specify
80. Stair case	1. Yes	2. No	3. Others specify
81. If yes is the stairs guarded with railings	1. Yes	2. No	3. Others specify
82. Is there proper lighting at the staircase	1. Yes	2. No	3. Others specify
83. Presence of furniture that can cause tripping hazard	1. Yes	2. No	3. Others specify
84. Presence of door thresholds that can cause tripping hazard	1. Yes	2. No	3. Others specify
85. Presence of any other material that can cause tripping hazard	1. Yes	2. No	3. Others specify
86. Electricity connection	1. Yes	2. No	3. Others specify
87. Grab bars fixed on the walkways /entrance	1. Yes	2. No	3. Others specify
88. Any modification done to prevent falls	1. Yes	2. No	3. Others specify
• Bedroom			
89. Is there proper lighting in the bedroom	1. Yes	2. No	3. Others specify
90. Is there a light switch easily accessible from the bed	1. Yes	2. No	3. Others specify
• Bathroom			
91. Bathroom away from the bedroom	1. Yes	2. No	3. Others specify
92. Bathroom at a different level	1. Yes	2. No	3. Others specify
93. How far is the bathroom if it is away	_____		
94.1Type of floor of bathroom	_____		
94. Light switch at the entrance of the bathroom	1. Yes	2. No	3. Others specify
95. Well lit bathroom	1. Yes	2. No	3. Others specify

96. Bathroom divided into dry and wet areas	1. Yes	2. No	3. Others specify
97. Grab bars fixed in bathroom	1. Yes	2. No	3. Others specify
Personal			
98. Any protective devices to prevent falls/injuries due to falls	1. Yes	2. No	3. Others specify
99. Use of walking aid	1. Yes	2. No	3. Others specify
Outside the house			
100. Way to the entry of the house smooth and even	1. Yes	2. No	3. Others specify
101. Walkways around the house smooth and free of obstacles and overgrown shrubbery, grass and weeds that could cause tripping	1. Yes	2. No	3. Others specify
102. Any tripping hazard	1. Yes	2. No	3. Others specify
103. Any slippery surfaces	1. Yes	2. No	3. Others specify
104. Presence of stairs/steps outside the house	1. Yes	2. No	3. Others specify
105. Stairs guarded with rails	1. Yes	2. No	3. Others specify

Thank you very much for your cooperation

A.8

The risks, risk factors and immediate consequences of falls among older persons in their home environment in Thiruvananthapuram

Information and consent form

You are sought permission to conduct observation of your household as part of a research study conducted by Dr Rekha M Ravindran, a PhD Scholar of Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum, India as part of her PhD Dissertation. This study is planned to investigate the risk factors of falls among persons above the age of sixty years. Before agreeing to participate in this research study, it is important that you read the following explanation of the study that describes the purpose, benefits and risks and rights as a study subject.

Title of Research: “The risks, risk factors and immediate consequences of falls among older persons in their home environment-A study in Thiruvananthapuram”.

Principal Investigator and affiliation: Dr Rekha M Ravindran, PhD Scholar, AMCHSS, SCTIMST, Trivandrum.

Background of this study: Elderly is a group of the population which deserves special attention as they face a variety of health problems as well as socio economic and emotional insecurities in the day-to-day life. Fall induced injuries are one of the common causes of longstanding pain, functional impairment, disability and death among elderly. One out of every three elderly persons above the age of 65 years falls at least once every year. In half of all the cases it results in serious injury.

Why is this research study being done?: Information on the magnitude, risk factors and impact of any injuries in developing countries especially India is not clearly known because of paucity of data in this direction. Researches in this area to identify the risk factors of falls and subsequent injuries among elderly will help in formulating preventive measures and devise policies for an elderly friendly environment to reduce a significant amount of injury burden among the elderly.

Details of enrolment: The built environment inside and outside the elderly dwellings add to the risk for falls and subsequent injuries among the older persons. Your household is selected as you are above 60 years and is residing in Athiyannur block Panchayat of Thiruvananthapuram district. Your permission is sought for observing your household for identifying those potential factors that may lead to falls and subsequent injuries among older persons. This may take around 30 minutes.

Voluntary Participation/ Withdrawal from the Study:

Your participation in this research study is completely voluntary. You may choose or not choose to participate in the study. If you choose to participate in the study, you can withdraw from the study at any time without providing the investigator with a

reason. Your decision to withdraw from or not participate in the study will not affect you in any way. The Investigator may withdraw you from the study at any time, without your agreement.

Confidentiality

Your identity will be kept confidential. You will not be individually identifiable in any publications or presentations resulting from this study. All information we have collected is coded and does not have your name associated. No one outside the research team will have access to that information.

Anonymity – Information collected will be recorded without your name and will be detached from the consent form while filing.

Possible Side Effects and/or Risks

No risks are expected from allowing us to observe your household. Utmost care will be taken not to interfere with your household activities. The only risk may be the inconvenience you may experience while observing your household.

Benefits of the Study – There will be no major benefits to you for your participation in this study. Information obtained from this may help us to have a better understanding of built environment risk factors for falls among older adults above sixty years of age and this may be useful for devising prevention strategies for falls in the future.

Questions/ parties to contact

If you have any questions about this research study, you can contact or Dr Anoop Kumar Thekkuveetil, Member Secretary of Institute Ethics Committee, Ph 0471 2520256/257 at any time. If you decide to take part in this research study, you must sign this form to show that you want to take part. You can keep a copy of this form for further reference.

Consent form

I have been given a chance to read and understand the consent form thoroughly. I understand that I can contact Dr Rekha M Ravindran at any point of time to ask questions regarding my participation in this research study and that I will be answered to my satisfaction.

I understand that my participation in this study is voluntary and I can quit at any time without any problem. I also understand that the investigator can decide at any point that I should no longer participate in the study.

If I have any questions about my rights as a subject in the study, I may contact Dr Rekha M Ravindran, PhD Scholar, AMCHSS, SCTIMST, Trivandrum, Ph: 9400330847.

I have read and understood the above information. I consent you to observe my household. I understand that I will be given a copy of this signed and dated form for my own records. I have initialed the boxes below to indicate my consent to complete the questionnaire.

I consent you to observe my household? Yes No

Study Participant (Signature)

Date

Name

Person who explained or answered questions (Signature)

Date

Name

A.9

Observation guidelines

Name and address of the participant

Date and cause of fall

What is the condition of the patient? (Is he/she doing all the chores as before fall, If not back to normal how much is lacking?)

Outside the house	
Observation findings	Alterations made after the falls
Road to the house: <ul style="list-style-type: none"> • distance from the main road where they catch bus • distance from the adjacent road • Level with the road • Condition of the road (regularity, slippery, vegetations etc) 	Road to the house:
Around the house <ul style="list-style-type: none"> • Tripping hazards • Evenness • Condition of the surface 	Outside the house <ul style="list-style-type: none"> •
General features of the house <ul style="list-style-type: none"> • Area • Area of the compound • compound walls • immediate neighbours • Roof • storeys • No of rooms 	General features of the house <ul style="list-style-type: none"> •
Step/ ramp to enter the house (front and back) <ul style="list-style-type: none"> • No of steps • height of the steps • evenness • condition of the steps • uniformity of the steps 	Step/ ramp to enter the house (front and back) <ul style="list-style-type: none"> •

Inside the house	
Observation findings	Alterations made after the falls
Floor <ul style="list-style-type: none"> • Flooring material • Evenness • Regularity • Condition of the floor 	Floor <ul style="list-style-type: none"> •
Levels of the house <ul style="list-style-type: none"> • Different levels within the house 	Levels of the house <ul style="list-style-type: none"> •
Lighting <ul style="list-style-type: none"> • All the rooms especially the subject's room • Main hall • walk ways • walk way to the bathroom 	Lighting <ul style="list-style-type: none"> •
Potential tripping hazards <ul style="list-style-type: none"> • furniture • Door thresholds 	Potential tripping hazards <ul style="list-style-type: none"> •
Bedroom <ul style="list-style-type: none"> • lighting • Proper chairs • Height of the cot • Clutter • Loose wires/low curtains 	Bedroom <ul style="list-style-type: none"> •
Doors <ul style="list-style-type: none"> • Width • Thresholds 	Doors <ul style="list-style-type: none"> •
Toilets <ul style="list-style-type: none"> • Attached • Different level • Light switch at the entry • light inside • Dry wet separated • Toilet/bathroom of convenient size • commode 	Toilets <ul style="list-style-type: none"> •

<ul style="list-style-type: none"> • Floor • Tripping/ slipping hazard • Provision to sit and take bath • Easy to reach for things like soap, towel etc 	
<p>Kitchen</p> <ul style="list-style-type: none"> • Cabinet height • Sink height • Clutter 	<p>Kitchen</p> <ul style="list-style-type: none"> •
<p>Preventive measures</p>	

Remarks:

A.10

വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വ്യഭജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം.

സർവ്വേയുടെ വിശദാംശങ്ങൾ

ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജിയിലെ അച്യുത മേനോൻ സെൻറർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസിലെ ഗവേഷണ പഠന വിദ്യാർഥിയാണു ഞാൻ. ഗവേഷണ പഠനത്തിന്റെ ഭാഗമായി അറുപത് വയസ്സിനുമേൽ പ്രായമായവർക്കിടയിലുള്ള വീഴ്ചയുടെ അപകട സാധ്യതയെ കുറിച്ചുള്ള ഒരു പഠനം നടത്തുന്നു. ഈ പഠനത്തിന്റെ ഭാഗമായി നടത്തുന്ന ഒരു സർവ്വേയിലേക്ക് താങ്കളെ ക്ഷണിക്കുന്നു. പഠനത്തിൽ പങ്കെടുക്കാൻ അനുമതിനൽകുന്നതിനു മുൻപ് പഠന ലക്ഷ്യങ്ങളും ഉദ്ദേശ്യങ്ങളും താങ്കൾ അറിഞ്ഞിരിക്കേണ്ടത് അത്യാവശ്യമാണ്.

ഗവേഷണ വിഷയം: വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വ്യഭജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം.

ഗവേഷകൻ: ഡോ. രേഖ എം രവീന്ദ്രൻ പി എച്ച് ഡി വിദ്യാർഥിനി, അച്യുത മേനോൻ സെൻറർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്, ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി, തിരുവനന്തപുരം.

പഠനപരിഷ്കാരം: ദൈനംദിന ജീവിതത്തിൽ ഒട്ടേറെ ആരോഗ്യ, സാമൂഹ്യ, സാമ്പത്തിക, വൈകാരിക പ്രശ്നങ്ങൾ അഭിമുഖീകരിക്കുന്ന, പ്രത്യേക പരിഗണന അർഹിക്കുന്ന ജനവിഭാഗമാണ് മുതിർന്ന പൗരന്മാർ. വീഴ്ച മൂലമുണ്ടാകുന്ന പരിക്കുകളാണു പ്രധാനമായും മുതിർന്നവരിൽ സ്ഥായിയായ വൈകല്യങ്ങൾക്കും ഒരു പക്ഷെ മരണത്തിനും വരെ കാരണമാകുന്നതും. അറുപത്തിയഞ്ചുവയസ്സിനു മുകളിൽ പ്രായമുള്ള മൂന്നുപേരിൽ ഒരാൾ വർഷത്തിൽ ഒരു പ്രാവശ്യമെങ്കിലും വീഴുന്നതായി കണക്കാക്കപ്പെടുന്നു. ഇതിൽ പകുതിയോളം വളരെയേറെ അപകട സാധ്യതയുള്ളതായി പരിണമിക്കാറുണ്ട്.

ഈ പഠനത്തിന്റെ ആവശ്യകത

ഇന്ത്യ ഉൾപ്പെടെയുള്ള വികസന രാജ്യങ്ങളിൽ മുതിർന്ന പൗരന്മാർക്ക് (വാർധക്യ കാലത്ത്) സംഭവിക്കുന്ന വീഴ്ചയുടെ അപകട സാധ്യതയെ കുറിച്ചുള്ള അവബോധം/അറിവ് വളരെ പരിമിതമാണ്. ഇത്തരം വിഷയത്തെ പറ്റിയുള്ള വിവരങ്ങളുടെ അഭാവമാണിതിനു കാരണമായി കരുതുന്നത്. ഈ മേഖലയിലെ പഠനങ്ങൾ മുതിർന്ന പൗരന്മാർക്കിടയിലുണ്ടാകുന്ന മുറിവുകളുടെ കാരണം കണ്ടെത്തുക വഴി ഇത്തരം വീഴ്ചകളെ പ്രതിരോധിക്കുന്നതിനു വേണ്ടിയുള്ള പദധതികൾ വിഭാവനംചെയ്യുന്നതിനും ഇത്തരം സംഭവങ്ങളുടെ തോത് കുറയ്ക്കുന്നതിനും സഹായിക്കും.

പഠനപങ്കാളിത്തം

താങ്കളുടെ പ്രായം അറുപതിനു മുകളിൽ ആയതും, താങ്കൾ ഇപ്പോൾ തിരുവനന്തപുരം ജില്ലയിലെ അതിയന്നൂർ ബ്ലോക്ക് പഞ്ചായത്തിൽ താമസിക്കുന്നതും കൊണ്ടും ഈ പഠനത്തിൽ പങ്കാളിയാകാൻ ക്ഷണിക്കുന്നു. താങ്കളുടെ ഇപ്പോഴത്തെ ആരോഗ്യസ്ഥിതിയെക്കുറിച്ചും കഴിഞ്ഞ ഒരു വർഷത്തിൽ വീട്ടിനകത്തോ പരിസര പ്രദേശങ്ങളിലോ താങ്കൾ എപ്പോഴെങ്കിലും വീണിട്ടുണ്ടെങ്കിൽ അതിന്റെ കാരണങ്ങൾ എന്തൊക്കെയാണ് എന്തൊക്കെയാണ് അതിന്റെ അനന്തര ഫലങ്ങൾ എന്നിവയെപ്പറ്റിയെല്ലാം ചില ചോദ്യങ്ങൾ ചോദിക്കുന്നതാണ്. ഏകദേശം 25 മിനിറ്റ് എടുക്കും ഇത് പൂരിപ്പിക്കാൻ.

സ്വമേധയായുള്ള പങ്കാളിത്തം

ഈ പഠനത്തിലുള്ള പങ്കാളിത്തം തികച്ചും താങ്കളുടെ സ്വന്തം ഇഷ്ടപ്രകാരമാണ്. ഇതിൽ പങ്കെടുക്കാനും പങ്കെടുക്കാതിരിക്കാനുമുള്ള സ്വാതന്ത്ര്യം താങ്കൾക്കുണ്ട്. ഈ പഠനത്തിൽ നിന്നും യാതൊരു കാരണവും

ബോധിപ്പിക്കാതെ തന്നെ എപ്പോൾ വേണമെങ്കിലും താങ്കൾക്ക് പിന്മാറാവുന്നതാണ്. ഇതിൽ നിന്നും പിന്മാറുന്നതിനുള്ള തീരുമാനം താങ്കളുടെ ഒരു തരത്തിലും ബാധിക്കുകയില്ല.

പഠനവിശ്വാസ്യത: ഈ പഠനഫലങ്ങൾ രഹസ്യസ്വഭാവത്തോടെ സൂക്ഷിക്കുന്നതാണ്. താങ്കളെ തിരിച്ചറിയാൻ കഴിയുന്ന യാതൊരു വിവരങ്ങളും പഠനഫലം പ്രസിദ്ധീകരിക്കുന്ന പ്രസിദ്ധീകരണങ്ങളിലോ, പ്രദർശനങ്ങളിലോ ഉണ്ടായിരിക്കുന്നതല്ല. ഞങ്ങൾ ശേഖരിക്കുന്ന എല്ലാ വിവരങ്ങളും കോഡ് ചെയ്ത് സൂക്ഷിക്കുന്നതാണ്. അതിൽ താങ്കളുടെ പേര് ഉൾപ്പെടുത്തുന്നതല്ല. സമൂഹത്തിലുള്ള മറ്റാർക്കും തന്നെ ഈ വിവരങ്ങൾ കൈമാറ്റം ചെയ്യപ്പെടുന്നതല്ല.

പഠന വിവരങ്ങളുടെ രഹസ്യസ്വഭാവം: താങ്കളിൽ നിന്നും ശേഖരിക്കുന്ന വിവരങ്ങൾ പേരില്ലാതെ സൂക്ഷിക്കുന്നതാണ് അവ സമ്മതപത്രത്തോടൊപ്പം സൂക്ഷിക്കുന്നതുമല്ല. ഒരു തിരിച്ചറിയൽ നമ്പറിന്റെ സഹായത്തോടെ മാത്രമേ താങ്കളുടെ വിവരങ്ങൾ തിരിച്ചറിയാൻ കഴിയുകയുള്ളൂ.

ആപൽസാധ്യതകളും പാർശ്വഫലങ്ങളും: ഈ സർവ്വേ പൂരിപ്പിക്കുന്നതു കൊണ്ട് യാതൊരു തരത്തിലുള്ള ആപൽസാധ്യതകളും പ്രതീക്ഷിക്കുന്നില്ല. ഇതിന് യാതൊരു തരത്തിലുമുള്ള പാർശ്വഫലങ്ങളുമില്ല. വീഴ്ചയും അതിനോടനുബന്ധിച്ചുള്ള ആരോഗ്യ, സാമൂഹ്യ, സാമ്പത്തിക, വൈകാരിക പ്രശ്നങ്ങൾ തുടങ്ങിയവയെക്കുറിച്ചുള്ള ചോദ്യങ്ങൾ ചോദിക്കുമ്പോൾ അല്പം അസ്വസ്ഥത അനുഭവപ്പെട്ടേക്കാം.

പഠനത്തിന്റെ പ്രയോജനങ്ങൾ: താങ്കൾക്ക് ഇതിൽ പങ്കെടുക്കുന്നത് കൊണ്ട് യാതൊരുവിധ സാമ്പത്തിക ആനുകൂല്യങ്ങളും ലഭിക്കുന്നതല്ല. താങ്കൾ തരുന്ന വിവരങ്ങൾ ഞങ്ങളെ സമൂഹത്തെ കുറിച്ച് മനസ്സിലാക്കി ഭാവിയിൽ ആരോഗ്യപദ്ധതികൾ രൂപപ്പെടുത്തുന്നതിന് സഹായിക്കും.

ഈ ഗവേഷണപഠനത്തെ കുറിച്ച് എന്തെങ്കിലും തരത്തിലുള്ള സംശയങ്ങൾ അവശേഷിക്കുന്നുവെങ്കിൽ തിരിച്ചയായും താങ്കൾക്ക് ഡോ. രേഖ എം. രവീന്ദ്രനെയോ (9400330847) ഡോ. അനൂപ്കുമാർ തെക്കുവീട്ടിൽ, മെമ്പർ സെക്രട്ടറി, ഇൻസ്റ്റിറ്റ്യൂട്ട് എത്തിക്കൽ കമ്മിറ്റി, (04712520256/257) എന്ന നമ്പറിലോ സമീപിക്കാവുന്നതാണ്. ഈ ഗവേഷണപഠനത്തിൽ പങ്കെടുക്കാൻ തീരുമാനിക്കുകയാണെങ്കിൽ സമ്മതമാണെന്ന് വ്യക്തമാക്കുന്നതിന് സമ്മതപത്രം ഒപ്പിട്ട് തിരികെ നൽകേണ്ടതാണ്. ഇതിന്റെ ഒരു കോപ്പി താങ്കൾക്ക് സൂക്ഷിക്കാനായി നൽകുന്നതാണ്.

സമ്മതപത്രം

ഈ ഗവേഷണപഠനത്തെ കുറിച്ച് എനിക്ക് ചോദ്യങ്ങൾ ചോദിക്കാൻ അവസരം തന്നിട്ടുണ്ട്. എന്റെ ചോദ്യങ്ങൾക്ക് തൃപ്തികരമായ മറുപടി കിട്ടിയിട്ടുണ്ട്. ഇതിൽ പങ്കെടുക്കുന്നതിനെ കുറിച്ച് എന്തെങ്കിലും സംശയമുണ്ടെങ്കിൽ എനിക്ക് ഡോ. രേഖ എം. രവീന്ദ്രനെ സമീപിക്കാവുന്നതാണ്.

ഈ ഗവേഷണപഠനത്തിലെ പങ്കാളിത്തം സ്വന്തം ഇഷ്ടപ്രകാരമാണെന്ന് എനിക്ക് മനസ്സിലായി. എപ്പോൾ വേണമെങ്കിലും ഇതിൽ നിന്നും പിന്മാറാവുന്നതാണെന്നും എനിക്ക് മനസ്സിലായി. എപ്പോൾ വേണമെങ്കിലും എന്നെ പങ്കെടുപ്പിക്കാനും പങ്കെടുപ്പിക്കാതിരിക്കാനുമുള്ള സ്വാതന്ത്ര്യം ഗവേഷകനുണ്ടെന്നും എനിക്ക് മനസ്സിലായി.

ഈ പഠനത്തിൽ പങ്കെടുക്കുന്ന ആളെന്ന നിലക്ക് എന്റെ അവകാശങ്ങളെ കുറിച്ച് ഏതെങ്കിലും തരത്തിലുള്ള ചോദ്യങ്ങളുണ്ടെങ്കിൽ എനിക്ക് പ്രധാന ഗവേഷകയായ ഡോ. രേഖ എം. രവീന്ദ്രനെ സമീപിക്കാവുന്നതാണ്.

ഈ സമ്മതപത്രം ഒപ്പിടുന്നതിലൂടെ എന്റെ നിയമപരമായ അവകാശങ്ങളൊന്നും തന്നെ വേണ്ടെന്നു വയ്ക്കുന്നില്ല.

ഞാൻ മുകളിൽ പറഞ്ഞിരിക്കുന്ന വിവരങ്ങൾ വായിക്കുകയും മനസ്സിലാക്കുകയും ചെയ്തു. ഇതിൽ പങ്കെടുക്കാൻ എനിക്ക് സമ്മതമാണ്. ഏന്റെ സ്വന്തം ആവശ്യത്തിലേക്കായി ഇതിന്റെ ഒരു കോപ്പി എനിക്ക് തരുമെന്നും മനസ്സിലായി. താഴെ പറയുന്ന ഭാഗത്ത് എന്റെ സമ്മതം വ്യക്തമാക്കുന്നതിനായി ഒപ്പിട്ട് നൽകുന്നു.

ഈ പഠനത്തിൽ പങ്കെടുക്കാൻ എനിക്കു സമ്മതമാണ്:

പഠനത്തിൽ പങ്കെടുക്കുന്ന

ആളിന്റെ ഒപ്പ്: _____

തീയതി: _____

പഠനത്തിൽ പങ്കെടുക്കുന്ന

ആളിന്റെ പേര്: _____

കാര്യങ്ങൾ വിശദീകരിച്ച് തന്നയാൾ/

ചോദ്യകർത്താവ് (ഒപ്പ്): _____

തീയതി: _____

കാര്യങ്ങൾ വിശദീകരിച്ച് തന്നയാൾ/

ചോദ്യകർത്താവ് (പേര്): _____

A.11

വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വൃദ്ധജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം.

ചോദ്യാവലി

വ്യക്തിഗതകോഡ്-----

1. പ്രായം:

2. ലിംഗം:

1 പുരുഷൻ

2 സ്ത്രീ

I. സാമൂഹ്യസാമ്പത്തിക ഘടകങ്ങൾ

3. വൈവാഹിക നില

1 വിവാഹിതൻ/വിവാഹിത

4 നിയമപരമായി വിവാഹ ബന്ധം വേർപ്പെടുത്തിയത്/ വേർപിരിഞ്ഞ് താമസിക്കുന്നു

2 വിവാഹം കഴിച്ചിട്ടില്ല

5 മറ്റുള്ളവ വിശദീകരിക്കുക

3 വിധവ/വിഭാര്യൻ

4. വിദ്യാഭ്യാസം

1 നിരക്ഷരൻ

7 ഡിപ്ലോമ

2 ഔദ്യോഗിക വിദ്യാഭ്യാസം നേടിയിട്ടില്ല

8 ബിരുദം

3 നാലാം ക്ലാസുവരെ

9 പ്രൊഫഷണൽ വിദ്യാഭ്യാസം

4 ഏഴാം ക്ലാസുവരെ

10 ബിരുദാനന്തരബിരുദം

5 പത്താം ക്ലാസുവരെ

11 മറ്റുള്ളവ വിശദീകരിക്കുക

6 ഹയർ സെക്കൻഡറി സ്കൂൾ
പുർത്തീകരിച്ചു

5. താങ്കൾ സാമ്പത്തികമായി സ്വയം പര്യാപ്തനാണോ?
1 അതെ 2 അല്ല ചോദ്യം 8 ലേക്ക് പോകുക

6. താങ്കളുടെ വരുമാന മാർഗ്ഗമെന്താണ്? (അനുയോജ്യമായതെല്ലാം അടയാളപ്പെടുത്തുക)

- | | |
|--|--|
| 1 ശമ്പളത്തോടു കൂടിയ ജോലി | 6 സ്വയം തൊഴിൽ |
| 2 ദിവസക്കൂലി | 7 കൃഷി |
| 3 ജോലിയുടെ പെൻഷൻ | 8 ബന്ധുക്കളിൽ നിന്നും സുഹൃത്തുക്കളിൽ നിന്നുമുള്ള സഹായം |
| 4 പുരയിടത്തിൽനിന്നുള്ള ആദായം/മറ്റു നിക്ഷേപങ്ങൾ | 9 സാമ്പത്തിക സഹായം (സംഘടനകളിൽ നിന്നും) |
| 5 കർഷക/വിധവ/വാർദ്ധക്യ പെൻഷൻ | 1 മറ്റുള്ളവ വിശദീകരിക്കുക |
| | 0 |

7. ജോലിയുണ്ടെങ്കിൽ, താങ്കളുടെ ഇപ്പോഴത്തെ ജോലി എന്താണ്?
(അനുയോജ്യമായതെല്ലാം അടയാളപ്പെടുത്തുക)

- | | |
|-------------------------|----------------------------|
| 1 പെൻഷണർ | 6 സ്വയം തൊഴിൽ |
| 2 സർക്കാർ ജോലി | 7 വ്യവസായം |
| 3 സ്വകാര്യ ജോലി | 8 കൃഷി |
| 4 കുലിപ്പണി (സ്കിൽഡ്) | 9 ജോലിയൊന്നുമില്ല |
| 5 കുലിപ്പണി (അൺസ്കിൽഡ്) | 10 മറ്റുള്ളവ വിശദീകരിക്കുക |

8. താങ്കൾ സ്വന്തം വീട്ടിലാണോ ഇപ്പോൾ താമസിക്കുന്നത്?
1 അതെ 2 അല്ല 3 മറ്റുള്ളവ വിശദീകരിക്കുക

9. താങ്കളെ സാമ്പത്തികമായി ആരെങ്കിലും സഹായിക്കുന്നുണ്ടെങ്കിൽ അതാരാണ്?

- | | |
|------------------|---------------------------|
| 1 കുട്ടികൾ | 5 ബന്ധുക്കൾ |
| 2 സഹോദരങ്ങൾ | 6 അതിന്റെ ആവശ്യമില്ല |
| 3 ഭർത്താവ്/ഭാര്യ | 7 മറ്റുള്ളവ വിശദീകരിക്കുക |
| 4 കുട്ടുകാർ | |

10. താങ്കളുടെ കുടുംബത്തിന്റെ മാസവരുമാനം എത്ര? -----

11. താങ്കൾക്ക് എത്ര മക്കളുണ്ട്? -----

12. ഈ വീട്ടിൽ എത്ര പേർ താമസിക്കുന്നു? -----

13. ദൈനംദിനചര്യകൾ സ്വയം ചെയ്യാൻ താങ്കൾക്കു സാധിക്കുമോ?

- 1 സാധിക്കും 2 സാധിക്കില്ല

14. സാധിക്കില്ലെങ്കിൽ സഹായിക്കാൻ ആരെങ്കിലും ഉണ്ടോ?

- 1 ഉണ്ട് 2 ഇല്ല

15. Q 14 ന് ഉണ്ട് എങ്കിൽ ആരാണ് സഹായിക്കാനുള്ളത്? -----

IV ചികിത്സാവിവരങ്ങൾ

16. കഴിഞ്ഞ 12 മാസത്തിനിടയ്ക്ക് എപ്പോഴെങ്കിലും വീട്ടിലോ പരിസരപ്രദേശങ്ങളിലോ വീണിട്ടുണ്ടോ? (വാഹനാപകടങ്ങൾ ഒഴിവാക്കുക)

17. ചോദ്യം 16 ന് ഉണ്ട് എങ്കിൽ കഴിഞ്ഞ 12 മാസത്തിനിടയ്ക്ക് എത്ര തവണ വീണിട്ടുണ്ട്?

- 1 ഒരു തവണ 2 രണ്ടു തവണ 3 മൂന്നു തവണ 4 നാലു തവണ 5 അഞ്ചു തവണ 6 അഞ്ചിൽ കൂടുതൽ

കഴിഞ്ഞ 12 മാസത്തിനിടയ്ക്ക് സംഭവിച്ച വീഴ്ചകളെക്കുറിച്ച് വിശദീകരിക്കുക (അവസാനത്തതിൽ നിന്നും തുടങ്ങുക)

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

18. വീണ ദിവസം

19. വീണ സമയം

20. വീണ സ്ഥലം

(കോഡ് എടുത്തെഴുതുക)

20.1 വീടിനകത്ത്

1.a കിടപ്പുമുറിയിൽ

1.b കുളിമുറിയിൽ

20.2 വീടിന് പുറത്ത്

2. a കോണിപ്പടി കയറുകയു
 ◦ ഇറങ്ങുകയു
 ചെയ്തപ്പോൾ

2.b വരാന്തയിൽ

20.3 വീട്ടിൽനിന്നും അകലെ

3.a റോഡിൽ

3.b മറ്റു വീടുകളിൽ

1.c കുളിമുറിയിൽ പോകുന്ന വഴി

2.c പുനോട്ടത്തിൽ

3.c മറ്റു കെട്ടിടങ്ങളിൽ (ഓഫീസ്)

1.d കോണിപ്പടി കയറുകയും ഇറങ്ങുകയും ചെയ്യുമ്പോൾ

2.d മുറ്റത്ത്

3.d. ജോലി സ്ഥലത്ത്

1.e അടുക്കളയിൽ

2.e വീട്ടു പറമ്പിൽ

3.e മറ്റുള്ളവ

1.f ഭക്ഷണമുറിയിൽ

2.f മറ്റുള്ളവ

1.g മറ്റു മുറികളിൽ

1.h മറ്റുള്ളവ

20.4 മറ്റുള്ളവ വിശദീകരിക്കുക

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

21. വീഴ്ചയുടെ കാരണം

(കോഡ് എടുത്തഴുതുക)

1.കാൽ തട്ടി വീണു 2. കാൽ വഴുതി വീണു 3. ബാലൻസ് നഷ്ടപ്പെട്ടു 4. കാൽകുഴഞ്ഞു പോയി 5.തലകറങ്ങി വീണു 6.ബോധം കെട്ടു വീണു, 7.കാരണം ഓർമ്മയില്ല/അറിയില്ല,

8. മറ്റുള്ളവ വിശദീകരിക്കുക-----

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

22. ഏത് പ്രവൃത്തിയിലേർപ്പെട്ടപ്പോഴാണ് വീണത്?

(കോഡ് എടുത്തഴുതുക)

1. നടക്കുമ്പോൾ 2. മുത്രമൊഴിക്കാൻ പോയപ്പോൾ 3. കട്ടിലിൽ/കസേരയിൽ എണീക്കുമ്പോൾ 4.കസേരയിൽ/കട്ടിലിൽ ഇരിക്കുമ്പോൾ 5. കസേരയിലോ/കട്ടിലിലോ ഇരിക്കാൻ പോകുമ്പോൾ 6. കോണിപ്പടി കയറുമ്പോൾ 7. കുളിക്കുമ്പോൾ 8.ഉറക്കത്തിൽ 9. വെറുതെ നിൽക്കുമ്പോൾ 10.അടുക്കളയിൽ ജോലി ചെയ്യുമ്പോൾ 11.പറമ്പിൽ ജോലി ചെയ്യുമ്പോൾ 12. സംസാരിക്കുമ്പോൾ 13. മറ്റുള്ളവ വിശദീകരിക്കുക

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

23.വീഴ്ചയിൽ എന്ത് പരിക്കാണ് പറ്റിയത്? (കോഡ് എടുത്തെഴുതുക)

- 1. വേദന 2. മുറിവ് 3. ചതവ് 4. ഉളുക്ക് 5. ഒടിവ് 6. ഒന്നുമില്ല
- 7. മറ്റുള്ളവ വിശദീകരിക്കുക

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

24 ശരീരത്തിൽ എവിടെയാണ് പരിക്ക് പറ്റിയത് ? (വിശദീകരിക്കുക) :

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

25. ആശുപത്രി/ഡോക്ടറെ സമീപിച്ചുവോ? (കോഡ് എടുത്തെഴുതുക)

- 1. ഉവ്വ് 2. ഇല്ല

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

26. എന്ത് ചികിത്സയാണ് ചെയ്തത്?

(കോഡ് എടുത്തെഴുതുക)

- 1. ഒന്നും ചെയ്തില്ല 2. മരുന്നുകൾമാത്രം 3. മുറിവ് പൊതിഞ്ഞുകെട്ടൽ
- 4. മുറിവുതുന്നിച്ചേർക്കൽ 5. ഒടിവുകൾ കെട്ടിവയ്ക്കൽ 6. തിരുമ്മൽ/ഫിസിയോതെറാപ്പി
- 7. ശസ്ത്രക്രിയ 8. മറ്റുള്ളവ (വിശദീകരിക്കുക) -----

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

27. വീഴ്ചയ്ക്കു ശേഷം സാധാരണ നിലയിൽ എത്താൻ എത്ര നാളെടുത്തു? (കോഡ് എടുത്തെഴുതുക)

- 1. വീഴ്ചയിൽ ഒന്നും പറ്റിയില്ല 2. കുറച്ച് ദിവസങ്ങൾ 3. കുറച്ച് ആഴ്ചകൾ 3. കുറച്ച് മാസങ്ങൾ
- 4. ഇപ്പോഴും സാധാരണ അവസ്ഥയിൽ എത്തിയിട്ടില്ല
- 5. മറ്റുള്ളവ വിശദീകരിക്കുക

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

28. കഴിഞ്ഞ 12 മാസത്തിനിടയ്ക്ക് വീഴ്ചക്കായി ചികിത്സ തേടിയപ്പോൾ വീഴ്ചയെ തടയുവാനുള്ള പ്രതിരോധ മാർഗ്ഗങ്ങൾ എന്തെങ്കിലും ഡോക്ടർമാർ ഉപദേശിച്ചിരുന്നോ?

33. താങ്കൾക്ക് താഴെ പറയുന്ന ഏതെങ്കിലും തരത്തിലുള്ള അസുഖം ഉണ്ടോ?

ക്ര. നം.	അസുഖം	ഉണ്ട്/ ഇല്ല #	ചികിത്സ \$	എത്ര നാളായി	ഏതു വിഭാഗം*
1	കാഴ്ചക്കുറവ് വിശദീകരിക്കുക-----				
2	ശ്വാസകോശരോഗങ്ങൾ വിശദീകരിക്കുക-----				
3	ഹൃദയസംബന്ധമായ രോഗങ്ങൾ വിശദീകരിക്കുക-----				
4	ദഹനേന്ദ്രിയ രോഗങ്ങൾ വിശദീകരിക്കുക-----				
5	വൃക്ക/മൂത്രാശയരോഗങ്ങൾ വിശദീകരിക്കുക-----				
6	നാഡിസംബന്ധമായ രോഗങ്ങൾ വിശദീകരിക്കുക-----				
7	ഹോർമോൺ സ ബന്ധമായ രോഗങ്ങൾ വിശദീകരിക്കുക-----				
8	പേശീസംബന്ധമായ അസുഖം വിശദീകരിക്കുക-----				
9	ഉയർന്ന രക്തസമ്മർദ്ദം				
10	ഉയർന്ന കൊളസ്ട്രോൾ				
11	പ്രമേഹം				

12 പ്രമേഹം മുർച്ഛിച്ചതു കൊണ്ടുള്ള പ്രശ്നങ്ങൾ

വിശദീകരിക്കുക-----

13 ഉറക്കമില്ലായ്മ

വിശദീകരിക്കുക-----

14 അസ്ഥിതേയ്മാനം

15 മറവീരോഗം

വിശദീകരിക്കുക-----

16 മാനസിക പ്രശ്നങ്ങൾ

വിശദീകരിക്കുക-----

17 അർബുദം

വിശദീകരിക്കുക-----

15 മറ്റുള്ളവ

വിശദീകരിക്കുക-----

1.ഉണ്ട് 2.ഇല്ല

\$ 1.ഉണ്ട് 2.ഇല്ല വിശദീകരണങ്ങൾ ഉണ്ടെങ്കിൽ വേറെ ഒരു ഷീറ്റിൽ രേഖപ്പെടുത്തുക

* 1. അലോപ്പതി 2. ആയുർവേദം 3. ഹോമിയോ 4. സിദ്ധ/യുനാനി 5. മറ്റു പരമ്പരാഗത ചികിത്സാരീതികൾ 6. മറ്റുള്ളവ വിശദീകരിക്കുക

34. താങ്കൾ പതിവായി ഏതെങ്കിലും മരുന്നുകൾ കഴിക്കുന്നുണ്ടോ?

1 ഉണ്ട് 2 ഇല്ല

35. ഉണ്ടെങ്കിൽ വിശദീകരിക്കുക

മരുന്നിന്റെ പേര്

അളവ്

എത്ര തവണ

എത്ര നാളായി

കഴിക്കുന്നു?

A.12

വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വ്യവജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം

അഭിമുഖത്തിന്റെ വിശദാംശങ്ങൾ

ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജിയിലെ അച്യുത മേനോൻ സെൻറർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസിലെ ഗവേഷണ പഠന വിദ്യാർഥിയാണു ഞാൻ. ഗവേഷണ പഠനത്തിന്റെ ഭാഗമായി അറുപത് വയസ്സിനുമേൽ പ്രായമായവർക്കിടയിലുള്ള വീഴ്ചയുടെ അപകട സാധ്യതയെ കുറിച്ചുള്ള ഒരു പഠനം നടത്തുന്നു. ഈ പഠനത്തിന്റെ ഭാഗമായി നടത്തുന്ന ഒരു അഭിമുഖ സഭാഷണത്തിലേക്ക് താങ്കളെ ക്ഷണിക്കുന്നു. പഠനത്തിൽ പങ്കെടുക്കാൻ അനുമതിനൽകുന്നതിനു മുൻപ് പഠന ലക്ഷ്യങ്ങളും ഉദ്ദേശ്യങ്ങളും താങ്കൾ അറിഞ്ഞിരിക്കേണ്ടത് അത്യാവശ്യമാണ്.

ഗവേഷണ വിഷയം: വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വ്യവജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം.

ഗവേഷകൻ: ഡോ. രേഖ എം രവീന്ദ്രൻ പി എച്ച് ഡി വിദ്യാർഥിനി, അച്യുത മേനോൻ സെൻറർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്, ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി, തിരുവനന്തപുരം.

പഠനപശ്ചാത്തലം: ദൈനംദിന ജീവിതത്തിൽ ഒട്ടേറെ ആരോഗ്യ, സാമൂഹ്യ, സാമ്പത്തിക, വൈകാരിക പ്രശ്നങ്ങൾ അഭിമുഖീകരിക്കുന്ന, പ്രത്യേക പരിഗണന അർഹിക്കുന്ന ജനവിഭാഗമാണ് മുതിർന്ന പൗരന്മാർ. വീഴ്ച മൂലമുണ്ടാകുന്ന പരിക്കുകളാണു പ്രധാനമായും മുതിർന്നവരിൽ സ്ഥായിയായ വൈകല്യങ്ങൾക്കും ഒരു പക്ഷെ മരണത്തിനും വരെ കാരണമാകുന്നതും. അറുപത്തിയഞ്ചുവയസ്സിനു മുകളിൽ പ്രായമുള്ള മൂന്നുപേരിൽ ഒരാൾ വർഷത്തിൽ ഒരു പ്രാവശ്യമെങ്കിലും വീഴുന്നതായി കണക്കാക്കപ്പെടുന്നു. ഇതിൽ പകുതിയോളം വളരെയേറെ അപകട സാധ്യതയുള്ളതായി പരിണമിക്കാറുണ്ട്.

ഈ പഠനത്തിന്റെ ആവശ്യകത

ഇന്ത്യ ഉൾപ്പെടെയുള്ള വികസന രാജ്യങ്ങളിൽ മുതിർന്ന പൗരന്മാർക്ക് (വാർധക്യ കാലത്ത്) സംഭവിക്കുന്ന വീഴ്ചയുടെ അപകട സാധ്യതയെ കുറിച്ചുള്ള അവബോധം/അറിവ് വളരെ പരിമിതമാണ്. ഇത്തരം വിഷയത്തെ പറ്റിയുള്ള വിവരങ്ങളുടെ അഭാവമാണിതിനു കാരണമായി കരുതുന്നത്. ഈ മേഖലയിലെ പഠനങ്ങൾ മുതിർന്ന പൗരന്മാർക്കിടയിലുണ്ടാകുന്ന മുറിവുകളുടെ കാരണം കണ്ടെത്തുക വഴി ഇത്തരം വീഴ്ചകളെ പ്രതിരോധിക്കുന്നതിനു വേണ്ടിയുള്ള പദധതികൾ വിഭാവനംചെയ്യുന്നതിനും ഇത്തരം സംഭവങ്ങളുടെ ആവൃത്തി കുറയ്ക്കുന്നതിനും സഹായിക്കും.

പഠനപങ്കാളിത്തം

താങ്കളുടെ പ്രായം അറുപതിനു മുകളിൽ ആയതും, താങ്കൾ ഇപ്പോൾ മെഡിക്കൽ കോളേജ് ആശുപത്രിയിൽ കിടത്തി ചികിത്സ നേടുന്നതു കൊണ്ടും താങ്കളെ ഈ പഠനത്തിൽ പങ്കാളിയാകാൻ ക്ഷണിക്കുന്നു. താങ്കളുടെ ഇപ്പോഴത്തെ ആരോഗ്യസ്ഥിതിയെക്കുറിച്ചും വീട്ടിനകത്തോ പരിസര പ്രദേശങ്ങളിലോ താങ്കൾ എപ്പോഴെങ്കിലും വീണിട്ടുണ്ടെങ്കിൽ അതിന്റെ കാരണങ്ങൾ എന്തൊക്കെയാണ്, എന്തൊക്കെയാണ് അതിന്റെ അനന്തര ഫലങ്ങൾ, ഇപ്പോൾ കഴിക്കുന്ന മരുന്നുകൾ എന്തെല്ലാം, താങ്കളുടെ ശീലങ്ങൾ, താങ്കൾ താമസിക്കുന്ന വീടും പരിസരവും എന്നിവയെക്കുറിച്ചെല്ലാം ചില ചോദ്യങ്ങൾ ചോദിക്കുന്നതാണ്. ഏകദേശം 45 മിനിറ്റ് എടുക്കും ഇത് പൂരിപ്പിക്കാൻ.

സാമേധയായുള്ള പങ്കാളിത്തം

ഈ പഠനത്തിലുള്ള പങ്കാളിത്തം തികച്ചും താങ്കളുടെ സ്വന്തം ഇഷ്ടപ്രകാരമാണ്. ഇതിൽ പങ്കെടുക്കാനും പങ്കെടുക്കാതിരിക്കാനുമുള്ള സ്വാതന്ത്ര്യം താങ്കൾക്കുണ്ട്. ഈ പഠനത്തിൽ നിന്നും യാതൊരു കാരണവും

ബോധിപ്പിക്കാതെ തന്നെ എപ്പോൾ വേണമെങ്കിലും താങ്കൾക്ക് പിന്മാറാവുന്നതാണ്. ഇതിൽ നിന്നും പിന്മാറുന്നതിനുള്ള തീരുമാനം താങ്കളുടെ ഒരു തരത്തിലും ബാധിക്കുകയില്ല.

പഠനവിശ്വാസ്യത: ഈ പഠനഫലങ്ങൾ രഹസ്യസ്വഭാവത്തോടെ സൂക്ഷിക്കുന്നതാണ്. താങ്കളെ തിരിച്ചറിയാൻ കഴിയുന്ന യാതൊരു വിവരങ്ങളും പഠനഫലം പ്രസിദ്ധീകരിക്കുന്ന പ്രസിദ്ധീകരണങ്ങളിലോ, പ്രദർശനങ്ങളിലോ ഉണ്ടായിരിക്കുന്നതല്ല. ഞങ്ങൾ ശേഖരിക്കുന്ന എല്ലാ വിവരങ്ങളും കോഡ് ചെയ്ത് സൂക്ഷിക്കുന്നതാണ്. അതിൽ താങ്കളുടെ പേര് ഉൾപ്പെടുത്തുന്നതല്ല. സമൂഹത്തിലുള്ള മറ്റാർക്കും തന്നെ ഈ വിവരങ്ങൾ കൈമാറ്റം ചെയ്യപ്പെടുന്നതല്ല.

പഠന വിവരങ്ങളുടെ രഹസ്യസ്വഭാവം: താങ്കളിൽ നിന്നും ശേഖരിക്കുന്ന വിവരങ്ങൾ പേരില്ലാതെ സൂക്ഷിക്കുന്നതാണ് അവ സമ്മതപത്രത്തോടൊപ്പം സൂക്ഷിക്കുന്നതുമല്ല. ഒരു തിരിച്ചറിയൽ നമ്പറിന്റെ സഹായത്തോടെ മാത്രമേ താങ്കളുടെ വിവരങ്ങൾ തിരിച്ചറിയാൻ കഴിയുകയുള്ളൂ.

ആപൽസാധ്യതകളും പാർശ്വഫലങ്ങളും: താങ്കളുമായുള്ള അഭിമുഖസംഭാഷണം പൂർത്തിയാക്കുന്നതിൽ യാതൊരു തരത്തിലുള്ള ആപൽസാധ്യതകളും പ്രതീക്ഷിക്കുന്നില്ല. ഇതിന് യാതൊരു തരത്തിലുമുള്ള പാർശ്വഫലങ്ങളുമില്ല. വീഴ്ച അതിനോടനുബന്ധിച്ചുള്ള ആരോഗ്യ, സാമൂഹ്യ, സാമ്പത്തിക, വൈകാരിക പ്രശ്നങ്ങൾ തുടങ്ങിയവയെ കുറിച്ചുള്ള ചോദ്യങ്ങൾ ചോദിക്കുമ്പോൾ അല്പം അസ്വസ്ഥത അനുഭവപ്പെട്ടേക്കാം.

പഠനത്തിന്റെ പ്രയോജനങ്ങൾ: താങ്കൾക്ക് ഇതിൽ പങ്കെടുക്കുന്നത് കൊണ്ട് യാതൊരുവിധ സാമ്പത്തിക ആനുകൂല്യങ്ങളും ലഭിക്കുന്നതല്ല. താങ്കൾ തരുന്ന വിവരങ്ങൾ ഞങ്ങളെ സമൂഹത്തെ കുറിച്ച് മനസ്സിലാക്കി ഭാവിയിൽ ആരോഗ്യപദ്ധതികൾ രൂപപ്പെടുത്തുന്നതിന് സഹായിക്കും.

ഈ ഗവേഷണപഠനത്തെ കുറിച്ച് എന്തെങ്കിലും തരത്തിലുള്ള സംശയങ്ങൾ അവശേഷിക്കുന്നുവെങ്കിൽ തിരിച്ചയായും താങ്കൾക്ക് ഡോ. രേഖ എം. രവീന്ദ്രനെയോ (9400330847) ഡോ. അനൂപ്കുമാർ തെക്കുവീട്ടിൽ, മെമ്പർ സെക്രട്ടറി, ഇൻസ്റ്റിറ്റ്യൂട്ട് എത്തിക്കൽ കമ്മിറ്റി, (04712520256/257) എന്ന നമ്പറിലോ സമീപിക്കാവുന്നതാണ്. ഈ ഗവേഷണപഠനത്തിൽ പങ്കെടുക്കാൻ തീരുമാനിക്കുകയാണെങ്കിൽ സമ്മതമാണെന്ന് വ്യക്തമാക്കുന്നതിന് സമ്മതപത്രം ഒപ്പിട്ട് തിരികെ നൽകേണ്ടതാണ്. ഇതിന്റെ ഒരു കോപ്പി താങ്കൾക്ക് സൂക്ഷിക്കാനായി നൽകുന്നതാണ്.

സമ്മതപത്രം

ഈ ഗവേഷണപഠനത്തെ കുറിച്ച് എനിക്ക് ചോദ്യങ്ങൾ ചോദിക്കാൻ അവസരം തന്നിട്ടുണ്ട്. എന്റെ ചോദ്യങ്ങൾക്ക് തൃപ്തികരമായ മറുപടി കിട്ടിയിട്ടുണ്ട്. ഇതിൽ പങ്കെടുക്കുന്നതിനെ കുറിച്ച് എന്തെങ്കിലും സംശയമുണ്ടെങ്കിൽ എനിക്ക് ഡോ. രേഖ എം. രവീന്ദ്രനെ സമീപിക്കാവുന്നതാണ്.

ഈ ഗവേഷണപഠനത്തിലെ പങ്കാളിത്തം സ്വന്തം ഇഷ്ടപ്രകാരമാണെന്ന് എനിക്ക് മനസ്സിലായി. എപ്പോൾ വേണമെങ്കിലും ഇതിൽ നിന്നും പിന്മാറാവുന്നതാണെന്നും എനിക്ക് മനസ്സിലായി. എപ്പോൾ വേണമെങ്കിലും എന്നെ പങ്കെടുപ്പിക്കാനും പങ്കെടുപ്പിക്കാതിരിക്കാനുമുള്ള സ്വാതന്ത്ര്യം ഗവേഷകനുണ്ടെന്നും എനിക്ക് മനസ്സിലായി.

ഈ പഠനത്തിൽ പങ്കെടുക്കുന്ന ആളെന്ന നിലക്ക് എന്റെ അവകാശങ്ങളെ കുറിച്ച് ഏതെങ്കിലും തരത്തിലുള്ള ചോദ്യങ്ങളുണ്ടെങ്കിൽ എനിക്ക് പ്രധാന ഗവേഷകനായ ഡോ. രേഖ എം. രവീന്ദ്രനെ സമീപിക്കാവുന്നതാണ്.

ഈ സമ്മതപത്രം ഒപ്പിടുന്നതിലൂടെ എന്റെ നിയമപരമായ അവകാശങ്ങളൊന്നും തന്നെ വേണ്ടെന്നു വയ്ക്കുന്നില്ല.

ഞാൻ മുകളിൽ പറഞ്ഞിരിക്കുന്ന വിവരങ്ങൾ വായിക്കുകയും മനസ്സിലാക്കുകയും ചെയ്തു. ഇതിൽ പങ്കെടുക്കാൻ എനിക്ക് സമ്മതമാണ്. എന്റെ സ്വന്തം ആവശ്യത്തിലേക്കായി ഇതിന്റെ ഒരു കോപ്പി എനിക്ക് തരുമെന്നും മനസ്സിലായി. താഴെ പറയുന്ന ഭാഗത്ത് എന്റെ സമ്മതം വ്യക്തമാക്കുന്നതിനായി ഒപ്പിട്ട് നൽകുന്നു.

ഈ പഠനത്തിൽ പങ്കെടുക്കാൻ എനിക്കു സമ്മതമാണ്:

പഠനത്തിൽ പങ്കെടുക്കുന്ന

ആളിന്റെ ഒപ്പ്: _____

തീയതി: _____

പഠനത്തിൽ പങ്കെടുക്കുന്ന

ആളിന്റെ പേര്: _____

കാര്യങ്ങൾ വിശദീകരിച്ച് തന്നയാൾ/

ചോദ്യകർത്താവ് (ഒപ്പ്): _____

തീയതി: _____

കാര്യങ്ങൾ വിശദീകരിച്ച് തന്നയാൾ/

ചോദ്യകർത്താവ് (പേര്): _____

A.13

വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വൃദ്ധജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം.

ചോദ്യാവലി

വ്യക്തിഗതകോഡ്-----

1. പ്രായം:

2. ലിംഗം: 1.പുരുഷൻ

2.സ്ത്രീ

I. സമൂഹസാമ്പത്തിക ഘടകങ്ങൾ

3. വൈവാഹിക നില

1. വിവാഹം കഴിച്ചിട്ടില്ല

2. വിവാഹിതൻ/വിവാഹിത

3. വിധവ/വിഭാര്യൻ

4. നിയമപരമായി വിവാഹ ബന്ധം വേർപ്പെടുത്തിയത്/ വേർപിരിഞ്ഞ് താമസിക്കുന്നു

5. മറ്റുള്ളവ വിശദീകരിക്കുക

4. വിദ്യാഭ്യാസം

1. നിരക്ഷരൻ

7 ഡിപ്ലോമ

2 ഔപചാരികവിദ്യാഭ്യാസം നേടിയിട്ടില്ല

8 ബിരുദം

3 നാലാം ക്ലാസുവരെ

9 പ്രൊഫഷണൽവിദ്യാഭ്യാസം

4 ഏഴാം ക്ലാസുവരെ

10 ബിരുദാനന്തരബിരുദം

5 പത്താം ക്ലാസുവരെ

11 മറ്റുള്ളവ (വ്യക്തമാക്കുക)

6 ഹയർ സെക്കൻഡറിസ്കൂൾ

പുർത്തീകരിച്ചു

5. താങ്കൾ സാമ്പത്തികമായിസ്വയം പര്യാപ്തനാണോ? 1.അതെ 2.അല്ല

6. താങ്കളുടെ വരുമാനമാർഗ്ഗമെന്താണ്? (അനുയോജ്യമായതെല്ലാം അടയാളപ്പെടുത്തുക)

- 1 ശമ്പളത്തോടു കൂടിയ ജോലി
- 2 ദിവസ കൂലി
- 3 പെൻഷൻ
- 4 പുരയിടത്തിൽനിന്നുള്ള ആദായം
- 5 സാമ്പത്തിക സഹായം
- 6 സ്വയം തൊഴിൽ
- 7 ബന്ധുക്കളിൽനിന്നും സുഹൃത്തുക്കളിൽനിന്നുമുള്ള സഹായം
- 8 കൃഷി
- 9 മറ്റുള്ളവ (വ്യക്തമാക്കുക)

7.താങ്കളുടെ ഇപ്പോഴത്തെ ജോലി എന്താണ്?

- 1 സർക്കാർ ജോലി
- 2 സ്വകാര്യം
- 3 കൂലിപ്പണി (സ്കിൽഡ്)
- 4 കൂലിപ്പണി (അൺസ്കിൽഡ്)
- 5 സ്വയം തൊഴിൽ
- 6 വ്യവസായം
- 7 കൃഷി
- 8 മറ്റുള്ളവ (വ്യക്തമാക്കുക)
- 9

8. താങ്കളുടെ സ്വന്തം വീട്ടിലാണോ താമസിക്കുന്നത്?

1.അതെ 2.അല്ല 3. മറ്റുള്ളവ (വ്യക്തമാക്കുക)-----

9. താങ്കളെ സമ്പത്തികമായി സഹായിക്കുന്നത് ആരാണ്?

- 1 കുട്ടികൾ
- 2 സഹോദരങ്ങൾ
- 3 പങ്കാളി
- 4 ബന്ധുക്കൾ
- 5 സ്വയം
- 6 മറ്റുള്ളവ (വ്യക്തമാക്കുക)

4 കുട്ടുകാർ

10. താങ്കളുടെ കുടുംബത്തിന്റെ മാസവരുമാനം?-----

11. കുട്ടികളുടെ എണ്ണം-----

12. കുടുംബാംഗങ്ങളുടെ എണ്ണം-----

13. ദൈനംദിന ജീവിതത്തിന് ആവശ്യമുള്ള കാര്യങ്ങൾ സ്വയം ചെയ്യാൻ താങ്കൾ പ്രാപ്തനാണോ?

- 1.അതെ
- 2. അല്ല

14. അല്ലെങ്കിൽ താങ്കളെ സഹായിക്കാൻ ആരെങ്കിലും ഉണ്ടോ? 1. ഉണ്ട്
2.ഇല്ല

15. Q 14 ന് ഉണ്ട് എങ്കിൽ ആരാണു്? -----

II ചികിത്സാസംബന്ധ വിവരങ്ങൾ

16. വീഴ്ചയുമായി ബന്ധപ്പെട്ടപ്രശ്നങ്ങൾ കാരണമാണോ താങ്കളെ ഇവിടെ കിടത്തിയിട്ടുള്ളത്?

- 1.അതെ
- 2. അല്ല--> ചോദ്യം നമ്പർ 35ലേക്ക് പോകുക

17. വീഴ്ച പറ്റിയദിവസം

18. വീഴ്ചയുടെ സമയം?

19. വീഴ്ചയുടെ സ്ഥലം:

19.1 വീടിനകത്ത്

1.a കിടപ്പുമുറിയിൽ

1.b കുളിമുറിയിൽ

1.c കുളിമുറിയിൽപോകുന്നവഴി

1.d കോണിപ്പടി കയറുകയും ഇറങ്ങുകയും ചെയ്യപ്പോൾ

19.2 വീടിന് പുറത്ത്

2.a കോണിപ്പടി കയറുകയും ഇറങ്ങുകയും ചെയ്യപ്പോൾ

2.b വരാന്തയിൽ

2.c പുന്തോട്ടത്തിൽ

2.d മുറ്റത്ത്

19.3 വീട്ടിൽനിന്നും അകലെ

3.a റോഡിൽ

3.b മറ്റു വീടുകളിൽ

3.c മറ്റു കെട്ടിടങ്ങളിൽ (ഓഫീസ്)

3.d. ജോലി സ്ഥലത്ത്

1.e അടുകളയിൽ

2.e മറ്റുള്ളവ

3.e മറ്റുള്ളവ

1.f ഭക്ഷണമുറിയിൽ

1.g മറ്റു മുറികളിൽ

1.h മറ്റുള്ളവ

19.4 മറ്റുള്ളവ

വ്യക്തമാക്കുക-----

20. വീഴ്ചയുടെ കാരണം

1. കാൽ തട്ടി വീണു

2. തെന്നി വീണു

3. നിലതെറ്റുക

4. കാൽ കുഴഞ്ഞുവീണു

5. ബോധരഹിതം

6. വിറയൽ/ തളർച്ച

7. വ്യക്തമല്ല/ അറിയില്ല

8. മറ്റുള്ളവ

21. ഏത് പ്രവൃത്തിയിലേർപ്പെട്ടിരുന്നപ്പോഴാണ് താങ്കൾക്ക് വീഴ്ച സംഭവിച്ചത്?

1. നടത്തം

2. കോണിപ്പടി കയറുമ്പോൾ

3. കട്ടിലിൽനിന്നോ കസേരയിൽനിന്നോ എണീക്കുമ്പോൾ

4. കസേരയിലോ കട്ടിലിലോ ഇരിക്കാൻ പോകുമ്പോൾ

5. ഉറങ്ങുമ്പോൾ

6. കുളിക്കുമ്പോൾ

7. ഇരിക്കുമ്പോൾ

8. നിൽക്കുമ്പോൾ

9. മറ്റുള്ളവ

22. ഏതെങ്കിലും തരത്തിലുള്ള ക്ഷതങ്ങൾ/ മുറിവുകൾ സംഭവിച്ചിട്ടുണ്ടോ?

1. വേദന

2. മുറിവ്

3. ചതവ്

4. നീരോടു കൂടിയ ചതവ്

5. ഒടിവ്

6. ഒന്നുമില്ല

7. മറ്റുള്ളവ വ്യക്തമാക്കുക

23. ശരീരത്തിലുണ്ടായ മുറിവ് (വ്യക്തമാക്കുക) :

24. ബോധം നഷ്ടപ്പെട്ടിട്ടുണ്ടായിരുന്നോ?

1. ഉണ്ട്

2. ഇല്ല

25. ഉടൻ തന്നെ വൈദ്യ സഹായം തേടിയോ?

1. ഉണ്ട് --> ഉണ്ടെങ്കിൽ ചോദ്യം 27 ലേക്ക് പോകുക

2. ഇല്ല

26. ചികിത്സ തേടാൻ വൈകിയതിന്റെ കാരണം?

1. അപകടം ഗൗരവമായിട്ടെടുത്തില്ല
2. ബോധം നഷ്ടപ്പെട്ടു സമീപത്ത് ആരും ഉണ്ടായിരുന്നില്ല
3. എണീക്കാൻ പ്രയാസമായിരുന്നു അതിനാൽ ആരെയും അറിയിക്കാൻ സാധിച്ചില്ല
4. വീട്ടിൽ മറ്റാരും ഉണ്ടായിരുന്നില്ല
5. സാമ്പത്തിക പ്രശ്നങ്ങൾ
6. വാഹനം കിട്ടാനുള്ള കാലതാമസം.
7. ആശുപത്രിയിൽകൊണ്ടുപോകാൻ ആരും ഉത്തരവാദിത്തം എടുത്തില്ല
8. ആശുപത്രിയിൽകൊണ്ടുപോകാൻപുരുഷന്മാരാരും ഉണ്ടായിരുന്നില്ല
9. മറ്റുള്ളവ-----

27. ആദ്യമായി താങ്കൾ ഏതു വിഭാഗം ചികിത്സാരീതിയാണ് അവലംബിച്ചത്?

- | | | |
|-----------------|--------------------------|-------------|
| 1.അലോപ്പതി | 2.ആയുർവേദം | 3.ഹോമിയോ |
| 4.സിദ്ധ/ യുനാനി | 5.പാരമ്പര്യ ചികിത്സാരീതി | 6.മറ്റുള്ളവ |

28. ആദ്യമായിസമീപിച്ച സ്ഥാപനം/ഡോക്ടർ എവിടെയാണ്?

- | | |
|------------------------------|------------------------------------|
| 1. ജനറൽ ഡോക്ടർ | 2.പ്രാഥമികാരോഗ്യ കേന്ദ്രം |
| 3.കമ്മ്യൂണിറ്റിഹെൽത്ത്സെന്റർ | 4.സ്വകാര്യ ആശുപത്രി |
| 5. ജില്ലാ ആശുപത്രി | 6.സ്വകാര്യസ്പെഷ്യലിസ്റ്റ് ആശുപത്രി |
| 7. മറ്റു ഗവണ്മെന്റ് ആശുപത്രി | 8. മറ്റുള്ളവ----- |

29. താങ്കൾക്ക് ഏതുതരം ചികിത്സയാണ് ലഭിച്ചത്?

- | | | |
|-------------------------|--------------------------|-------------------------|
| 1.ഒന്നുമില്ല | 2. മരുന്നുകൾമാത്രം | 3. മുറിവ്പൊതിഞ്ഞുകെട്ടൽ |
| 4.മുറിവുതുന്നിച്ചേർക്കൽ | 5. ഒടിവുകൾ കെട്ടിവയ്ക്കൽ | 6. ശസ്ത്രക്രിയ |
| 7. മറ്റുള്ളവ----- | | |

30. ചികിത്സ ലഭിക്കാൻ താങ്കളെ സഹായിച്ചത് ആരാണ്?

- | | | |
|----------------------------------|-------------|-------------|
| 1.കുട്ടികൾ | 2.സഹോദരങ്ങൾ | 3. പങ്കാളി |
| 4 മറ്റുബന്ധുക്കൾ | 5.അയൽക്കാർ | 6. ആരുമില്ല |
| 7..മറ്റുള്ളവർ വ്യക്തമാക്കുക----- | | |

31. എങ്ങനെയാണ് ആശുപത്രിയിൽ എത്തിയത്?

- | | | |
|--------------------|--------------|-------------|
| 1.ബസ് | 2.ആംബുലൻസ് | 3.കാർ |
| 4.ട്രെയിൻ | 5.ആട്ടോറിക്ഷ | 6.മറ്റുള്ളവ |
| വ്യക്തമാക്കുക----- | | |

III ചികിത്സാ ചിലവ്

32. ഈ ആശുപത്രിയിൽ ചികിത്സയ്ക്കായി എത്ര രൂപ ചിലവായി?

<u>ചികിത്സ</u>	<u>ചിലവ് (രൂപയിൽ)</u>
ഡോക്ടറുടെ ഫീസ്
മരുന്നുകൾ
എക്സ് റേ,ഇസിജി,സ്കാനിംഗ് തുടങ്ങിയവ
ശസ്ത്രക്രിയ
മറ്റു ചിലവുകൾ
ഗതാഗതം
മറ്റുള്ളവ
ആകെത്തുക

33. ഇവിടെ വരുന്നതിനുമുമ്പ് ഈ പ്രശ്നത്തിനായി മറ്റു ചികിത്സകൾനേടിയിട്ടുണ്ടെങ്കിൽ അവിടെ എത്രതുക ചിലവായി?

34. ഇപ്പോൾ കഴിക്കുന്നമരുന്നുകൾ ഇവിടെ നിന്നും ലഭിച്ചതാണോ?

- 1.അതെ 2.എല്ലാ മരുന്നുംലഭിച്ചില്ല 3.ഒന്നും അല്ല 4.മറ്റുള്ളവ
 വ്യക്തമാക്കുക-----

35. അല്ല എങ്കിൽ കുറിച്ചു തന്ന മരുന്നുകൾ പുറത്തു നിന്നും വാങ്ങാൻ താങ്കൾക്ക് സാധിക്കുന്നുണ്ടോ?

1. ഉണ്ട് 2.ഇല്ല 3.മറ്റുള്ളവ

IV മുൻ ചികിത്സാവിവരങ്ങൾ

36. കഴിഞ്ഞ ഒരു വർഷത്തിനിടയിൽ എപ്പോഴെങ്കിലും വീഴ്ച സംഭവിച്ചിട്ടുണ്ടോ? (ഉണ്ടെങ്കിൽ സമയം വ്യക്തമാക്കുക)

1. ഉണ്ട് 2.ഇല്ല---> ചോദ്യം 49 ലേക്ക് പോകുക 3. തീർച്ചയില്ല/
 ഓർമ്മയില്ല

കഴിഞ്ഞ 12

മാസത്തിനിടയ്ക്ക് സംഭവിച്ച

വീഴ്ചയെക്കുറിച്ച്

വിശദീകരിക്കുക

(അവസാനത്തതിൽ നിന്നും

തുടങ്ങുക)

വീഴ്ച 1

വീഴ്ച

വീഴ്ച 3

വീഴ്ച 4

37. വീഴ്ച പറ്റിയ ദിവസം

38. വീഴ്ചയുടെ സമയം

39. വീഴ്ചയുടെ സ്ഥലം

39.1 വീടിനകത്ത്

1.a കിടപ്പുമുറിയിൽ

1.b കുളിമുറിയിൽ

1.c കുളിമുറിയിൽപോകുന്നവഴി

1.d കോണിപ്പടി കയറുകയും ഇറങ്ങുകയും ചെയ്തപ്പോൾ

1.e അടുക്കളയിൽ

1.f ഭക്ഷണമുറിയിൽ

1.g മറ്റു മുറികളിൽ

1.h മറ്റുള്ളവ

39.2 വീടിന് പുറത്ത്

2.a കോണിപ്പടി കയറുകയും ഇറങ്ങുകയും ചെയ്തപ്പോൾ

2.b വരാന്തയിൽ

2.c പുനോട്ടത്തിൽ

2.d മുറ്റത്ത്

2.e മറ്റുള്ളവ

39.3 വീട്ടിൽനിന്നും അകലെ

3.a റോഡിൽ

3.b മറ്റു വീടുകളിൽ

3.c മറ്റു കെട്ടിടങ്ങളിൽ (ഓഫീസ്)

3.d. ജോലി സ്ഥലത്ത്

3.e മറ്റുള്ളവ

39.4 മറ്റുള്ളവ

വ്യക്തമാക്കുക-----

വീഴ്ച 1 വീഴ്ച 2 വീഴ്ച 3 വീഴ്ച 4

40. വീഴ്ചയുടെ കാരണം

41. ഏത് പ്രവൃത്തിയിലേർപ്പെട്ടിരുന്നപ്പോഴാണ് താങ്കൾക്ക് വീഴ്ച സംഭവിച്ചത്?

1. നടത്തം
2. കോണിപ്പടി കയറുമ്പോൾ
3. കട്ടിലിൽ നിന്ന് എണീക്കുമ്പോൾ
4. കസേരയിൽ നിന്ന് എണീക്കുമ്പോൾ
5. കസേരയിലോ കട്ടിലിലോ ഇരിക്കാൻ പോകുമ്പോൾ
6. ഇറങ്ങുമ്പോൾ
7. കുളിക്കുമ്പോൾ

- 1 കാഴ്ച പ്രശ്നം
 - 2 ശ്വാസകോശസംബന്ധമായവ
 - 3 ഹൃദയസംബന്ധമായ അസുഖം
 - 4 ദഹനേന്ദ്രിയപ്രശ്നങ്ങൾ
 - 5 വൃക്ക/മൂത്രാശയരോഗങ്ങൾ
 - 6 പേശീസംബന്ധമായ അസുഖം
 - 7 രക്തസമ്മർദ്ദം/രക്താതിസമ്മർദ്ദം
 - 8 ഉറക്കമില്ലായ്മ
 - 9 പ്രമേഹം
 - 10 പ്രമേഹസംബന്ധമായപ്രശ്നങ്ങൾ
 - 11 വാതരോഗം
 - 12 മറവിരോഗം
 - 13 മാനസിക പ്രശ്നങ്ങൾ
 - 14 അർബുദം
 - 15 മറ്റുള്ളവ
- # 1.ഉണ്ട് 2.ഇല്ല

\$ വിശദീകരണങ്ങൾ ഉണ്ടെങ്കിൽ വേറെ ഒരു ഷീറ്റിൽ രേഖപ്പെടുത്തുക

* 1. അലോപ്പതി 2. ആയുർവേദം 3. ഹോമിയോ 4. സിദ്ധ/യുനാനി 5. മറ്റു പരമ്പരാഗത ചികിത്സാരീതികൾ 6. മറ്റുള്ളവ വിശദീകരിക്കുക

52. താങ്കൾ പതിവായി ഏതെങ്കിലും മരുന്നുകൾ കഴിക്കുന്നുണ്ടോ?

1.ഉണ്ട് 2.ഇല്ല

53. ഉണ്ടെങ്കിൽവിശദീകരിക്കുക

മരുന്നിന്റെ പേര്

അളവ്

ഇടവേള

കാലാവധി

ചോദ്യം സ്ത്രീകളോടുമാത്രം.

54. താങ്കൾക്ക് ആർത്തവ വിരാമം സംഭവിച്ചിട്ടുണ്ടോ(സ്ത്രീകളോട്മാത്രം)

- 1.ഉണ്ട്
- 2.ഇല്ല

55. ഉണ്ടെങ്കിൽ ഏതുപ്രായത്തിൽ?

V സ്വഭാവ ഘടകങ്ങൾ

പുകവലി

56. താങ്കൾ എപ്പോഴെങ്കിലും പുകവലിച്ചിട്ടുണ്ടോ/ പുകയില്ലാത്ത പുകയില ഉൽപന്നങ്ങൾ ഉപയോഗിച്ചിട്ടുണ്ടോ?

ഉൽപന്നം	ഉണ്ട്	ഇല്ല
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സിഗരറ്റ്

ബീഡി

പുകയില്ലാത്ത ഉൽപന്നം

ഇല്ലെങ്കിൽചോദ്യം 63 ലേക്ക് പോകുക, ഉണ്ടെങ്കിൽ 57 ലേക്ക് പോകുക

57. താങ്കൾക്ക് ഇപ്പോൾപുകവലി/ പുക ഇല്ലാത്ത പുകയില ഉൽപന്നങ്ങളുടെ ഉപയോഗം ഉണ്ടോ? (കുറഞ്ഞത് കഴിഞ്ഞ 30 ദിവസത്തിനിടയ്ക്ക് ഒരിക്കലെങ്കിലും)

എണ്ണം	ദിവസത്തിൽ	ആഴ്ചയിൽ
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സിഗററ്റിന്റെ

ബീഡിയുടെ

പുകയില്ലാത്ത

ഉൽപന്നങ്ങളുടെ അളവ്

മൂന്നു ചോദ്യത്തിനും ഇല്ല എന്നാണ് ഉത്തരമെങ്കിൽ ചോദ്യം 59 ലേക്ക് പോകുക, ഒരേണ്ണത്തിനെങ്കിലും ഉണ്ട് എന്നാണ് ഉത്തരമെങ്കിൽ ചോദ്യം 58 ലേക്ക് പോകുക

59. താങ്കൾ പുകയില ഉപയോഗം തുടങ്ങിയപ്പോൾ താങ്കളുടെ പ്രായം എത്രയായിരുന്നു?

----- വർഷത്തിൽ

60. താങ്കൾ പുകയിലയുടെ ഉപയോഗം ഉപേക്ഷിച്ച വ്യക്തിയാണെങ്കിൽ മുൻപ് എത്ര കാലം പുകയില ഉപയോഗിച്ചു? ----- മാസം ----- വർഷം

61. ഏതെങ്കിലും അസുഖത്തിന്റെ ചികിത്സയുടെ ഭാഗമാണോ?

- 1. അതെ
- 2. അല്ല

62. ഉത്തരം അതെ എങ്കിൽ വ്യക്തമാക്കുക.

മദ്യപാനം

63. താങ്കളുടെ മദ്യപാനത്തെ താങ്കൾ എങ്ങനെ കണക്കാക്കുന്നു?

- 1. നിലവിൽ മദ്യം ഉപയോഗിക്കും
- 2. മുൻപ് ഉപയോഗിച്ചിരുന്നു ---> ചോദ്യം 66 ലേക്ക് പോകുക
- 3. ഉപയോഗിച്ചിട്ടില്ല ---> ചോദ്യം 68 ലേക്ക് പോകുക

64. ഒരു പ്രാവശ്യം എത്ര അളവ് മദ്യം ഉപയോഗിക്കും?

- 1. എല്ലാ ദിവസവും
- 2. രണ്ടു മൂന്നു ദിവസത്തിൽ ഒരിക്കൽ
- 3. ആഴ്ചയിലൊരിക്കൽ
- 4. കഴിഞ്ഞ 30 ദിവസത്തിനിടയ്ക്ക് ഒന്നു രണ്ടു പ്രാവശ്യം

5. കഴിഞ്ഞ 30 ദിവസത്തിനിടയ്ക്ക് ഒരിക്കൽ പോലും മദ്യം കഴിച്ചിട്ടില്ല

65. അപ്രകാരം കഴിക്കുന്ന ദിവസങ്ങളിൽ എത്ര അളവ് കഴിക്കും

66. ഏതെങ്കിലും അസുഖത്തിന്റെ ചികിത്സയുടെ ഭാഗമായാണോ മദ്യപാനശീലം ഒഴിവാക്കിയത്?

67. ഉത്തരം അതെ എങ്കിൽ വ്യക്തമാക്കുക-----

VI ഭക്ഷണശീലം

ഭക്ഷണം	ദിവസം	തവണ
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68. പാലുൽപ്പന്നങ്ങൾ

69. പച്ചക്കറി/പഴങ്ങൾ

70. മത്സ്യം

71. ഇറച്ചി

72. പ്രധാനമായും താങ്കൾ എത്ര നേരം ആഹാരം കഴിക്കും?

- 1. ഒരു തവണ
- 2. രണ്ടു തവണ
- 3. മൂന്നു തവണ
- 4. നാലു തവണ

73. കഴിഞ്ഞ ആറു മാസത്തിനിടയിൽ താങ്കളുടെ ഭക്ഷണരീതിയിൽ എന്തെങ്കിലും മാറ്റങ്ങൾ സംഭവിച്ചിട്ടുണ്ടോ?

- 1. ഉണ്ട് --> വ്യക്തമാക്കുക-----
- 2. ഇല്ല
- 3. മറ്റുള്ളവ വ്യക്തമാക്കുക-----

74. കഴിഞ്ഞ ആറു മാസത്തിനിടയിൽ താങ്കളുടെ ശരീരഭാരത്തിൽ എന്തെങ്കിലും മാറ്റങ്ങൾ സംഭവിച്ചിട്ടുണ്ടോ?

- 1. ഉണ്ട് ശരീരഭാരം ഗണ്യമായി കുറഞ്ഞു
- 2. ഉണ്ട് ശരീരഭാരം ക്രമമായി വർദ്ധിച്ചു
- 3. ഇല്ല ഒരു മാറ്റവും സംഭവിച്ചില്ല
- 4. മറ്റുള്ളവ വ്യക്തമാക്കുക-----

75. താങ്കൾ പതിവായി ഏതെങ്കിലും തരത്തിലുള്ള ശാരീരിക വ്യായാമം ചെയ്യാറുണ്ടോ?

- 1. ഉണ്ട് 2. ഇല്ല

76. ഉണ്ടെങ്കിൽ ഏതുതരം ശാരീരിക വ്യായാമം?

- 2. നടത്തം
- 3. മറ്റുള്ളവയായാമം
- 4. വീട്ടു ജോലികൾ
- 5. ജോലി സംബന്ധമായ വ്യായാമം
- 6. യോഗ
- 7. മറ്റുള്ളവ (വ്യക്തമാക്കുക)

77. താങ്കളോടൊപ്പം ആരെങ്കിലും വ്യായാമം ചെയ്യാറുണ്ടോ?

- 1. ഉണ്ട് 2. ഇല്ല

78. ഉണ്ടെങ്കിൽ ആര് -----

VII വീടിന്റെ ഘടന

- 1. മണ്ണ്
- 2. സിമന്റ്

- 3. റെഡ് ഓക്സൈഡ്
- 4. മൊസൈക്ക്
- 5. തറയോട്
- 6. റെറ്റൽസ്
- 7. മാർബിൾ

79. വീടിന്റെ തറ

<ul style="list-style-type: none"> 1.മണ്ണ് 2.സിമന്റ് 3. റെഡ് ഓക്സൈഡ് 	<ul style="list-style-type: none"> 4. മൊസൈക്ക് 5. ഡെറക്കോട്ട 6. ടൈൽസ് 	<p style="text-align: right;">വീടിനുള്ളിൽ</p> <ul style="list-style-type: none"> 7. മാർബിൾ/ ഗ്രാനൈറ്റ് 8. മറ്റുള്ളവ് വിശദീകരിക്കുക
അതെ/അല്ല		മറ്റുള്ളവ വ്യക്തമാക്കുക

- 80. വിവിധനിലകളിലായാണോ?
- 81. കോണിപ്പടി
- 82. കോണിപ്പടി ഉണ്ടെങ്കിൽ കൈവരി/കൈപ്പടി ഉള്ളതാണോ
- 83. കോണിപ്പടിയിൽ നല്ല പ്രകാശം ലഭ്യമാണോ?
- 84. താങ്കൾ തട്ടിവീഴാൻസാധ്യത ഉള്ള തരം വീട്ടുപകരണങ്ങൾവല്ലതും വീട്ടിൽ ഉണ്ടോ?
- 85. താങ്കളുടെ വാതിൽപ്പടി തട്ടിവീഴാൻ സാധ്യതയുള്ളതാണോ?
- 86. തട്ടി വീഴാൻ സാധ്യത ഉള്ള തരം ഉപകരണങ്ങൾ വല്ലതും വീട്ടിൽ ഉണ്ടോ?
- 87. വീട്ടിൽ വൈദ്യുതി ഉണ്ടോ?
- 88. നടക്കുന്ന വഴിയിലും വാതിലിലും കൈപിടി ഘടിപ്പിച്ചിട്ടുണ്ടോ?
- 89. വീഴ്ച തടയാനായി എന്തെങ്കിലും പ്രതിരോധ മാർഗങ്ങൾ

നടപ്പിലാക്കിയിട്ടുണ്ടോ?

കിടപ്പുമുറി

- 90. ആവശ്യത്തിനുപ്രകാശം ഉണ്ടോ?
- 91. ലൈറ്റിന്റെ സമീപം ഉണ്ടെന്ന് കിടന്നുകൊണ്ട് ഇടാവുന്നതരത്തിലാണോ?

കുളിമുറി

- 92. കുളിമുറി കിടപ്പുമുറിയിൽനിന്നും അകലെയാണോ?
- 93. വെറെ നിലയിലാണോ?
- 94. കുളിമുറിമാറിയാണെങ്കിൽ കിടപ്പുമുറിയിൽ നിന്നും അവിടേക്ക് എത്ര ദൂരമുണ്ട്?
- 95. കുളിമുറിയുടെ വാതിൽക്കൽ ലൈറ്റ് ഇടാനുള്ള സമീപം ഉണ്ടോ?
- 96. കുളിമുറി ആവശ്യത്തിനു പ്രകാശം ഉള്ളതാണോ?
- 97. കുളിമുറി നന്നുള്ളതും അല്ലാത്തതുമായി ഭാഗിച്ചതാണോ?
- 98. കുളിമുറിയിൽ കൈപ്പിടി ഘടിപ്പിച്ചതാണോ?

വൃക്ഷപരം

- 99. വീഴ്ചകളും മുറിവുകളും തടയാൻ ഏതെങ്കിലും തരത്തിലുള്ള പ്രതിരോധ മാർഗ്ഗങ്ങൾ സ്വീകരിച്ചിട്ടുണ്ടോ?
- 100. നടക്കുമ്പോൾ സഹായത്തിനായി എന്തെങ്കിലും ഉപകരണങ്ങൾ ഉപയോഗിക്കാറുണ്ടോ?

വീടിനു പുറത്ത്

101. വീട്ടിലേക്കുള്ള വഴി നിരപ്പുള്ളതാണോ?

102. വീടിനു ചുറ്റുമുള്ള നടപ്പാത
തടസ്സങ്ങളൊന്നും ഇല്ലാതെ
നിരപ്പുള്ളതാണോ?

103. കാൽ തട്ടി വീഴാനുള്ള
സാധ്യതയുണ്ടോ?

104. കാൽ വഴുതി വീഴാനുള്ള
സാധ്യതയുണ്ടോ?

105. വീടിനുപുറത്തുകോണിപ്പടി ഉണ്ടോ?

106. കോണിപ്പടി കൈപ്പടി/കൈവരി
ഘടിപ്പിച്ചതാണോ?

താങ്കളുടെ സഹകരണത്തിന് നന്ദി!

A.14

വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വ്യഭജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം

പഠനത്തിന്റെ വിശദാംശങ്ങൾ

ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജിയിലെ അച്യുത മേനോൻ സെൻറർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസിലെ ഗവേഷണ പഠന വിദ്യാർഥിയാണു ഞാൻ. ഗവേഷണ പഠനത്തിന്റെ ഭാഗമായി അറുപത് വയസ്സിനുമേൽ പ്രായമായവർക്കിടയിലുള്ള വീഴ്ചയുടെ അപകട സാധ്യതയെ കുറിച്ചുള്ള ഒരു പഠനം നടത്തുന്നു. ഈ പഠനത്തിന്റെ ഭാഗമായി താങ്കളുടെ വീടും പരിസരവും നിരീക്ഷിക്കാൻ അനുമതി ചോദിക്കുന്നു. പഠനത്തിൽ പങ്കെടുക്കാൻ അനുമതിനൽകുന്നതിനു മുൻപ് പഠന ലക്ഷ്യങ്ങളും ഉദ്ദേശ്യങ്ങളും താങ്കൾ അറിഞ്ഞിരിക്കേണ്ടത് അത്യാവശ്യമാണ്.

ഗവേഷണ വിഷയം: വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വ്യഭജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം.

ഗവേഷകൻ: ഡോ. രേഖ എം രവീന്ദ്രൻ പി എച്ച് ഡി വിദ്യാർഥിനി, അച്യുത മേനോൻ സെൻറർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്, ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി, തിരുവനന്തപുരം.

പഠനപരിഷ്കാരങ്ങൾ: ദൈനംദിന ജീവിതത്തിൽ ഒട്ടേറെ ആരോഗ്യ, സാമൂഹ്യ, സാമ്പത്തിക, വൈകാരിക പ്രശ്നങ്ങൾ അഭിമുഖീകരിക്കുന്ന, പ്രത്യേക പരിഗണന അർഹിക്കുന്ന ജനവിഭാഗമാണ് മുതിർന്ന പൗരന്മാർ. വീഴ്ച മൂലമുണ്ടാകുന്ന പരിക്കുകളാണു പ്രധാനമായും മുതിർന്നവരിൽ സ്ഥായിയായ വൈകല്യങ്ങൾക്കും ഒരു പക്ഷെ മരണത്തിനും വരെ കാരണമാകുന്നതും. അറുപത്തിയഞ്ചുവയസ്സിനു മുകളിൽ പ്രായമുള്ള മൂന്നുപേരിൽ ഒരാൾ വർഷത്തിൽ ഒരു പ്രാവശ്യമെങ്കിലും വീഴുന്നതായി കണക്കാക്കപ്പെടുന്നു. ഇതിൽ പകുതിയോളം വളരെയേറെ അപകട സാധ്യതയുള്ളതായി പരിണമിക്കാറുണ്ട്.

ഈ പഠനത്തിന്റെ ആവശ്യകത

ഇന്ത്യ ഉൾപ്പെടെയുള്ള വികസന രാജ്യങ്ങളിൽ മുതിർന്ന പൗരന്മാർക്ക് (വാർധക്യ കാലത്ത്) സംഭവിക്കുന്ന വീഴ്ചയുടെ അപകട സാധ്യതയെ കുറിച്ചുള്ള അവബോധം/അറിവ് വളരെ പരിമിതമാണ്. ഇത്തരം വിഷയത്തെ പറ്റിയുള്ള വിവരങ്ങളുടെ അഭാവമാണിതിനു കാരണമായി കരുതുന്നത്. ഈ മേഖലയിലെ പഠനങ്ങൾ മുതിർന്ന പൗരന്മാർക്കിടയിലുണ്ടാകുന്ന മുറിവുകളുടെ കാരണം കണ്ടെത്തുക വഴി ഇത്തരം വീഴ്ചകളെ പ്രതിരോധിക്കുന്നതിനു വേണ്ടിയുള്ള പദധതികൾ വിഭാവനംചെയ്യുന്നതിനും ഇത്തരം സംഭവങ്ങളുടെ തോത് കുറയ്ക്കുന്നതിനും സഹായിക്കും.

പഠനപങ്കാളിത്തം

നമ്മൾ താമസിക്കുന്ന വീടും പരിസരവും പ്രായമായവരിൽ ഉണ്ടാകുന്ന വീഴ്ചകൾക്കും അതുമൂലമുണ്ടാകാവുന്ന പല പരിക്കുകൾക്കും കാരണമാകുന്നു. താങ്കളുടെ പ്രായം അറുപതിനു മുകളിൽ ആയതും, താങ്കൾ വീഴ്ചയെത്തുടർന്ന് തിരുവനന്തപുരം മെഡിക്കൽകോളേജിൽ ചികിത്സ തേടിയതു കൊണ്ടുമാണ് ഈ പഠനത്തിൽ പങ്കെടുക്കാൻ ക്ഷണിക്കുന്നത്. താങ്കളുടെ വീടും പരിസരവും നിരീക്ഷിച്ച് പ്രായമായവരിൽ വീഴ്ചകൾക്ക് കാരണമായേക്കാവുന്ന ഘടകങ്ങൾ കണ്ടുപിടിക്കുക എന്നതാണ് ഇതിന്റെ ഉദ്ദേശ്യം. ഇതിന് ഏകദേശം 30 മിനിറ്റോളം.

സ്വമേധയായുള്ള പങ്കാളിത്തം

ഈ പഠനത്തിലുള്ള പങ്കാളിത്തം തികച്ചും താങ്കളുടെ സ്വന്തം ഇഷ്ടപ്രകാരമാണ്. ഇതിൽ പങ്കെടുക്കാനും പങ്കെടുക്കാതിരിക്കാനുമുള്ള സ്വാതന്ത്ര്യം താങ്കൾക്കുണ്ട്. ഈ പഠനത്തിൽ നിന്നും യാതൊരു കാരണവും ബോധിപ്പിക്കാതെ തന്നെ എപ്പോൾ വേണമെങ്കിലും താങ്കൾക്ക് പിന്മാറാവുന്നതാണ്. ഇതിൽ നിന്നും പിന്മാറുന്നതിനുള്ള തീരുമാനം താങ്കളുടെ ഒരു തരത്തിലും ബാധിക്കുകയില്ല.

പഠനവിശ്വാസ്യത: ഈ പഠനഫലങ്ങൾ രഹസ്യസ്വഭാവത്തോടെ സൂക്ഷിക്കുന്നതാണ്. താങ്കളെ തിരിച്ചറിയാൻ കഴിയുന്ന യാതൊരു വിവരങ്ങളും പഠനഫലം പ്രസിദ്ധീകരിക്കുന്ന പ്രസിദ്ധീകരണങ്ങളിലോ, പ്രദർശനങ്ങളിലോ ഉണ്ടായിരിക്കുന്നതല്ല. ഞങ്ങൾ ശേഖരിക്കുന്ന എല്ലാ വിവരങ്ങളും കോഡ് ചെയ്ത് സൂക്ഷിക്കുന്നതാണ്. അതിൽ താങ്കളുടെ പേര് ഉൾപ്പെടുത്തുന്നതല്ല. സമൂഹത്തിലുള്ള മറ്റാർക്കും തന്നെ ഈ വിവരങ്ങൾ കൈമാറ്റം ചെയ്യപ്പെടുന്നതല്ല.

പഠന വിവരങ്ങളുടെ രഹസ്യസ്വഭാവം: താങ്കളിൽ നിന്നും ശേഖരിക്കുന്ന വിവരങ്ങൾ പേരില്ലാതെ സൂക്ഷിക്കുന്നതാണ് അവ സമ്മതപത്രത്തോടൊപ്പം സൂക്ഷിക്കുന്നതുമല്ല. ഒരു തിരിച്ചറിയൽ നമ്പറിന്റെ സഹായത്തോടെ മാത്രമേ താങ്കളുടെ വിവരങ്ങൾ തിരിച്ചറിയാൻ കഴിയുകയുള്ളൂ.

ആപൽസാധ്യതകളും പാർശ്വഫലങ്ങളും: വീടും പരിസരവും നിരീക്ഷിക്കാൻ സമ്മതിച്ചതു കൊണ്ടു ആപൽസാധ്യതകളും പ്രതീക്ഷിക്കുന്നില്ല. താങ്കളുടെ വീട്ടാവശ്യങ്ങളെ യാതൊരു രീതിയിലും ബാധിക്കാത്ത രീതിയിൽ നിരീക്ഷണം നടത്താൻ അത്യധികം ശ്രദ്ധിക്കുന്നതാണ്. വീടും പരിസരവും നിരീക്ഷിക്കുമ്പോൾ താങ്കൾക്ക് നേരിടേണ്ടി വരുന്ന അസൗകര്യം ഒഴിച്ചാൽ വേറെ പാർശ്വഫലങ്ങളൊന്നും തന്നെയില്ല.

പഠനത്തിന്റെ പ്രയോജനങ്ങൾ: താങ്കൾക്ക് ഇതിൽ പങ്കെടുക്കുന്നത് കൊണ്ട് യാതൊരുവിധ സാമ്പത്തിക ആനുകൂല്യങ്ങളും ലഭിക്കുന്നതല്ല. ഇതിൽ നിന്നും ലഭിക്കുന്ന വിവരങ്ങൾ പ്രായമായവരിൽ വീഴ്ചകൾക്ക് കാരണമായേക്കാവുന്ന ഘടകങ്ങൾ മനസ്സിലാക്കി ഭാവിയിൽ ആരോഗ്യപദ്ധതികൾ രൂപപ്പെടുത്തുന്നതിന് സഹായിക്കും.

ഈ ഗവേഷണപഠനത്തെ കുറിച്ച് എന്തെങ്കിലും തരത്തിലുള്ള സംശയങ്ങൾ അവശേഷിക്കുന്നുവെങ്കിൽ തിരിച്ചയായും താങ്കൾക്ക് ഡോ. രേഖ എം. രവീന്ദ്രനെയോ (9400330847) ഡോ. അനൂപ്കുമാർ തെക്കുവീട്ടിൽ, മെമ്പർ സെക്രട്ടറി, ഇൻസ്റ്റിറ്റ്യൂട്ട് എത്തിക്കൽ കമ്മിറ്റി, (04712520256/257) എന്ന നമ്പറിലോ സമീപിക്കാവുന്നതാണ്. ഈ ഗവേഷണപഠനത്തിൽ പങ്കെടുക്കാൻ തീരുമാനിക്കുകയാണെങ്കിൽ സമ്മതമാണെന്ന് വ്യക്തമാക്കുന്നതിന് സമ്മതപത്രം ഒപ്പിട്ട് തിരികെ നൽകേണ്ടതാണ്. ഇതിന്റെ ഒരു കോപ്പി താങ്കൾക്ക് സൂക്ഷിക്കാനായി നൽകുന്നതാണ്.

സമ്മതപത്രം

ഈ ഗവേഷണപഠനത്തെ കുറിച്ച് എനിക്ക് ചോദ്യങ്ങൾ ചോദിക്കാൻ അവസരം തന്നിട്ടുണ്ട്. എന്റെ ചോദ്യങ്ങൾക്ക് തൃപ്തികരമായ മറുപടി കിട്ടിയിട്ടുണ്ട്. ഇതിൽ പങ്കെടുക്കുന്നതിനെ കുറിച്ച് എന്തെങ്കിലും സംശയമുണ്ടെങ്കിൽ എനിക്ക് ഡോ. രേഖ എം. രവീന്ദ്രനെ സമീപിക്കാവുന്നതാണ്.

ഈ ഗവേഷണപഠനത്തിലെ പങ്കാളിത്തം സ്വന്തം ഇഷ്ടപ്രകാരമാണെന്ന് എനിക്ക് മനസ്സിലായി. എപ്പോൾ വേണമെങ്കിലും ഇതിൽ നിന്നും പിന്മാറാവുന്നതാണെന്നും എനിക്ക് മനസ്സിലായി. എപ്പോൾ വേണമെങ്കിലും എന്നെ പങ്കെടുപ്പിക്കാനും പങ്കെടുപ്പിക്കാതിരിക്കാനുമുള്ള സ്വാതന്ത്ര്യം ഗവേഷകനുണ്ടെന്നും എനിക്ക് മനസ്സിലായി.

ഈ പഠനത്തിൽ പങ്കെടുക്കുന്ന ആളെന്ന നിലക്ക് എന്റെ അവകാശങ്ങളെ കുറിച്ച് ഏതെങ്കിലും തരത്തിലുള്ള ചോദ്യങ്ങളുണ്ടെങ്കിൽ എനിക്ക് പ്രധാന ഗവേഷകയായ ഡോ. രേഖ എം. രവീന്ദ്രനെ സമീപിക്കാവുന്നതാണ്.

ഈ സമ്മതപത്രം ഒപ്പിടുന്നതിലൂടെ എന്റെ നിയമപരമായ അവകാശങ്ങളൊന്നും തന്നെ വേണ്ടെന്നു വയ്ക്കുന്നില്ല.

ഞാൻ മുകളിൽ പറഞ്ഞിരിക്കുന്ന വിവരങ്ങൾ വായിക്കുകയും മനസ്സിലാക്കുകയും ചെയ്തു. ഇതിൽ പങ്കെടുക്കാൻ എനിക്ക് സമ്മതമാണ്. ഏന്റെ സ്വന്തം ആവശ്യത്തിലേക്കായി ഇതിന്റെ ഒരു കോപ്പി എനിക്ക് തരുമെന്നും മനസ്സിലായി. താഴെ പറയുന്ന ഭാഗത്ത് എന്റെ സമ്മതം വ്യക്തമാക്കുന്നതിനായി ഒപ്പിട്ട് നൽകുന്നു.

എന്റെ വീട് നിരീക്ഷിക്കാൻ ഞാൻ സമ്മതം നൽകുന്നു:

പഠനത്തിൽ പങ്കെടുക്കുന്ന _____ തീയതി: _____

ആളിന്റെ ഒപ്പ്:

പഠനത്തിൽ പങ്കെടുക്കുന്ന _____

ആളിന്റെ പേര്: _____

കാര്യങ്ങൾ വിശദീകരിച്ച് തന്നയാൾ/

ചോദ്യകർത്താവ് (ഒപ്പ്): _____ തീയതി: _____

കാര്യങ്ങൾ വിശദീകരിച്ച് തന്നയാൾ/

ചോദ്യകർത്താവ് (പേര്): _____

A.15

വീട്ടിലും പരിസരപ്രദേശങ്ങളിലും വൃദ്ധജനങ്ങൾക്ക് ഉണ്ടാകാവുന്ന വീഴ്ചകൾ, അതിലേക്ക് നയിക്കുന്ന ഘടകങ്ങൾ, ഉടനടിയുണ്ടായേക്കാവുന്ന അനന്തരഫലങ്ങൾ എന്നിവയെക്കുറിച്ച് തിരുവനന്തപുരത്ത് നടത്തുന്ന പഠനം.

വീഴ്ചകൾ സംഭവിച്ചവരുടെ വീടും പരിസരവും നിരീക്ഷിക്കാനുള്ള രൂപരേഖ പേര്, വയസ്സ്,

അഡ്രസ്സ്

വീഴ്ചയിൽ എന്താണ് പറ്റിയത്?

ഇപ്പോൾ എങ്ങിനെയുണ്ട്?

(മരിച്ചു എങ്കിൽ അതിന്റെ കാരണം, വീണ്ടു കഴിഞ്ഞ് എത്രനാൾ കഴിഞ്ഞാണ് മരിച്ചത് എന്നിവ ചോദിക്കുക. ജീവിച്ചിരിക്കുന്നവരോട് വീഴുന്നതിന്റെ മുൻപ് ചെയ്ത കൈമാറ്റങ്ങളുടെ എത്ര ശതമാനം പ്രവൃത്തികൾ ചെയ്യാൻ സാധിക്കും എന്നു ചോദിക്കുക)

വീടിന് പുറത്ത്

നിരീക്ഷണഫലം

റോഡിൽ നിന്നും വീട്ടിലേക്കുള്ള വഴി

വീഴ്ചകൾക്ക് ശേഷം വീടിന് വരുത്തിയിട്ടുള്ള മാറ്റങ്ങൾ

റോഡിൽ നിന്നും വീട്ടിലേക്കുള്ള വഴി

ബസ് പോകുന്ന റോഡിൽ നിന്നും എത്ര

അകലെയാണ് വീട്?

തൊട്ടടുത്തെ റോഡിൽ നിന്നും എത്ര
അകലെയാണ് വീട്?

റോഡും വീടും ഒരു നിരപ്പാണോ?

ചരിഞ്ഞ പ്രതലം ഉണ്ടോ?

വഴിയിൽ വീഴാൻ സാധ്യതയുള്ള
എന്തെങ്കിലും തടസ്സങ്ങൾ ഉണ്ടോ?
(മരക്കുറ്റി, തെങ്ങിൻകുഴി)

നിരപ്പാണോ?

വഴുക്കൽ ഉണ്ടോ?

ചെടികൾ/പുല്ല് വളർന്ന്
കാടുപിടിച്ചിട്ടുണ്ടോ?

വീടിനു ചുറ്റും

വീടിനു ചുറ്റും

നിരപ്പാണോ?

ചരിഞ്ഞ പ്രതലം ഉണ്ടോ?

വീഴാൻ സാധ്യതയുള്ള എന്തെങ്കിലും
തടസ്സങ്ങൾ ഉണ്ടോ? (മരക്കുറ്റി,
തെങ്ങിൻകുഴി)

വഴുക്കൽ ഉണ്ടോ?

ചെടികൾ/പുല്ല് വളർന്ന്
കാടുപിടിച്ചിട്ടുണ്ടോ?

കിണറുണ്ടോ?
(കെട്ടിയതാണോ/മുടിയിട്ടുണ്ടോ?)

വീടിന്റെ പ്രത്യേകതകൾ

**വീടിന്റെ
പ്രത്യേകതകൾ**

വീടിന്റെ ഏരിയ (ഏകദേശം)

എത്ര സ്ഥലം ഉണ്ട് (ഏകദേശം)

മതിലുണ്ടോ?

തൊട്ടടുത്ത് വീടുകളുണ്ടോ?

മേൽക്കൂര

എത്ര നിലകളുണ്ട്?

എത്ര മുറികളുണ്ട്?

വീട്ടിലേക്ക് കയറാനുള്ള പടികൾ/ചരിഞ്ഞ പ്രതലം

**വീട്ടിലേക്ക്
കയറാനുള്ള
പടികൾ/ചരിഞ്ഞ
പ്രതലം**

പടികൾ

മുൻവശം
ത്ത

പുറകുവശം
ത്ത

പടികൾ

പടികൾ

കയറാൻ പ്രയാസമുണ്ടോ?

ഉയരം കുടുതൽ/കുറവ്

തറയിൽ നിന്നും പടികൾ പെട്ടെന്ന്
വേർതിരിച്ചറിയാൻ സാധിക്കുമോ?

പടികളുടെ അവസ്ഥ?

(തകർന്നിരിക്കുകയാണ്/വഴുക്കാൻ സാധ്യത
ഉണ്ട്/തട്ടി വീഴാൻ സാധ്യത ഉണ്ട്)

പിടിച്ചു കയറാൻ കൈവരി
പിടിപ്പിച്ചിട്ടുണ്ടോ?

ചരിഞ്ഞ പ്രതലം

മുൻവശം
ത്ത

പുറകുവശം
ത്ത

വഴുക്കൽ ഉണ്ടോ?

പിടിച്ചു കയറാൻ

കൈവരി പിടിപ്പിച്ചിട്ടുണ്ടോ?

വീടിന്റെ ഉൾവശം

നിരീക്ഷണഫലം

**വീഴ്ചകൾക്ക്
ശേഷം വീടിന്
വരുത്തിയിട്ടുള്ള
മാറ്റങ്ങൾ**

തറ (ഓരോ മുറിയുടേയും)

തറ

മാർബിൾ /ഗ്രാനൈറ്റ്/ ടൈൽ/റെഡ്
ഓക്സൈഡ്/മൊസൈക്/തറയോട്/സിമെ
ന്റ്

നിരപ്പാണോ?

വഴുക്കൽ ഉണ്ടോ?

തറയുടെ അവസ്ഥ (തകർന്നിരിക്കുകയാണ്/
വിള്ളൽ/വിടവ്)

സിങ്ക്/ഫ്രിഡ്ജിൽ നിന്ന് വെള്ളം ലീക്ക്
ചെയ്യുന്നുണ്ടോ?

വീടിന് പല തട്ടുകൾ ഉണ്ടോ?

**വീടിന് പല
തട്ടുകൾ ഉണ്ടോ?**

മുറികൾ തമ്മിൽ തറയുടെ ഉയരത്തിൽ
വ്യത്യാസം ഉണ്ടോ

മുറികളിലെ പ്രകാശം

മുറികളിലെ പ്രകാശം

o

കറണ്ട് ഉണ്ടോ?

എല്ലാ മുറികളിലും ലൈറ്റ് ഉണ്ടോ?

വെളിച്ചം ആവശ്യത്തിനുണ്ടോ?

പടികളിൽ വേണ്ടത്ര വെളിച്ചം ഉണ്ടോ?

ഹാളിലും നടക്കുന്ന വഴിയിലും വേണ്ടത്ര
വെളിച്ചം ഉണ്ടോ?

വീഴാൻ സാധ്യതയുള്ള എന്തെങ്കിലും തടസ്സങ്ങൾ ഉണ്ടോ?

**വീഴാൻ
സാധ്യതയുള്ള
എന്തെങ്കിലും
തടസ്സങ്ങൾ ഉണ്ടോ?**

ഫർണിച്ചർ

കട്ടിള

കാർപെറ്റ്

വയർ/കോർഡ്

മുഴുച്ച്/ ഉന്തി നിൽക്കുന്ന എന്തെങ്കിലും
o വസ്തുക്കൾ

കിടപ്പുമുറി

കിടപ്പുമുറി

വെളിച്ചം ആവശ്യത്തിനുണ്ടോ?

കിടന്നു കൊണ്ട് ലൈറ്റ് ഇടാൻ സൗകര്യം
ഉണ്ടോ?

ഇരിക്കാൻ ഉറപ്പുള്ള ഒരു കസേര

ഉണ്ടോ?

കട്ടിലിന്റെ ഉയരം

കുടുതലോ/കുറവോ ഉണ്ടോ?

വീഴാൻ സാധ്യതയുള്ള എന്തെങ്കിലും

തടസ്സങ്ങൾ/ വസ്തുക്കൾ ഉണ്ടോ?

വാതിലുകൾ

വാതിലുകൾ

വീതി

ഉയരം

കട്ടിള

കട്ടിളയുടെ ഉയരം

വാതിലിനിരുവശവും ഒരേ ഉയരം

ആണോ?

ടോയ്ലെറ്റ്

ടോയ്ലെറ്റ്

അറ്റാച്ഡ് ആണോ?

ദൂരയാണെങ്കിൽ എത്ര ദൂരെ?

ടോയ്ലെറ്റ് തറയുടെ ഒരേ

നിരപ്പിലാണോ?

ലൈറ്റിന്റെ സമീപ് വെളിയിലാണോ?

വെളിച്ചം ആവശ്യത്തിനുണ്ടോ?

അകത്ത് ആവശ്യത്തിനുള്ള സ്ഥലം

ഉണ്ടോ?

ഡ്രൈ/വെറ്റ് എന്നിങ്ങനെ

വേർതിരിച്ചിട്ടുണ്ടോ?

തറ എങ്ങനെയുള്ളതാണ്?

കമോഡിൽ നിന്ന് പൈപ്പും ബക്കറ്റും
സോപ്പും എല്ലാം എത്തി എടുക്കാൻ
സൗകര്യം ഉണ്ടോ?

കമോഡ് എങ്ങനെയുള്ളതാണ്?
വെസ്റ്റേൺ/ഇൻഡ്യൻ

കമോഡിന്റെ ഉയരം

വീഴാൻ സാധ്യതയുള്ള എന്തെങ്കിലും
തടസ്സങ്ങൾ/ വസ്തുക്കൾ ഉണ്ടോ?

ഇരുന്ന് കുളിക്കാനുള്ള സൗകര്യം
ഉണ്ടോ?

അടുക്കള

അടുക്കള

തറ

വീതനയുടെ ഉയരം

സിക്കിന്റെ ഉയരം

സിങ്ക്/ഫ്രിഡ്ജ് ലീക്കുന്നുണ്ടോ?

**വീഴ്ച പ്രതിരോധിക്കാൻ എടുത്ത
നടപടികൾ**

श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान

तिरुवनन्तपुरम- 695 011, केरल, इंडिया

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY

THIRUVANANTHAPURAM - 695 011, INDIA

(An Institute of National Importance under Govt. of India)



Institutional Ethics Committee (IEC)

SCT / IEC-435/ SEPTEMBER-2011

03-10-2012

Dr. Rekha. M. Ravindran

PhD Scholar

AMCHSS

SCTIMST.

Dear Dr. Rekha. M. Ravindran,

Thank you for submitting additional documents related to the proposal titled “The Risks, Risk Factors and Immediate Consequences of Falls among Older Persons in their Home Environment in Thiruvananthapuram “to the IEC for review.

The following documents were reviewed:

1. *Letter from IEC.*
2. *Clarifications for IEC recommendations.*
3. *Copy of approval from Human ethical committee of Medical College, Thiruvananthapuram.*
4. *Cover page.*
5. *Short CV.*

Page 1 of 4

तार-चित्रमेट
Grams - Chitramet

टेलक्स
Telex : 0435-6290

फोन
Phone : 443152

फाक्स
Fax : (91) 0471-446433
550728

ई. मेले
E.Mail: sct.@sctimst.kernic.in

6. *Consent letters from three HODs of Medical College Hospital, Thiruvananthapuram.*
7. *IEC forms, 8. Study proposal with references.*
8. *Informed consent for the community survey.*
9. *Vernacular translation of the informed consent.*
10. *Interview schedule for the community survey.*
11. *Vernacular translation of the community survey.*
12. *Informed consent for the case control study.*
13. *Vernacular translation of the informed consent for the case control study.*
14. *Interview schedule for the case control study.*
15. *Vernacular translation of the interview schedule.*
16. *Informed consent for the in depth interview with the care taker.*
17. *Vernacular translation of the Informed consent for the in depth interview with the care taker.*
18. *Interview guidelines for in depth interview with care takers.*
19. *Vernacular translation of interview guidelines for in depth interview with care takers.*
20. *Informed consent for in depth interview with Key informants.*
21. *Interview guidelines for in depth interview with Key informants.*
22. *Informed consent for the household observation.*
23. *Vernacular translation of the informed consent for observation.*
24. *Guidelines for observation of the household.*
25. *Letter dated 03-10-12 addressed to the Member Secretary, IEC- SCTIMST from Dr. Rekha. M. Ravindran, PhD Scholar, AMCHSS, SCTIMST submitting the modified Consent form.*
26. *Modified Consent forms in English and Malayalam*

The following members of the Ethics Committee were present at the meeting held on 7th September, 2012 at Director's Conference Hall.

Sl. No	Member Name	Highest Degree	Gender	Scientific / Non-scientific	Affiliation with Institution (s)
1.	Justice M.R. Hariharan Nair.	MA BL	Male	Legal Expert (Chairperson)	No
2.	Prof. K. Radhakrishnan	MD	Male	Clinician (Neurologist)	Yes
3.	Dr. Meenu Hariharan	DM	Female	Clinician (Gastro Enterologist)	No
4.	Dr. Rema M. N	MD	Female	Pharmacologist	No
5.	Dr. R.V. G. Menon	PhD	Male	Lay person	No
6.	Dr. S. N. Pal	PhD	Male	Basic Scientist (Biomaterials Expert)	No
7.	Dr. C. P. Sharma	PhD	Male	Basic Scientist (Biomaterials)-	Yes
8.	Dr. Sivasankaran	MD	Male	Clinician (Cardiologist)	Yes
9.	Dr. Anoopkumar Thekkuveetil	PhD	Male	Basic Scientist (Molecular Biology) /Ethicist (Member Secretary)	Yes

IEC Decision

IEC approved the study.

Remarks:

The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Yours Sincerely



Dr. Anoopkumar Thekkuveetil
Member Secretary, Ethics Committee.