



# **PREVENTION OF FALLS IN THE ELDERLY**

Florence Asombang

Delphine Tafor

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<p><b>ABSTRACT</b></p> <p>This study seeks to find answers to the main research question; how can falls in the elderly be prevented. However, in order to provide answers to this main research question, it is important to identify the causes of such falls in the elderly and last but not the least, how the consequences of these falls are managed once they occur. Qualitative content analysis was the methodological choice for this study because we had access to sufficient scientific articles on fall prevention in the elderly from which to analyze and provide answers to our research questions. The analysis of these articles was guided by Elo &amp; Kyngäs' (2008) abstraction process model for inductive content analysis. Dorothea Orem's Self – care Deficit theory provided the theoretical road map for this study. It defines self-care as, “the performance or practice of activities that individuals initiate and perform on their own behalf to maintain life, health, and well-being, while self-care deficit delineates when nursing is needed. The theory's three steps of nursing process namely – assessment, diagnosis and planning, implement, evaluation further enriched the findings. At the end, we arrived at some interesting conclusions. For instance, falls in the elderly is a vicious circle. As such, any prevention and or management strategies must be holistic. They should include physical, psychological and environmental - the habitat of the elderly. Nevertheless, they are some limitations that could be improved upon. For instance, the thesis could have benefitted from more articles than the fifteen articles analysed. Secondly, a mixed method content analysis comprising inductive and deductive strategies would have brought out other perspectives than relying on the inductive approach alone. These limitations notwithstanding, the study sheds some light on fall prevention measures in the elderly and how these can be improved.</p>	
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## Contents

# 1 INTRODUCTION

Among older individuals, usually referred to as the elderly, falls are common place. Injuries that result from these falls can be life threatening. More so, with a foreseeable increase in the elderly group amongst many population demographics worldwide, falls and their resultant injuries in the elderly are becoming an even bigger public health concern. In Finland for example, as of 2012, about 18.5% of the entire population was 65 years or above and 5% 80 years or above (OECD, 2013). This is a significant chunk of the population with health care needs on the increase, especially with outcomes from falls. Hence a need, not only to address risk factors, but also to bring to light interventions that work and improve upon overall quality of life for the elderly.

Haven worked during practical trainings and often in part-time gigs in some elderly homes within the Helsinki metropolitan region in Finland, the exposure to fall related traumas on the elderly, effect on life expectancy, state and institutional costs were worth noticing. This aroused the interest through this literature review to delve into falls in the elderly. This thesis seeks to bring to light from within existing literature some common causes of falls in the elderly and ways to address the problem.

The elderly by virtue of their ages, 65 years or above experience their health differently from during their youth. Those who are more prone to falls usually suffer from more than one impairments in posture and balance, cognition, and overall physical health (Berry et al, 2014). As such, need help in managing daily functions at home or receive support in health care institutions like nursing homes, hospital wards and centers for rehabilitation.

The division of tasks in the composition of this thesis was between both authors Florence Asombang and Nala Tafor. The introduction and theoretical framework was handled by Florence Asombang while Nala Tafor worked on research method. Both authors analyzed and reported on the data. In spite of this partitioning of tasks to ensure thoroughness in the thesis writing, the authors worked hand in gloves by consulting especially in the review of literature by sharing with each other at every stage of the writing process.

Having identified some fall risk factors, therefore, this study will seek to put in interventions in preventing falls which will go a long way to decrease dependency among this group of people and increased health care costs from prolonged hospitalizations resulting from falls. This will rely mostly on educating staff members through increased caregiving skills and motivation (Kato et al, 2008).

## **2 BACKGROUND**

In most contemporary or modern societies, awareness on not only about the new shifts in population demographics that put the elderly group in forefront, but also on the need to find workable solutions to the problems these shifts might cause, is on a steady increase. In fact, in some of these countries like Finland in particular, not only is this awareness on an increase, but most importantly practical or concrete actions are being put in place, led by worth mentioning the government, through the ministry of social affairs and health in collaboration with other national supervisory authorities and state administrative agencies to address health care for the elderly as well as impact on Finland as a nation.

The concreteness of the government of Finland's leadership on this issue is evident in the 2013 act on care services for elderly people in Finland to ensure high standard of quality nationwide. The act seeks to ensure social welfare of the elderly through social services and health care are optimized and provided such that it is readily available to every member of society. Key among its goals to the elderly, is to maintain good health and functional capacity, provision of housing and or dwelling environment that is accessible, feasible applicable transport solutions tailored to suite the services in use or demand (Ministry of Social affairs and health, 2014)

This literature review, can be contextualized as being a step into or an extension to some key aspects of this act by emphasizing health care especially falls in the elderly and consequent outcomes with the overall goal being to improve on quality of life of the elderly population. Delving into the assessment and management of falls in the elderly within this literature review will add value this already existent awareness and shed more light to result-yielding

interventions that the elderly population can benefit from (Ministry of Social affairs and health, 2014)

Incidence of falls in population of the elderly, 65 years of age and older both at home and in the health care settings are on the increase. The purpose of this thesis is to first of all identify the cause of falls in this population and then outline measures that can be put in place to reduce the incidence of falls. According to Kato et al. (2008), falls can cause various serious outcomes in elderly persons, especially those in health care facilities. Examples of these outcomes include fall-related fractures of the lower extremities which will eventually lead to dependency (Kato et al., 2008). Having such outcome will lead to prolonged hospitalizations and increase in healthcare costs, affecting the economy as a whole (Kato et al, 2008).

There have been reports of an increased risk of falls in people aged 65 and older which makes it very necessary to put fall-prevention interventions in place so as to try to reduce the incidents. Such risks among this group of people can stem from the increased use of medications because of the many health problems acquired in the aged population which leads to drug-drug interactions (Fonad et al., 2007). Another reason for the increase in falls is cognitive decline in this population and a greater use of psychotropic medications (Fonad et al., 2007). As a result of the increase incidents of falls, fears of legal responsibilities have led to nurses putting patients on restraints in an effort to avoid fall incidents (Kato et al. 2008).

Therefore, healthcare workers and caregivers need to be educated and motivated on fall prevention strategies to help reduce the incidence of falls and, this should be done on an individualized basis. According to Kato et al. (2008), nurses and caregiving staff have the main supporting roles in maintaining the health and lifestyles of elderly persons in facilities, so they need to be knowledgeable and skillful in identifying fall risks and in making and implementing appropriate care plans to reduce individual fall risks.

Certain terms and key words that help to engender the rendition of this literature review to its reader include elderly and elderly home, prevention and falls as well as medical procedure. These provide context within which developed themes and ideas within the thesis are confined.

In this paper 'the elderly' is referred to as a person aged 65 years or above. According to WHO (2013), most developed world countries have accepted the chronological age of 65 years as a

definition of 'elderly' or older person, but like many westernized concepts, this does not adapt well to the situation in Africa. The Finnish government in Act of Care Services for older People to ensure high standards, defined 'old person' with similar semblance to the elderly as people whose physical, cognitive, mental and social functional capacities have impairments. (Act of Care service for older people, 2013).

Prevention is defined as the act or practice of stopping something bad from happening (Merriam-dictionary, 2011 Webster). Fall prevention will avoid injuries like fractures and increased healthcare costs.

Meanwhile, as used in this study, elderly home refers to establishment that provides living quarters and care for the elderly or the chronically ill. Residents in these homes require different levels of care from minimal to maximal assistance. Care of these patients is therefore individualized.

More so, a fall is defined as unintentionally coming to rest on the ground, floor, or object, regardless of whether or not an injury has occurred (University of Minnesota, 2004).

The Meriam-Webster dictionary (2011) defines a medical procedure as: "a series of actions that are done in a certain way or order: an established or accepted way of doing something"

## **2.1 Significance of the study**

This study will contribute to the existing knowledge on falls by the elderly with particular focus on its prevention. It will conglomerate what existing literature has as risk factors to falls and appropriate interventions. One of the ways in solving a problem is knowing the origin of the problem. This study will show the benefits of using fall prevention interventions on the elderly and the impact it has had on these individual – shorter hospital stay leading to a decrease in medical costs, independence, increased dignity and better health. Prevention of falls will help reduce the medical costs involved in the treatment of the injuries resulting from such falls. Most especially we expect that the recommendations from the findings will help nurses and caregivers in improving the quality of life of the elderly living in the elderly homes whose care have been entrusted unto them.

## **2.2 Literature review**

The prevention of falls and hence their resulting consequences in the elderly population demographic across the world, especially in developed countries is increasingly becoming a major priority for local and state governments. This literature review elucidates some of the risk factors and causes to falls in the elderly as well as possible interventions to address and prevent them.

### **2.2.1 Assessment of risk factors and causes**

According to the World Health Organization (WHO), risk factors are traits or characteristics of a subject that increase its susceptibility to injury and disease. Therefore, identifying these risk factors, causes and addressing them form an important constituent in this review.

#### *2.2.1.1 Biological*

This risk factor constitute that which affects optimal physiological functioning. The skeletal system for instance forms the basic foundation for support and balance. Bone density is the state of concentration of minerals in the bones, of which estimation of bone strength and hence osteoporosis could be determined (WebMd). In elderly people, the incidences of falls, hence fractures and other injuries are on a rapid increase. Järvinen et al. (2008) in their work on shifting the focus in fracture prevention from osteoporosis to falls, argue that bone density in tandem with osteoporosis should not be classified as a major risk factor to falls in the elderly. The authors concluded that from randomised controlled trials, it was not evident that bone density/osteoporosis was a good determinant as over 80% of falls that resulted to low trauma



fractures were in people who did not have osteoporosis. In fact, these individuals had bone densities in miscorrelation to osteoporosis.

Paradoxically, Wolf et al (2003) were rather conclusive to the contrary when they reviewed falls in the elderly and their prevention. To these researchers, bone density constituted a major risk factor to falls in the elderly, especially when in combination with other risk factors that they termed environmental. These authors in their work, came to the determination of the correlation of bone density to strength as seen with the proportionate increase to falls and hence fractures to elderly population with poor bone density/increased osteoporotic values.

These conflicting results from two sets of researchers probing bone density's effect on falls in elderly is exemplary of how in a literature review such as this, it is scholastic for seasoned academicians to have divergence in critical subject matters.

Inadequacy or deficiency of vitamin D, the sun vitamin relates very often to imbalances in physiological functioning of the body. Vitamin D is a fat-soluble vitamin that is obtained from the conversion of 7-dehydrocholesterol by the sun's B-spectrum of ultraviolet radiation in the skin (Binkley. N et al 2010). When these authors; Binkley N et al in their work, probed into Low vitamin D status, its prevalence, consequences and correction, they came to the determination that low vitamin D levels ( below 30ng/mL) were associated with skeletal problems like osteomalacia. Hence, bones soften, loose their strength and that part of the skeletal system function to provide support is compromised. Moreover, Cedric Annweiler et al went a step further in their work on fall prevention and vitamin D in the elderly, to show that when vitamin D is inadequate, phosphate and calcium regulation is disrupted, hence a build-up that leads to osteoporosis as well as a negative effect on muscle mass as in the case with myopathy.

In addition, the elderly with chronic illnesses, whose health conditions have been compromised by prolonged sicknesses, are more susceptible to falls (Miller et al, 2009). In their work on the management of falls related injuries in the elderly, their findings drew parallels with protracted medical history of ill health in the elderly to predispositions to falls and hence negative outcomes on general health. The semblance of this risk factor is also corroborated by Todd and Skeleton, 2004 in their work for the World Health Organization which brought to light some of the major risk factors to falls within the elderly.

Moreover, other biological risk factors like age and gender have in researches shown effects on falls (Miller et al, 2009). Increase in age is greatly associated with instances of falls. This is as a result of increased fragility of the lower body extremities that comes with aging.

#### *2.1.1.2 Accidental or environmental factors*

Falls that result from an accident or a combination of environmentally related factors occur the most in the elderly (Laurence Z. 2006). When Laurence Z looked at fall in older people in this clinical risk assessment from a review of large retrospective researches on falls in the elderly, it was clear that accidental or environmental factors caused the most falls. These include for instance rough walking foot paths, bad weather outside, poorly illuminated dwellings, floors which are slippery and poorly maintained mobility assisting devices like wheel chairs or beds. As the author writes, increase in age is directly proportional to increased susceptibility to environmental hazards, increased tendency to poor maintenance of posture and balance as well as poor control of body orientation and reflexes.

#### *2.1.1.3 Other common factors*

Psychotropic drugs commonly referred to as tranquilizers, drugs that sedate or have sedative effect especially benzodiazepines together with anti-depressants according to E Fonad et al in their work on fall and fall risk among nursing home residents in Sweden, were found to be strongly correlated to falls and hence fractures in the elderly. The effects on some of these drugs last longer than their normal indicated period of action on the elderly, causing imbalances on physiology, impairments and dizziness from which the risk of accidental falls increases. In the same light, this unintended, unwanted protracted effect on physiology by these psychotropic drugs is substantiated by Ronchon Pa et al in their publication *Optimising drug Treatment for Elderly people in the British Medical journal*. The authors concluded similarly, the elderly with their weakness and frailty by default suffer more from the long lasting effects of drugs resulting to proneness to falls and loss of balance and posture.

### 2.2.2 Management

The assessment of risk factors and causes pave paths for the determination of appropriate or suitable management methods or interventions to prevent these falls and provide care. In some Scandinavian countries like Sweden, the use of pads that protect the hips in elderly homes (lonka housut) has seen a reduction in hip fractures resulting from falls (L.Z Rubenstein 2006). The pads act as cushions that absorb the weights and pressures exerted on the hips from falls. Dawn et al, of Health Evidence Network in their HEN report, complement the use of hip protectors or pads with their research work in Germany between 2002 and 2005 saw remarkable outcomes in resultant complications from falls in subjects of North-Rine region populated with 15million people. More so, there is substantial evidence indicative that together with pharmacological approach using supplementation of vitamin D to support bone health, balance and posture is improved and hence a reduction in falls.

Further corroboration to the positive effects of vitamin D supplementation on physical performance by Annweiler et al in their research on older women aged 75 and above in community dwellings is worth noting. However, Haug et al, concluded to the contrary from their research involving elderly subjects with age ranges between 70 to 91 years, that the concentration of 25(OH)D rather correlated with strength decrease, sustained physical activity and problems with climbing. These discrepancies in the conclusions by researchers is indicative of a divergence in outcomes of the effects of vitamin D on physiology of different groups of the elderly.

Besides the use of vitamin D (Anthony D et al, 2003), other pharmacological interventions with resultant enhancement on bone mass like oestrogen receptor modulators, the use of calcitonin which block bone resorption as well as a balanced use of parathyroid hormone via subcutaneous injections have shown promising outcomes in strengthening the skeletal system and hence prevent or reduce falls/fall related injuries in the elderly.

According to Pekka K et al, in their work on the prevention of falls and consequent injuries in elderly people, training that improves balance and strength in the elderly, especially with exercises that are individually tailored was found to have a reduction rate of 15-50% on injuries that resulted from falls and even from those that didn't. The community living elderly subjects in

their studies experienced a reduction in this risk factor because that strength and balance related trainings improved upon their balance and posture, ability to react faster, muscle strength and general coordination.

Also, staff education in health care institutions like elderly care homes and rehabilitation centres have shown improved outcomes in falls and fall related injuries with the elderly. Staff training or education on common risk factors of falls, especially those tailored to individual patients, their effect on overall health on the elderly and how these can be prevented are active useful interventions (M. Kato et al, 2008).

When Angela M et al in 2011 worked on a collaborative approach to fall prevention and Mayumi K et al in 2008 attempted solutions to fall prevention in their work on the development of a fall prevention program for the elderly Japanese people, they came out with results having broad similarities even though both research groups employed slightly dissimilar methods. The researchers in these works seek to engender techniques in fall management based on evidence-base-practice and to highlight those that are most effective.

Muyami K et all in their prevention program in Japan, used 31 elderly people in one of two long-term wards in the intervention/management ward and 20 elderly people in the other long term ward in the control ward. Using evidence-base-practise, the best available practise or tools or management protocols were used in the intervention ward. These included education of staff on causes of falls, individual risk assessment of each of the 31 elderly people in the intervention ward, care implemented based on these risks, continuous consultations on problems related to falls and modified care after falls over a 6 months period. The researchers used action research in management section of the program and a triangulation approach in its evaluation. The results expressed in the table below.

Variable	Participants	Number	6 months before the intervention period	During the 6 months intervention period
Number of fallers	Intervention	31	14	11
	Control	20	6	7
Number of persons injured	Intervention	31	7	3
	Control	20	2	3

Table 2.1

The intervention group experience a decrease in fallers and fall related injuries when compared 6 months prior to the interventions and 6months after. Fallers dropped by 3 and fall related injuries by 4. However, the control group had an increase in number of falls and fall related injuries respectively by 1. In looking further into the results, staff education on how risk factors of falls and implemented care tailored to individual patient's fall risk assessment were helpful in improving fall outcomes in the elderly within the implementation group.

On the other hand, Angela M et al used a rather collaborative approach with a multi professional team in their fall prevention program. Five older adults susceptible to or at high risk of falling from St. Michael hospital emergency department's records were observed and assisted by an interdisciplinary team of health care workers (public health nurses, 4 nurses from emergency staff-consultants and occupational therapists) over a 14 week period, immediately after intervention and 6 months follow-ups post intervention. Each occupational therapist assigned to one patient did three home visits and each nurse assigned to her own elderly patient did six visits to the elderly's home. The team performed joined visits at various intervals. During the visits to the patients' mobility assessment was performed, home support exercises were taught and number of times performed recorded. The workers reported their work to each other, collaborated actively and met frequently. The table below represents reported falls at each stage of the program.

		Participants (5)	
Falls	First assessment	Follow-up immediately after intervention	Follow-up after six months

1 in 30 days	5	1	0
1 within 31-90 days	0	1	0
2 or more in 90 days	0	1	0
No falls in 90 days	0	2	5

Table 2.2

From the results expressed in the table above, the frequent visits that trained the five elderly people used in this studies on home support exercises by the multidisciplinary staff ensured very positive outcomes in fall reductions culminating to zero falls from all 5 participants six months post intervention.

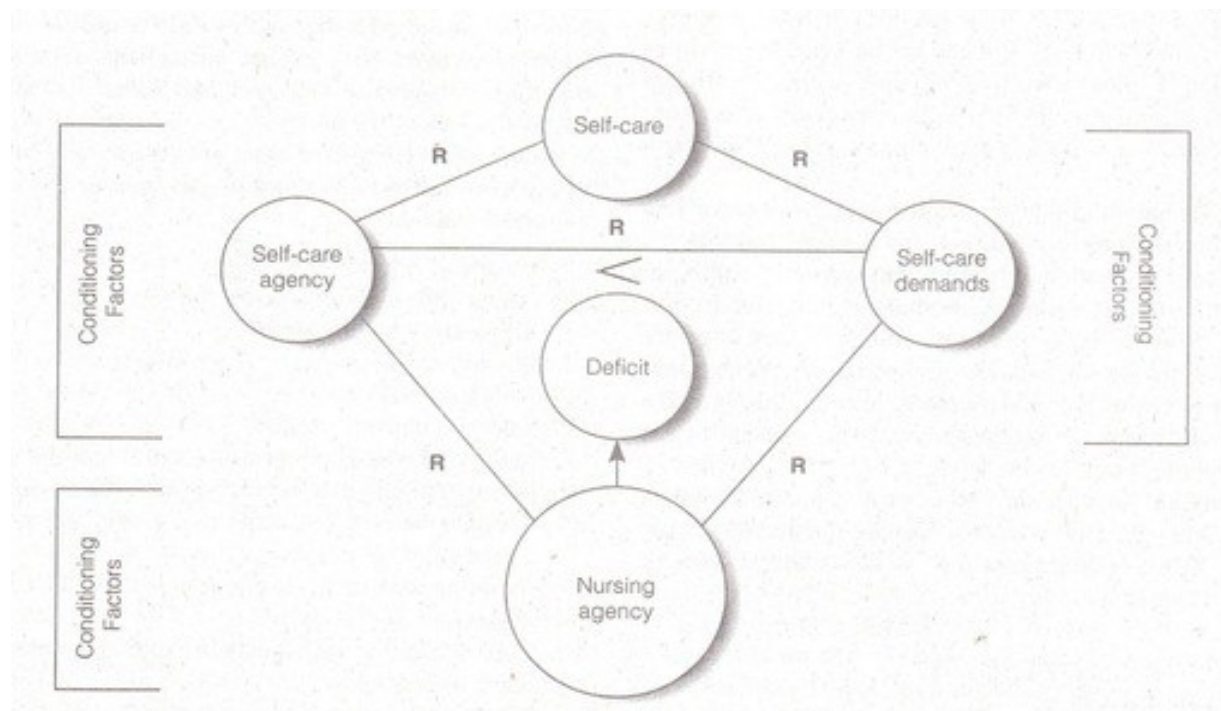
Fall management from both group of researchers, Angela M et al and Mayumi K et all showed that the application of best practises from evidence-based practise as well as a collaborative approach using multi professional staff falls and fall related injuries in the elderly can be reduced and general outcomes remarkably improved.

### **3 THEORETICAL FRAMEWORK**

#### **3.1 Fall prevention in the elderly in tandem with Dorothea Orem’s self-care deficit of nursing**

Self-care deficit is defined as, “The condition that validates the existence of a requirement for nursing in an adult in the absence of the ability to maintain continuously that amount and quality of self-care which is therapeutic in sustaining life and health, in recovering from disease or injury, or in coping with their effects. With children, the condition is the inability of the parent (or guardian) to maintain continuously for the child the amount and quality of care that is therapeutic” (Orem, 1991).

An older adult is incapable of providing continuous effective self-care and seeks help with accomplishing self-care tasks. Dorothea Orem seeks to portray the issue of individuals not being able to take care of themselves in this theory by relating self-care deficit with self-care demands, nursing agency, self-care agency and self-care as illustrated in the diagram below:



*R indicates a relationship between the components; < indicates a current or potential deficit where nursing would be required (Orem, 1991). Figure 3.1*

### 3.2 Dorothea Orem's three steps of nursing process

- a. Assessment: Determine why a patient needs care. A nurse's first encounter with a patient seeks to address the issue(s) of why this patient seeks care. There is the collection and analyzing of data which is relevant for the ultimate planning and care of this patient. This is based on the patient's diagnosis and prescriptions.
- b. Nursing diagnosis: After data has been collected, nurses sum up what has been collected, with a diagnosis based on the data specific to the patient. This involves designing a nursing system and planning the delivery of care. After the nurse determines why a patient needs care, the next item on the agenda will be planning to see that the appropriate care is given to these individuals.

- c. Planning, Implementation, Evaluation: After a nursing diagnosis is formed – for example – potential for injury related to falls – a plan is put in place on how nursing can best manage this. The plan is later implemented based on the institution. There after periodic evaluations are done to check for the effectiveness of the interventions put in place. After designing and planning how care will be delivered, nurses now put this plan into action and assess from time to time the effectiveness of this care (Orem, 1991).

This theory is appropriate for this research because of several reasons: the elderly adult is brought to the nursing home mainly because of a lack of self-care. Staying in these elderly homes will give nurses the ability to work with these patients with the intention of them becoming independent. Dorothea Orem defines self-care as, “the performance or practice of activities that individuals initiate and perform on their own behalf to maintain life, health, and well-being while self-care deficit delineates when nursing is needed (Orem, 1991).

#### **4 AIM AND RESEARCH QUESTION**

Our aim in this study is to provide answers to our main research question which is: How can falls in the elderly be prevented? We will also be looking at the tragedies leading to falls among the elderly living in elderly homes. Our interest has been motivated by the fact that, the elderly are susceptible to frequent falls more than younger individuals. We will focus on the nurse’s perspective in the prevention of these falls in particular and the management of injuries resulting from falls to a lesser extent. This is because we believe that, in the case of falls as in other medical situations prevention is better than cure.

As people in societies get older, get classed into the population group known as the elderly, the overall number of people susceptible or vulnerable to falls and resultant injuries increase. So too does the toll on their health and that of society in general increase. Therefore, seeking to identify potential risk factors of falls, effective management methods or approaches and implementing within a comprehensive plan can be of useful servitude to people in society.



## **5 METHODOLOGY**

The choice of the method is determined by the research question. Our main research question is: “How can falls in the elderly be prevented?” In this light, fifteen scientific articles on falls and fall prevention among the elderly were chosen and analyzed. This is due to the fact that, much research has been done in this area. Consequently, we want to provide a wider perspective into our subject matter, which is prevention of falls in the elderly. Therefore, we will undertake qualitative content analysis of previously published research articles on fall prevention among the elderly.

Bryman (2008) states that, qualitative content analysis, is probably the most prevalent approach to the qualitative analysis of documents. It comprises a searching-out of underlying themes in the materials being analyzed. Cole (1988) adds that content analysis is a method of analyzing written, verbal or visual communication messages. Qualitative content analysis is a very flexible method that can be applied to a variety of different media. In this study the principal media are scientific articles on falls prevention and online sources

### **5.1 Data collection**

We employed the use of bibliographic/resourceful databases (Google scholar, EBSCO host as well as The Lancet library catalogue) as our primordial and major resource from which we searched articles and journals using the terms elderly, fall(s) and prevention.

The Lancet library and EBSCO, though slightly different in the variety and depth of materials they provide had an almost similar search interfaces that offered advanced tools from which ‘AND’, ‘OR’ and ‘NOT’ can be used to exclude or include key words during the search. The ‘AND’ option was particularly useful in this search because not all falls and/or their prevention were found to be related to the elderly, the important population demographic of this literature review.

On the other hand, Google scholar offered a more plentiful source for articles as its embedded modern search technique also brought up not only search results but also relevant/similar articles

cited within articles previously published. This made first and second reads right up to chosen articles more logical and focused.

It was important to use these terms in the searches because their narrowness ensured we obtained search result or hits that reflected or addressed specifically our objectives and kept us within the confines of our subject matter. From these search terms, the initial results including patents and citations were huge, of which further screening based on relevance and date, allowed for a first and second read of articles in the process to determine their inclusion for the review. Inclusion of articles based on date published included only those published from year 2000 and above. Those below were excluded. This ensured only recent articles were used in the work. Articles whose author(s) employed empirical methods, arrived at conclusions and results from evidence based research and those that semblance good scoring from other guidelines by the Appraisal of Guidelines Research and Evaluation (AGREE) had priority. This was tedious, but worthwhile in bringing useful relevance to the literature review.

<b>Database</b>	<b>Used search term/combination</b>	<b>Source Hits</b>	<b>Progressed articles</b>	<b>Relevant articles</b>	<b>Chosen Articles</b>
The Lancet Library	‘Falls AND Elderly’	502	10	7	4
	‘Fall prevention AND elderly’	267	13	8	
Google scholar	‘Falls AND Elderly’	197000	15	9	8
	‘Fall prevention AND elderly’	19,600	9	5	
EBSCO	‘Falls AND Elderly’	436	15	9	3
	‘Fall prevention AND elderly’	215	9	7	

Table 5.1: Sources of articles

## 5.2 List of scientific articles

Author	Title	Year	Method Used	Results/Conclusion
<b>Article 1</b> Kato,M.Izumi,K.Shirai,S. Kondo,K. Kanda,M. Watanabe,I. Ishii, K. Saito, R.	Development Of a Fall prevention program for elderly Japanese people. Journal of nursing and Health sciences	2008	Action research methodology which uses a problem approach	The fall prevention program was successful, especially in reducing injuries. The fall rate per 1000 residential days was reduced from 7.6 to 5.0 in the intervention ward.
<b>Article 2</b> Fonad, E.Wahlin,T. Winblad ,B. Emami,A. Sandmark ,H.	Falls and fall risks among home residents. Journal of Clinical Nursing	2008	Quantitative method using questionnaire	Less falls occurred among patients with wheelchair or bed rail which can be regarded as a result as protective measures. A higher intake of medicine was associated with an increase in fractures
<b>Article 3</b> Angela, M. Thomas, P. Stephens, A. Moghbab, R. Gruneir, M.	A Collaborative Approach to Fall Prevention	2011	Qualitative interviews	Reported a less number of falls. 3.6 points increase on the berg balance scale.
<b>Article 4</b> J Close, M Ellis, R Hooper, E Glucksman, S Jackson, C Swift	Prevention of falls in the elderly trial (PROFET): a randomised controlled trial	1999	Systemic literature review	This randomised controlled trial indicated a reduction in number of falls and risk of falling in the intervention group whereas the control group experienced an increase in same parameters.
<b>Article 5</b> Laurence, Z.	Falls in older people: epidemiology, risk factors and strategies for prevention	2006	Qualitative Literature review	Exercise programmes can clearly improve strength, endurance and body mechanics, and several controlled trials have shown significant reduction in falls

<p><b>Article 6</b> P Kannus, H Sievänen, M Palvanen, T Järvinen, J Parkkari</p>	<p>Prevention of falls and consequent injuries in elderly people</p>	<p>2005</p>	<p>Systematic literature review</p>	<p>Interventions with emphasis on the improvement of balance and strength, optimal levels of vitamin D in tandem with proper home-hazard assessment are useful prevention strategies.</p>
<p><b>Article 7</b> C Annweiler, M Montero-Odasso, A Schott, G Berrut, B Fantino, O Beauchet</p>	<p>Fall prevention and vitamin D in elderly : an overview of the key role of non-bone effects</p>	<p>2010</p>	<p>Systematic review</p>	<p>Vitamin D and calcium supplementation in adequate amounts show improved outcomes in management of falls in the elderly and therefore should be factored in the healthcare strategies to support elderly bone health.</p>
<p><b>Article 8</b> A Woolf, K Akesson</p>	<p>Prevention of fractures in elderly people</p>	<p>2003</p>	<p>Systematic review</p>	<p>The reduction in fall frequencies, investigation of causes of previous falls and focused use of pharmacological interventions on high risk groups combined, reduce substantially fractures and hence health deterioration in the elderly</p>
<p><b>Article 9</b> P Alonso-Coello, A Lopez, G Guyatt, R Moynihan</p>	<p>Shifting the focus in fracture prevention from osteoporosis to falls</p>	<p>2008</p>	<p>Systematic review</p>	<p>The application of more routine focus on the risk of falling is more important in the reduction of cost-raising and health-reducing outcomes in elderly care.</p>
<p><b>Article 10</b> Feder,G. Cryer,C. Donovan, S. Carter ,Y.</p>	<p>Guidelines for the prevention of falls in people over 65</p>	<p>2000</p>	<p>Qualitative Literature review</p>	<p>Evidence from a tailored design trials program shows that assessment and</p>

				modification of risk factors of older people who have presented to an accident and emergency department after a fall and the provision of hip protectors in residents of nursing homes are effective
<b>Article 11</b> C Todd, D Skelton	What are the main risk factors for falls amongst older people and what are the most effective interventions to prevent these falls?	2004	Systematic review	The frequency of falls resulting to huge reduction in mobility and loss of independence occur predominantly in the elderly over 75 years, especially those in nursing homes. Though cost can be reduced, the cons of pharmacological and physical management measures are huge.
<b>Article 12</b> Knot,L.	Prevention of falls in the elderly	2014	Systematic literature review	Fall prevention gives lots of challenges to both the clients and healthcare in general.
<b>Article 13</b> E Miller, E Wightman, k Rumbolt, S McConnel, K Berg, M Devereaux, F Campbell	Management of fall-related injuries in the elderly: A retrospective chart review of patients presenting to the emergency department of a community-based teaching hospital	2009	Retrospective chart review	The inadequacy in documentation of the causes of falls in the emergency department was consequential to the provision of multi professional interventions to only few patients. Evidence based techniques were thought to be useful going forward.
<b>Article 14</b> J Chang, S Morton, L Rubenstein, W Mojica, M Maglione, M Suttorp, E Roth, P Shekelle	Interventions for the prevention of falls in the older adults: Systematic review and meta-analysis of randomized clinical	2004	Systematic review and meta analyses	The risk of falling was hugely mitigated by employing a multifaceted approach that involved a thorough pre and

	trials			follow up assessment regime and use of tailored management techniques.
<b>Article 15</b> Rapp, K. Lamb,S. Buchele,G. Lall,R. Lindemann,U. Becker,C.	Prevention of falls in Nursing Homes: Subgroup Analyses of a Randomised falls prevention Trial. Journal of American Geriatrics society	2008	Observational studies and quantitative research	Clients with no history of depressive symptom or with a reported fall benefited more from the program regarding their number of falls than those with at least one depressive symptom or no history of falls.

### 5.3 Data Analysis

After identifying our sources of required articles (Table 7.1), the analysis of these documents was the logical next step. Content analysis is a method that may be used with either qualitative or quantitative data, as such the data may be analyzed in an inductive or deductive way (Elo and Kyngäs 2008). We settled for the inductive qualitative content analysis of our data. Elo & Kyngäs insist that the content analysis process consists of three main phases, these are – preparation, organization and reporting. The preparatory phase starts with selecting the unit of analysis (McCain 1988). The research question determines the unit of analysis. This can be a letter, word or words, sentence (Robson 1993).

Due to the importance of the unit of analysis, the two writers of this thesis agreed to identify and use one unit of analysis. In line with our main research question, we chose “fall causes, outcomes and management with the elderly’ as our unit of analysis for all fifteen articles. We then proceeded to share the articles for analysis as follows – the first writer will analysis seven and the second writer will analyze eight. Before proceeding to carry out our individual tasks, we agreed to read and brainstorm on Elo & Kyngäs 2008 insightful article – “The Qualitative Content Analysis Process”. This article is the principal reference guiding our content analysis for this thesis.

According to Elo & Kyngäs (2008), it is possible through content analysis to distil words into fewer content related categories. The outcome of such an analysis is concept or categories describing the phenomenon. The phenomenon in this study is fall prevention in elderly home care. Coding is the starting point of this abstraction process. In order to facilitate the categorization process of our data, we adopted the categorization process of Elo & Kyngäs. From the coding we began creating categories. According to Dey (1993) when formulating categories by inductive content analysis, the researcher comes to a decision through interpretation, concerning which things to put in the same category. Dey continues stating that, each category is named using content-characteristic words. As such, subcategories with similar events and incidents are grouped together as generic categories these, are subsequently grouped as main categories. At this juncture, we will present below the categorization process of our data. We will title the analysis of the first seven articles by the first writer – Analysis Part 1 and the analysis from the following eight articles by the second writer – Analysis Part 2. Each analysis begins with a tabulation showing the categorization process followed by a brief description.

### 5.3.1 Analysis 1

Sub-Category	Generic Category	Main Category
Long term care residents, cognitive impairment, Depression, Bladder incontinence, Neurological problems, Cardiac disease, Orthostatic hypotension, Cerebral blood flow	Illness/Disease	Causes
Multiple medications, Drug-drug interaction, sensitive to side effects, drowsiness/hallucination from neuroleptic drugs	Effects of medication	

Visual impairment, Cognitive impairment, impaired ability to balance, Foot problem, Gait disorder, Transfer deficit	Aging	Consequences of Falls
Lighting, Bed height, Floor surface	Environmental Hazards	
Bruises, Wrist & Bone Fractures, Hip Injury	Physical Injuries	
Fear of Falling, Unnecessary Dependence, Decrease Socialization	Psychological Injuries	
Increase cost of Care, Burden to Medical Services	Increase Economic Cost	
Age, Gender, Walk unaided, Fall history, Diagnosis, Length of stay	Physiognomy/Health	Individual Characteristics
Remember faces, Can find own way to bed	Cognitive function	
Mood swing, Aggressive	Emotional Status	
Cognitive & Physical function, Continenence, Vision, Mood state, Disease, Medication	MDS RAI = Minimum Data Set of the Resident Assessment Instrument	Assessment Tools
Cognitive Test	MMSE = Mini Mental State Examination	
Risk of Falling	IZUMI's Modified Fall Risk Assessment Tool	
Sitting, Getting up, Transferring, Reaching, Picking an object from the Floor, Turning	Berg's Scale to Measure Balance	



around in a Full Circle, Standing on One Leg		
Staff training, Identifying Fall Risks, Staff consciousness, Staff motivation, Increased Care Giving Skills, Clinical Judgement, Cooperation with Other Staff, Care Plan before a Fall	Staff Empowerment	Institutional Measures for Fall Prevention
Individually Tailored Exercise, Group Exercise	Physical Exercise	Physical Exercise for Fall Prevention
Adjusted Bed Heights, Antislip Stockings, Better Lighting, Environmental Assessment	Environmental Adaptation	Environmental Improvement for Fall Prevention
Bath Transfer seats, Transfer Poles, Sofa Seats	Assistive Devices for Increased Mobility	Assistive Devices for Fall Prevention
Special Chairs, Bedside Rails, Belts	Physical Restraint	Fall Prevention by Freedom Restriction
Participants Informed of Purpose, Methods, Potential Risk, Measurements, Reporting, Publication, Interviews Recorded with Permission	Informed Consent	Ethical Considerations in Fall Prevention
Participants Rights Explained e.g. They could refuse to participate or withdraw at any time	Legal Rights of Participants	Measures
Codes Used Instead of Names, Documents Shredded After, Electronic Data Destroyed	Confidentiality	
Restrain or Painful Methods Excluded	No Physical Violence	

Improved Balance, Improved Gait, Improved Social Participation, Higher Confidence Levels	Improved Wellbeing	Positive Fall Prevention Results
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Table 5.2 Categorization Process

### 5.3.2 Analysis 2

Sub-Category	Generic Category	Main Category
Stiffer and poorly coordinated gait, postural hypotension, problems with vision, abrupt leg weakness, transient knee fragility, disorders in central nervous system, deficits in cognition, osteoporosis, low serum vitamin D, dehydration or hypovolemia, prior fractures, inadequate bone density and increase in age	Natural or congenital causes	Contributing/ Risk factors of falls
Overactive effects of tranquilizers or sedatives, drugs with hypotensive effects, excessive consumption of alcohol/smoking, use of unsuitable footwear and clothing.	External/adventitious causes	
Physical inactivity/passivity, perception of increased hazard susceptibility, poor lighting, inadequate universal design in living environment, loose children toys and electronic cords, pet's upkeep, winter snow/ice condition, no or inadequate equipment for safety.	Other variant and environmental triggers	
Bruises and wounds, fractures hips, wrists and other skeletal tissue, fear of falling again, losing independence, protracted hospital stays, permanent handicaps, death from fall related complications.	Effects of falls	

<p>Treatment of arrhythmias with antiarrhythmics and pacemakers, stoppage/pausing medicines</p> <p>that induce hypotension and unwarranted sedation, vitamin D-testing and supplementation</p> <p>in combination with Calcium if necessary, use of bio phosphates like alendronate, estrogen and parathyroid hormone test – titrating until adequate for patient, reversing hypovolemic induced falls with rehydration (hemodynamic stability)</p>	<p>Pharmacological remedies/interventions to support pre and post fall</p> <p>Pharmacological remedies/interventions to support pre and post fall</p>	<p>Management of falls</p> <p>Management of falls</p>
Hip and joint replacement surgery	Invasive orthopedic procedures	
<p>Use of walkers, rollators, appropriate shoes within and outside, stay in bed with raised head (improve blood pressure and volemia), attempting temporal rehabilitation show good outcome, improve home hazards, remove loose cables</p> <p>Regular exercises with supervision (application of ti-chi remarkable outcomes), post fall assessments, referrals of patients to appropriate health care expert, use of occupational therapy, investigating reasons of prior or previous falls.</p>	Effective preventative measures against falls/repetitive falls	
MMSE, Balance test scales like Berg’s and RAI	Standardized tests for cognition and Physical health	

Table 5.3

## **6 FINDINGS**

As stated earlier, Elo & Kyngäs 2008 provided the main guide for the content analysis of this data. Of particular interest is their model of the abstraction process. In this categorization process, a number of concepts and themes were derived and highlighted below. The process began with repeated reading of the selected articles while making some notes or signs in the margin (coding). Shifting through these codes gave rise to sub categories and those depicting similar incidents were grouped into generic categories. Moving up the categorization ladder, generic categories were further separated and grouped into distinct and higher concepts or themes called main categories as shown on Tables 5.2 and 5.3. Below are the main results from this abstraction process.

### **6.1 Causes of falls**

According to numerous literature on falls, there are a number of causes leading to falls by the elderly who live in nursing homes [2, 15 &10]. A number of these causes were also identified from the data for this study. Through the categorization process one could identify some of these causes. Top among the causes that led to falls in the elderly were illness or disease conditions. This featured in all seven articles analyzed [1,2,3,5,10,12&15]. The most common illnesses mentioned are cognitive impairment, depression, bladder incontinence, neurological problems, cardiac disease, orthostatic hypotension and cerebral blood flow. As a result, most long-term residents with these disease conditions are more susceptible to falls than healthy residents.

The effect of medication was the second most common explanation provided for falls in the elderly. Due to the fact that, most of them suffer from ill health, they are on long term and often multiple medications [2, 5 & 10]. This may lead to drug-drug interaction, negative side effects such as drowsiness, hallucination especially from neuroleptic drugs. The short and long-term effect of such over medication in the elderly is the increase in fall rates.

As we grow older we all suffer from visual and cognitive impairment, limited ability to balance, foot problems soon emerge resulting in gait disorders. All these conditions lead to deficit in transferring one's self from one position to another. In this situation environmental challenges like poor lighting, bed heights, wet or slippery floors become real environmental hazards leading to falls [12].

From table 5.3, it can be seen that majority of falls in the elderly result from causes which can be further broken down to natural, external/adventitious and other variant environmental triggers which are consequential on the health of the victim.

In the analyzed data, content that formed natural causes as a generic category included postural problems from hypotension, poor visions that reduce mobility and increase risk of falls, problems with volemia especially hypovolemia, low bone density that weakens the strength of the skeletal system hence rendering its ability to support that weak person [8, 9, and 7] In general, a weak skeletal system and a compromised functioning central nervous system are huge natural causes of falls in elderly [7]

More so, external factors that acted as triggers to falls referred to stimuli from the outside that when put in contact with physiology caused an upset or imbalance. Overuse of tranquilizers or sedatives, smoking and consumption of alcohol cause destabilizing effects from which falls result [11].

In addition, inadequacies or lack thereof, of physical support within the elderly's living environment can trigger falls. These triggers were grouped under environment triggers under the general umbrella of contributing factors of falls – main category. Physical inactivity, the unwillingness or inability to engage in activities that will strengthen the skeletal system is a problem. When that is coupled with a home or living environment that is not universally designed, with poor lighting, walk paths with no hand rail supports, homes littered with loose cables and/or toys and poorly mitigated wintery conditions, the risk of falling becomes unavoidably high [ 6, 8,11].

The effects of falls triggered by these factors can be in certain cases minimal but in most instances a starting point of the deterioration of the health of the elderly, in some cases leading to death. Falls may lead to bruises, hip fractures, twisted writes, sprained knees, ankles and in

general damage to the skeletal system. In nursing homes and other institutional care centers, recovery from these is challenging. Bruises and wounds may become infected and cause further problems. Rehabilitation from hip surgery or knee joint replacement post fall can fail, causes a relapse of the same injury. Some elderly maybe too fragile that it even becomes a higher health risk to use surgery as a remedy for fear of the effects of anesthetics in the procedure [6, 8, 11]

## **6.2 Consequences of falls**

From the data it emerged that, when the elderly living in nursing homes fall, it often can result in severe consequences, ranging from minor bruises to wrist or bone fractures and hip injuries. While these are physical, other consequences are psychological. These includes the fear of falling leading to unnecessary dependence or reducing the ability to socialize. Such psychological effects, limit the wellbeing of the affected nursing home client. Fall victims need extra medical attention in nursing/treating the fall injuries including more assistance as a result of the fall. These put a lot of burden on the health personal and institution. Generally it leads to increase economic cost for the state financing such extra care [8].

## **6.3 Fall prevention strategies**

While analyzing the data, it became evident that, there are certain preconditions that need to be fulfilled before fall prevention measures are instituted, especially for the elderly in caring institutions. Whether the measures are individually tailored or group oriented, these preconditions are worth initiating because each individual is unique. In the categorization process, measures were distinguished and grouped under the main category column as individual characteristics and assessment tools (see Tables 5.2 and 5.3).

In the analysis process, individual characteristics of each client were recorded. These included among others; age and gender of the client [1]. It was important to determine whether they could walk unaided, what their health diagnosis were, including their fall history and finally, for how long they have been living in the nursing home [15]. These characteristics are grouped here

under the generic category – physiognomy and health. Other characteristics were; the ability of the client to remember faces or his or her ability to find own way to bed. These appear under the generic category as cognitive function. The emotional status of the elderly client was an important characteristic as well. In such cases, the emphasis was on mood swings and levels of aggressiveness [15].

It was interesting to discover during the analysis that, there were unique tools for assessing each of the individual characteristics. These were placed under the main category as assessment tools. The MDS RAI which stands for Minimum Data Set for the Resident Assessment Instrument was all encompassing and was used to assess cognitive and physical function, continence, vision, mood state, disease and medication. Another assessment tool commonly used was the MMSE. It is the Mini Mental State Examination and is used exclusively for the cognitive assessment of clients. Finally, the Berg's scale was used to measure balance [3, 10]. In order to achieve this, the elderly client was asked to perform the following functions – sitting, getting up, transferring, reaching, picking an object from the floor, turning around in a full circle and standing on one leg.

The individual characteristics and the assessment tools constitute what I refer to above as precondition for preventive measures. These assessments were undertaken by all the nursing home elderly involved in the articles analyzed [1].

Fall prevention is at the core of this thesis. It is therefore not surprising that an analysis of the selected articles yielded a lot of main categories on this phenomenon. The main findings range from institutional, through individual, environmental, mechanical devices to minimal limitation of freedom for the clients own safety [3].

At the institutional level, it emerged from the data that nursing home staff empowerment was quite crucial if clients are to be prevented from falling. Staff empowerment can take the form of training on identifying fall risks, raising staff consciousness on fall prevention and motivating staff for extra efforts on fall prevention. Their care giving skills and clinical judgment can be fine-tuned in refresher courses/seminars. It is equally important for staff in nursing homes to draw up a nursing plan for each client before a fall. This should include aspects of prevention. Finally, at the institutional level, collaboration and cooperation between staff and other professionals can only be beneficial in preventing falls in the elderly [5, 15].

Individually, falls in the elderly can be minimized through physical exercise. Such exercises can be individually targeted or in a group of nursing home residents. The importance of exercise for human wellbeing is well documented and this is even more so for the elderly in nursing homes, especially those with a previous history of fall. It stems from the fact that after a fall or repeated falls, the elderly develops the fear of falling again. As such, reduces his or her activities resulting in muscle weakness and leading to further falls in what one may call the vicious circle of falls. Individually tailored or group exercises can help strengthen the muscles thereby preventing falls and improving the quality of life of nursing home residents [1,3,5]

Just like environmental hazards can lead to falls by the elderly in nursing homes, it is evident that, measures to prevent falls should include environmental improvements. Such improvements may entail wearing ant slip stocking on fall susceptible residents. There may be the need to improve the environmental lighting as the need arise and bed heights adjusted. Above all environmental assessment needs to be undertaken on a regular basis [12].

Assistive devices also emerged prominently as successful fall prevention measure from the data. Some of the devices that featured prominently include bath transfer seats, transfer poles and sofa seats. All these devices have as main goal to assist nursing home elderly improve on their mobility as safely as possible. They have the double advantage of improving on the quality of life of the users as well as contributing in strengthening their muscles [5].

Preventing falls in the elderly by physical restrain appeared a bit controversial. Some articles argued that it is unethical. Meanwhile, others held that losing a minimum amount of one's freedom to prevent falls and the consequences was worth the try. These physical restraining devices include special seats with belts and bedside rails [10].

This is as equally important in the wholism of this subject as are the causes or risk factors of falls in the elderly. By management, we refer to the process by which falls in the elderly are dealt with and/or controlled [13]. In reading, re-reading and getting 'immersed' in the data, it became evident that management of falls occur in variegated ways; from the use of pharmacological means, to invasive orthopedics, application of standardized tests and other effective preventative measures [13,14]. Each of these formed a separate generic category substantiated by matched



group of words or ideas in their respective sub-categories on the left side of table 5.3 during the induction process of the analysis.

The use of pharmacological products like medicines and drugs in alleviating the effects and mitigating falls in the elderly is common place. This approach in this analysis, effects/addresses mostly the natural or congenital causes of falls. Weaknesses and deficiencies in optimal physiological functions can be corrected with medicines and drugs, hence reducing falls. Using anti-arrhythmics against arrhythmias, sedatives for calming restlessness, application of Calcium, vitamin D, alendronate bio phosphate, titration of estrogen levels in women with supplementation aiming to boost bone health and overall strength of skeletal system as well as balancing problems with volemia with rehydrating product have useful effects as managing tools [4, 8, 9]

Some serious outcomes of falls in the elderly can be effectively managed only with the application of invasive orthopedics. This include hip replacement surgery for broken hips and knee joint replacement for disfunctioning ligaments at the knee joint. This in conjunction with other pharmacological applications have profoundly positive outcomes in managing falls in elderly [4 ,8, 9, 13]

Other effective preventative measures against falls/repetitive falls exist that complement those described above. These also had a separate generic category in the review. It is common to see elderly people with walkers and rollators that support their movements within and outside the home. Use of appropriate shoes for a particular season, improving volemia problems by staying in beds with heads raised, using of bed side protectors to prevent falling, removing loose cables, littered toys and other home hazards have helped. More so, regular exercises through physiotherapy in collaboration if necessary with occupational therapy are other use tools. Investigating and finding out the reasons of previous falls is also a good way to address prevention. Standardized tests like MMSE, RAI and Berg's for cognition and physical health are increasingly being applied especially in nursing homes to support and improve inadequate levels in cognition, balance and posture with good results [4, 8, 9, 11, 13, 14].

## 6.4 Ethics in fall prevention measures

In the data, a lot of experiments were conducted to test various fall prevention measures. Interestingly, it was evident that ethical considerations ran through all of these articles. Informed consent appeared frequently as an important ethical consideration in fall prevention. Here, all the participants in any fall prevention experiment were informed of the purpose, methods, potential risk, measurements, reporting and eventual publication of the findings. Interviews for the studies were all recorded with the permission of the residents.

The fact that most elderly persons living in elderly homes are frail, sick and may never leave these homes does not imply their legal rights as humans is diminished. Consequently, their legal rights were explained to them before involving them in any fall prevention experiment. This included their right to refuse to participate in any experiment or to withdraw at any stage in the studies if they so desire.

The third ethical consideration deals with avoiding any form of physical violence. In this light all involuntary restrain or painful methods were excluded. It is worth stating here, that these ethical considerations in fall prevention are distinct from the ethical reflections involved in this thesis. This will be presented later. The ethical considerations above were gleaned from the categorization process during data analysis. They are included here because it featured prominently in almost all the articles analyzed.

From the data, it was evident that, all fall prevention experiments resulted in positive results by significantly reducing the number of falls within the study period and in the long run. The findings reveal a general improvement in balance, improved gait, improved social participation leading to higher confidence levels. The end result is improved wellbeing and quality of life of elderly residents who participated in the fall prevention trials, compared to the control group that did not take part.

## **7 ETHICAL REFLECTIONS**

No matter the research method employed to carry out a scientific study as this, issues of ethics are of primordial concern. It concerns the role of values in the research process. In this chapter, we will attempt to present some reflections on ethics in general and where applicable in this study in particular. Ethical principles have generally been broken down into four main areas by Diener and Crandell (1978). These will provide the broad framework within which we will undertake these reflections on ethics. The main focus is to highlight these ethical principles and reflect on how they were applicable in this study relying on content analysis. In this light, the first part of each ethical concern states its requirement in research in general. This is followed by its application in this study in particular.

### **7.1 Lack of informed consent**

This principle requires that, prospective research participants should be given as much information as necessary to enable them to decide whether or not they wish to take part in the study. Covert observation violates this principle because participants are not given the choice between taking part in the study or not. This is evident in all the articles analyzed for this study, all the participants were fully aware of the research process.

With regard to this study the principle of informed consent is not straight forward. This is due to the fact that, we made use of content analysis as our methodological approach. However, informed consent was obtained from our supervisor before and during the research period for this study. Our supervisor guided us throughout the process in order that we might not violent any ethical requirements irrespective of our choice of research methods. In this vain, we may state that, we had our supervisor's informed consent concerning our methodological choice – qualitative content analysis.

## **7.2 Invasion of privacy**

It relates to the degree to which invasion of privacy can be accepted. The right to privacy is a tenet that many of us cherish and its violation in the name of research is generally not accepted. This ethical principle is somehow linked to that of informed consent. Invasion of privacy is particularly important in research on health. This is due to the fact that, individuals view their health conditions often as their private concern not to be made public. In this guise the need for anonymity of interviewees is very crucial. Other sensitive areas against invasion of privacy will include aspects as income, religious beliefs, sexual activities and others (Bryman 2008).

In all the articles reviewed and analysed for this study, the participants' personal information were not revealed. These information including names, date of birth, address were not mention in order to protect their identity and respect their privacy. We made sure no mention was made of the nursing home units were some of these studies were undertaken, even though this information was available in some of the articles.

## **7.3 Deception**

Deception occurs when researchers present their work as something other than what it is. This practice is often encountered in social psychology experiments. It is due to the fact that, researchers often want to limit participants' understanding of what the research is about so that they respond more naturally to the experiment (Bryman 2008). The Social Research Association's guidelines on ethic warn about the consequences of deceit in research. It states that, it is the duty of social researchers not to pursue methods of inquiry that are likely to infringe human values and sensibilities. To do so would be to endanger the reputation of research and the mutual trust between social researchers and society which is the prerequisite for much research (Social Research Association).

All the articles analyzed for this study were derived from official academic databases that the authors had the right to access by virtue of their student status at Arcada University of Applied

Sciences. Quotations from the articles are duly referenced to avoid plagiarism. All the information in the analysis has been carried out with all honesty and decency to the best abilities of the authors.

## **8 DISCUSSION**

In this chapter elucidates interpretations of the findings that emerged from the qualitative content analysis of the data. Guidance was sorted with the use of Dorothea Orem's self-care deficit theory (See chapter 3). Such interpretation will elevate the main categories presented in Tables 5.2 and 5.3 above to higher concepts that are expected to provide answers to our research questions.

### **8.1 The vicious circle of falls**

Before elaborating fall prevention strategies for the elderly in nursing homes, it is important to identify the causes of these falls. These causes can be divided into two broad group of factors namely, natural or congenital causes and external causes. Unfortunately, these fall risk factors lead to falls and other severe consequences in a chain reaction that can be referred to as the vicious circle of falls. After a fall, the victim develops the fear of falling again, leading to reduce activity. This results in muscle weakness which makes the victim susceptible to more falls. Fonad et al (2008) put it clearly when they state that, even if no physical injury occurs, fall victims may develop a fear of falling again, thus reduce their activities as a result. This leads to further deterioration and a greater risk of falling. Figure 8.1 below captures this vicious circle vividly.

Figure 8.1: Vicious circle of falls

In order to halt or slow this vicious fall circle, it is important to investigate both the natural and external risk factors leading to these falls in elderly home residents. Such an approach is in line with Dorothea Orem's Self Care deficit theory. According to this theory self-care is, the performance or practice of activities that individuals initiate and perform on their own behalf to maintain life, health, and well-being, while self-care deficit delineates when nursing is needed (Orem, 1991).

The reason elderly persons come to live in nursing homes is due to this self-care deficit. Orem's theory of self-care deficit theory, demands of the nurse coming in contact with the client for the first time, to carry out an assessment to determine why s/he seeks care. There is the collection and analysing of data which is relevant for the ultimate planning and care of this patient. After data has been collected, nurses sum up what has been collected, with a diagnosis based on the data specific to the patient. At this juncture, the nurses are able to determine how susceptible the client is to suffer a fall. It is here that the natural and external fall risk factors come into play.

Natural or congenital causes emanating from the data include factors such as aging and its health complications. For many, aging implies a decline in activity and poorer health, leading to a dependency on others in daily life (Sjögren & Björnstig 1991). Such poor health may result in illnesses like cognitive impairment, depression, bladder incontinence, neurological problems, cardiac disease, orthostatic hypotension, hypovolemia, inadequate bone density among others. For a complete picture of the risk factors leading to falls in elderly home residents, it is worthwhile to consider the external factors as well. Top among these external factors resulting in falls is the excessive use of medication. Giron et al (1999) state that in Sweden nine percent of the population are 75 years and above, yet this group consumes 25% of all medication. Such over use of medication can lead to drug-drug interaction, negative side effects, drowsiness/hallucination from neuroleptic drugs. All these natural and external causes of falls in the elderly are worth considering before putting in place fall prevention measures.

## **8.2 Prevention as a pre-fall management approach**

Prevention is better than cure. As such, our main research question seeks to find out how falls in the elderly living in nursing homes can be prevented. Orem's self-care deficit theory demands

that the first step in providing nursing care to a patient is to assess the health care needs of the individual. This was quite evident in our data. As demonstrated in the categorization process shown in Table 5.2, the individual characteristics of each client admitted in the nursing home was recorded. Information concerning age, gender, fall history, can the patient walk unaided and other health diagnosis constitute physiognomic and health characteristics. In order to ascertain their cognitive function, it was necessary to know if the patients can remember faces or find their own way to bed. Mood swings and aggressiveness were building blocks to identify their emotional status. The individual characteristics of each patient were used to come up with individually tailored or targeted fall prevention measures.

It was interesting to find out from the analysis process that, specific assessment tools were used for each generic category. For instance, the Minimum Data Set of the Resident Assessment Instrument (MDS RAI) was widely used as a general assessment tool for a variety of findings, including cognitive and physical function, continence, vision, mood state, disease, medication. For more specific tests like cognitive function, the Mini Mental State Examination (MNSE) was undertaken. IZUMI's Modified Fall Risk Assessment Tool was used to determine the risk of future falls. Finally, Berg's scale was the preferred instrument to measure balance with indicators like sitting, getting up, transferring, turning around in a full circle and others.

As stated above, data from such assessment was vital in designing individually tailored fall prevention measures for each patient. These fall prevention measures included physical exercises to build muscle strength and increase body fluid circulation. Assistive devices like bath transfer seats, transfer poles and sofa seats for increased mobility were prescribed to those in need according to their assessment results. Following environmental assessments, a patient may be given ant slip stockings or the client's bed height could be adjusted.

Prevention as a pre-fall management approach is not limited to individually targeted measures. Environmental and most importantly, institutional measures are also incorporated into a prevention program. Environmentally, better lighting may be provided for improved vision. In case of slippery floors the situation might be improve with rougher surfaces or avoiding floor wetness. The institutional measures touch on nursing home staff empowerment. This entails staff training in identifying fall risks, increased care giving skills and improved clinical judgment. These staff need motivation, they should be encouraged to initiate cooperation with other staff. It

is important for nursing home staff to establish a care plan for each resident before a fall. All these preventive measures constitute what we refer to as a pre-fall management approach.

### **8.3 Findings-related management of falls**

When the elderly who live in nursing homes suffer a fall, the consequences are often times quite severe as our categorization process presented in Tables 5.2 and 5.3 reveal. These may range from minor physical injuries like bruises and wounds to severe wrist and bone fractures and sometimes to hip injuries. Other skeletal tissues may be damaged. All of these may lead to protracted hospital stay. In worse instances, these may result in deaths from fall related complications. Falls also have a psychological impact on the victim, like the fear of falling again (Friedman et al 2002). The short to long term effects are unnecessary dependence, reduced socialization culminating in poor quality of wellbeing for the elderly in nursing homes.

Our sub research question, seeks to determine how these fall injuries in nursing home elderly are managed when they occur. The third step in Orem's self-care deficit theory talks of planning, implementation and evaluation of the patient after the initial assessment phase. After a nursing diagnosis is formed, for example, a fall related injury, a plan is put in place on how nursing can best manage this. The plan is later implemented based on the institution. Thereafter, periodic evaluations are done to check for the effectiveness of the interventions put in place (Orem 1991).

As demonstrated in the abstraction process shown on Table 5.3, pharmacological remedies are often used for the management of some of the injuries or consequences of falls in the elderly. There is for instance, the treatment of arrhythmias with antiarrhythmic and pacemakers or using stoppage/pausing medicines that induce hypotension and unwarranted sedation. Other pharmacological remedies include vitamin D-testing and supplementation in combination with calcium if necessary. The data also reveal the use of bio phosphates like alendronate, estrogen and parathyroid hormone test – titrating until adequate for patient, reversing hypovolemic induced falls with rehydration (hemodynamic stability)

In situations of severe injury like a hip dislocation, there may be the need for an invasive orthopedic procedure for a hip or joint replacement surgery. When the patient is recovering from a fall related injury, physically restraining measures like wheelchairs, bed side rails or belts may



be used in order not to jeopardize the recovery process. The objective of all these measures whether, pharmacological or surgical is to nurse the patient back to being as healthy as possible thereby improving their physical and psychological wellbeing.

## **9 TRUSTWORTHINESS IN CONTENT ANALYSIS**

According to (Elo et al 2014) although qualitative content analysis is commonly used in nursing science research, the trustworthiness of its use has not yet been systematically evaluated. The aim of trustworthiness is to support the argument that the inquiry's findings are worth paying attention to (Lincoln and Guba 1985). With content analysis, this has to do with how well the author satisfies the requirements of the three phases as identified by (Elo et al 2014). These are firstly, the preparation phase, in this study, the selection of articles. Secondly, the organization phase, it touches on categorization and abstraction process as elaborated in chapter 7.2 above. Finally, there is the reporting phase as demonstrated in chapter 9 above. Elo et al 2014 argue that there has been much debate about the most appropriate terms ranging from rigor, validity, reliability to trustworthiness. However, the most commonly used in research in general is reliability and validity as presented here below chapter 10.1.

### **9.1 Reliability and validity**

When a measuring instrument (interviews for qualitative data and questionnaires for quantitative data) is developed, what qualities should be built into it? In answer to this question, Punch (2005) states that, the two main technical criteria are reliability and validity. Bryman (2008) concurs with this view but add a third concept – replication. He argues that, three of the most prominent criteria for the evaluation of social science research are reliability, validity and replication. Bryman further warns that, although reliability and validity are analytically distinguishable, they are related because validity presumes reliability. Nevertheless, in this section we will highlight the analytical differences and importance of these two criteria for evaluating the quality of social science research. It is worth mentioning here that, substantial reference will be derived from Punch (2005) and Bryman (2008). This is due to the fact that,

these two authors present reliability and validity in non-technical and easy to understand language.

### **9.1.1 Reliability**

Reliability is a central concept in measurement. It basically means consistency. This refers to the consistency in the measurement of a concept. For instance, the concept of falls as used in this study. There are two main factors involved when considering whether a measure is reliable.

- Consistency over time or stability is usually expressed in the question: if the same instrument were given to the same people, under the same circumstances, at a different time, to what extent will they get the same scores? According to Punch (2005) to the extent that they would, the measuring instrument is reliable. To the extent they would not, it is unreliable.
- Internal reliability answers the question whether the indicators that make up the scale or index are consistent. In other words are all working in the same direction. As in this study, the first three questions were intended to measure falls prevention (see appendix A).

### **9.1.2 Validity**

The focus here is on measurement validity. It means the extent to which an instrument measures the concept it is claimed to measure. Punch (2005) asks the question – how do we know that this measuring instrument, measures what we think it measures? There are three main criteria to ascertain the validity of a measuring instrument.

- Content validity focuses on whether the full content of a conceptual definition is represented in the measuring instrument
- Criteria-related validity: Here, an indicator is compared with another measuring instrument in which the researcher has confidence measuring the same concept.

Construct validity deals with how well a measure conforms with theoretical expectations. For instance, in this research question three (see appendix A) on the role of the client in preventing falls was constructed in the backdrop of Dorothea Orem's self-care deficit theory.

## **9.2 Requirements for a successful research**

There are certain procedures that should be followed in order to undertaking a successful research. In this section, we will discuss these as applicable in research in general and in our research in particular. Before duelling into these modalities, it is worthwhile to mention that, the research process can be divided into the pre-empirical stage and the empirical stage.

At the pre-empirical phase it is important to come up with a research worthy topic. This calls for a topic that will contribute something new to the existing body of knowledge in that field of study. Nevertheless, we are aware that, we are not going to reinvent the wheel by our research. However, our research has to contribute something worthy, for instance, a different perspective to a previously researched topic. Thereafter, it is important to carry out a careful analysis of the problem to be studied. This is achieved by undertaking an in depth literature review of previous studies in the field of interest. In our case, we had to review the rich literature on falls among the elderly.

Armed with information from the literature and the researcher's own interest/curiosity in the chosen topic, research questions are elaborated. This entails stating the original problem in a series of research questions. According to Punch (2005), research questions play a central role in the research process. They are the goal of the pre-empirical stage of the research. They provide the backbone of the empirical procedures and also provide the organizing principle for the final report. How we do something in research depends on what we are trying to find out. Having identified our research questions, we now turn to the empirical stage, still guided by our research questions.

It is here that, the methodology choice between quantitative and qualitative methods is made. This is possible only after, the research questions have guided the researcher to the target population for the study. The qualitative method was to be employed to provide answers to our research questions. The qualitative method was the approach by which we were going to make

the connections between questions and techniques for the collection and analysis of data. However, after further consideration, we decided to analyze scientific articles on the causes, management and prevention of falls in elderly homes.

## **10 CONCLUSION**

According to the American Centre for Disease Control (2015), about 1,800 older adults living in nursing homes die each year from fall-related injuries and those who survive frequently sustain injuries that result in permanent disability and reduced quality of life. The situation is so serious that, it has been noted each year, a typical nursing home with 100 beds reports 100 to 200 falls. Many falls go unreported (Rubenstein et al. 1994). It is within this background that our interest in the prevention of falls in the elderly living in nursing homes was heightened. We were interested in having an in depth insight into this phenomenon. In order to achieve this, we decided to analyse fifteen scientific articles on falls among the elderly living in nursing homes.

The findings from these articles have been presented in chapter 8. However, there are some salient points worth discussing here. We found it interesting that researchers were not always unanimous about the causes and even preventive measures. Of particular interest are the conflicting results on the effect of bone density as a contributing factor on falls among the elderly. Järvinen et al (2008) conclude that, it was not evident that bone density/osteoporosis was a good determinant as over 80% of falls that resulted to low trauma fractures were in people who did not have osteoporosis. In fact, these individuals had bone densities in miscorrelation to osteoporosis. Meanwhile in another study, Wolf et al (2003) argue that, bone density constituted a major risk factor to falls in the elderly, especially when studied in combination with other risk factors that they termed environmental.

This conflicting finding by researchers was also evident with results relating to our main research question – prevention of falls in the elderly. Annweiler et al concluded that vitamin D had a positive effect on physical performance. Meanwhile Haug et al, arrived at a contrary conclusion from their research involving elderly subjects with age range between 70 to 91 years. They found that, the concentration of 25(OH)D rather correlated with strength decrease, sustained physical

activity and problems with climbing. These conflicting findings reveal that, there is much to be learnt in the causes, management and prevention of falls among the elderly.

Despite these differences in the findings from the data, we also gathered results that were quite informative in addressing our main research question. For instance, the use of pad hips in Sweden were quite effective in minimizing the impact of falls in the elderly. This is due to the fact that, the pad provided a cushion for the hip, thereby preventing severe injury when a fall occurred. We will recommend the adoption of these hip pads in other elderly homes if this is not yet in use.

The results from the individually designed exercises were impressive. It revealed a significant reduction of 15 - 50 percent of injuries resulting from falls. Staffs training on falls prevention measures were equally strategic in preventing falls among the elderly. These are some of the measures we found to be quite effective in the prevention of falls among the elderly in nursing homes. Consequently, we recommend that, in nursing homes where some of these measures exist, they should be strengthened. Where they are non-existent, they should be introduced. This is as a result of the fact that, from the data, their effectiveness in the prevention of falls has been proven and worth replicating. Finally, due to the cyclical consequences of falls and the fear of falling again as shown in Figure 8.1, all fall prevention measures must be holistic. This implies that, such measures may be targeted or institutional. However, they should include both physical and psychological measures, without leaving the environment (nursing homes) in which these elderly reside.

Nevertheless, there are some limitations that could be improved upon. For instance, the thesis could have benefitted from more articles than the fifteen articles analyzed. Secondly, a mixed method content analysis comprising inductive and deductive strategies would have brought out other perspectives than relying on the inductive approach alone. These limitations notwithstanding, the study sheds some light on fall prevention measures in the elderly and how these can be improved.

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