

**RISK FACTORS FOR FALLS IN ELDERLY LIVING IN OLD
AGE HOME OF NEPAL**

By

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As the supervisor of Ms Niru Lama's Thesis work, I certify that I consider her thesis
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- This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADL	Activities of Daily Living
BMJ	British Medical Journal
CAD	Coronary Artery Disease
CDC	Centre for Disease control and Prevention
CGA	Comprehensive Geriatrics assessment
COPD	Chronic Obstructive Pulmonary Disease
FICSIT	Frailty and Injuries: Co-operative Studies of Intervention Techniques
HHL	Harvard Health Letter
MWCSW	Ministry of Women, Children and Social Welfare of Nepal
NGO	Non-Government Organization
NHRC	National Health Research Council
ODPHP	Office of Disease Prevention and Health Promotion
QOL	Quality of Life
UN	United Nation
WHO	World Health Organization

ABSTRACT

Background: Falls are the leading cause of morbidity and mortality for persons aged 60 and older. When elders fall, they sustain such injuries as hip, spine, hand, and/or pelvic fractures. Even without injury, falls cause a loss of confidence that results in reduced physical activity, increased dependency, and social withdrawal. **Objectives:** The objective of this study was to study different risk factors related to falls in elderly living in old age homes of Nepal and also to determine demographic information of participants along with their association with fall injury or fall accidents.

Methodology: 1:1 case control study was carried out to accomplish the objectives of this study. A total of 90 participants, 45 cases with fall injury and 45 controls with no fall injury were taken as sample. The well-structured questionnaire was used to identify the possible risk factors. Odd ratio was calculated as a mode of association between exposure and outcome. **Results:** Most of the elderly living in old age homes was of the age between 70 to 80 years, 64% were female, 36% were male and majority of participants 70% were illiterate. The risk factors for fall among elderly include need of minimal assistance for moving around old age homes (OR=3.6; 95% CI 1.13-11.2), elderly with mild frail for physical performance (OR=9.06; 95%CI 2.40-34.11), no positive Romberg's test (OR=2.7; 95% CI 1.03-6.85), gait (OR=.85; 95% CI .69-.99). **Conclusion:** The necessary preventive measures for those highly significant risk factors i.e. environmental hazards, physical performance, gait and co-ordination may help to prevent fall injury among elderly people living in old age homes of Nepal.

Keywords: Elderly, fall injury, physical performance

CHAPTER I: INTRODUCTION

1.1 Introduction

Fall is an unexpected event where person falls from an upper level or same level to the ground. It is defined as 'unintentionally coming to rest on the ground, floor or other lower level' by FICSIT (Frailty and Injuries: Co-operative Studies of Intervention Techniques) (Masud & Morris, 2001). In world, more than 80% of fall injury has incidence of fatalities which is found more mostly in low and middle income countries. The data from low income South Asian countries like Nepal reveals a non-fatal fall-injury prevalence of 5.23% and a fatal fall-injury prevalence of 8.8% (Gupta et al., 2015). Presently, falls in older or ageing people are major public health concern causing impact on morbidity, mortality and financial burden for treatment and services (Masud & Morris, 2001).

Ageing is a natural phenomenon of gradual change in physical appearance and mental situations that cause a person to grow old (Yadav, 2013). It is characterized by physical disabilities, mental disorder, characterized by loss of memory and less socialization (Poudel, 2005). There is rapid increase in world ageing, especially in developing countries and has arisen several questions to planner and government (Hodgson, 1983). However, 5 percent of the old age people are inhabitants in many developing countries and by 2050 are expected to be 19 percent of Latin America's population and 18 percent of Asia's (PRB, 2007).

A fall in elderly population can be intrinsic affecting postural control or extrinsic factors where environment can become main reason of falling. Besides these, there are so many potential causes which have been classified into five categories i.e. environmental (e.g. poor lighting, unsafe stairs, ill-fitting shoes etc.), medication (e.g. antidepressants, sedatives etc.), medical conditions and changes associated with ageing (e.g. poor vision, cognitive impairment), nutritional (e.g. calcium and vitamin D deficiency) and lack of exercises by The Effective Health Care Bulletin (Masud & Morris, 2001). Some risk factors for fall in old people are weakness, balance, mobility limitations, gait deficit, cognitive impairment, and postural hypotension and impaired ADL (Rubenstein, 2006). Also, the high incidence of foot problems in about 71% to 87% of elderly populations are associated with poor quality of life, balance

impairment and increase the risk of falls with limitations on mobility and activities of daily living resulting serious physical, mental and social consequences in the elderly people (Rodriguez-Sanz et al., 2017).

Ageing population evinces an increase in the share of the elderly in the total population. In our country, elderly populations are demarcated as age 60 and above (Yadav, 2013). According to World population data sheet of 2011, Nepal's ageing population is 1.22 million. The Government and some public enterprises provide scheme of pension and an old-age allowance of US dollar two per month in Nepal which is enjoyed by less than two percent of populations of government services and, therefore, that does not ensure secured future of those ageing population. The old age people who can't hear have more miserable life (Poudel, 2005).

Nepal wasn't influenced by the first conference on elderly people in Vienna but once the UN declared 1999A.D. as the international year of elders, it started to show its piquancy. Presently, 72 organizations are registered under the government as governmental, private, NGO, personal charity, extending all over Nepal. About 1,500 elders are living in these old-age homes at present enjoying the provided services. The services and care, virtually, do not include aspects that are essential to cater elderly in old age home. The survey done by Geront World Nepal in 2007 indicated that elderly homes are favorable for the residents and the society as a whole despite of some problems, particularly for those who are uncomfortable in their family (Shrestha, 2013). There is need of building a model old age homes which has to be set up and strictly followed by keeping all the criteria such as infrastructure, space health care etc. The generation gap between parents and children is putting pressure on family cohesion which is intensifying issues and need to be looked either by any institutions or any organizations like old age homes (Acharya, 2008).

The conditions such as impairments in balance, gait, cognition, vision, muscle strength and psychoactive medications and arthritis are known to increase the risk of falling among community-living older adults (Bergland & Wyller, 2004; Tinetti et al., 1995) and simultaneous increase in these factors increase the risk of fall too (Nevitt et al., 1991). It is also aggravated by environmental hazards such as stairs and obstacles in the walking path and unsafe behaviors which lands on experience of serious injury or risk of falling (Studenski et al., 1994). The high prevalence of FOF i.e. evinces a high need to be addressed it as it is associated with distress, increased use of

medications, decreased physical functions, increased risk fall, decreased QOL, fractures, admission to institutional (Dewan & MacDermid, 2014). Similarly, fall without serious injuries develop fear and poor self-confidence in a person which leads to loss of functions (Tinetti & Williams, 1998; Yardley & Smith, 2002).

Despite of high prevalence of fall and FOF, the studies on management strategies have been studied but little attention has been given to fall-preventions services, risk-fall evaluation and management in clinical practices (Miller & Levy, 2000). This fall-prevention service is sensitive to multiple assumptions about the prevalence of risks, effect sizes, and service-related for older adults at high risk of falls (Tinetti, Gordon, Sogolow, Lapin, & Bradley, 2006).

1.2 JUSTIFICATIONS

The areas of geriatric population are mostly neglected and have low study in south Asian countries (WHO, 2004). The prevalence of fall in geriatric population is very high which is estimated that one in every 3 elderlies has fall (ODPHP, 2016). Approximately 10% of these falls result in a serious fall injury such as a fracture, serious soft-tissue injury, or head injury (Finkelstein, Fiebelkorn, & Binder, 2004). Nepal reveals a non-fatal fall-injury prevalence of 5.23% and a fatal fall-injury prevalence of 8.8% (Gupta et al., 2015). Such falls may reinforce inactivity, fear of falls and lower QOL and lead disability in later stages (Adamska, et al., 2012). This results on expenditure of high health costs for treatment which do not include caregiver time, nonmedical expenditures, decreased quality of life, or loss of functional capacity, all of which are potentially avoidable fall related costs (Tinetti et al., 2006). In Nepal, the study shows that though there is huge number of elderly people suffering from different problems but only the limited number of studies are done in relation to their general morbidities (Shrestha, 2013). Another study done in 2008, suggested a need of model old age home with the criterion structure, infrastructure etc. (Acharya, 2008). Similarly, in 2010, another study was performed in 3 old age homes of Kathmandu valley under Geriatric Centre Nepal, revealed an urgent need of developing fundamental guidelines to improve care services (Shrestha, 2013). It is said that a proper geriatric care management helps to promote quality of life (Counsell et al., 2007).

1.3 Research Question

What are the risk factors for fall among old age people staying in old age homes of Nepal?

1.4 Operational Definitions

Risk factors: Risk factors are those factors or something that increase a person's chance of developing fall injury.

Ageing: It is a natural phenomenon that promotes increment in incidence, risk of disease and disabilities.

Elderly population: They are demarcated as the person with age 60 and above. They are considered as senior citizens in Nepal.

Old age homes: It is second home for elderly people who are unable to continue living independently or isolated at home and generally established with the purpose of social services to elderly who are vulnerable and frail without any support system.

Medical Factors: Medical factors in this study are the common conditions of elderly which either contributes to fall injury or developed after fall injury such as medications, musculoskeletal problems, foot problems, vision problems and nutritional status which is described on the basis of Body Mass Index.

Environmental hazards: This study describes environmental hazards as the physical factors/hazards present in biophysical environment or surroundings which can occur in natural or built environment whether in urban or rural area but resisting elderly from performing his/her activities of daily living independently or freely.

Activities of daily living: These are activities that elderly are usually involved in their daily life for example bathing, toileting, moving around, going to market etc.

Physical assistance: Physical assistance refers to the extra support which can be either from another person or by the use of assistive devices like canes and sticks to perform individual's daily activities.

Fear of falling (FOF): It can be defined as an ongoing concern about falling which ultimately results into the declination of activities of daily livings.

Physical function: Physical function in this study refers to the performance of tasks that stimulate activities of daily living of various degrees of difficulty.

CHAPTER II: LITERATURE REVIEW

2.1. Ageing:

Ageing is natural phenomenon and an inevitable truth which is pervasive as it is causing various problems all over the world (Shrestha, 2013). It is faced by all living beings associating with changes to the aspect, biomechanics, structure and function of the body (Rodriguez-Sanz et al., 2017). It comes with different changes in physical, mental, social and along with there is decrease in body's ability to protect itself from different diseases that surrounds it. Aging usually companies decrease in mobility, chronic pain, frailty, physical (strength and endurance) and mental problems. This all lead to elderly losing their ability to live independently and may even require a long-term care (WHO, 2016). Elderly are likely to feel their status has been lower than it used to be as they are no longer earning member of family and community. They may be even reluctant to take help from others. Elder may feel sense of bereavement, isolation and loneliness.

Nowadays there is advanced development in modern technology which has led in increment of life expectancy. This has caused increased in number of elderly population and become the topic to be thought for whole world (Acharya, 2012). This problem hasn't left Nepal too. In Nepal, there were 2.1 million elderly inhabitants in 2011 which covers 8.1% of total population of country. According to census 1991 – 2001, the annual population growth rate of elderly population was 3.39% which was more than the annual growth rate (Shrestha, 2013). The increased number of elderly population and modernization phase of Nepalese family i.e. modification in traditional norms towards elderly family members and concept of nuclear family has added extra pressure in care of elderly people (Acharya, 2012). The government of Nepal has formulated National policy, acts and regulations on ageing and the problems of elderly. However, there is delay in proper implementation which could be because of limited resources and government's slow initiatives (Shrestha, 2013).

Active ageing (Rowe and Kahn, 1997) is what the government nowadays are mainly focused on achieving. It is process based on ICF model of health by using the available facilities, participating and health to improve the quality of life of elderly (WHO, 2002; 12). Rather than increasing the length of life people are more focused on how to live independently.

2.2. Old age homes:

Old age homes are second homes for the elderly people who are unable to continue living independently or isolated at home and generally established with the purpose of social services to elderly who are vulnerable and frail without any support system. It is relatively new concept in Nepal as it is a family oriented country where there is a social pressure for children to take care of their elders in the family (Acharya, 2011). The study shows that old age home was started since 1938 B.S but the first old aged home in Nepal was established in the year 1976 by His majesty government in order to take care of elderly who do not have any support. There are 72 registered old age homes among which 11 old age homes receive annual governmental grants whereas remaining are supported from the part of NGO and civil society (MWCSW, 2002).

Nowadays due to migration of younger generation abroad in search of better opportunities had led to household full of elderly without support of younger generation. Due to this reason old aged homes and residential care of elderly is a new scope in geriatric care (Acharya, 2011). The prevalence of diseases in elderly living in old aged home in Nepal found that more than half of the elderly were suffering from at one chronic diseases among which hypertension, gastritis and arthritis were most common. It also states that lack of health professionals and limited funding resources were the major concerns of these old aged home (Khanal and Gautam, 2011).

The state of elderly homes in Nepal was found to be poor and has been linked to different problems but are favourable for the residents and society particularly who are not comfortable at homes (Acharya, 2008). Elderly living in old aged homes was found most susceptible to at least one chronic disease among which hypertension, gastritis and arthritis were most common (Khanal and Gautam, 2011). The studies have shown that frail older people living in residential aged care facilities (RACFs) have impaired physical function on contrary to those living in communities (Wilson et al., 2011). Similarly, the physically active residents have good balance and good in dual task ability which shows that falls in aged care residents can be prevented by programs focused on balance and dual task ability (Bootsman, Skinner, Lal, Glindermann, Lagasca & Peeters, 2017).

2.3. Factors affecting Elderly health:

WHO (2004) consider economic factors, education, social factors, gender, community participations, behavioral risks to health as the major factor influencing the health of elderly in community in South Asian context. Individual behavior on how he treats his/her health, diseases he is suffering or self-care plays an important role in health outcome of elderly. For those who cannot take care of their health the social factors such as accessibility, social support plays role for elderly health outcome. Availability of health services like medicines, urinary catheter etc. determines quality of life of adults whether elderly will be bed bound or an active member of a group (ODPHP, 2016).

Research (Han, et al., 2014) has found that how elderly feels about themselves; their health, self-esteem, achievements and recreational activities has positive impacts on healthy aging. Same research found that depression and loneliness plays a pivotal role in influencing negative health outcomes in an elderly. As age increases person preferences for food also changes which may be the reason of increase weight which leads to the decrease in bone mass and increase incidence of metabolic disorders (Adamska, et al., 2012). This may be the major cause of obesity in old age. Cardiac disorders such as coronary artery disease, hypertension is common in elderly. It reveals CAD is cause of cardiac deaths in 50% females and 70-80% males in case of elderly (Williams et al., 2002).

2.4. Fall in elderly people:

A fall has recently been defined as 'to be an unexpected descent from an upright, sitting or horizontal positions, the descent height being 1 meter'. It includes the impacts on morbidity, mortality, functional deterioration, hospitalization, institutionalization and expenses to health care (Masud & Morris, 2001). Prevalence of falls in elderly are high, one in every three elderlies have fall (ODPHP, 2016). It can become a precursor for health-related disease in later stages of life (Patel, et al., 2014). Prevalence of falls among older adults was found to be 35.9% in Italy (Cesari, et al., 2002) and 27.5% in Brazil (Siqueira, et al., 2011). Similarly, the data from low income South Asian countries like Nepal reveals a non-fatal fall-injury prevalence of 5.23% and a fatal fall-injury prevalence of 8.8% (Gupta et al., 2015). Falls may lead to

disability in later stages, reinforce inactivity, fear of falls and lower QOL (Adamska, et al., 2012).

2.5. Causes of fall in elderly:

Falls are a common and most often devastating problem in older people with different distinct causes such as accident, gait/balance disorder/weakness, dizziness, drop attack, postural hypotension, visual disorders, syncope, other specified causes and unknown. These are mostly associated with one or more than one identifiable risk factors for e.g. weakness, impaired gait, medications etc. (Rubenstein, 2006). Several studies have shown that the risk of falling increases dramatically with the increased presence of risk factors (Faulkner et al., 2009; Shumway-Cook et al., 2009; Sibley et al., 2014). Some risk factors for fall in old people are weakness, balance, mobility limitations, gait deficit, cognitive impairment, and postural hypotension and impaired ADL (Rubenstein, 2006).

2.5.1. Environmental hazards:

There are different types of environmental hazards such as biological, physical, chemical etc. which directly or indirectly affect the health of elderly. The physical factors/hazards present in biophysical environment or surroundings which can occur in natural or built environment are risk factors of falls in elderly population, resisting elderly from performing his/her activities of daily living independently or freely such as stairs and obstacles in the walking path and unsafe behaviors which lands on experience of serious injury or risk of falling (Studenski et al., 1994). Many older people live in potentially hazardous environment. However, some study suggests that there isn't any establishment of connection for fall due to environmental hazards and more works are yet to be done more (Carter,1997)

2.5.2. Medical Problems:

Disability of lower extremities, palmomental reflex are also considered as risk factors for falls in elderly population (Tinetti, Speechley, & Ginter, 1988). The study also showed that though gender had no significant mark in fall rate but the incidence was found more likely in male at outsides during activities (Campbell et al., 1990).

Vision:

Poor vision increases the risk of falls and fractures in older people by reducing postural stability. The vision problems such as difficult in near/far vision, below vision including different eyes problems and complication of eye surgeries have increased the risk of falls. However, the study suggests that the reduced contrast sensitivity and depth perception are the most important visual risk factors for falls in comparison to other visual problems (Iord, 2006).

Medications:

Numerous medications are mostly recommended for any diseases for elderly people besides knowing its adverse effect for falls. Drugs are the most common reason for falls. The study suggests more use of medications such as serotonin-reuptake inhibitors, antidepressant drugs, anticonvulsants drugs etc. increase associated risks of falling. Episodes of acute illness or exacerbation of chronic illness are other factors of risk of fall in elderly population (Tinetti, 2003).

Ageing feet:

The feet also feel an effect of age with the thinning fat pads under heel and tissue change with age provide less cushion developing foot pain which increases more with tendency of falter arches. Older toes have tendency to develop claw toes and bunions etc. among old women respectively with muscle imbalance which leads to hot spots. The study suggests that 30% older people experience foot pain form these problems (HHL, 2011).

2.5.3. Fear of fall:

Falls can result in serious consequences, such as fear of falling, injury and death (Bootsman et al., 2017). Fear of falling can be defined as psychological consequences of a fall which could lead to severe restriction in the activities of daily living, leading to social isolations, depression, loss of muscle tone which forms a cycle leading to additional risk of falling (Murphy and Isaacs, 1982; Zijlstra et al., 2007). It's an ongoing concern of falling during social and physical activities inside and outside the home whether or not the person actually does the activity (Yardley et al., 2005).

2.5.4 Physical activity:

Low levels of physical function are very common in frail older people (Cesari et al., 2002). Falls can have serious consequences for physical performances and quality of life (Wilson et al., 2011). The decreased level of physical activity, muscle weakness, arthritis of knees and stroke in elderly groups also lead to fall (Campbell, Borrie & Spears, 1989). An approach of physical activities, simple physical exercises aimed at preventing falling in the elderly population plays an important role in the improvement of the health status, affective status and ambulation (Cesari et al., 2002). The physical activity programs targeting balance and dual-task ability are also suggested to prevent falls in aged care residents (Bootsman et al., 2017). The study also indicates the benefits on functional capabilities through a direct observation on their physical function (Reuben & Siu, 1990).

2.5.5. Gait:

Gait disorders are very common in elderly which contribute to the risk of falling (Sudarsky, 1990). The study suggests the walking speed in men was related positively to calf strength, step-score, hours spent in active leisure, height and weight, and negatively to age and the presence of health problems but in women, the relations weren't same with weight (Bendall, Bassey & Pearson, 1989). Physical changes in lower limbs and spine due to ageing have direct effect on gait. Normally, prescription of physical therapy along with gait training, assistive devices for lateral stability along with careful diagnostic evaluation of gait will serve well in gait disorders of elderly people (Sudarsky, 1990).

2.5.6. Cognitive function:

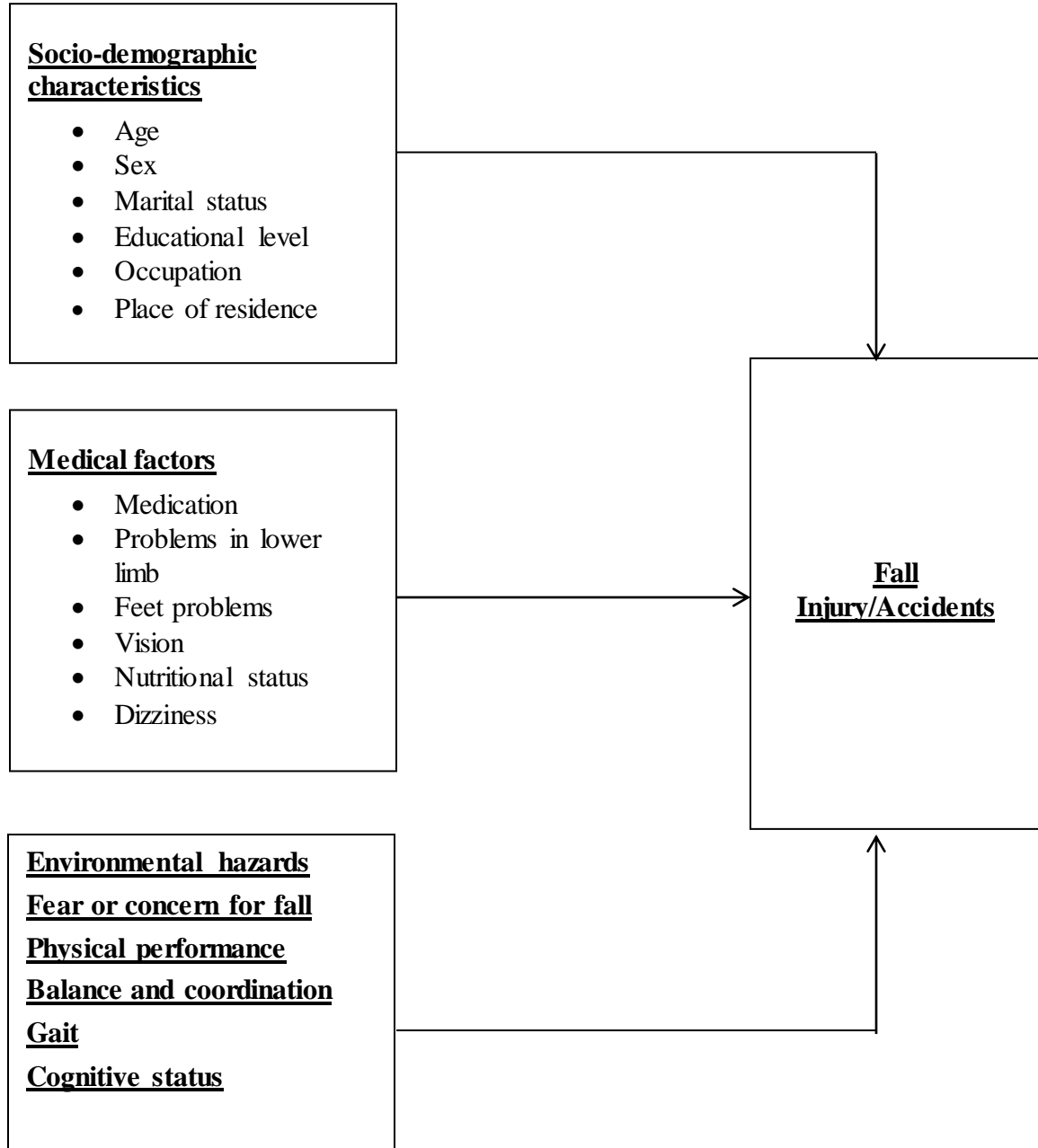
Cognitive impairment and poor vision (i.e. inadequate depth perception) increases with ageing are independently associated with falls (Lord & Dayhew, 2001).

CHAPTER III: RESEARCH METHODOLOGY

3.1 Conceptual Framework:

Independent variable

Dependent variable



3.2 Study Objectives

3.2.1 General Objectives

To study the risk factors related to falls in elderly living in old age homes of Nepal.

3.2.2 Specific Objectives

- To know and compare the causes for risk of fall.
- To study risk of high age, gender, of environmental factors, foot problems, balance, gait and cognition, on falls.
- To study level of fear of falling on real fall accidents.
- To know the activities those are highly concerned by geriatric population and know the relationship between fall and physical performance in elderly people.

3.3 Study design:

Study is a case control study because it is effective design to find risk factors where the cases are elderly who had falls in past years and controls are elderly who had no falls. The control group was included without matching with the group of case, so it is unmatched 1:1 case control study. The elderly who became fitted with inclusion criteria and were willing to participate in this study were included till the total number of 45 subjects within each groups were reached. The odd ratios are used to measure association between risk (exposure) and outcomes. The odd ratios are measured by relative magnitude of odds of exposure among individuals those who had falls (case) in past years and odds of exposure who had no fall (control) from 2 x 2 table as below.

Exposure	a	b
	c	d

Odd of exposure among case = a/c

Odd of exposure among control = b/d

Odd ratio = $\frac{a/c}{b/d}$

3.4 Study population

The study population consists of elderly people living in selected five old age homes of Nepal.

3.5 Study Area/site

The selected old age homes of Nepal namely Social Welfare Centre Elderly's Home, Nishaya sewa sadan, Matatirtha old aged home, Pokhara Aged Shelter and Sahara Care Centre.

3.5.1. Social Welfare Centre Elderly's Home

Social Welfare Centre Elderly's Home was established in the year 1976 for the elderly without any support system at Pashupati, Panchadeval, Kathmandu. It is the first old age home of Nepal which is run by government of Nepal under the Ministry of women, children and social welfare. Presently, it is providing services for the population of 186.

3.5.2 Nishaya sewa sadan

Nishaya sewa sadan is non-governmental elderly home registered in 1991 but was started from 1995 B.S situating at shantinagar, Kathmandu on the bank of holy river, named Bagmati with the aim to give shelter to those who are helpless and without any support.

3.5.3 Matatirtha old aged home

It is a non-profit organization run by individual solely for purpose of social services to elderly who are vulnerable and frail without any support system. It is located at Matatirtha near a religious place at Thankot. This organization is opened for women only and presently they are serving for the population of 26.

3.5.4 Pokhara Aged Shelter:

This organization is currently providing shelter for 58 elderly people at Pokhara – Lekhnath Metropolitan city.

3.5.5 Sahara Care Centre:

Sahara Care Center is a registered non- profit, non-government social organization that run under charity and donations in cash and kinds, started from 11th September 2011. it is situated at Srijananagar, Bhaltapur. It is operated for people who are unable to continue living independently and isolated at home. It is a home that was created to address the growing problem of elders and disabled that have been face with separation, isolation and loss of career. It was set up to provide services

including care medical, emotional and spiritual needs. It appreciates the support, assistance, advice and suggestion from national and international.

3.6 Study period

This study extended from November 2017 to May 2018.

3.7 Sample size

The prevalence of fall of elderly is 8.88% in Nepal. The use of this prevalence (lesser than 10%) with the precision of half of prevalence i.e. 0.044, gives the sample size of 640 (case = 160 and control = 480) which may not be possible to collect from selected old age homes. On researcher's convenience, precision is increased to 10% with the available prevalence of 8.88% which resulted sample size of 120 (case = 30 and control = 90) using the given formula.

$$n = \frac{(r+1) (P_1) (1-P_1) (Z_{\beta} + Z_{\alpha/2})^2}{r (P_1 - P_2)}$$

This study is old-age home based case control study and the samples of case were very higher than control in old age homes. Therefore, the achievable sample size for control group is 45 and for the case group is also 45 with total sample size of 90 elderly people living in old age homes of Nepal.

3.8 Inclusion and Exclusion Criteria

3.8.1 Inclusion criteria

This research includes;

- Elderly living in selected old age homes since 1 year.
- Elderly who are above 60 years.
- Elderly who are willing and available during data collections.
- Elderly who can understand Nepali or English language.
- Elderly who are independent or using assistive devices like sticks or canes.

3.8.2 Exclusion criteria

This research excludes;

- Elderly living with their families.
- Elderly who do not want to participate in the research.
- Elderly who are with former diagnosis of cognitive impairment.
- Elderly who are using wheel-chairs.

3.9 Sampling techniques

Sampling techniques is the first step in defining the validity and authenticity of the study. It is chosen to collect required data. Purposive sampling technique was used for my study. The reason of choosing purposive sampling was to include number of subject based on developed inclusion and exclusion criteria. Purposive sampling is also known as judgmental, selective or subjective sampling and also a type of non-probability sampling technique. A non-probability sampling technique focuses on sampling techniques where units that will be investigated are based on the judgment of the researcher.

3.10 Data collection tools/materials

The questionnaires were made on the light of objectives of the study. It consists of two sections i.e. first section includes subjective information whereas examinations of physical performance, balance, gait, co-ordination and cognition are included in second section of questionnaire. The parts of questionnaire were self-developed and adopted from standard instruments too. The screening of gait and balance in elderly population were noted through Tinetti gait and balance test while cognition was noted through Mini-CogTM. The instruments were used here only after the approval of use and copy right language from the respective authors. Here, the questionnaires were translated into Nepali language, following the rules of language validations. Pilot study was conducted to ensure that questionnaire did not have any doubled meaning questions, ambiguous questions that could potentially confuse respondent and hamper the validity of the study.

3.11 Data collection Procedures:

First of all, the thesis proposal was approved by the university. Approval was taken from Institutional review board (IRB) of Bangladesh Health Professions Institute

(BHPI). As study country was Nepal, approval was taken from ethical review board (ERB) to conduct research in the country followed by permission to collect data from all selected old aged homes. Permission was taken from concerned authority of old aged homes. Then individual informed consent was taken from selected participants. Questions were asked to participants that were prepared. The data collected were recorded and entered in SPSS program for analysis.

3.12 Data management and analysis:

The quantitative data were analyzed using Computer statistical analysis such as Statistical Package for social science (SPSS) version 16. The categorical variables as percentage were presented on tables. Descriptive statistics was used to find out the prevalence of different condition found in elderly among different groups (case and control; male and female etc.) and represented through tables, histogram, bar graphs and pie chart and required tests were performed accordingly.

The comparison between fall injury group and no fall injury group were tested through independent sample t test for equality of means for continuous variables and χ^2 test for categorical variables. The odd ratios and 95% confidence interval were calculated for all categorical variables to represent the odds of falling. The odd ratios (OR) indicates how often an event (fall) injury will be more likely if examined factors is present in comparison with absence of the factor.

All statistical tests were two-tailed because multiple tests were performed, a value of .05 was assumed to indicate a possible relationship, while a value of .01 was accepted as strong support of a true relationship between variables. The binary logistic regression analysis was performed to determine participant's variables strongly associated with falling and to derive a predictive equation. Fall injury and no fall injury were pooled; status of fall injury was considered as the dependent variables and selected participant's factors were independent variables.

3.13 Quality control and assurance:

To ensure and improve the quality of the study, first of all questionnaire was translated according to WHO guidelines i.e. first in the national language that is Nepalese language following the standard procedure of linguistic validation.

For translation, two individuals who were fluent in both languages were assigned for forward translation. They prepared two versions of questionnaires then sat together and discussed to come up with one first version of translated questionnaire. Then this translated version was provided to another person who is fluent in both languages and who have not seen the original copy of questionnaire for backward translation. Then all three translators sat together and consensus was drawn with final version of translated questionnaires in Nepali language.

Before starting data collection procedures, pilot study was conducted for the questionnaire to ensure the face validity of the questionnaire with 5 elderlies in general community and inter consistency reliability was analyzed which indicated a good internal consistency in environmental hazards and level of fear of fall with Cronbach's Alpha as .72 and .95 respectively. After reviewing the results of pilot study, changes were made in prepared questionnaires. For example, in education of respondent there was no option for non-formal education. After pilot study it was found that most elderly were neither educated nor illiterate. They could write and read their names and recognizes letters but they did not have formal educational background.

Filled questionnaire was safely kept. The data collected will be reviewed, recorded and enter into the SPSS program to reduce the human errors that are likely to occur while entering and analysis of the data collected.

3.14 Ethical consideration

Study was conducted following the standard guidelines of ethical consideration. The study followed the WHO guidelines. Firstly, prepared research proposal were submitted to the concerning authority after getting approval from course coordinator of Department of Masters in Rehabilitation Science and supervisor. Ethical approval was taken from Institutional Review Board review (IRB) of Bangladesh Health Professions Institute (BHPI) for conduction of research.

Informed consent as well as questionnaires in both Nepalese and English language was submitted along with proposal to selected old age homes of Nepal. Then, a written permission from the concerned Authority / managing authority of the old age homes were obtained. After this, research proposal was submitted to Ethical Review Board (ERB) of Nepal Health Research Council (NHRC) to conduct the research in Nepal. Ethical approval was given from NHRC after detail examination of our study's purpose.

Individual informed consents were taken from respondent before starting data collection. The respondents were informed of his right to leave or not give answer if he is not willing to answer any question within the questionnaire. Participants were not being forced or coerce to answer the questions if they were not willing to. Appropriate informed consents were taken from the inmates of old aged homes before conducting the study. The obtained information regarding the incidence of fall injury and medical problems were cross examined from the close caretaker of elderly people. Confidentiality and anonymity of the information provided by elderly will be maintained. It is protected by the law "right to privacy" which prevents the researcher from disclosing any direct information about the participants of the research.

CHAPTER IV: RESULTS

Table 4.1: Frequency distribution of Socio demographic data

Variables	Total N = 90	Case N = 45	Control N = 45
Age of the participant:			
(61 – 70) years	31 (34%)	16 (18%)	15 (17%)
(71 – 80) years	33 (37%)	15 (17%)	18 (20%)
80+ years	26 (29%)	14 (15%)	12 (13%)
Sex of the participant			
Female	58 (64%)	30 (33%)	28 (31.1%)
Male	32 (36%)	15 (17%)	17 (18.9%)
Marital status:			
Unmarried	15 (17%)	8 (9%)	7 (8%)
Married	32 (36%)	20 (22%)	12 (13%)
Widow/Widower	41 (46%)	16 (18%)	25 (28%)
Divorcee	2 (2%)	1 (1%)	1 (1%)
Educational level of participant:			
Illiterate	63 (70%)	29 (32%)	34 (38%)
Literate	27 (30%)	16 (18%)	11 (12%)
Occupation of participant:			
Farmer	65 (72%)	30 (33%)	35 (39%)
Services	5 (6%)	2 (2%)	3 (3%)
Business	6 (7%)	3 (3%)	3 (3%)
Other	14 (16%)	10 (12%)	4 (5%)
Place of residence of participant:			
Rural	58 (64%)	26 (29%)	32 (36%)
Urban	32 (36%)	19 (21%)	13 (14%)

The study classified the age of participants into three categories: 61 year to 70 years (n=31; 34%), 71 year to 80 years (n=33; 37%) and 80+ years (n=26; 29%). The female participants (n=58; 64%) were more than male (n=32; 36%). Most of the participants were married (n=32; 36%) and illiterate (n=63; 70%), living in rural areas (n=58; 64%) with the occupation of farmer (n=65; 72%).

Case-control group and the association with socio-demographical status

Table 4.2: Association of socio-demographic data with sub-groups

Exposure	Case (%)	Control (%)	Chi square	P values
Gender				
Female	52%	19%	.19	.66
Male	47%	53%		
Educational status				
Illiterate			1.32	.25
Literate	54%	46%		
	41%	59%		
Place of residence				
Rural	45%	55%	1.75	.19
Urban	57%	43%		

Table 4.3: Association of different groups of socio-demographic data with sub-groups

Exposure	Case (%)	Control (%)	P values
Age group			
61-70	52%	48%	.79
71-80	45%	55%	.86
80+	54%	46%	.52
Marital Status			
Unmarried	53%	47%	.26
Married	62%	38%	.55
Widow/Widower	39%	61%	.34
Divorcee	50%	50%	.93
Occupation			
Farmer	46%	54%	.39
Services	40%	60%	.79
Business	50%	50%	.86
Others	71%	29%	.09

Table 4.4: Association of height and weight with sub groups

Exposure	N	t values	P values two-tailed
Height of participant (m)			
Case	45 (1.43 ± .14)	.33	.74
Control	45 (1.42 ± .14)		
Weight of participant (kg)			
Case	45 (48.13 ± 7.5)	-.66	.51
Control	45 (49.2 ± 8.15)		

4.1.1 Age of the participants:

The data showed 16 numbers of participants within case group were aged between 61 to 70 years. Similarly 15 and 14 numbers of participants were aged between 71 year to 80 year and above 80 respectively. However, the control group had 15, 18 and 12 numbers of participants in different three age groups respectively.

The odd ratio for 71 year to 80 year and above 80 year are .78 and 1.1 respectively by considering 61 year to 70 year as referral. Here, in 95% CI, they had lower CI as .292 and .385 and upper CI as 2.1 and 3.10 respectively. The *p* value of three groups were *p* = .79, *p* = .87, *p* = 1.09 which were more than 0.05. This means that the result is statistically insignificant. The null hypothesis (no difference between three sub groups) is accepted.

4.1.2 Sex of the participant:

Among 90 participants, 30 (52%) were male and 15 (47%) were female within case group. The control group had 28 (19%) female and 17 (53%) male. The odd ratio is .82 with 95% CI, ranging from .35 (LL) to 1.95 (UL). The percentage of fall injury didn't differ by gender of the participant, $\chi^2 (1, N = 90) = .194, p = .66$. The result is statistically insignificant and failed to reject null hypothesis. This indicates that there is no difference between two sub groups of research sample in female-male ratio.

4.1.3 Marital Status of Participant:

The data showed 8 numbers of participants within case group were unmarried and 20, 41 and 2 numbers of participants were married, widow/widower and divorcee respectively. However, the control group had 7, 12, 16 and 1 numbers of participants in different four sub-groups of marital status respectively.

The odd ratio for married, widow/widower and divorcee were 1.46, .56 and .875 respectively in reference of unmarried status. Here, in 95% CI, they had lower CI as .42, .17 and .05 and upper CI as 5.05, 1.85 and 16.74 respectively. Similarly, the p value of four groups were $p = .265$, $p = .551$, $p = .341$ and $p = .929$ which were more than 0.05. This means that the result is statistically insignificant. The null hypothesis (no difference between four sub groups) is accepted.

4.1.4 Education of the participant:

Among 90 participants, 29 (54%) were illiterate and 16 (41%) were literate within case group. The control group had 34 (56%) illiterate and 11 (59%) literate. The odd ratio is .59 with 95% CI, ranging from .24 (LL) to 1.95 (UL). The percentage of fall injury didn't differ by education status of the participant, $\chi^2 (1, N = 90) = 1.32$, $p = .25$. The result is statistically insignificant and failed to reject null hypothesis. This indicates that there is no difference between two sub groups of research sample in illiterate-literate ratio.

4.1.5 Occupation of the participant:

The data showed 30 numbers of participants within case group were farmer and 2, 3 and 10 numbers of participants were service holders, business and others respectively. However, the control group had 35, 3, 3 and 4 numbers of participants in different four sub-groups of occupation of the participants respectively.

The odd ratio for service holders, business and others were .78, 1.17 and 2.91 respectively in reference of farmer. Here, in 95% CI, they had lower CI as .122, .22 and .83 and upper CI as 4.97, 6.21 and 10.26 respectively. Similarly, the p value of four groups were $p = .39$, $p = .79$, $p = .86$ and $p = .09$ which were more than 0.05. This means that the result is statistically insignificant. The null hypothesis (no difference between four sub groups) is accepted.

4.1.6 Place of Residence:

Among 90 participants, 26 (45%) were of rural area and 19 (57%) were of urban within case group. The control group had participants i.e. 32 (55%) and 13 (43%) from rural and urban area respectively. The odd ratio is 1.8 with 95% CI, ranging from .75 (LL) to 4.32 (UL). The percentage of fall injury didn't differ by the residential area of the participant, $\chi^2 (1, N = 90) = 1.75, p = .19$. The result is statistically insignificant and failed to reject null hypothesis. This indicates that there is no difference between two sub groups of research sample in rural-urban residential ratio.

4.1.7 Height of the participant:

An independent sample t-test was conducted to compare the height of the participants for case and control groups. There was no significant difference in score for case group (M = 1.43, SD = .14) and control group (M = 1.42, SD = .14; $t (90) = .334, p = .74$, two-tailed). The magnitude of the difference in means (mean difference = .01, 95% CI: - .05 to .07) was very small (eta squared = .0001).

4.1.8 Weight of participant:

An independent sample t-test was conducted to compare the weight of the participants for case and control groups. There was no significant difference in score for case group (M = 48.13, SD = 7.5) and control group (M = 49.2, SD = 8.15; $t (90) = -.66, p = .51$, two-tailed). The magnitude of the difference in means (mean difference = - 1.01, 95% CI: - 4.17 to 2.18) was very small (eta squared = -.002).

4.2 Case-control group and the association with medical factors

Table 4.5: Association of Medical Factors and sub-groups

Exposure	Case (%)	Control (%)	Chi square	P values
Medications intake for any disease conditions				
NO	44.4	56%	.28	.59
YES	51.4	49%		
Problems in Lower Limbs.				
NO	35%	65%	2.31	.13
YES	54%	46%		
Foot Problems that hinder walking				
NO	54%	46%	7.14	.398

	YES	45%	55%		
Vision Problems	NO	47%	53%	.08	.78
	YES	51%	49%		
Dizziness	NO	47%	53%	.41	.52
	Yes	54%	46%		

Table 4. 6: Association of different levels of BMI with sub-groups

Exposure	Case (%)	Control (%)	P values
Body Mass Index			
Underweight	83.3	16.7	.25
Normal range	45.1	54.9	.10
Overweight	62.5	37.5	.78
Obese	41.2	58.8	.22

In table 5, among 90 participants, 8 (45%), 7 (35%), 26 (54%), 7 (47%), 25 and (47%) had neither taken medications for any disease conditions nor had problems in lower limbs, feet, vision and dizziness respectively within case group. However, in control group, 35 (49%), 32 (46%), 23 (55%), 37 (49%) and 17 (46%) had undergone medications with problems on lower limbs, feet, vision and dizziness respectively. The percentage of fall injury didn't differ by the above mentioned medical factors of the participant, $\chi^2 (1, N = 90) =$ lesser than 3.84, $p =$ above 0.05. The result is statistically insignificant and failed to reject null hypothesis. This indicates that there is no difference between two sub groups of research sample in medical factors of the participants.

4.2 Body Mass Index of participants:

The data showed the Body Mass index of 51 numbers of participants within case group, were underweight. Similarly 23, 10 and 7 numbers of participants were of normal range, overweight and obese respectively. However, the control group had 28 numbers of participants of normal body mass index with 10 obese participants. The odd ratio for the BMI of normal range, overweight and obese are 7.14, 1.17 and 2.4 respectively by considering underweight as referral. Here, in 95% CI, they had lower CI as .68, .39 and .59 and upper CI as 75.22, 3.57 and 9.65 respectively. The *p* value of four groups were *p* = .25, *p* = .10, *p* = .78, *p* = .22 respectively, which were more than 0.05. This means that the result is statistically insignificant. The null hypothesis (no difference between four sub groups) is accepted.

Table 4.7: Mean values of Height, Weight and BMI by Case-control

Age (Years)	Group	N	Height(m)	Weight(kg)	BMI(kg/m ²)
Case					
61-70		16	1.4 ± .15	49.3 ± 9.6	25.03 ± 4.63
71-80		15	1.45 ± .147	47.20 ± 7.58	23.23 ± 7.19
80+		14	1.43 ± .117	47.78 ± 4.33	23.45 ± 3.76
Total		45	1.43 ± .138	48.13 ± 7.482	23.94 ± 5.35
Control					
61-70		15	1.43 ± .117	53.07 ± 9.823	26.95 ± 4.79
71-80		18	1.41 ± .142	46.67 ± 6.325	23.44 ± 4.42
80+		12	1.44 ± .152	48.25 ± 7.02	23.89 ± 6.98
Total		45	1.42 ± .145	49.22 ± 8.15	24.73 ± 5.44

Table 4.8: Mean values of Height, Weight and BMI by Gender

Age (Years)	Group	N	Height(m)	Weight(kg)	BMI(kg/m ²)
Male					
61-70		13	1.45 ± .168	53.85 ± 7.67	26.23 ± 5.09
71-80		9	1.56 ± .119	50.44 ± 7.67	21.09 ± 3.91
80+		10	1.53 ± .115	50.10 ± 4.19	21.90 ± 3.91
Total		32	1.50 ± .144	51.72 ± 5.96	23.43 ± 4.94
Female					
61-70		18	1.388 ± .117	49.17 ± 10.755	25.76 ± 4.60
71-80		24	1.389 ± .123	45.58 ± 7.12	24.19 ± 6.15
80+		16	1.387 ± .114	46.69 ± 6.12	24.75 ± 5.90
Total		58	1.388 ± .122	47.00 ± 8.22	24.83 ± 5.58

4.2.1 Classification of mean values of height, weight and BMI by Case-control:

Classified by Case-Control, mean values of height, weight, and BMI are presented in Table 7. The mean height for the elderly in case and control groups are 1.43 m ($SD = .138$) and 1.42 m ($SD=.145$), respectively. Therefore, Case group were taller than Control on average. The mean weight for the elderly of case group was 48.13 kg ($SD = 7.48$), whereas it was 49.22 kg ($SD = 8.15$) for the control group. However, the control group had a higher mean value of BMI compared with the case, that is, 24.73 ($SD = 5.44$) for control group compared with 23.94 ($SD = 5.35$) for case group. The statistics presented in Table 8 also revealed mean values of height, weight, and BMI had no much difference with age for both groups.

4.2.2 Classification of mean values of height, weight and BMI by Gender:

Classified by Gender, mean values of height, weight, and BMI are presented in Table 8. The mean height for the elderly in male and female are 1.50 m ($SD = .144$) and 1.38 m ($SD=.122$), respectively. Therefore, males were taller than female on average. The mean weight for the elderly of male was 51.72 kg ($SD = 5.96$), whereas it was 47.00 kg ($SD = 8.22$) for the female. However, the male had lesser mean value of BMI compared with the female, that is, 23.43 ($SD = 4.94$) and 24.83 ($SD = 5.58$) for

female. The statistics presented in Table 4.1 also revealed mean values of height, weight, and BMI had slight difference with age for both groups.

4.2.3 Percentiles of the Mean BMI:

Specific attention was placed on BMI. The percentiles of the mean BMI are calculated by age and gender. Generally, the values between the 25th and the 75th percentiles of the sample have been considered a normal range. Accordingly, the normal range for the mean BMI of the men was 21.4 to 25.6, and the normal range for the mean BMI of the women was 22.2 to 26.5. For the 50th percentile of the men, the mean BMI was from 19.92 to 26.84 for three age groups. On the other hand, the mean BMI of the 50th percentile of the women was from 20.47 to 27.60.

4.3 Case-control group and the association with status of environmental hazards

Table 4.9: Association of status of environmental hazards with sub-groups

Exposure	Case (%)	Control (%)	Chi square	P values
Physical assistance for personal care activities				
NO	43.9	56.1	3.636	.057
YES	66.7	33.3		
Physical assistance for market, temple etc.				
NO	43.1	56.9	3.103	.078
YES	62.5	37.5		
Physical assistance for moving around old age home.				
NO	42.2	57.8	5.409	.020
YES	69.2	30.8		
Disturbance from surrounding problems.				
NO	41.8	58.2	3.787	.052
YES	62.9	37.1		

Table 4.10: Association of different levels of environmental hazards with sub-groups

Exposure	Case (%)	Control (%)	P values	Odds ratio	95% of CI		
					L/L	U/L	
Level of Physical assistance for moving around old age homes							
No support	42.2	57.8	.139	1			
Minimal support	72.2	27.8	.030	3.563	1.134		11.191
Moderate support	100.0	0	.999	2.21	.000		
Totally dependent	25.0	75.0	.507	.457	.045		4.634

In Table 4.9, the data reveals that among 90 participants, the participants who didn't need physical assistance were more in both groups. In case group, 29 (44%), 25 (43%), 27 (42%) and 23 (42%), didn't need physical assistance neither for any personal care activities nor for going out, moving around old age homes and had no disturbance from surroundings respectively in case group whereas 8 (33%), 12 (37%), 23 (55%), 8 (31%) and 13 (37%) numbers of participants of control groups need physical assistance for above mentioned sub-groups.

The Table 4.9 also shows the percentage of fall injury is differ by the need of physical assistance for moving around old age homes, $\chi^2 (1, N = 90) = 5.41, p = .02$. The result is statistically significant and failed to accept null hypothesis. This indicates that there is difference between two sub groups of research sample in need of physical assistance for moving around old age homes of the participants.

Here in 95% CI ranging from .123 to .855, odd ratio for need of physical assistance for moving around old age homes is .32, $p = .02$ which is less than 1. This indicates that the participants who need physical assistance for moving around old age homes had .32 times less likely to have chance of fall injury with significant.

In Table 4.10, the numbers of participants who need either a minimal support or no any support for moving around old age homes are comparatively more in both groups. The odd ratio of the participants who need minimal support for moving around old age homes in comparison with the participants who didn't need any support is 3.6, $p = .03$. This indicates that the result is statistically significant noting that fall injury is 3.6 times higher for someone who reports having minimal support than participants who doesn't need physical assistance for moving around old age homes.

4.4 Case-control group and the association with level of concern for fall

Table 4.11: Association of level of concern for fall with sub-groups

Exposure	Case (%)	Control (%)	Chi square	P values
Fear of fall while and when changing clothes				
NO	47%	53%	.41	.52
YES	54%	46%		
Fear of fall while taking bath				
NO	44%	56%	1.11	.29
YES	55%	45%		
Fear of fall during while sitting and getting up from chair				
NO	49%	51%	.046	.83
YES	51%	49%		
Fear of fall during going up or down stairs				
NO	41%	59%	1.70	.19
YES	55%	45%		
Fear of fall during walking up or down slope				
NO	45%	55%	.44	.51
Yes	52%	48%		
Fear of fall during walking on wet/slippery surface				
NO	40%	60%	1.03	.31
YES	53%	47%		
Fear of fall during walking on uneven surfaces				
NO	47%	53%	.19	.63
YES	52%	48%		
Fear of fall going out temple, market				
NO	46%	54%	.74	.39
YES	56%	44%		

Table 4.12: Association of different level of concern for fall with sub-groups

Exposure	Case (%)	Control(%)	P values
Level of concern of fall when and while changing clothes			
No	46%	54%	.73
Somewhat	52%	48%	.35
Fairly	67%	33%	.50
Very	67%	33%	1
Level of concern of fall while taking bath			
No	44%	56%	.55
Somewhat	51%	48%	.77
Fairly	70%	30%	.93
Very	50%	50%	.39
Level of concern of fall during sitting and getting up from chair			
No	49%	51%	.874
Somewhat	48%	52%	.939
Fairly	67%	33%	.421
Very	50%	50%	.971
Level of concern of fall while going up or down stairs			
No	41%	59%	.27
Somewhat	47%	53%	.62
Fairly	71%	29%	.16
Very	67%	33%	.11
Level of concern of fall while walking up or down slope			
No	45%	55%	.34
Somewhat	47%	53%	.91
Fairly	86%	14%	.08
Very	56%	44%	.58
Level of concern of fall while walking on wet or slippery surfaces			
No	40%	60%	.25
Somewhat	46%	54%	.66
Fairly	80%	20%	.14
Very	65%	35%	.14
Level of concern of fall while walking on uneven surfaces			
No	47%	53%	.76
Somewhat	41%	59%	.60
Fairly	100%	0	.99
Very	60%	40%	.47
Level of concern of fall while going out			
No	46%	54%	.38
Somewhat	57%	44%	.42
Fairly	80%	20%	.28
Very	25%	75%	.12

The above table describes that more number of participants of control group had no concern on fear of falling whereas participants of case group are concerned at different level in different ratios. χ^2 of different level of concerns on fall during the various activities are insignificant. This indicates that different level of concerns of fall during the performance of daily activities had no difference in fall injury between the research samples of two sub groups.

4.5 Case-control group and association with participant's physical performance

Table 4.13: Association of participant's physical performance with sub-groups

Exposure	Case (%)	Control (%)	P values	Odds ratio	95% of CI	
					L/L	U/L
Level of Physical performance						
Not frail	38%	62%	.004	1		
Mild frail	85%	15%	.001	9.06	2.40	34.11
Moderate frail	60%	49%	.35	2.4	.374	15.38
Unable to function			.06	.63		

Direct logistic regression was performed to assess the impact of participant's level of physical performance on the likelihood that participants would report that they had association with fall injury by considering not frail as reference. The odd ratio of the mild frail group was 9.06, $p = .001$ which indicates the result is statistically highly significant that the participants with mild frail were over 9.06 times more likely to report having fall injury than the participants with not frail level of physical performance.

4.6 Case-control group and association with balance scores and coordination:

Table 4.14: Association of coordination with sub-groups

Exposure	Case (%)	Control (%)	Chi square	P value	Odds ratio	95% of CI	
						L/L	U/L
Romberg's test							
Positive							
NO	43%	57%	4.29	.04	2.7	1.03	6.85
YES	67%	33%					

Table 4.15: Association of balance scores with sub-groups

Exposure	N	t value	P values two-tailed	Mean difference	95% of CI		Eta squared
					L/L	U/L	
Balance of participants	12.02 ± 3.73	-1.6 ± 3.70	.11	-1.24	-2.8	.31	-0.03
	13.27 ± 3.70						

4.6.1 Romberg's test of participants:

Among 90 participants, 27 (43%) had negative and 18 (67%) had positive Romberg's test within case group. The control group had 9 (33%) of participants with positive Romberg's test. The odd ratio is 2.7 with 95% CI, ranging from 1.03 (LL) to 6.85 (UL). The percentage of fall injury was differed by the positive Romberg's test of participant, $\chi^2(1, N = 90) = 4.29, p = .04$. The result is statistically significant and failed to accept null hypothesis. This indicates that there is difference between two sub groups of research sample with positive Romberg's test of participants.

Here, the odd ratio of 2.7 for Positive Romberg's test was more than 1, indicating that the participants with the state of no positive Romberg's test were over 2.7 times more likely to report having fall injury.

4.6.2 Balance of participants:

An independent sample t-test was conducted to compare the participant's level of balance for case and control groups. There was no significant difference in score for case group (M = 12.02, SD = 3.73) and control group (M = 13.27, SD = 3.7; $t(90) = -1.6, p = .11$, two-tailed). The magnitude of the difference in means (mean difference = -1.24, 95% CI: - 2.9 to .31) was very small (eta squared = -.03). This indicates that the result is statistically insignificant and failed to reject null hypothesis noting no difference between two sub groups of research sample in level of balance of participants.

4.7 Case-control group and association with gait scores of participants:**Table 4.16: Association of gait scores of participants with sub-groups by t-test**

Exposure	N	t values	P values two-tailed	Mean difference	95% of CI		Eta squared
					L/L	U/L	
Gait scores of participants	8.13 ± 2.77	-2.42 ± 2.29	.02	-1.2	-2.3	-.14	-0.05
	9.33 ± 2.29						

Table 4.17: Association of gait scores of participants with sub-groups by Regression

Exposure	B	S.E	Wald	df	P values	Odds ratio	95% of CI	
							L/L	U/L
Gait scores of participant	.19	.09	4.51	1	.03	.823	.69	.99

An independent sample t-test was conducted initially to compare the participant's level of physical performance for case and control groups. There was significant difference in score for case group (M = 8.13, SD = 2.77) and control group (M = 9.33, SD = 2.29; $t(90) = -2.42, p = .02$, two-tailed). The magnitude of the difference in means (mean difference = -1.2, 95% CI: - 2.3 to - .14) had small effect (eta squared = 0.05).

To assess the impact of participant's scores of gait, direct logistic regression was performed on the likelihood that participants would report that they had association with fall injury. The odd ratio of the physical performance of participant was .82, $p = .03$ which indicates that the result is statistically significant and the odd ratio of .85 for gait scores was less than 1, indicating that the more scores a participant gain or every increase in scores of gait of participants had .85 times less likely to report having fall injury.

4.8 Case-control with scores of tinetti gait and balance evaluation:

Table 4.18: Association of tinetti gait and balance evaluation with sub-groups

Exposure	Case (%)	Control (%)	Chi square	P value
Tinetti gait and balance evaluation				
NO risk for fall	41%	59%	2.85	.09
Risk for fall	59%	41%		

Among 90 participants, 18 (41%) had no risk of fall and 27 (59%) had risk of fall within case group. The control group had 26 (59%) of participants with no risk for fall. The odd ratio is 2.05 with 95% CI, ranging from .21 (LL) to 1.45 (UL). The percentage of fall injury didn't differ by the cognition state of the participant, $\chi^2(1, N = 90) = 2.85, p = .09$. The result is statistically insignificant and failed to reject null hypothesis. This indicates that there is no difference between two sub groups of research sample in tinetti gait and balance evaluation of participant.

5.1 Case-control study and association with mini-cognition level of participants:

Table 4.19: Association of mini-cognition level of participants with sub-groups

Exposure	Case (%)	Control (%)	Chi square	P values
Mini- cognition range (present with Normal state)				
NO	46%	54%	1.46	.23
YES	61%	39%		

Among 90 participants, 36 (54%) had no normal state of cognition and 9 (39%) had normal cognition within control group. The case group had 23 (61%) of participants with normal cognition. The odd ratio is .55 with 95% CI, ranging from .21 (LL) to 1.45 (UL). The percentage of fall injury didn't differ by the cognition state of the participant, $\chi^2 (1, N = 90) = 1.46, p = .23$. The result is statistically insignificant and failed to reject null hypothesis. This indicates that there is no difference between two sub groups of research sample in cognition state of participant.

CHAPTER V: DISCUSSION

Falls are the leading cause of morbidity and mortality for persons aged 60 and older. When elders fall, they sustain such injuries as hip, spine, hand, and/or pelvic fractures. Even without injury, falls cause a loss of confidence that results in reduced physical activity, increased dependency, and social withdrawal. Many authors have documented that a fall is a multifactorial syndrome involving the patient and the environment. The study purpose was to find out the risk factors related to fall injury among elderly living in old age homes. Findings of this study suggests that elderly are in risk of fall injury due to presence of few risk factors within them and surroundings.

5.1. Socio-demographic

5.1.1 Age and gender:

First going to socio-demography of elderly, most of the elderly were between the aged group of 71-80 years of age with $n = 33$ (37%) and few in 80+ years of age. The data shows females staying in old aged homes is higher with $n=58$ (64%) and males is $n = 32$ (36%). This study suggests no association of age group and gender with fall and no fall injury. However, the study done in 1981 indicated that fall rates increased with age and more steeply in men than in women (Prudham & Evans, 1981). Similarly, one study found that risk of falling was significantly high ($P<0.05$) with age with OR = 1.03 at 95% CI ranging from 1.01 to 1.05 (Lastrucci, Lorini, Rinaldi & Bonaccorsi, 2018).

5.1.2. Level of Education:

Education in older times were consider as stigma so most of the elderly were illiterate with $n = 63$ (70%).and few were literate with $n = 27$ (30%). this study shows no association of level of education with fall injury. However, the study done in 2006 indicated high level of education (i.e. education for more than 10 years) as predictors of recurrent fallings (Pluijm, 2006).

5.1.3. Medical Factors:

Among 90 participants, 72 (80%), 70 (78%), 42 (47%) and 75 (83%) takes medications for any disease conditions and had problems in lower limbs, feet and vision problems respectively. This study shows more number of medical diagnoses which are associated for falls among fall injury group except feet problems than in non-fall injury group and similar finding was found in the study done in 1989 with the

problems more in fall injury group than other group (Robbins et al., 1989). The common medication intake for cardiac problems ($M = .32$, $S.D = .47$) were amlodipine, neurobin etc. whereas for asthma, COPD and other respiratory problems, medications were taken ($M = .23$, $S.D = .43$) and the participants were found taking medications for other diseases conditions too for e.g. mostly for gastritis and diabetes and other conditions like thyroid problems, hernia, urinary tract infection etc. knee osteoarthritis was common problems among lower limbs. However, this study had no association with weakness of lower limbs and not with intake of prescribed medicines too. But, the study which was done in 1989 by Robbins revealed that weakness of lower extremities i.e. mainly the hip weakness which had increasing likelihood of fall for three to eight times and prescriptions of medications taken for any disease conditions as a major risk factors for falls. The psychotropic and cardiac drugs were often associated with falls (Robbins et al., 1989). But the serious study was suggested to be done at a same time to assess real effects of psychotropic drugs among elder. Similarly, the generalized osteoarthritis ($OR = 2.01$; $95\% CI = 1.23-3.30$) and elderly with two or more co-existing diseases ($OR = 5.4$; $95\% CI = 1.68-17.39$) were also found significantly risk of falling (Lastrucci et al., 2018). In 2002, a study was done which revealed that elderly affected by depression were more likely to fall with $OR = 1.53$ at $95\% CI$ ranging from $1.36-1.73$ (Cesari et al., 2002).

This study showed that most of the participants had below vision problems and some other eye problems like cataract and other postoperative secondary complications like itching, pain etc. 53 (59%) of participants had presence of dizziness too with no association of all those mentioned medical factors with fall injury.

Vision makes an important contribution in balance being a significant independent risk factor for falls in older people, which had been well explained by the study done in 2006. In the same study, the reduced ability to detect low contrast hazards, judge distances and perceive spatial relationships had appeared to be the major visual impairment associated with falls (Lord, 2006). Another study which was done in 2006 indicated dizziness and low body weight as predictors of recurrent fallings (Pluijm, 2006).

5.1.4. Environmental hazards:

This study showed that more number of elderly of fall injury group had needed physical assistance to overcome environmental hazards such as for personal care activities such as eating, bathing, dressing, toileting, for going to temple, market, and

laundry or infrequent medical needs, for moving around old age homes and for disturbance from surrounding problems such as crowds, noise, lightening than no fall injury group. This study showed that physical assistance for moving around old age homes are statistically significant ($P = 0.02$) for fall injury. The participants who need minimal support for moving around old age homes (OR = 3.6; 95% CI 1.13-11.2) are associated for fall injury and considered as risk factor. Similarly a study done in 2002 also explained that elderly who lived in an unsafe place with environmental hazards had an increase in risk of falling with OR = 1.51, 95% CI ranging from 1.34–1.69 (Cesari et al., 2002).

5.1.5. Fear of fall or level of concern of fall:

More number of elderly with fall injury had high level of concern for fall than who had not have fall injury. This study showed no any association with the level of concern for fall for various activities such as while and when during changing clothes, while taking baths, while going up or down slope, stairs, walking on slippery or uneven surface etc. But the study done in 2006 indicated strong association of fear of falling with falls (Pluijm, 2006).

5.1.6. Physical performance:

This study revealed that physical performance of elderly participants had significant ($P=0.04$) association with fall injury. Elderly with mild frail had strong association (OR=9.06; 95%CI 2.40-34.11) with fall injury and considered as the strongest risk factors for fall in elderly. The study done in 2002 revealed that rate of falls among frail elderly people living in community was very high and significantly associated with an increased fall rate (Cesari et al., 2002). Another study done in 2017 indicated that more physically residents scored higher on balance and dual-task ability and which predicted for falls risk (Bootsman et al., 2017).

5.1.7. Balance and coordination:

Romberg's test was more positive among fall injury group than another group in this study. Positive Romberg's test have significant ($P=.04$) association with fall injury. It had relation (OR=2.7; 95% CI 1.03-6.85) with fall injury and predicted a risk for fall in elderly. However, this study showed insignificant association of balance with fall injury. But the study did in 1989 indicate poor balance as major risk factors (Robbins et al., 1989). Similarly the another study conducted in 2011 revealed that balance along with walking speed and sit to stand impairments were associated with falls (Wilson et al., 2011).

5.1.8. Gait and cognitive status:

This study suggested a significant ($P=.02$) difference between gait scores of elderly and fall injury. The gait scores (OR=.85; 95% CI .69-.99) were reversely associated with fall injury indicating that the more scores a participant gain or every increase in scores of gait of participants had .85 times less likely to report having fall injury whereas this study showed no any association of cognitive status for fall injury. Here, the study did in 1996 evinced mobility impairment as the strongest risk factors for falls and might be easiest to change in prevention program which mainly included exercises (Graafmans et al., 1996). Another study done in 2001 revealed that stride time variability which was significantly correlated with multiple factors such as strength, balance, gait speed, functional status and even mental health for falls (Hausdorff, Rios & Edelberg, 2001) and also the study conducted in 2002 stated gait problems (OR 2.13; 95% CI 1.81–2.51) as strongly associated risk factors for fall injury (Cesari et al., 2002). However, the study conducted in 2018 revealed cognitive impairment as an important risk factor for falls in elderly population (Lastrucci, Lorini, Rinaldi & Bonaccorsi, 2018).

CHAPTER II: LIMITATIONS

6.1. Limitations:

- The sample size was small. The numbers of control were found comparatively low because of which the study had to stop collecting data to 1:1 ratio, not being able to reach 1:3 ratio.
- The choice of sampling techniques might have some affected on result of the research. There were 72 old age homes among which 5 were selected according to researcher convenience. Random sampling might have improved the quality of research however lack of financial support, time constraints and difficulty to access the old aged homes had some amount of bias in study.
- Selection bias might have introduced while selecting old aged homes. Among five old aged homes selected, 1 old aged home was all women old age homes and it might have affected on the gender distribution of respondent and its association with other variables.
- Performance bias from respondents' side might have introduced during data collection as respondents were aware of what is to be asked to them. They might have sub consciously changed their choice to make themselves in better view and opinions of researcher. Key informant might have wished to keep quiet about actual status about old aged homes. Even the cold weather of winter season might have forced them to finish their examinations fast in short way. They might have altered their views and opinions regarding environmental hazards, fear of fall during interviews.
- Errors in records of old age homes for ages, medications and disease conditions might have led to different results.
- Long procedures for obtaining permission from old age homes of Nepal didn't allow including data from more old age homes of different areas.
- This study did not consider possible other factors that might influence the outcome of fall injury such as psychological status, details of old age home's environment etc.

CHAPTER VII: CONCLUSION AND RECOMMENDATIONS

7.1. Conclusion:

After completion of this study, investigators were able to know the major risk factors causing fall injury in elderly people living in old age homes of Nepal. This study revealed that females staying in old aged homes were higher than males and most of the elderly were illiterate. The need of minimal physical assistance for moving around old age homes was associated with fall injury and similarly mild frailty on physical performance, positive Romberg's test and gait of the participants were also associated too as risk factors for fall injury.

7.2. Recommendations:

- In this study, only 90 participants were selected as sample, so further research can be done with large sample size for validity and reliability of the results.
- The study was done within five selected old age homes of few districts of Nepal, similar research could be done by selecting sample from all other districts.
- Further research could be done exploring direct means of risk through cohort study.
- Further research could be done between elder people having less fall injury and more fall injury within certain periods of time to explore the strongest risk factors for recurrent falls.
- Separate studies for the strongest risk factors and its causes could be done
- Comparative studies on risk factors along with particular preventive measures or programs could be done to know the difference.

CHAPTER VIII: REFERENCES (APA)

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ANNEXES

Annex I Informed Consent (Nepali)

सुचना र सहमति फारम

नेपालको वृद्ध आश्रममा बस्नुहुने वृद्धाहरूमा लड्ने जोखिमका कारक तत्वहरू

प्रमुख अन्वेषक

नमस्कार,

म निरु लामा, हाल बांग्लादेश हेल्थ प्रोफेसन्स इन्स्टिच्युट, ढाका विश्वविद्यालयमा “पुनर्स्थापना विज्ञान” विषयमा मास्टर्स गर्दैछु । डा.कमल अहमदको प्रत्यक्ष पर्यवेक्षणमा यो अनुसन्धान गर्दैछु । म तपाईंलाई मेरो अध्ययनमा भाग लिन साथै मेरो खोज “नेपालको वृद्ध आश्रममा बस्नुहुने वृद्धाहरूमा लड्ने जोखिमका कारक तत्वहरू” मा सहभागी हुन अनुरोध गर्दैछु।

यो सबैक्षणले मुख्यतया लड्ने जोखिम कारकहरूलाई पत्ता लगाउने छ जुन वृद्धा अवस्थामा हुने गर्छ । यदि तपाईं यो अध्ययनमा भाग लिनुहुन्छ भने, तपाईंलाई केहि प्रश्नहरू सोधिनेछ । यो अनुसन्धान तपाईंको लागि लाभदायी हुनेछ, किनकि यसले तपाईंले सामना गरेका समस्याहरू पत्ता लगाउने साथै समाधान गर्न काम तिर सहयोग गर्नेछ ।

तपाईं आफ्नो पुरा इच्छाले यो अध्ययनमा सहभागी हुनुहोस भनि म चाहन्छु । कृपया जवाफहरू यथार्थमा दिनु प्रयास गर्नुहोला । यदि तपाईंलाई प्रश्नको जवाफ दिन असहज हुन्छ भने, तपाईं जवाफ नदिन या रद्द गर्न सक्नुहुन्छ साथै अध्ययनको समयमा कुनै पनि समस्या आईपरेमा अध्ययनमा बाट हट्न पुरै स्वतन्त्र रहनेछ ।

तपाईंले दिनुभएको जानकारीहरू, अध्ययन प्रयोजनको लागि मात्र प्रयोग गरिनेछ, तपाईंलाई चिन्न सक्ने जानकारीहरू कतै खुलासा वा प्रकाशित हुनेछैन। यदि तपाईंसँग अनुसन्धान र प्रश्नवाली सम्बन्धी कुनै पनि प्रश्न छ भने, तपाईं अनुसन्धानकर्तालाई सोध्न सक्नुहुन्छ ।

यस अध्ययनमा तपाईंले दिनुभएको सहमतिले जानकारीहरू प्रयोग गर्न अनुसन्धानकर्तालाई अनुमति दिन्छ र यो अनुसन्धानको लागि अनिवार्य छ ।

मैले माथिको सबै जानकारी राम्ररी पढेँ र यो अनुसन्धानमा आफ्नो इच्छाले सहभागि भएको छु । म सबै प्रश्नहरूको सहि जवाफ दिनेछु।

सहभागीको नाम : मिति :

सहि :

अनपढ भएमा: म सहमति फारमको सहि पढाइको साक्षी छु र म व्यक्तिलाई प्रश्न सोध्ने अनुमति दिन्छु ।

म सहमति दिएको पुष्टि गर्दछु ।

मिति:

साक्षीको नाम : सहभागीको नाम :

सहि :

छाप :

Annex II
Informed consent (English)
Consent Form to Participate in Research
RISK FACTORS FOR FALLS IN ELDERLY LIVING IN OLD AGE HOMES OF
NEPAL.

Principal Investigator:

..... student of Dhaka University under the supervision of Dr. Kamal Ahmed requests you to participate in the research study to find out the risk factors for falls in older people of Nepal. If you participate in this research study, you will be asked few questions about your health, medications, fear, concerns, problems and asked to perform certain activities to assess your balance, gait and physical independence. The research will be directly beneficial for you as it deals with acknowledgment of problems faced by you and work towards solving the problems. Please try to give truthful answers as much as possible. You can refuse or not give answer if you are not comfortable sharing the information. If you have any questions regarding the survey and questionnaire you may ask the researcher.

Agreeing to this study, gives permission to researcher to use all the information collected from you and it is mandatory for the research. The information will be used but the information which can identify you won't be disclosed or published. Participating in the study is completely voluntary and you may choose to discontinue at any time.

I have read the above information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

Name of Participant _____

Signature of Participant _____

Date _____

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual is allowed to ask questions. I confirm that the individual has given consent freely.

Name of witness _____

Thumb print of participant

Signature of witness _____



Date _____

Annex III
Questionnaire (Nepali)

प्रश्नावली

नेपालको वृद्ध आश्रममा बस्नुहुने वृद्धाहरूमा लड्ने जोखिमका कारक तत्त्वहरू

२०१७-२०१८

नमस्ते, मेरो नाम.....हो । म बङ्गलादेश हेल्थ प्रोफेशनल इन्सिटिच्युट, ढाका विश्वविद्यालय, बङ्गलादेशमा अध्ययनरत छु । मेरो पाठ्यक्रमको अनुसार मैले थेसिस गर्नु पर्ने हुन्छ । जसको कारण म नेपालको वृद्ध आश्रममा बस्नुहुने वृद्धाहरूमा लड्ने जोखिम कारकहरूमा सर्वेक्षण गर्दैछु । यो सर्वेक्षणले मुख्यतय लड्ने जोखिम कारकहरूलाई पत्ता लगाउने छ । जुन वृद्धा अवस्थामा हुने गर्छ । यसैले यसै प्रकृयाको लागि म हजुरलाई सम्बन्धित प्रश्नहरू सोध्न जाँदै छु । हजुरको सहयोग सराहनए हुनेछ । म हजुरलाई सत्य तथ्य जानकारी दिनुहुनको लागि हार्दिक अनुरोध गर्दछु । यो प्रश्नावली कार्य.....मिनेटको हुनेछ । तपाईंको सबै जानकारीलाई पूर्ण रूपमा गोपनीयता बनाएर राखिनेछ र साथमा हजुरलाई उत्तरदिन मन-नलागेको अवस्थामा कुनै पनि समय रोक्न सक्नुहुन्छ ।

के हजुर जानकारी दिन तयार हुनुहुन्छ ?

साक्षामकार बार्ताको मिति.....

समुह क : आत्मपुरक (SUBJECTIVE)

भाग १. सामाजिक तथ्याङ्क

१	सहभागीको आइ.डि	
२	उमेर	
३	लिंग	<input type="checkbox"/> १. पुरुष <input type="checkbox"/> २. महिला
४	उचाइ	
५	तौल	
६	वैवाहिक स्थिति	<input type="checkbox"/> १. अविवाहित <input type="checkbox"/> २. विवाहित <input type="checkbox"/> ३. विधवा / विदुर <input type="checkbox"/> ४. सम्बन्धविच्छेद <input type="checkbox"/> ५. अन्य

७ शिक्षा	<input type="checkbox"/> १. अशिक्षित <input type="checkbox"/> २. प्राथमिक / एस.एल.सी <input type="checkbox"/> ३. स्नातक <input type="checkbox"/> ४. पोष्ट स्नातक
८ पेशा	<input type="checkbox"/> १. कृषि <input type="checkbox"/> २. सेवा (सरकारी/निजि) <input type="checkbox"/> ३. व्यापार <input type="checkbox"/> ४. अन्य
९ सहभागीको भौगोलिक स्थान	
१० निवास स्थान	<input type="checkbox"/> १. ग्रामिण <input type="checkbox"/> २. शहर <input type="checkbox"/> ३. उपनगरिय (Sub-urban)

भाग दुई : चिकित्सा र जीवन शैलीका कारकहरू

कृपया उपयुक्त उत्तरमा ठीक लगाउनु होला (यदि 'होइन' भने = ० र 'हो' भने = १.)।

क्र.सं.	प्रश्नहरू	हो	होइन
११	के तपाईं कुनै रोग वा स्वास्थ्य समस्याको लागि औषधी लिदै हुनुहुन्छ? (यदि "होइन" भने कृपया तलको प्रश्नलाई छोडेर १३ मा जानुहोस् ।)		
१२	यदि हो भने, तपाईं कुन समस्याको लागि औषधी लिनुहुन्छ?		
	१. मुटुको समस्याहरू		
	२. श्वासको समस्याहरू		
	३. हाडजोर्नीको समस्याहरू		
	४. अन्य केही		
१३	के तपाईंको खुट्टामा समस्या छ? (यदि "होइन" भने कृपया तलको प्रश्नलाई छोडेर १५ मा जानुहोला ।)		
१४	यदि "हो" भने तपाईंलाई कुन समस्या छ ?		
	१. हिप (Hip) को समस्या		
	२. घुडाको (Knee) समस्या		

	३. अन्य केही		
१५	के तपाईंको पाउमा (Foot) समस्या छ जसले हजुरलाई हिड्न गाह्रो गछै ? (यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर १७ मा जानुहोला ।		
१६	यदि “हो” भने तपाईंलाई कुन समस्या छ ?		
	१. औलाहरूको विरूपता (Deformity - hallux valgus/claw toes etc)		
	२. पाइतला/कुरकुच्चा दुख्ने		
	३. अन्य केही		
१७	के तपाईंलाई आखाको दृष्टिमा कुनै समस्या छ ? यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर १९ मा जानुहोला ।		
१८	यदि “हो” भने तपाईंलाई कुन समस्या छ ?		
	१. नजिक/टाढाको देख्नलाई समस्या		
	२. तलको देख्नलाई समस्या		
	३. अन्य केही		
१९	पोषण स्थिति वि.एम.आई		
भाग तीन : पर्यावरण खतराहरू			
२०	के तपाईंले पछिल्लो समयमा लडेको या लड्ने लागको अनुभव गर्नुभएको थियो? यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर २२ मा जानुहोला ।		
२१	यदि “हो” भने कतिपटक लड्नु या लड्न लग्नु भएको थियो?		
२२	के तपाईंलाई आफ्नो कृयाकलापहरू जस्तै खान, नुहाउन, कपडा लगाउन, शौचालय जान, आउनको लागि अरुको सहयोग चाहिन्छ ? यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर २४ मा जानुहोला ।		
२३	यदि “हो” भने कति सम्मको सहयोगको आवश्यक पर्छ ?		
	१. न्युनतम सहयोग		
	२. मध्यम सहयोग		
	३. अरुमा पूरै निर्भर		
२४	माथि उल्लेखित कृयाकलाप बाहेक के तपाईंलाई मन्दिर जान, बजारमा कपडा, औषधी किन्न जानको लागि अरुको सहयोगको आवश्यक पर्छ ? यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर २६ मा जानुहोला ।		

२५	यदि “हो” भने कति सम्मको सहयोगको आवश्यक पर्छ ? १. न्युनतम सहयोग		
	२. मध्यम सहयोग		
	३. अरुमा पूरै निर्भर		
२६	के तपाईंलाई बृद्धाआश्रमको वरिपरि घुम्नको लागि सहयोगको आवश्यक पर्छ ? यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर २८ मा जानुहोला ।		
२७	यदि “हो” भने कति सम्मको सहयोगको आवश्यक पर्छ ? १. न्युनतम सहयोग		
	२. मध्यम सहयोग		
	३. अरुमा पूरै निर्भर		
२८	के तपाईंलाई वरपरको वातावरण जस्तै भीडभाग, ध्वनी, प्रकाशले सताएको छ ? यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर अर्को भागमा जानुहोला ।		
२९	यदि “हो” भने कति सम्मको सहयोगको आवश्यक पर्छ ? १. केही सताएको छ ।		
	२. एकदम सताएको छ ।		
	३. धेरै सताएको छ ।		
भाग चार : लड्ने डर			
	के तपाईंलाई तल उल्लेखित दैनिक कार्यहरू गर्दा लड्छु कि भन्ने डर लाग्छ ?		
३०	लुगा लगाउँदा वा फेर्दा यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर ३२ मा जानुहोला ।		
३१	यदि “हो” भने कति डरको अनुभव हुन्छ ? १. केहि		
	२. एकदम		
	३. धेरै		
३२	नुहाउँदा यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर ३४ मा जानुहोला ।		

३३	यदि “हो” भने कति डरको अनुभव हुन्छ ? १. केहि २. एकदम ३. धेरै		
३४	कुर्सीमा बस्दा/उठ्दा यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर ३६ मा जानुहोला ।		
३५	यदि “हो” भने कति डरको अनुभव हुन्छ ? १. केहि २. एकदम ३. धेरै		
३६	भन्याङ् चढ्दा, तल फर्दा/ओर्लदा । यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर ३८ मा जानुहोला ।		
३७	यदि “हो” भने कति डरको अनुभव हुन्छ ? १. केहि २. एकदम ३. धेरै		
३८	उकालो, ओरालो हिड्दा । यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर ४० मा जानुहोला ।		
३९	यदि “हो” भने कति डरको अनुभव हुन्छ ? १. केहि २. एकदम ३. धेरै		
४०	चिसो (भिजेको) तथा चिप्लो सतहमा हिड्दा । यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर ४२ मा जानुहोला ।		
४१	यदि “हो” भने कति डरको अनुभव हुन्छ ? १. केहि २. एकदम ३. धेरै		
४२	असमान जमिनमा हिड्दा ।		

	यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर ४४ मा जानुहोला ।		
४३	यदि “हो” भने कति डरको अनुभव हुन्छ ?		
	१. केहि		
	२. एकदम		
	३. धेरै		
४४	कुनै सामाजिक कार्य जस्तै पुजापाठ, विवाह, ब्रतबन्धनमा जाँदा यदि “होइन” भने कृपया तलको प्रश्नलाई छोडेर अर्को भागमा जानुहोला ।		
४५	यदि “हो” भने कति डरको अनुभव हुन्छ ?		
	१. केहि		
	२. एकदम		
	३. धेरै		
४६	के तपाईंलाई चकर (Dizziness) लाग्ने समस्या छ?		

समूह ख: जाँच गर्दा

भाग एक: शारिरिक कृयाकलाप र समन्वय (Co-ordination)

कृपया सहभागीहरूले निर्देशन अनुसार भनिएका कार्यहरू गरिदिनुहुन आग्रह गर्दछु । कुनै पनि कार्य गर्दा लागेको समय घडी (Stop watch) बाट रेकर्ड गरिने छ ।

(यदि ११ sec भन्दा कम = ४, ११ - १४ sec = ३, १४ - १७ sec = २, १७ सेकेन्ड भन्दा बढी = १, कार्य गर्न नसकेमा = ०)

	कार्य	समय	प्राप्ताङ्क
क	चाबीले ताल्चा खोल्ने र बन्द गर्ने		
१.			
२.	लुगा लगाउने र फेर्ने		
३.	भुइँबाट सिक्का टिप्ने (ढल्केर)		
४.	कुर्सीबाट उठ्ने		
५.	करिब २.५ केजीको भार उठाएर आफ्नो कुमका तहमा कतै राख्ने		
६.	एक राउण्ड घुम्ने		
ख	रोम्बर्गस टेस्ट (Rombergs test)		
कुल अंक			

भाग दुई

अंक:- जति धेरै अंक त्यति धेरै राम्रो प्रदर्शन । ०-२ स्कोर मा '०' ले धेरै नराम्रो संकेत गर्दछ ।

तसर्थ, १९ भन्दा कम = लड्ने उच्च जोखिम

१९ - २४ सम्म = लड्ने जोखिम

(अ) सन्तुलन (Balance)

(निर्देशन:- सहभागीलाई कडा प्रकारको कुर्सी (Armless Chair) मा बसाइनेछ र तलको कृयाकलापको जाच गरिनेछ । उपयुक्त बक्सामा ठीक लगाउनु होला)

क्र.सं.	कृयाकलापहरू	अंक	√
१.	बसाई सन्तुलन	०	
	- कुर्सिमा अडेस लगाउनु/चिप्लनु		
	- स्थिर, सुरक्षित	१	
२.	उभिनु		
	- सहयोग विना नसक्नु	०	
	- हातको सहायताले सक्नु	१	
	- सहयोग विना सक्नु	२	
३.	उभिने प्रयास		
	- सहयोग विना नसक्नु	०	
	- एक भन्दा बढी प्रयासमा उभिनु	१	
	- प्रथम प्रयासमा उभिनु	२	
४.	तुरुन्तै उठ्दाको सन्तुलन (प्रथम ५ सेकेन्ड)		
	- अस्थिरता (लरखराउनु, पाइलाहरू त्वगल्प को हल्लाई अनुसार चल्ल्नु/सर्छ्नु)	०	
	- लठ्ठी, वाकर (Walker) वा कुनै बस्तुलाई सहायताको रूपमा प्रयोग	१	
	- स्थिर अवस्था विना लठ्ठी वा अरुको सहायता	२	
५.	उभिने सन्तुलन		
	- अस्थिरता	०	

	- स्थिरता तर कुरकुच्चाहरूको बीचमा ४ इन्च भन्दाको दुरी या लठ्ठी वा अरुको सहायताको प्रयोगमा	१	
	- खुट्टाहरूको साघुरो दुरीमा कुनै सहायता बिना	२	
६.	दुवै पाउसँगै राखेर उभेको व्यक्तिलाई छातीको बीचको हड्डी (Sternum) मा हल्का ३ पटक हतकेलाले ठेलने ।	०	
	- लड्न खोज्ने		
	- लरबराउनु, समान्तु तर आफैले रोक्नु या बचाउनु	१	
	- स्थिर रहनु	२	
७.	आँखा बन्द गर्ने		
	- अस्थिर हुनु	०	
	- स्थिर हुनु	२	
८.	३६०° मा घुम्ने		
	- असन्तुलित / पाइला (Discontinuous)	०	
	- क्रमिक / सन्तुलित पाइला (Continuous)	१	
९.	बस्नु		
	- असुरक्षित -(गलत मुल्याङ्कन; कुर्सिमा लडनु)	०	
	- हातको सहयोगमा बस्नु वा सुचारु गति नहुनु	१	
	- सुरक्षित र सुचारु गतिमा बस्नु	२	
सन्तुलित (Balance) अंक			/१६
गेट (Gait)			
(निर्देशन: सहभागी जाँच गर्ने व्यक्तिसँग उभिएर कोठा वरपर सँगै आफ्नो गतिमा हिंड्नुहुन्छ र यसपछि अलि छिटो तर सुरक्षित गतिमा लठ्ठी, बाकर आदिको सहायतामा हिंड्नुहुन्छ ।) कृपया उपयुक्त बाकसमा ठीक लगाउनु होला ।			
१०.	पाइला अगाडि सार्नु / (Gait) को सुरुवात (जानु भनेको तुरुन्तै)		
	- कुनै संकोच वा सुरुवातको लागि धेरै प्रयास गर्नु पर्ने	०	
	- कुनै संकोच नभएको	१	
११.	पाइलाको उचाई र लम्बाई		

११.१	दाहिने खुट्टा उठाउन, दाहिने स्विंग (Swing) पैदल		
	- बायाँ टेकिएको खुट्टालाई पाइलाले पास । पार गर्दैन ।	०	
	- बायाँ टेकिएको खुट्टालाई पास / पार गरिन्छ ।	१	
	- दायाँ खुट्टाको पाइलाले फुट क्लियर (foot clear) गर्दैन ।	०	
	- दायाँ खुट्टाले फुट क्लियर गर्छ ।	१	
११.२	बाया स्विंग (Swing) पैदल / बायाँ खुट्टाको कदम		
	- दायाँ टेकिएको खुट्टालाई पाइलाले पास / पार गर्न नसकिने	०	
	- दायाँ टेकिएको खुट्टालाई पाइलाले पास / पार गर्न सकिन्छ ।	१	
	- बायाँ खुट्टाको पाइलाले फुट क्लियर (foot clear) गर्ने	०	
	- बायाँ खुट्टाको पाइलाले फुट क्लियर गर्न सक्ने	१	
१२.	कदम सममिति (Step Symmetry)		
	- दायाँ र बाया कदमको दुरीमा असमानता -लगभग)	०	
	- दायाँ र बाया कदम बराबरी जस्तो देखिन्छ ।	१	
१३.	कदम निरन्तरता (Continuity)		
	- रोक्ने र अनिरन्तरता कदमहरूको / पाइलाहरूको बीचमा	०	
	- कदम / पाइलाहरू निरन्तरता देखिन्छ ।	१	
१४.	मार्ग (path), फ्लोर (floor) को टाइलस (tiles)को सम्बन्धमा अनुमान, १२ व्यास (diameter) । एउटा खुट्टाको यात्रालाई १० फिट जति सम्म अवलोकन गर्ने)	०	
	- चिन्हित मोडिएको (Deviation)		
	- हल्का / हल्का मध्यम मोडिएको वा हिड्ने सहायताको प्रयोग	१	
	- सिदा कुनै पनि हिड्ने सहायता (Aids) बिना	२	
१५.	ट्रंक (Trunk)		
	- चिन्हित रूपमा ढल्किएको वा हिड्ने सहायता (Aids) को प्रयोग	०	
	- नढल्किएको तर घुडा वा ढाड खुम्चिएको (Flexion) वा हातहरू फैलाउदै गरिएको हिड्ने / हिडेको अवस्था	१	
	- नढल्किएको / नखुम्चिएको / हिड्ने सहायता (Aids) भएको	२	
१६.	हिड्ने बेला (Walk Stance)		
	- कुर्कुचाहरू अलग भएको	०	
	- हिड्दा कुर्कुचाहरू लगभग जोडिने	१	

गेट (Gait) अंक	/१२
कुल (Total) अंक	/२८

भाग ३ - संज्ञानात्मक प्रकार्य (Cognition)

चरण - १. तीन शब्द दर्ता

सिधा हेर्नुस अनि भन्नु “राम्ररी सुन्नुहोस् । म तपाईंलाई ३ वटा शब्द भन्छु जुन तपाईंले दोहोर्थाउनु पर्छ अहिले अनि पछि याद राख्नुपर्छ ।

ती शब्दहरू यी हुन् । अब क्रिपया भन्नु.

यदि ३ चोटिको प्रयासमा पनि ती शब्द भन्न सकेन भने चरण - २ जानु (घडी बनाउने)

तलको शब्दहरू १ वा बढी नैतिक अध्ययनमा प्रयोग भएको छ ।

१. केरा	२. नेता	३. गाउँ	४. खोला	५. कप्तान	६. छोरी
सूर्योदय	मौसम	भान्छा	राष्ट्र	बगैचा	स्वर्ग
कुसी	तालिका	बच्चा	औला	चित्र	पहाड

चरण - २. घडी रेखाचित्र

भन्नुहोस् : “अर्को, तपाईं एउटा घडी बनाउनुस मेरो लागि । पहिला, ती संख्याहरूमा राख्नुहोस् जहा तिनीहरू जान्छन् ।”

जब त्यो सक्कन्छ, भन्नु: “अब १० बजेर ११ मिनेटमा हात राख्नुहोस त्यस व्यायामको लागि गोलो प्रिन्ट प्रयोग गर्नु: (अर्को पृष्ठ हेर्नुहोस्) प्रयोग गर्नुहोस् । यो स्मृति परिक्षण होइन त्यसैले आवश्यक अनुसार निर्देशनहरू दोहोर्थाउनुहोस् ।

चरण - ३ मा जानु, यदि घडी ३ मिनेटमा तयार हुदैन भने ।

चरण ३. ३ शब्द सम्झनु

ती व्यक्तिलाई ३ वटा शब्द सम्झनु भन्नु जुन चरण १ मा प्रयोग भएको थियो भन्नु: “त्यो ३ वटा शब्द कुन हो याद छ ?” त्यो शब्दको अंक र उत्तर तलको लेख्नुहोस् ।

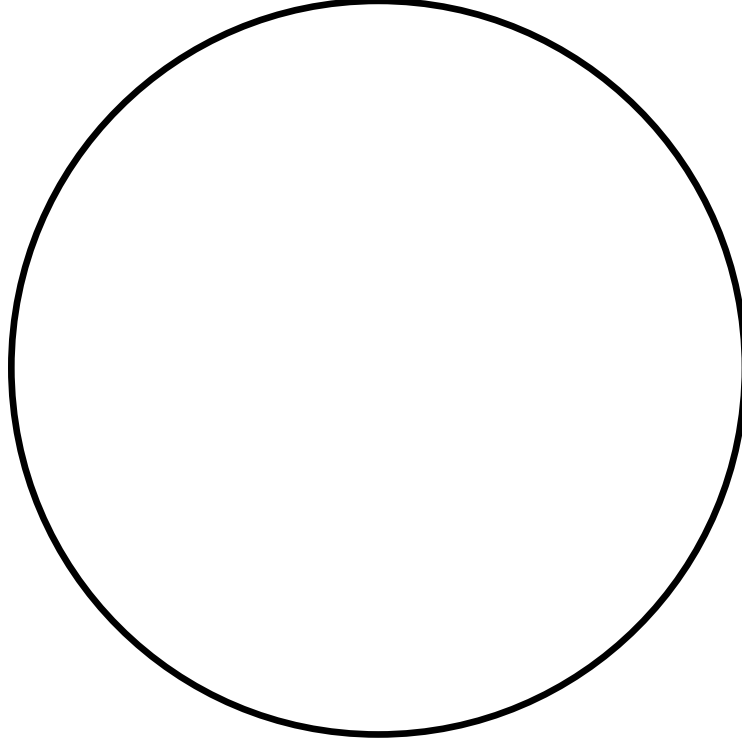
शब्द सूची संस्करण :

उत्तर :

शब्द सम्झने : (०-३ अंक)	१ अंक प्रति आफै याद गरेकोलाई, कुनै क्यु बिना
घडी बनाउने: (०-२ अंक)	सामान्य घडी - २ (सबै अंक ठिक ठाउँमा र कुनै संख्या नछुटाई सुई ११ र २ मा हुनुपर्छ, 11:10)

	० - घडी बनाउन नसकेमा
कुल संख्या : (० - ५ अंक)	<p>कुल संख्या - शब्द सम्झने + घडी बनाउने</p> <p>मिनी कोगTM मा < ३ को पोइन्ट dementia स्क्रिनिंगको लागि मान्य गरिएको छ,</p> <p>तर धेरै जना जो सार्थक संज्ञानात्मक विकलांगले उच्च स्कोर गर्नेछन् ।</p> <p>जब अधिक संवेदनशीलता वांछित हुन्छ, < ४ को पोइन्टले संज्ञानात्मक स्थितिको थप मुल्याङ्कनको आवश्यकतालाई संकेत गर्दछ ।</p>

घडीको रेखाचित्र



Annex IV
Questionnaire (English)

**RISK FACTORS FOR FALLS IN ELDERLY LIVING IN OLD AGE HOMES OF
NEPAL.
(2017-2018 AD)**

Namaste! My name is I am a student of Bangladesh Health Professions Institute under Dhaka University, Bangladesh. As a part of my curriculum for thesis I am conducting a survey on RISK FACTORS FOR FALLS IN ELDERLY LIVING IN OLD AGE HOMES OF NEPAL. This survey is mainly about finding the risk factors for falls in elderly population who are living in old age homes of Nepal. So, I am going to ask these questions for this matter. Your help will be appreciated; I would request you to provide true information. The interview will take minutes. You can withdraw or chose not to answer the question. Would you like to give the interview?

Date of interview.....

GROUP A: SUBJECTIVE

PART ONE: SOCIO-DEMOGRAPHICS

1 Participant I.D.	
2. Age	
3. Sex	<input type="checkbox"/> 1. Male <input type="checkbox"/> 2. Female
4. Height (cm)	
5. Weight (kg)	
6. Marital status	<input type="checkbox"/> 1. Unmarried <input type="checkbox"/> 2. Married <input type="checkbox"/> 3. Widow/widower <input type="checkbox"/> 4. Divorcee <input type="checkbox"/> 5. Others

7. Education	<input type="checkbox"/> 1. Illiterate <input type="checkbox"/> 2. primary/SLC/ SSC <input type="checkbox"/> 3. Graduation <input type="checkbox"/> 4. Post-graduation
8. Occupation	<input type="checkbox"/> 1. Farmer <input type="checkbox"/> 2. Services <input type="checkbox"/> 3. Business <input type="checkbox"/> 4. Others
9. Geographical location of participant	
10. Place of residence	<input type="checkbox"/> 1. Rural <input type="checkbox"/> 2. Urban <input type="checkbox"/> 3. Semi/sub-urban

PART TWO: MEDICINE AND LIFESTYLE

Please tick the most appropriate option for you.

(If 'No' scores 0 and if 'Yes' scores 1.)

Questions		Yes	No
11	Do you take medications for any disease conditions? (If answer is 'No' please skip the following question and proceed to 13.)		
12	If answer is Yes, for which conditions do you take medications?		
	1. Cardiac Problems		
	2. Respiratory Problems		
	3. Musculoskeletal Problems		
	4. Any Other		
13	Do you have any problems in your lower limbs? (If answer is 'No' please skip the following question and proceed to 15.)		

14	If yes, which problems do you have? 1. Problem in hip		
	2. Problem in knee		
	3. Any other		
15	Do you have any foot problems that hinder you while walking? (If answer is 'No' please skip the following question and proceed to 17.)		
16	If yes, which problems do you have? 1. Toes deformities (hallux valgus / claw toes\ hammer toes etc.)		
	2. Plantar heel pain		
	3. Other		
17	Do you have any problem in vision? (If answer is 'No' please skip the following question and proceed to 19.)		
18	If yes, which problems do you have? 1. Difficulty in near/ far sights		
	2. Difficulty in below vision		
	3. Any other		
19	Do you feel dizziness while getting out of bed in early morning?		
20	Nutritional Status: Body Mass Index		
<u>PART THREE: ENVIRONMENTAL HAZARDS</u>			

20	Have you fallen or experienced near-fall in past years? (If answer is 'No' please skip the following question and proceed to 22)			
21	If yes, how many times have you had fall or near-fall accidents?			
22	Do you need physical assistance from other person for your personal care activities such as eating, bathing, dressing, toileting and mobility? (If answer is 'No' please skip the following question and proceed to 24)			
23	If yes, how much assistance do you need?			
	1. Minimal support			
	2. Moderate support			
23	3. Totally dependent			
	24	Besides that above mentioned daily activities, do you need someone's assistance for performing things such as going to market, temple, laundry, or infrequent medical needs? (If answer is 'No' please skip the following question and proceed to 26)		
	25	If yes, how much assistance do you need?		
1. Minimal support				
2. Moderate support				
25	3. Totally dependent			
	26	Do you need assistance for moving around the areas of old age home?		

	(If answer is 'No' please skip the following question and proceed to 28)		
27	If yes, how much assistance do you need?		
	1. Minimal support		
	2. Moderate support		
	3. Totally dependent		
28	Does your surrounding problems (crowds, noise, lighting) disturbing you? (If answer is 'No' please skip the following question and proceed to 30)		
29	If yes, how much disturbance do you feel?		
	1. Somewhat disturbing		
	2. Fairly disturbing		
	3. Very disturbing		
<u>PART FOUR: FEAR OF FALL (LEVEL OF CONCERN OF FALL)</u>			
Do you have any fear of falling down during performing following activities?			
30	When and while changing clothes. (If answer is 'No' please skip the following question and proceed to 32)		
31	If yes, how much fear do you feel?		
	1. Somewhat		
	2. Fairly		
	3. Very		
32	While taking a bath or shower.		

	(If answer is 'No' please skip the following question and proceed to 34)		
33	If yes, how much fear do you feel? 1. Somewhat		
	2. Fairly		
	3. Very		
34	Sitting and getting up from chair (If answer is 'No' please skip the following question and proceed to 36)		
35	If yes, how much fear do you feel? 1. Somewhat		
	2. Fairly		
	3. Very		
36	Going up or down stairs. (If answer is 'No' please skip the following question and proceed to 38)		
37	If yes, how much fear do you feel? 1. Somewhat		
	2. Fairly		
	3. Very		
38	Walking up or down slope. (If answer is 'No' please skip the following question and proceed to 40)		
39	If yes, how much fear do you feel?		

	1. Somewhat		
	2. Fairly		
	3. Very		
40	Walking on wet or slippery surface. (If answer is 'No' please skip the following question and proceed to 42)		
41	If yes, how much fear do you feel? 1. Somewhat		
	2. Fairly		
	3. Very		
42	Walking on uneven surfaces (rocky ground). (If answer is 'No' please skip the following question and proceed to 44)		
43	If yes, how much fear do you feel? 1. Somewhat		
	2. Fairly		
	3. Very		
44	Going out to social events like religious activities (If answer is 'No' please skip the following question and proceed to next part)		
45	If yes, how much fear do you feel? 1. Somewhat		
	2. Fairly		

	3. Very		
46	Do you feel any dizziness?		

PART B: ON EXAMINATION

1. PHYSICAL FUNCTION AND CO-ORDINATION

Participants are requested to follow proper instructions. Time taken to complete a particular physical task will be noted by stop watch.

		Time	Score
A	Locking and Unlocking keys		
1			
2	Put and Remove a jacket/sweater/shawl		
3	Pick up penny from floor (from sideways)		
4	Chair Rise		
5	Lift weight (about 2.5 kg) and place it at height of shoulder level		
6	Take a full turn around yourself		
B	Romberg's Test		
TOTAL SCORE			

2. GAIT AND BALANCE EVALUATION

I. BALANCE:

(Instructions: Subject is seated in hard armless chair. The following maneuvers are tested. Please tick in appropriate box.

Serial Number	Activities	Scores	√
1.	Sitting Balance Leans or slides in chair	0	

	Steady, Safe	1	
2.	Arise Unable without help	0	
	Able but uses arm to help	1	
	Able without use of arm	2	
3.	Attempts to arise Unable without help	0	
	Able, but requires more than one attempt	1	
	Able to rise with one attempt	2	
4.	Immediate standing balance (first 5 seconds) Unsteady (stagger, moves feet marked trunk sway steady)	0	
	Uses walker or cane or grabs other object for support.	1	
	Steady without walker or cane or other support	2	
5.	Standing balance Unsteady	0	
	Steady, but wide stance (medial heels more than 4 inch apart) or uses cane or other supports	1	
	Narrow stance without support	2	
6.	Nudge (subject at maximum position with feet as close together as possible, examiner pushes lightly on subject's sternum with palm of hand 3 times) Begins to fall	0	
	Stagger, grab, but catches self	1	
	Steady	2	
7.	Eyes closed (at maximum position #6) Unsteady	0	
	Steady	1	
8.	Turn 360° Discontinuous steps	0 1	
	Continuous		
9.	Sit down Unsafe (misjudged distance: falls into chairs)	0	

	Uses arms or not a smooth motion	1	
	Safe, smooth motion	2	
BALANCE SCORES		/16	
GAIT			
INSTRUCTIONS: subject stands with examiner. Walks down hallway or across room, first at his usual paces, then back at “rapid, but safe” pace using usual walking aid such as canes, sticks).			
Please, tick on appropriate box.			
10.	Initiation of gait (immediately after told to “go”) Any hesitancy or multiple attempts to start	0	
	No hesitancy	1	
11.	Step length and height		
11.1.	Right swing foot Doesn't pass left stance foot with step	0	
	Passes left stance foot	1	
	Right foot doesn't clear foot completely with step	0	
	Right foot completely clears foot	1	
11.2.	Left swing foot Doesn't pass right stance foot with step	0	
	Passes right stance foot	1	
	Left foot doesn't clear foot completely with step	0	
	Left foot completely clears foot	1	
12.	Step symmetry Right and left step length not equal (estimate)	0	
	Right and left step appear equals	1	
13.	Step continuity Stopping or discontinuity between steps	0	
	Steps appear continuous	1	
14.	Path (estimated in relation to floor tiles, 12 inch diameter. Observe excursion of one foot over 10 feet of course)	0	

	Marked deviation		
	Mild/moderate deviation or uses walking aids	1	
	Straight without walking aid	2	
15.	Trunk Marked sway or uses walking aids	0	
	No sway, but flexion of knees or back or spreads arms out while walking	1	
	No sway, no flexion, no use of arms and no walking aids	2	
16.	Walk stance Heels apart	0	
	Heels almost touching while walking	1	
GAIT SCORE			/12
TOTAL SCORES			/28

PART 3: COGNITIVE FUNCTION

MINI-COGNI™:

Step 1: Three Word Registration

Version 1 Banana Sunrise Chair	Version 2 Leader Season Table	Version 3 Village Kitchen Baby	Version 4 River Nation Finger	Version 5 Captain Garden Picture	Version 6 Daughter Heaven Mountain
--	---	--	---	--	--

Step 2: Clock Drawing

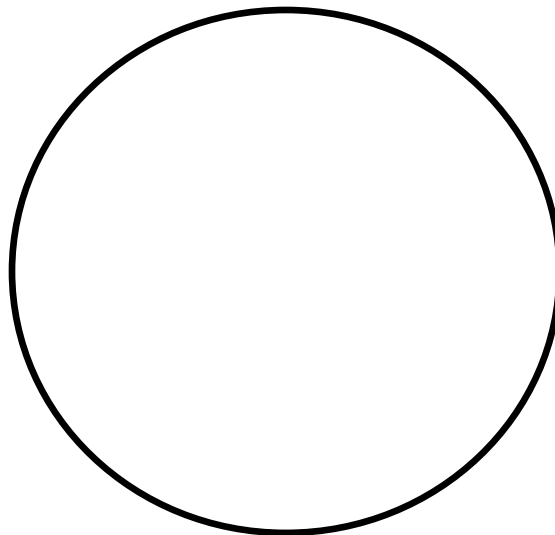
Step 3: Three Word Recall

Word List Version: _____ Person's Answers: _____

Word Recall: _____ (0-3 points)	1 point for each word spontaneously recalled without cueing.
Clock Draw: _____ (0 or 2 points)	Normal clock = 2 points. A normal clock

	<p>has all numbers placed in the correct sequence and approximately correct position (e.g., 12, 3, 6 and 9 are in anchor positions) with no missing or duplicate numbers. Hands are pointing to the 11 and 2 (11:10). Hand length is not scored. Inability or refusal to draw a clock (abnormal) = 0 points.</p>
<p>Total Score: _____ (0-5 points)</p>	<p>Total score = Word Recall score + Clock Draw score. A cut point of <3 on the Mini-Cog™ has been validated for dementia screening, but many individuals with clinically meaningful cognitive impairment will score higher. When greater sensitivity is desired, a cut point of <4 is recommended as it may indicate a need for further evaluation of cognitive status</p>

CLOCK DRAWING



Annex V

Approval of thesis proposal by ethics committee of BHPI



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই) Bangladesh Health Professions Institute (BHPI)

(The Academic Institute of CRP)

CRP-BHPI/IRB/11/17/151

Ref.

Date: 23/11/2017

Niru Lama
Part – II, M.Sc. in Rehabilitation Science
Session: 2016-2017, Student ID 181160071
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal – “Risk Factors for Falls in Elderly living in Old Age Homes of Nepal.” by ethics committee.

Dear Niru Lama,

Congratulations.

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on April 29, 2017 to conduct the above-mentioned thesis, with yourself, as the Principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Thesis Proposal
2	Questionnaire (English and Nepali version)
3	Information sheet & consent form.

The purpose of the study is to determine the risk factors for fall in elderly population. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential. Participants will answer a questionnaire that takes 20 to 30 minutes and the study have no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 9.00 AM on 08-05-2017.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

Muhammad Millat Hossain
Asst. Professor, MRS
Member Secretary,
Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh



পিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ, ফোন : ৭৭৪৫৪৬৪-৫, ৭৭৪১৪০৪ ফ্যাক্স : ৭৭৪৫০৬৯

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404, Fax : 7745069, E-mail : contact@crp-bangladesh.org, www.crp-bangladesh.org

Annex VI
Approval of thesis proposal by NHRC



Government of Nepal
Nepal Health Research Council (NHRC)
Estd. 1991

Ref. No.: 1292

28 December 2017

Ms. Niru Lama
Principal Investigator
Bangladesh Health Professional Institute
Bangladesh

Subject: Approval of research thesis entitled Risk Factors for fall in Elderly Living in Old Age Homes of Nepal

Dear Ms. Lama,

It is my pleasure to inform you that the above-mentioned proposal submitted on **10 December 2017** (Reg.no. 522/2017 please use this Reg. No. during further correspondence) has been approved by NHRC Ethical Review Board on **27 December 2017**.

As per NHRC rules and regulations, the investigator has to strictly follow the protocol stipulated in the proposal. Any change in objective(s), problem statement, research question or hypothesis, methodology, implementation procedure, data management and budget that may be necessary in course of the implementation of the research proposal can only be made so and implemented after prior approval from this council. Thus, it is compulsory to submit the detail of such changes intended or desired with justification prior to actual change in the protocol before the expiration date of this approval. Expiration date of this study is **April 2018**.

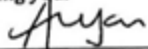
If the researcher requires transfer of the bio samples to other countries, the investigator should apply to the NHRC for the permission. The researchers will not be allowed to ship any raw/crude human biomaterial outside the country; only extracted and amplified samples can be taken to labs outside of Nepal for further study, as per the protocol submitted and approved by the NHRC. The remaining samples of the lab should be destroyed as per standard operating procedure, the process documented, and the NHRC informed.

Further, the researchers are directed to strictly abide by the National Ethical Guidelines published by NHRC during the implementation of their research proposal **and submit progress report in between and full or summary report upon completion**.

As per your research proposal, the total research amount is **NRs 40,000.00** and accordingly the processing fee amount to **NRs.10,000.00**. It is acknowledged that the above-mentioned processing fee has been received at NHRC.

If you have any queries, please feel free to contact the Ethical Review M & E section of NHRC.

Thanking you.



Prof. Dr. Anjani Kumar Jha
Executive Chairman

Tel: +977 1 4254220, Fax: +977 1 4262469, Ramshah Path, PO Box: 7626, Kathmandu, Nepal
Website: <http://www.nhrc.org.np>, E-mail: nhrc@nhrc.org.np

Annex VII

Application of permission to different old age homes of Nepal



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref.

Date: 23/11/2017

CRP-BHPI/MRS/11/17/0089

To Whom It May Concern

This is to certify that Ms. Niru Lama, a student of M Sc. in Rehabilitation Science at Bangladesh Health Professional Institute (BHPI) under the faculty of Medicine, University of Dhaka has to conduct a research for fulfillment of her master's degree. Her research title is "Risk Factors for Falls in Elderly living in Old Age Homes of Nepal" which is a self funded study. The research proposal has been approved by Institutional Review Board (IRB) of this institute. To accomplish research objectives, she will collect data from different old age homes of Nepal. We request you to provide her necessary support from your organizations.

I wish her for every success in order to accomplish her research.

Best regards,

Muhammad Millat Hossain

Muhammad Millat Hossain
Assistant Professor, Bangladesh Health Professions Institute (BHPI)
Project & Course Coordinator, M.Sc. in Rehabilitation Science
BHPI, CRP, Savar, Dhaka-1343, Bangladesh



সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ, ফোন : ৭৭৪৫৪৬৪-৫, ৭৭৪১৪০৪ ফ্যাক্স : ৭৭৪৫০৬৯

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404, Fax : 7745069, E-mail : contact@crp-bangladesh.org, www.crp-bangladesh.org

Annex VIII
Recommendation letter

25/11/2017

RECOMMENDATION LETTER

Dear Sir/Madam

Bangladesh Health Professional Institute (BHPI), an academic institute of CRP, has been conducting M.Sc. in Rehabilitation Science program under the faculty of Medicine of University of Dhaka (DU) since 2014. This program is a 2-year full time course where under part II, students have to conduct individual thesis under honorable supervisors approved by faculty of Medicine of University of Dhaka (DU).

According to the approval of DU, Miss Niru Lama is my student of Part II whose thesis is presently under my supervision. As I am familiar with her during her entire program of Part I, I have found her a sincere and hardworking student. Miss Niru has already worked in many assignments under my supervision during her first year course.

She is an ambitious and career driven to shape her future academic undertakings. She is sociable among her friends and faculty members.

Miss Niru Lama is an academically and technically capable, diligent, reliable and disciplined student with a great zeal for academic pursuits. I believe she is highly prospective candidate for pursuing the thesis titled "**Risk Factors for Falls in Elderly living in Old Age Homes of Nepal**" in respective reputed organizations of Nepal and hence I recommend her for the same.

I wish her all the best in her thesis study.


25/11/2017
Dr. Kamal Ahmed

MBBS, MPH, MPhil

Associate Professor, BHPI

Email: k_ahmed_m10@yahoo.com880

Contact no: +8801714004742

Annex IX
Permission letters

जि.प्र.का.का.द.नं.३६३/२०१३

स.क.प.आ.नं.५७३५/२०१४



पौखरा वृद्धाश्रम
(Pokhara Aged Shelter)

Ref: 074/75-30

Date: 2074-08-17

To,
Niru Lama
Student of Part-II M.sc Rehabilitation Science
Session-2016/2017
BHPH, CRP, Savar, Dhaka 1343, Bangladesh

Subject: Approved of Data collection for your master's thesis.

It's our pleasure to support your master's study. For your kind information **Pokhara Aged Shelter** has accepted your request to use beneficiary database and collect data from this shelter on the title "**Risk Factors for Falls in Elderly living in Old Age Home of Nepal**". We believe, you will respect the privacy of personal information and research ethics. Pokhara Aged Shelter will expect a copy of final report you produce from the study.

(Tika Bahadur Bhandari)
Chairman



का.नि.का.द.नं.- ४३०/०४७/०४८

निःसहाय सेवा सदन CENTER OF SERVICES FOR HELPLESS

शान्तिनगर, मिनभवन, काठमाडौं, नेपाल
Shanti Nagar, Minbhawan, Kathmandu, Nepal
Phone: १०७६३८, G.P.O. Box : 12523



Date: 2018-01-31

TO WHOM IT MAY CONCERN

This letter is written to confirm that Niru Lama, a student of MSc. in Rehabilitation Science had taken permission from our organization prior to her data collection. She had successfully completed it by maintaining all the privacy and rules of organization.

We wish her success in her endeavors in the near future.

Thank you.

Sagun Shah

SAGUN SHAH

PRESIDENT



आर.यस
श्री समुल राय
☎ ४६२२७७३

उपार.यस
श्री करणमोविन्द श्रेष्ठ
☎ ४४६६२६३

रुपि
डा. बाबुराम पोखरेल
☎ ४४८७७२४, ४४९५०७३

कोषा.यस
श्री गीरीलाल श्रेष्ठ
☎ ४४२२२६७

रह.रुपि
श्री रत्नदेवरी प्रधान
☎ ४४८७२९३
रह.कोषा.यस
श्री सित श्रेष्ठ
☎ ४४३४५२६

सद.यस
श्री प्रमिल सिंह
☎ ४४००६५५
श्री शक्ति श्रेष्ठ
☎ ४४७२६३९
श्री इन्दु थापा
☎ ४४७०७३६
श्री शक्ति रिमाल
☎ ४४२०२२०
श्री बालकुमारी श्रेष्ठ

श्री ज्ञानमाया शायल
☎ ४४९६२६०
श्री शंकर प्रसाद मजुरेल
☎ २३०४०२३
श्री शम्भु प्रसाद बघीचासे
☎ ९८५२२२५८७०
श्री सानु कावस्था

व.उ.श्री श्रीहरी जर्वाल
☎ ४४७०२०४
श्री वीरेन्द्र भण्डारी
☎ ४२०८७६७

सल्लाहकार
प्रा. शिवमोपाल रिमाल
श्री हिमालचन्द्रमशेर ज.ब.रा.
डा. विजयालक्ष्मी श्रेष्ठ
डा. जसकृता श्रेष्ठ
श्री. जोगकारसाल श्रेष्ठ
प्रा. डा. हरिभक्त बघीचासे

प्रसारकिय अधिकृत
प्रेम प्रसाद उप्रेती
☎ ९८४२२८०४२६

मातातिर्थ वृद्धाश्रम समिति (Matatirtha Oldage Home Committee)

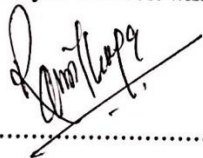

Kathmandu, Nepal

चन्द्रागिरी नगरपालिका-५, मातातिर्थ कुण्ड
काठमाडौं, नेपाल
२०५४

पत्र सख्या: ०५५/०७५
बलानी नं: ५५

विषय:

मिति:

पदाधिकारीहरु: अध्यक्ष वसन्त प्रसाद गौचन ४२७१७२१	To, M/S Niru Lama Student of M.Sc in Rehabilitation Science. Session- 2016 -2017 BHPI, CRP, Savar, Dhaka – 1343	December 20, 2017
उपाध्यक्ष सुमन सायमी ५८५१०६३०००	Subject: Approval of data collection for your Master's thesis.	
सचिव दुर्गालाल श्रेष्ठ ५८४१५४२३६०	Dear Niru,	
कोषाध्यक्ष प्रल्हाद बहादुर कार्की ५८५१०८८७३८	It's our pleasure to support your Master study. For your kind information, Matatirtha Old age home has accepted your request to use beneficiary database and collect data from the elderly people living here.	
सदस्यहरु: सूर्य बहादुर महर्जन ४३१०५०० ५८४१३६४१२५ बिजु बज्राचार्य ५८४१२२१४५० पूर्णलाल महर्जन ५८०१०१००१५ सोनी काजित ५८४१७८३१०७ युक्ति बस्नेत ५८४१२७७८८८ बसन्ती श्रेष्ठ ५८४१४४८५१७ जनक रिजाल ५८५१०७४५७५	I believe, you will respect the privacy of personal information and research ethics. This organization will expect a copy of final report you produce from the study.	
	Thank you with best wishes.	
		
	
	Ram Thapa Secretary Matatirtha Old Age Home (COMMITTEE) Matatirtha, Kathmandu Nepal	
		

सल्लाहकारहरु: गोविन्द प्रसाद मिश्र, बिजु बज्राचार्य, गीता सिलवाल, गणेश खत्री, रविन्द्र बज्राचार्य, मयाराजा महर्जन
सम्पर्क: चन्द्रागिरी नगरपालिका-५, मातातिर्थ कुण्ड, काठमाडौं । फोन नं. ४३१२५५० । <http://www.facebook.com/matatirthaoldagehome>