Assessment of Nutritional Status, Lifestyle Behaviour and Health Condition of Selected Elderly in Coimbatore City

By

A.Shabana

REG NO: 13PFD013

A thesis submitted to the

Avinashilingam Institute for Home Science and

Higher Education for Women University

Coimbatore - 641 043.

In partial fulfilment of the requirements for the Degree of

Master of Science in Food Service Management and Dietetics

March, 2015

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Certified as Bonafide Research Work

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Signature of the

Head of the Department

G. Rajamanani 31/3/15

Signature of the Guide

31/3/15

Signature of the Co-Guide

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INTRODUCTION

INTRODUCTION

Good nutrition is essential to good health throughout life, begining with prenatal life and extending through old age (Williams, 2005).Old age may be defined as regression of physiological functions accompanied by an advancing age. Malnourished populations do not have a long expectation of life. In developed countries the maximum expectation of life for the human of approximately eighty five years is being achieved (Eastwood, 2007).

Ageing is a process that involves the whole body. Each organ independently loses its function and the body becomes senescent. Individuals are known to age at different rates. Ageing can be described as the progressive constriction of the homeostatic reserve of every organ system. The decline to a large extent is influenced by diet environment and personal habits as well as by genetic factors (Krause, 2008). Successful ageing is not longevity alone but also sufficient well being in multiple domains, socially, physically and mentally. Avoiding disease, engagement with life and maintaining high physical and cognitive function are the three major components for successful ageing (Srilakshmi, 2008).

India is the second most populous country in the world with seventy two million elderly above sixty years of age, constituting approximately eight percent of the total Indian population. This number is low when compared to the developed countries but it is expected to rise by 150 percent (Saraswathy, 2010).

According, to Caeser, (2013) improvement in health care technology has resulted in increase in life expectancy. In India the elderly constitute about 7.4 percent .The total population of elderly by 2016 is likely to increase by 10 percent.

The number of persons older than 65 years of age has increased from four percent of the population in 1900 to 13 percent of the population and expected to reach 20 percent by the year 2030 (world population of ageing,2013).

Current trends in modern ways of living in urban areas lead to isolation, depression and poor dietary habits in the elderly and these are increasing the incidence of various

non-communicable diseases (NCDs) like diabetes, osteoporosis, osteoarthritis, cardiovascular disorder and emotional disturbances and so on(Majumar,2010).

Older persons experience a heavier disease burden. Over half of the older population has two or more co-existing, chronic health problems .As well, 7 to10 of the years lived after age 65 will include significant disability and major health complaints ,including pain and discomfort or reduced function in activities of daily living .Other serious health related problem ,such as malnutrition, dementia, visual and hearing impairment and incontinence further impact functional independence and the quality of daily living .Therefore it is important to recognize preventive health strategies which improve the accompanying discomfort and disability in older people (health status of elderly.2012)

A study of conducted by Roa (2003) points out that health indicated problems of the rural aged persons,tend to increase with advancing age and very often the problems aggravate due to neglect, poor economic status, social deprivation and inappropriate dietary intake. A high proportion of the total respondents stated that they were suffering from illness seriously. Lack of medical facilities in the village and poor economic conditions might be responsible for the low health status of the villagers. Hence, majority of landless rural aged were suffering from one or other health problems and physical disabilities.

Dzuvichu (2005) has mentioned that health is not only a biological or medical concern but also a significant personal and social concern. In general with declining health, individuals can lose their independence, lose social roles, become isolated, experience economic hardships, be labeled or stigmatized, change their self perception and some of them may even be institutionalized.

Many of the diseases associated with the age and the ageing can be positively affected by an active life style.

Between 2000 and 2030 the number of adults worldwide aged 65 years and older is projected to move to 973 million. In the past century the leading cause of death has shifted from infectious diseases to chronic disease such as cardiovascular disease

and cancer, which may be influenced by the diet .Existing data indicate a significant morbidity among the aged most may remain subclinical (Albrecht,2011)

The National health and nutrition examination study III observed that the percent of men between 51 and 70 years old who consumed less than estimated average requirement (EAR) for protein was less than three percent for men above 71 years of age, The rate was 4.4percent and 5.9 percent for women above 71 years old, who consumed less than estimated average rate (EAR) for protein. Protein intake seems to be very important for providing some benefit in managing chronic disease .such as osteoporosis and sarcopenia (Martini, 2010). A potential effect of the protein intake on bone mass includes production and action of insulin like growth factor (Genarc, 2010).

Moreover, nutrient inadequacy can have an impact on their immune function as well as other aspects of their health .Hence the Indian national policy on older persons aims at providing an improved quality of life for elderly Indians.

In recent years elderly institution are becoming popular as they provide security, care and all the residential facilities.

Physical activity in older people is often restricted by weakness and muscle loss .Many factors including illness, sedentary life style, nutritional inadequacy or deficiencies and ageing may contribute to muscle weakness and loss of skeletal muscle mass in people of advanced age.

Exercise training in elderly subjects has proved to be beneficial in improving gait velocity, range of motion and endurance. Loss of independence and motion can become stressful issues for the elderly. Failing health may further increase problem of fearfulness, isolation and immobility.

Balamurugan et al., (2013) found that the rural aged suffered from nutritional, psychological and other problems, when compare to urban aged. Among the aged,those employed privately and those self employed had more of health problems than not gainfully employed persons. In general, the male members were found to be literates, economically independent and had less physiological and nutritional problems

when compare to the female counter parts.When literacy level, income level and employment status improve, they seem to have better health.

Depression can affect appetite, digestion, energy level, weight and well being. Older adults are likely to achieve integrity if they continue to be psychologically intimate with others or committed to something, such as family, friends, religion, career that gives –meaning to their lives. Being part of a family or group and feeling confident and optimistic about their lives are other measures of integrity for older adults. A good nutritional status coupled with sound mental health and physical fitness will make every senior citizen lead a healthy and quality life.

People who perceive their friends and family members as supportive during times of need have a stronger sense of meaning in their lives; that is, they live their lives with a broader purpose, adhering to a value system that fits within the larger social world (Krause's ,2007). The elderly have a much higher risk of depression than the young because major losses tend to take place in the later stages of life eg. medical illnesses, changes in physical status, loss of income on retirement, death of parents and friends, loss of a life partner and changes in accommodation arrangements. Psychological disorders are characterized by a disorganization of thinking that affects logic and the perception of reality. Psychosis in old age is associated with hearing and visual impairment and social isolation. Agitation can be a problematic symptom, and concurrent depression can complicate matters. Antipsychotic medication is usually prescribed at low doses (health library, 2013).

Elderly Nutrition Programs (ENP) include nutrition assessments, health screenings, physical activity programs, connection to support services, education and counseling. Currently, about 87 percent of ENPs include a nutrition education component. These are as diverse as the populations they serve but they all share a common vision: to improve the know ledge, skills and behavior of older adults in order to enhance their health and well-being (Tucci, 2008).

Most elderly people continue to engage in learning throughout their lifetime and they tend to be more receptive to nutrition education. Quality of ageing life is a subjective and multidimensional concept that is recognized as a useful tool to measure

the welfare of the society. The World Health Organization has defined the quality of life as an individual perception of their position in life in the context of the culture and value systems and in relation to their goals and concerns. The idea of quality of life includes the aspects of health status, life style satisfaction, mental health and well being. (Kalyani, 2012).

The present study entitled, “Assessment of Nutritional Status, Life Style Behaviour and Health Condition of Elderly in Coimbatore City” is an attempt to evaluate the quality of life the nutritional status and health condition of a selected group of elderly with following objectives:

A. Assess the prevalence of malnutrition among elderly in urban areas of Coimbatore.
B. Find out the life style behavior and food and nutrient intake.
C. Determine the dietary pattern and health status of elderly.
D. Impart nutrition education based on the health condition

REVIEW OF LITERATURE

REVIEW OF LITERATURE

The Review of Literature pertaining to the study entitled “Assessment of Nutritional Status, Life style behaviour and Health condition of Elderly in Coimbatore City”, is discussed under the following headings.

A. Demographic profile of elderly
B. Morbidity pattern of elderly
C. Dietary practices of elderly
D. Physiological changes in elderly
E. Life style pattern of the elderly
F. Social issues and emotional changes in elderly

A. DEMOGRAPHIC PROFILE OF ELDERLY

India has around 100 million elderly at present and the number is expected to increase to 323 million constituting 20 percent of the total population by 2050 (Kameshwaran, 2013).

The world ageing population is ten percent of the total population and it is expected to increase to 21.1 percent in 2050. As per current situation the major segment of this growth takes place in developing countries and more than half in Asia particularly in India and China (Pichaipillai, 2012).

India’s population of ages 60 and older is projected to increase dramatically over the next four decades, from eight percent in 2010 to nineteen percent in 2050, according to the United Nations population Division. By Mid-Century, this age group is expected to encompass 323 million people, a number greater than the total U.S Population in 2012 (Paola Scommegna, 2012).

China’s population has grown to 1.34 billion in a decade, according to results from the country’s first census (China, Demography, 2013).

In 2011, aged population (65 years and over) was 29.75 million, constituting 23.3 percent of the total population and marking a record high. This percentage of elderly in the population is the highest in the world. The speed of aging of Japan's population is much faster than in advanced western European countries or the U.S.A. Although aged population in Japan accounted for only 7.1 percent of the total population in 1970, 24 years later in 1994, it had almost doubled in scale to 14.1 percent. In other countries with an aged population, it took 61 years to in Italy, 85 years in Sweden, and 115 years in France for the percentage of elderly to increase from 7 percent to 14 percent of the population.

Elderly women usually face more risks than elderly men in terms of income, disability and access to health care services and social health insurance (Hanoi, 2012).

Over the twenty year period from 1950-1970, the proportion of people in the population aged 65 and over was five percent. In 1980 this age group began to increase. The United Nations has predicted that it will rise to 10 percent in 2050.In 1950, 34 percent of the world's population were children and 8 percent consisted of people over 60 years. In 1950, the life expectancy was 46 years, compared with 65 years in 2000 and it is projected that it will be 76 years by 2050. This means that the increase in absolute numbers of older people around the world will be dramatic. In 1970, the number of older people was around 200 million. This is expected to be as much as 828 million in 2025. The United Nations predicts that one person in seven in the world will be over 60 years in 2025. In 2050, in developing countries, the figures are expected to rise from 8% to 19 % (United Nations,2000).

Pakistan's demographic trends show that between 1990 till 2010, the population aged 60 plus years increased by 75.1 percent. It is projected that the life expectancy will increase to 72 years by 2023 (Ageing and Elderly in Pakistan, 2012)

WHO report (1998) projected that 5.6 percent of Pakistan's population was over 60 years of age, with a probability of doubling to 11 percent by the year 2025. Hence, the country needs to develop a National health policy for the ageing, which would assist in integrating the ageing population and offer them better social security and health care (Ageing and Elderly in Pakistan, 2012).

B. MORBIDITY PATTERN OF ELDERLY

According to Anderson et al., (2009) increasing age and coexisting congestive atherosclerosis have significant effects on the prevalence of secondary forms of hypertension.

Basnet et al., (2011) found that the high prevalence of coronary artery disease and its risk factors in the urban population of elderly in South and North India.

Nowson et al., (2011) found that among elderly population of more than one third had depressive symptoms, one fifth were at risk of malnutrition, more than half were either overweight or obese and depressive were associated with a poor appetite.

Arthritis occurs in approximately 17 million older adults; two fifths of those older adults with arthritis have functional limitations due to the condition (Nakasato, 2011).

Hypertension is highly prevalent in the elderly, several epidemiological surveys conducted in the USA and Europe conclude that hypertension prevalence in the elderly ranges between 53 percent and 72 percent (Assimia, 2012).

Quresli et al., (2012) suggested that a significant prevalence of geriatric depression was reported. In order to reduce is prevalence. General physicians and health care professionals needs to be sensitized about geriatric depression and its risk factors.

Sutapa (2012) stated that, elderly who are living alone have poorer health status, in terms of self reported prevalence of acute and chronic ailments, than elderly who are living with their family. Therefore, there is a strong need for interventions to ensure the health of this most vulnerable group and to create a policy to meet the care and need sociologically. Epidemiological and qualitative research, with data based on a wider range of living arrangements is needed to explore the influence on the health of the elderly.

Amir Aslani (200) founded points out that aortic atheroma is present is in 25 percent of elderly patients with ischemic stroke ceratoid artery stenosis.

According to Shinji et al (2007) the isolated systolic hypertension increases with age.

Henein (2010) suggested that, the prevalence of various degrees of age related behaviour changes. A large proportion of Elderly men and women have blood abnormalities (Panagio tako, 2010).

According to Zhenyun et al., (2011) the higher prevalence of depression in the Chinese older population compared with those reported two decades ago. Family support and health status were the most significant protection factors for depression in Chinese older adults. Traditional Chinese culture, which values family significantly and contributed to the previously reported lower prevalence rate, changed dramatically, which may explain in current higher prevalence. In addition to the deterioration of family support is worsening of health status is another significant factor.

Manjit et al., (2012) founded that, high prevalence of caries coronal, root periodontal disease and edentulousness immediate for oral health services for the Elderly in Chandigarh. Hilary King et al., (2012) stated that, “diabetic epidemic will continue even if levels of obesity remain constant. Given the increasing prevalence of obesity, is likely that these figures provide and underestimate of future diabetes prevalence.

Seokbum et al., (2011) found that in Elderly Korean, Musculoskeletal (MSK) pain is a common problem, the female gender was found to be the most consistent and important factor of Musculoskeletal pain in the Korean Elderly.

In 2010, the prevalence of obesity among 60 years and older is estimated to reach 37.4 percent which reflects an increase from 32 percent reported in 2000 (Laura P Sands, 2010).

In contrast, after age 65 to70 years, body fat content tends to decrease even in healthy individuals and unexplained weight loss. Older persons, as many as 30 percent to 50 percent are reported to suffer from protein energy malnutrition (Andrew, 2000). The prevalence of dementia increase with age, particularly after the age of 80 years, ageing is related vascular associated brain atrophy which causes an increased in performance on timed and untimed cognitive tasks. It seems likely that patho physiological abnormalities such as atherosclerosis cause vascular associated brain atrophy, which then cause cognitive impairment. (Folstein, 2010).

Morbidities associated with musculoskeletal system (38.8%) were the predominant health problems. The burden of chronic disease was high among the elderly. Musculoskeletal

and ophthalmic morbidities were the major health problems found. Elderly face a unique nutritional problem, where one fifth were found to be obese.(Amalraj, 2011).

Malnutrition is associated with poor health status and high mortality. It is therefore essential to assess the nutritional status in this population in order to identify patients with malnutrition, to determine the causes of this condition, and to try to correct these. Anthropometric parameters play a key role in nutritional assessment. (Mas Caro, 2013).

Old age pension scheme has to be implemented especially in the rural areas for the elderly people to make them financially independent. It has to be revised frequently based on consumer price index. Geriatric health care service be made a part of primary health care services, mandatory training for all the health care providers in the primary and secondary health care services. (Olga Torres, 2011).

Meydani et al., (2010) found that, elderly have higher rates of pneumonia associated morbidity and mortality. Pneumonia is one of the top five leading causes of death among older adults.

Saraswasthy et al., (2010) stated that, the prevalence of osteoporosis and its associated risk factors among post menopause. It was concluded that although the associated risk factors among post menopause and family history is indispensable , the dietary inclusion of sufficient quantities of milk from an early age can reverse the chances of osteoporosis development upon adulthood.

Visual retinol and cortico deteriorates by altering the functioning of both mangocellular and parvocellular visual pathways among elderly (Justino ,2001). Long term smoking is closely associated with higher risk of cerebrovascular disease that leads to vascular dementia (Maeng jecho,2003).

C. DIETARY PRACTICES OF ELDERLY

The general principles for planning a nutritious diet for the Elderly are similar to those for younger adults. The importance of a balanced intake of foods from all food groups should be

emphasized, when significant nutrient sources such as milk are voluntarily eliminated from the diet. Alternatives that supply the missing nutrient should be substituted (Krause's, 2008).

Vulnerable older adults, like older women, minorities, rural living and the poor are at greatest risk for mal nutrition. As ageing is a risk factor for under targeting older adults for dietary supplementation may help them overcome the detrimental effects of under nutrition. However, there remains to consensus on the best method to improve dietary intake to meet energy, protein and other nutrient requirement, and there by improve the body weight and body composition, physical and cognitive function, and other health outcomes. (Dietary requirement of Elderly, 2009).

Protein and calcium intake should be considered in the preventive or treatment of chronic diseases .(Araiyo, 2010).

Vatan parast et al., found that, recommended calcium intake should be balanced against the likely benefits of calcium on bone, particularly in elderly women. Calcium supplementation should be assessed more carefully to evaluate the risk of cardio vascular disease as the primary outcome.

Ebehara et al., found that, frequent consumption of green tea was associated with a lower prevalence of depressive symptoms in the community dwelling older population.

Nutrition and nourishment are the most basic requirement of an individual, for the protection of health and promotion of well being influencing the quality of life of an individual. The primary function of the teeth is mastication; tooth loss is likely to reduce masticatory abilities leading to detrimental changes in the food choices, thereby increasing the risk of certain systemic diseases. One of the most likely mechanisms by which impaired oral health may affect diet is that difficulty in chewing or loss of teeth causes dietary restrictions. Old people with less number of teeth consumed fewer vegetables, less dietary fibers and carotene than people with 25 or more teeth. Tooth loss was associated with a lower intake of foods which are hard to chew, such as apples and carrots.

Age related changes are related as an adaption to the Natural decrease in energy requirement but also predispose older people to malnutrition by increasing the risk of an extreme reduction in food intake. If additional risk factors such as disease develop, dietary intake is often no longer sufficient to meet the requirements (Soderstrom, 2013).

Morley et al., found that drug therapy can also negatively affect nutritional status through the side effects often caused by poly pharmacy, such as decreased appetite, nausea alterations in taste and smell, dry mouth, constipation, diarrhea, and confusion.

Acdziokowska (2006) points out that during diabetes, pathologic lesions develop in oral cavity, thereby it affects the hygienic status.

According to Promslaw et al.,(2002) increasing protein consumption appears to be beneficial for women with low calcium intake.

D. PHYSIOLOGICAL CHANGES IN ELDERLY

Aging, an inevitable and extremely complex, multifactorial process, is characterised by the progressive degeneration of organ systems and tissues. It is largely determined by genetics, and influenced by a wide range of environmental factors, such as diet, exercise, exposure to microorganisms, pollutants, and ionising radiation. This explains why two people of the same age may differ markedly in terms of both physical appearance and physiological state. Gender also plays a part and, in most developed countries, women typically outlive men by 7–10 years (J. Knight and Y. Nigam 2008)

As a person grows older his organs show reduced ability to perform physiological functions. This is because there is cell loss and reduced cell metabolism. For example rate of blood flow through kidney is reduced by 65 percent. In a glucose tolerance test the blood sugar level takes a longer time to return to the normal level. Such and similar changes take place while ageing (Krause's, 2008).

Cross sectional studies indicates that the age related loss in strength is associated with poor function because muscle strength appears to be a critical component in maintaining physical function, mobility and vitality.

Emerging evidence suggests that fat accumulation with in skeletal muscle is associated with muscle weakness, poor function and increased risk of incident mobility limitation (Won Park, 2009).

The senses of **smell** and **taste** can also diminish as a natural consequence of aging, which can decrease interest in and appreciation of food. Fifty percent of people

over the age of 65 have decreased ability to smell, and 75% of people between the ages of 80 and 97 have an impaired sense of smell (Bernstein & Luggen, 2010).

Physical changes of ageing occur in nearly every major system of bodies. The skin becomes less elastic and more lined and wrinkled skin due to loss of subcutaneous fat. Hair it's normal for hair gradually thin on the scalp. As hair pigment cells decline in number, grey hair growth increases. Height it's common changes in posture and compression of joints, spinal bones (Healthy Ageing ,2011).

The oral health, nutrition can be comprised by poor health (Sahyoun et., 2003),tooth loose and dentures and xerostomia (dry mouth) can lead to difficulty in swallowing.

Emerging evidence suggests that fat accumulation within skeletal muscle is associated with muscle weakness, poor function and increased risk of incident mobility limitation (Park, 2009).

The decrease in the sense of taste and smell may cause dislike of the consumed foods and may create risks for the nutritional condition due to decrease in appetite.(Ankara, 2006)

The decrease in the number of teeth and usage of dental prosthesis complicates the disintegration and chewing of some foods. The decrease in the evacuation rate of the foods in the stomach may create a long-term satiety sense.(Ankara , 2003)

The multiplication of the immunity cells slows down and the body resistance to the infections decreases. The amount of lean body tissue is decreases and the amount of fat tissue is increases. , After the age of 80 and later the speed of reduction in the fatless tissues increases. The amount of lean body tissue in the women is less than the men. The decrease in the amount of lean body tissue masses affects walking and balance by causing decrease in the amount of muscles and their strength. This factor increases the risk of falling and fracture.(world health organization ,2007)

The dry mouth which is a result of reduction in the saliva secretion affects the intake of food and complicates the swallowing of food. Dry mouth conditions may occur as a result of the treatment by medicines as Well as being a result of aging .The swallowing of the chewed foods becomes complicated. This complication may reduce the appetite for food and the frequency of eating. (Ankara ,2007)

Micttinam et al., (2011) found that lower synthesis and absorption of cholesterol , and low serum cholesterol level are associated with deteriorating health and indicate impaired survival in old age.

Low serum and total selenium concentration are associated with an increased risk of death among older man and women living in the community. This work provides some early insight the relation between antioxidant and mortality among older person (Amanda , 2011)

F. SOCIAL ISSUES AND EMOTIONAL CHANGES IN ELDERLY

Older adults promotes a focus on optimizing emotional satisfaction in the present moment, in the last decade, researchers began to examine the consequences of this motivational shift for cognitive processing. Specifically, mood-enhancement goals presumably render older adults more sensitive to positive information and less sensitive to or avoidant of negative information, a phenomenon termed the “positivity effect. Practically speaking, age-related shifts in the overall ratio of positive-to-negative material attended to or remembered have the potential to improve momentary mood and longer term well-being (Social changes of older people, 2007).

Older adults who reported being useful to their friends and family had lower rates of disability and mortality seven years. Later compared to older adults who rated themselves as lower on perceived usefulness to their social work under social issues (Seeman, 2007).

Theories of emotional-motivational life-span development propose normative shifts in emotional goals and strategies across adulthood. Socio emotional selectivity theory, for example, holds that anticipated endings such as the sense that lifetime is running out give primacy to enhancing emotionally gratifying experiences in the moment as opposed to maximizing future rewards (Cartensen, 2007).

Older adults increasingly favor affect optimization over affect complexity. The life-span theory of control holds that individuals’ capacity to control their environment and achieve their developmental goals declines in older adulthood. Consequently, older adults increasingly use secondary control strategies, such as emotion regulation, aimed at changing the self in order to adjust to a given situation, rather than using primary control strategies that change the situation itself (socio emotional changes of ageing, 2007).

Adding to selective and compensatory changes in emotional preferences and strategies, it is possible that learning and practice effects make older adults more competent at emotional regulation (Emotional changes of older people, 2007).

Older people are often perceived as lonely, hopeless, and sad. Even older adults who report high levels of satisfaction frequently express beliefs that most other older people are not faring well (Lachman, 2008).

Elderly people are indeed, facing mounting physical ailments, psychological stress, social losses, and increased dependency at the very end of life, most of the older people are well adjusted emotionally for the bulk of their later years (nessorlad, 2008).

Older people are commonly perceived unsuitable in employees part of a demographic that is not worth advertising to because they are already “Set in their ways”. Socialization and relationship are very important to a human’s well being. Positive emotions experienced during social interactions are considered accented reason why social interactions may benefit cognitive functioning social issues (Michaltocoski, 2008)

Emotional changes that lead to improved well-being, such as attending to positive more than negative information, can diminish older adults’ decision-making abilities and learning in certain situations. Compared with younger adults, older adults perform more poorly on tasks involving avoidance learning (Khutsen, 2008).

Naturally, individual differences are apparent; Improvements to well-being are general trends, not guarantees. Disposal tendencies, life events, and individuals’ management of such events can all influence whether well-being improves or deteriorates with age. Nevertheless, research suggests that reasonably high levels of affective well-being and emotional stability are the norm rather than the exception at least until after adults reach 70 or 80 years of age (Staudingar, 2009).

At first sight, the trajectory of emotional aging may appear surprising. Given that older adults are confronted with bodily deterioration, increasingly frequent health problems and memory failures, and losses in mobility and in the social worlds. One possible explanation, which has recently received much attention, is an increasing motivation to regulate emotional states and increasing competence to do so (Cartensen, 2009).

Ageing is naturally associated with endings; therefore, the theory predicts motivational changes with age. However, the same motivational changes can also occur in contexts other than aging that are associated with a limited time perspective (socio emotional changes, 2009).

Specifically, the long-term experience and practice in dealing with emotional situations should lead older adults to acquire situational, strategic, and procedural knowledge about emotional processes that increase their effectiveness in handling emotional situations. For example, with age, people may become more about the emotional effects of future events (Scheibe, 2009).

Lockenhoff et al.,(2008) demonstrated that when older people are explicitly provided different goals-specifically, goals about accuracy-the effect was eliminated. Hypothesized and found that the perception of threat represents an adaptive exception to positivity. In the face of threat, focusing on positive information would be maladaptive.

Arguably more illuminating are findings showing that reduced activation in response to negative experience is accompanied by increased activation in cortical regions associated with regulatory control. Moreover, neuroimaging studies indicate that a brain region which becomes less sensitive to negative stimuli with age are activated in older adults by stimuli other than negative valence. For example, novelty in combination with negative valence produces comparable amygdale activation in both young and older adults the activation of several other sub cortical and cortical regions responsible for emotional processing is modifiable through experiential manipulation (Carstensen ,2007)

Older people emotions occur in social contexts, choice of social partners could reflect antecedent-focused regulation. There is ample evidence that older adults tend to prefer familiar social partners and have smaller social networks, with a higher percentage of emotionally close partners, than younger adults (Carstesen, 2009).

The brain grows older; a person’s capacity for reasoning begins to decline. In actuality, there is very little truth to this. A senior citizen’s intellectual capacity remains the same well into old age and as little as 1% of the population will live long enough to be affected by senility. While the elderly are just as intelligent as younger people, they sometimes process information more slowly or must repeat a new skill several times before the steps become second nature (Rowe, 2010)

Elderly people become less physically able to engage in favorite hobbies, drive themselves to appointments or take care of things around the house, they often mourn their loss of independence. It is difficult to rely on others for essential care or even to ask for small favors at times – particularly of the people who once relied upon them for daily assistance **(** Ageing health association ,2007)

Mental or physical disabilities about two third of all people 65 or older need help with at least one “daily living: activity, such as preparing a meal (Federal Indigence form on ageing related statistics, 2010).

Ageing seniors themselves and typically their families try to ignore the need for seeking expert advice and for planning for final years the inability to pay for service or medical care, hospitalization or sudden illness or some other precipitating event that result in action being taken. Assets are already depleted, interventions have not been pursued and the family is not ready to accept responsibility for over sight and care.

Elderly people can lose their independence simply because of advanced age and general weakness and frailty requiring intervention and support from other people, risk of dementia or a loss of cognitive capacity increases considerably as one grows older. For aged people who are age so and above, the risk of dementia is almost 50% (Social issues and facing society of Elderly, 2010).

Social issues can have a significant impact on life and both physical and mental health of elderly. Lone lines from losing a spouse and friends, inability to independently manage regular activities of living, difficulty coping and accepting physical changes of ageing, frustration with ongoing medical problems and increasing number of medications. Social isolation as adult children are engaged in their own lives. Financial stresses from the loss of regular income. (Social issues of Elderly, 2014).

METHODOLOGY

III. METHODOLOGY

The methodology pertaining to the study entitled “Assessment of Nutritional Status, Life Style Behavior and Health Condition of Selected Elderly in Coimbatore city” is discussed under the following headings.

A. Selection of area

B. Selection of sample

C .Conduct of the study

1 .Formulation of interview schedule and Collection of data on socio economic, health status and life style.

2. Assessment of nutritional status

a. Recording the Anthropometric measurements

b. Eliciting the dietary habits

c. Examination for Clinical symptoms

d. Estimation of blood glucose and lipid profile

A. Selection of area

The study was conducted in Coimbatore city. Both old age homes and community dwellings in urban areas were selected for the study.Three old age homes namely St’ Joseph home for the aged destitue situated in Podanur , Anbalayam maruvazhvu illam situated in Vadavalli and Neyam old age home situated in Vadavalli were selected. The urban areas selected were Thotta salai, Samiyappan Street and Nanjundapuram. The old age homes and urban areas were selected for the study by judgment sampling method.

These old age homes were selected as the authorities were co-operated and consented to give permission to carry out the study in their homes.

.**B.SELECTION OF SAMPLE**

A total number of 200 elderly subjects were selected, among which 100 subjects were from urban community dwelling and 100 subjects were from the old age homes. Easy approachability, good response and consent from the subjects were the reasons for the selection. The elderly were selected by random sampling method. Both male and female elderly subjects in the age group of 60 to 90 years and those who were willing to participate in the study were included.

The exclusion criteria for the selected participants included 1. The following elderly subjects below 60 years of age, 2.Subjects with abnormal mental health and 3.Subjects unwilling to participants.

The proposal for the research was reviewed and approved by the Institutional Human Ethics Committee (IHEC) of Avinashilingam Institute for Home Science and higher Education for Women. All the subjects were informed about the need for the study and their consent was obtained. A copy of the IHEC clearance certificate is attached in **Appendix – I**.

C. CONDUCT OF THE STUDY

1. Formulation of interview schedule and collection data

Interview method is one of the important and powerful tools for the data collection in social research (Saravanavel, 2007). It is known as face to face contact with persons selected for interview (Khan zode, 2007).

An interview schedule was formulated by the investigator to collect the details of the subjects regarding socio-economic status, life style, health status and food habits Personal interview method was used to collect the data from the elderly. The investigator recorded the information as the selected subjects answered the questions.

To elicit the socio-economic status, the details regarding age, gender level of education, type of family, occupational status and source of income were elicited and recorded. Plate-I shows interview being conducted by investigator.

PLATE I

INTERVIEW BEING CONDUCTED BY THE INVESTIGATOR

Dietary patterns are frameworks that people tend to follow when making choices about what to eat. Dietary patterns have been used to identify typical combinations of foods that may be associated with disease risks. A number of factors can dictate what people eat and many of these factors overlap in various ways *(*Rastogi, 2008*).*

Dietary pattern play an important part in assessing the health status of the elderly. In dietary assessment details regarding food habits, foods included and excluded, type of food consumed and special foods consumed during sickness were elicited.

To assess the health status details regarding medical problems, surgeries under gone, type of treatment and sleeping problems were evaluated.

The life style patterns of elderly need special concern as it greatly contributes to the risk .Hence, information like exercise pattern, leisure time activities, smoking, beverages and alcohol consumption were elicited.

The Mini Nutritional Assessment (MNA) tool, Which is a validated, reliable and easy to use nutritional assessment technique recommended by NHCN was used in the present study .This tool was developed to assess nutritional status as part of the standard evaluation of elderly persons aged 60 years and older. Since the MNA tool uses a combination of different types of assessment, it gives accurate result compared to those obtained by anthropometric assessment alone.

a. Recording the Anthropometric Measurements

Nutritional anthropometry is concerned with the measurement of the variations in the physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition (Jelliffe, 2001).

Anthropometric measurements such as height, weight, waist circumference, hip circumference and calf circumference were recorded for all the two hundred selected subjects. The BMI and waist hip ratio were calculated.

i. Height

The height of an individual is made up of studies body proportion; the measurements are required in field nutritional anthropometry usually only the total height is measured (Jelliffe, 2001).

The height of the subjects were measured by marking the graduations on the straight wall. Subjects were made to stand straight with head facing forward, shoulders relaxed, arms hanging loosely at sides with palms facing forward, feet together and knees straight. Heels, buttocks and shoulder blades touching the vertical back wall, shoes removed, wearing minimal clothing. A vertical scale was placed touching the head of the subjects and the wall. Marking corresponding to the head was recorded nearest to 0.1 cm. Plate II indicates height being measured by the investigator.

ii. Weight

Weight is the anthropometric measurement most in use. In developing region, the prevalence of disease appears to be indicated by weight deficiency in all age groups. Weight is the key anthropometric measurement (Jelliffe, 2001)

A portable bathroom scale was used for measuring weight of the subjects. Initially the balance was set at zero and checked for accuracy and sensitivity by using a standard weight. After each measurement it was rechecked for zero error and accuracy. The subjects were asked to wear light clothing and step on to the balance with bare foot and stand erect. Then the weight was noted nearest to 0.5 kg. Plate III indicates weight being measured by the investigator.

iii. Body Mass Index (BMI)

Body mass index is a simple indicator of total body fat or obesity. The most effective diagnostic examination is to look at the person and to decide whether the subjects are under weight, normal, overweight or obese.

PLATE II

MEASUREMENT OF HEIGHT TAKEN BY THE INVESTIGATOR

PLATE III

MEASUREMENT OF WEIGHT TAKEN BY THE INVESTIGATOR

According to WHO (2010) Body Mass Index can be calculated using the formula,

BMI = Weight in kg/Height in m²

Using the formula, body mass index of all selected elderly were computed and the extent of adiposity determined.

iv. Waist circumference

The waist circumference was taken at the horizontal plane mid-way between the lowest rib margin and the iliac crest when the chest is exhaled. The widest point of the hip was used to measure the hip circumference (Fernando, 2010).

With the help of a non -stretchable measuring tape the waist circumference was measured to the nearest of 0.1 cm.

v. Hip circumference

By making the subject stand with both feet together the hip circumference was taken. A non- stretchable tape was passed round, the hip horizontally and circumference was measured. The circumference was marked to the nearest millimeter. (Fernando ,2010)

vi. Waist to hip ratio

Waist and hip circumferences were measured when the subject was standing erect with abdominal muscles relaxed, arms at sides and heels together. The waist hip ratio were calculated using the values of waist and hip circumferences (Fernando, 2010).

$$\text{Waist Hip Ratio (WHR)} = \frac{\text{Waist circumference (cms)}}{\text{Hip circumference (cms)}}$$

c. Examination for clinical symptoms

Clinical examination has always been and remains an important practical method for assessing the nutritional status of a community. The method is based on examination for changes , believed to be related to nutrition , that can be seen or felt in superficial epithelial tissues , especially the skin , eyes, hair and buccal mucosa or in organs near the surface of the body such as the parotids and thyroid glands (Jelliffe ,2001)

With the help of the clinical assessment proforma recommended by ICMR the investigator examined all the selected elderly subjects for symptoms related to nutritional deficiency and recorded.

d. Biochemical Assessment

Bio chemical estimations of nutritional significance can be carried out on variety of body tissues in field survey. Tests are confined to fairly easily obtainable body fluids (Jelliffe, 2001). Most of the nutritional deficiencies are characterized by changes in body fluids and tissues. The bio -chemical indicators used in the present study were blood hemoglobin levels, blood lipids, blood glucose and blood pressure.

i. Estimation of hemoglobin

Then hemoglobin estimation is associated with the examination of thin blood films and haematocrit estimation (Jelliffe, 2001).In the present study haemoglobin content was measured by making a bold finger prick by sterile disposable lancet and a drop of blood was collected on test strip provided with HCS. The absorbed blood drop on test strip was matched against the standards by moving it up and down behind holes in the centre of each color standard, to determine the value of hemoglobin.

ii. Estimation of lipids

Persons under going lipid assessment should be fasting (for a recommended 12 hours) at time of blood sampling .Fasting is necessary because triglycerides levels rise and fall dramatically in the postprandial state. Total cholesterol, triglycerides and lipo proteins were estimated using standard procedure.

iii. Blood glucose estimation

Blood glucose estimation includes a simple finger-stick test, which uses only a drop of blood and gives the glucose reading in a few seconds. Impaired fasting glucose was defined based on WHO criteria, fasting capillary blood glucose ≥110 and <126 mg/dl. Impaired glucose tolerance was defined according to WHO criteria, where 2 h capillary post-glucose value is ≥160 but <220 mg/dl (Pradeep, 2011).

iv. Blood pressure

Blood pressure of the sub samples was checked and recorded using sphygmomanometer.

RESULTS & DISCUSSION

IV .RESULTS AND DISCUSSION

The results of the current study entitled, **"**Assessment of Nutritional Status, Life Style Behavior and Health Condition of Elderly in Coimbatore City", is discussed under the following headings.

A. Socio economic status of the selected elderly.

B. Nutritional status of the selected elderly.

1. Mini nutritional assessment

2. Anthropometric measurements

3. Dietary habits

4. Clinical assessment

5. Bio chemical estimation

C. Life style pattern of the selected elderly

D. Health status of the selected elderly

A. Socio economic status of selected elderly

1. Age and gender

The results of the socio economic status of the selected elderly are presented and discussed in the following**.** Table I and figure1 and 2 present the data on age and gender of the selected elderly subjects in community dwelling and old age home.

TABLE I

DISTRIBUTION OF THE SELECTED SUBJECTS ACCORDING TO AGE AND GENDER

Age (Years)	Community dwelling (N=100)				Old age home (N=100)					
	Male	%	Female	%	Male	%	Female	%	Total	%
60-70	19	9.5	21	10.5	13	6.5	22	11	75	37.5
70-80	16	8	20	10	14	7	19	9.5	69	34.5
80-90	14	7	9	4.5	16	8	15	7.5	54	27
90 above	-	-	1	0.5	1	0.5	-	-	2	1
TOTAL	49	24.5	51	25.5	44	22	56	28	200	100

From Table I it is evident that 37.5 percent of the elderly were in the age group of 60 to 70 years and 34.5 percent were in the age group of 70 to 80 years. The number of elderly subjects were more in 80 to 90 years. It is also clearly evident that the percentage of the elderly in the age group of 80 to 90 years was more in the old age homes when compared with community dwelling. Maximum number of subjects belonged to 60 to 70 years age group indicating lesser population in higher age groups.

Both in community dwelling and old age homes number of female subjects were more compared to male subjects.

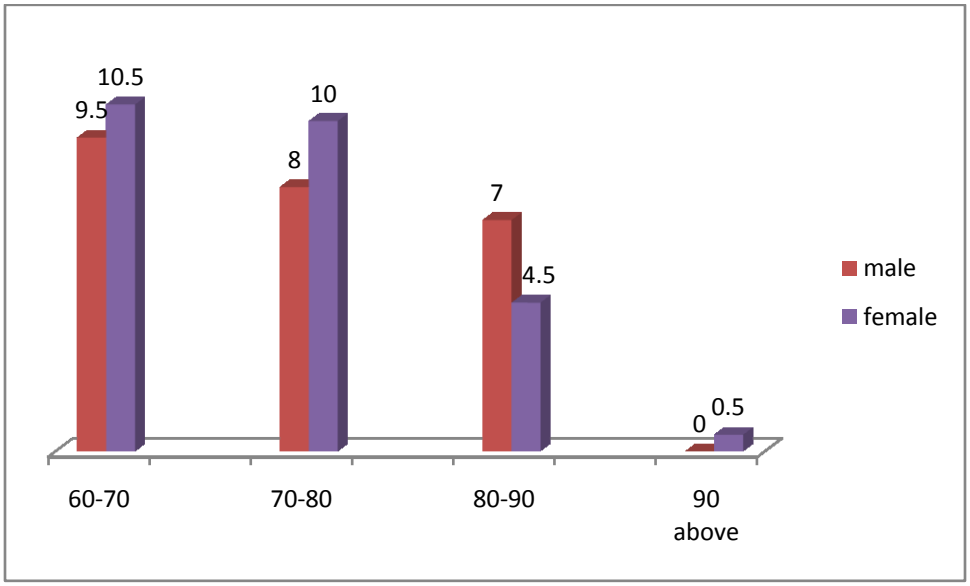

Figure 1

COMMUNITY DWELLING

AGE IN YEARS

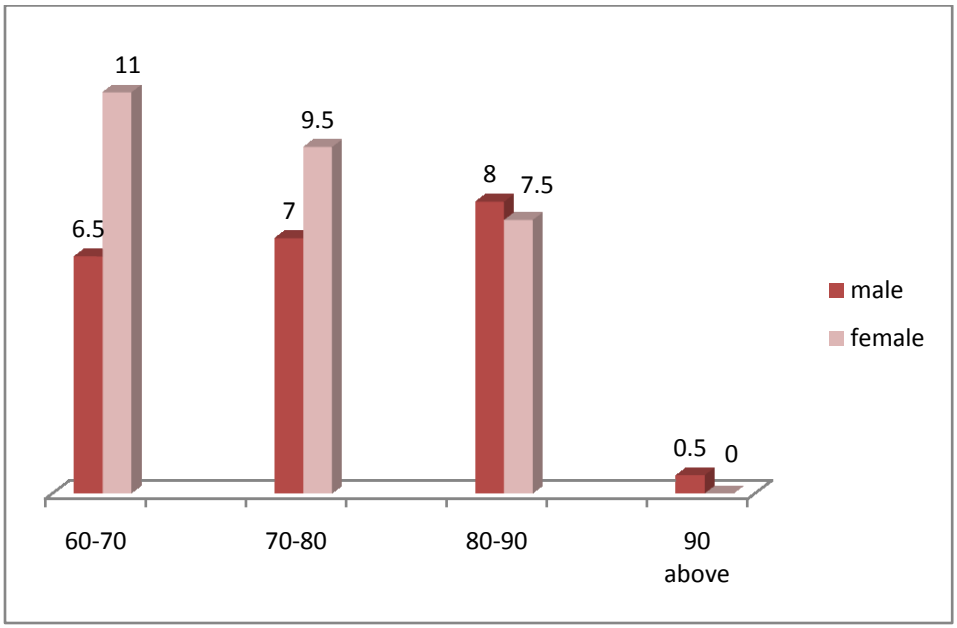

Figure 2

OLD AGE HOME

AGE IN YEARS

2. Educational Status

The selected elderly were classified according to their educational status and the results are shown in Table II.

TABLE II

EDUCATIONAL STATUS OF THE SELECTED ELDERLY

Education	Community dwelling				Old age home					
	Male	%	Female	%	Male	%	Female	%	Total	%
Literate	37	18.5	34	17	29	14.5	38	19	138	69
Illiterate	12	6	17	8.5	15	7.5	18	9	62	31
TOTAL	49	24.5	51	25.5	44	22	56	28	200	100

From Table II it is observed that 35.5 percent of elderly in community dwelling and 33.5 percent of elderly in old age home were literates. The number of literates and illiterates was equal in both the dwellings. In general 70 percent of the elderly were literates and 30 percent were illiterates.

3. Occupational Status

The selected elderly were classified according to their occupational status and results are shown in Table III.

TABLE III

OCCUPATIONAL STATUS OF THE ELDERLY

Occupational Status	Community dwelling				Old age home					
	Male	%	Female	%	Male	%	Female	%	Total	%
Working	19	9.5	17	8.5	-	-	-	-	36	18
Not working	30	15	34	17	44	22	56	28	164	82

Total	49	24.5	51	25.5	44	22	56	28	200	100

Table III depicts that 18 percent of the elderly were working and the remaining 82 percent of elderly were not in to any kind of job. Those who were working were living with family (community dwelling) while none of the elderly in the old age home go for any job after retirement. The number of elderly without work was more in the old age homes compared to community dwelling.

4. Source of income

The source from which the selected elderly got money was studied. The results are presented in Table IV.

TABLE IV

SOURCE OF INCOME OF THE SELECTED ELDERLY

Source of income	**Living with Family**				**Old age home**					
	Male	**%**	**Female**	**%**	**Male**	**%**	**Female**	**%**	**Total**	**%**
Pension	4	2	2	1	2	1	-	-	8	4
Salary	19	9.5	12	6	-	-	-	-	31	15.5
Investment (house rent)	3	1.5	7	3.5	-	-	-	-	10	5
Income from son/daughter	14	7	12	6	16	8	22	11	64	32
Other Earnings	9	8	18	9	15	7.5	16	8	58	29
No income	-	-	-	-	11	5.5	18	9	29	14.5
Total	49	28	51	25.5	44	22	56	28	200	100

Source of Income of the selected elderly depicted in Table IV point out that the main source of income for all the categories of elderly was from son or daughter. They lived both with their family or in old age homes. But those who lived with family or in community had some source of income through employment. But all those who did not have any income lived in old age homes. But some of them got minimum amount of earnings from other sources through government elderly schemes.

B. Nutritional Status of the selected elderly

The nutritional status of the selected elderly was assessed through Mini Nutritional Assessment (MNA), anthropometric, dietary, clinical and biochemical examinations. The results are presented in the Table V.

1. Mini nutritional assessment score

The data collected using Mini Nutritional Assessment tool is depicted in Table V

TABLE V

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

Malnutrition indicator score	Community dwelling		Old age home			
	Male Mean ± SD	Female Mean ± SD	Male Mean ± SD	Female Mean ± SD	Total	
					No	%
24 – 30 Normal Nutritional status	26.5 ± 1.33 (20)	25.6 ± 1.33 (18)	24.5 ± 1.36 (16)	26.6 ± 1.80 (19)	73	37
17 – 23.5 At risk of Malnutrition	21.68 ± 1.68 (21)	18.15 ± 1.94 (18)	20.15± 1.38 (19)	5.95 ± 1.48 (22)	80	40
Less than 17 Malnourised	16 ± 0.92 (8)	16.53 ± 0.53 (14)	16.5 ± 0.93 (9)	15.34 ± 1.48 (16)	47	23

***Values in parenthesis indicate number of subjects**

Mini Nutritional Assessment tool was used to assess the level of malnutrition among the selected elderly in both the dwellings.

The results showed that the number of female elderly residing in old age homes were more in the category of "At risk of malnutrition" (22) and malnourished (16) when compared with community dwelling female elderly. The number of male elderly residing in community (21) and old age homes (19) were more or less similar both in the category of risk of malnutrition and malnourished.

The number of elderly in the category of normal nutritional status was high in community dwelling when compared to the elderly residing in old age homes. Twenty three percent were homes found to be malnourished.

On the whole 40 percent of the elderly were "At risk of malnutrition" in both the dwellings. **From old age homes were found to be malnourished.**

2. Anthropometric measurements

a. Body Mass Index

The body mass index was calculated from height and weight for all the selected elderly subjects. The mean BMI is classified according to the BMI classification recommended by World Health Organisation (2010) is presented in Table VI and figure 3 and 4.

TABLE VI

DISTRIBUTION OF THE SELECTED SUBJECTS ACCORDING TO BMI CLASSIFICATION

*Category	Community dwelling				Old age home					
	Male	%	Female	%	Male	%	Female	%	Total	%
<18.5 Under weight	17	8.5	18	9	20	10	22	11	77	38.5
18.5 – 24.9 Normal	22	11	21	10.5	15	7.4	18	9	76	38
25- 29.9 Over weight	7	3.5	10	5	7	3.5	11	5.5	35	17.5
>30 Obesity	3	1.5	2	1	2	1	5	2.5	12	6
Total	49	24.5	51	21.5	44	21.9	56	28	200	100
Mean ± SD	**21.0 ± 4.0**		**21.4 ± 4.37**		**21.93 ± 3.91**		**20.9 ± 4.42**			

***World health organization (2010)**

Table VI shows that most of the elderly subjects had a normal body mass index in both the dwellings. In the category of overweight the males and females of both the dwellings were almost similar. Prevalence of obesity among males and females of both the dwellings was only one to three percent.

The mean values (BMI) of males and females in both dwellings were within normal range. Though the mean BMI was normal 38.5 percent were in the underweight category.

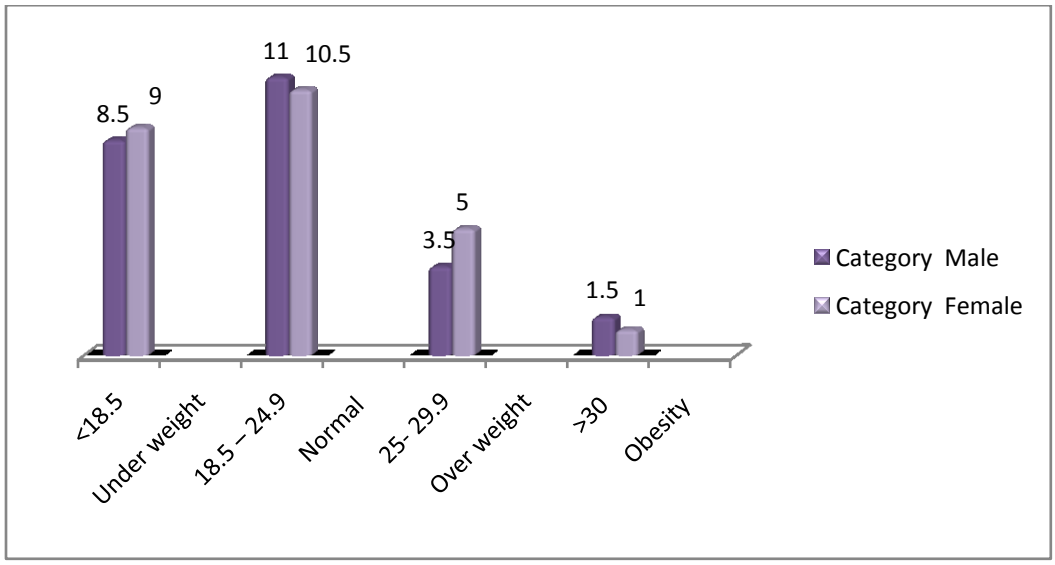

Figure 3

ANTHROPOMETRY MEASUREMENTS FOR BODY MASS INDEX

COMMUNITY DWELLING

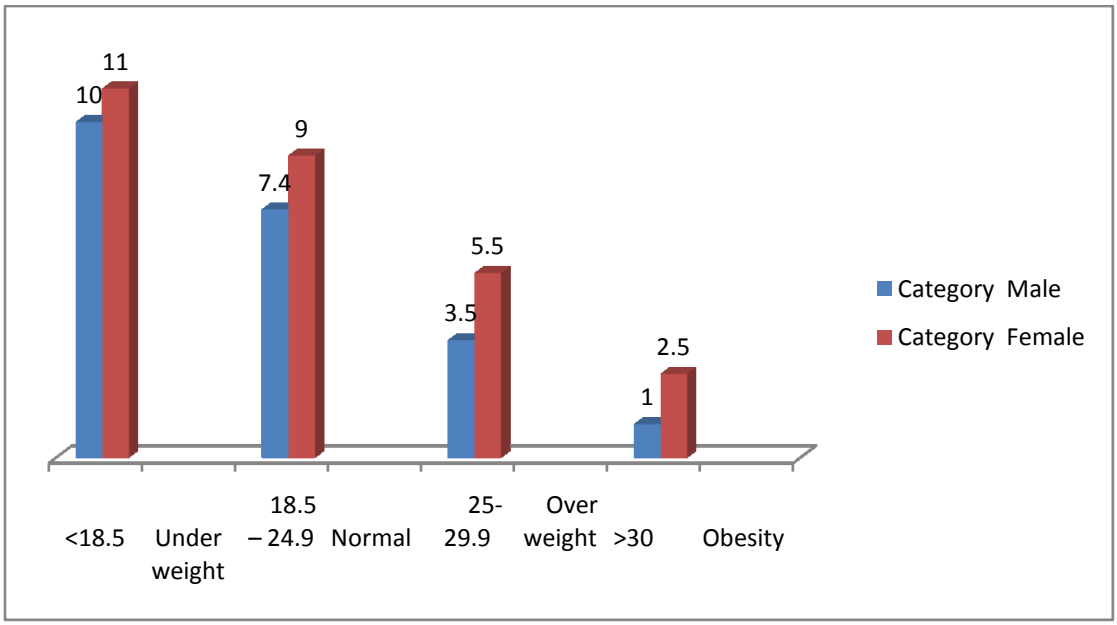

Figure 4

ANTHROPOMETRY MEASUREMENTS FOR BODY MASS INDEX

OLD AGE HOME

b. Waist hip ratio

The waist hip ratio for the community dwelling and old homes for the selected elderly are shown in Table VII and figures 5 and 6.

TABLE VII

WAIST HIP RATIO OF THE SELECTED ELDERLY

*Category	Community dwelling		Old age home		TOTAL	
	Male	%	Male	%	NO	%
Normal 0.95	18	9	8	7.4	26	13
Under weight <0.95	17	8.5	20	10	37	18.5
>0.95 (obese)	14	5	16	8	30	15
Total	49	22.5	44	25.4	93	46.5
Category	**Community dwelling**		**Old age home**		**TOTAL**	
	Female	**%**	**Female**	**%**	**No**	**%**
Normal 0.85	19	9.5	18	9	37	18.5
Under weight <0.85	14	7	15	7.4	29	14.5
>0.85 obesity	18	9	23	11.5	41	20.5
Total	51	25.5	56	27.9	107	53.5

***Centre for Disease Control and Prevention (2010)**

Distribution of the elderly according to waist - hip ratio shown in Table VII indicate that 9 percent of male subjects in community dwelling and 7 percent of male subjects in old age homes registered normal waist hip ratio. Five percent from community dwelling and 8 percent from old age homes were in obese category.

Among both the dwellings female subjects had higher prevalence of obesity compared to the males. The number of elderly in the underweight category were more in old age homes (17.4%) compared to community dwelling (15.5%).

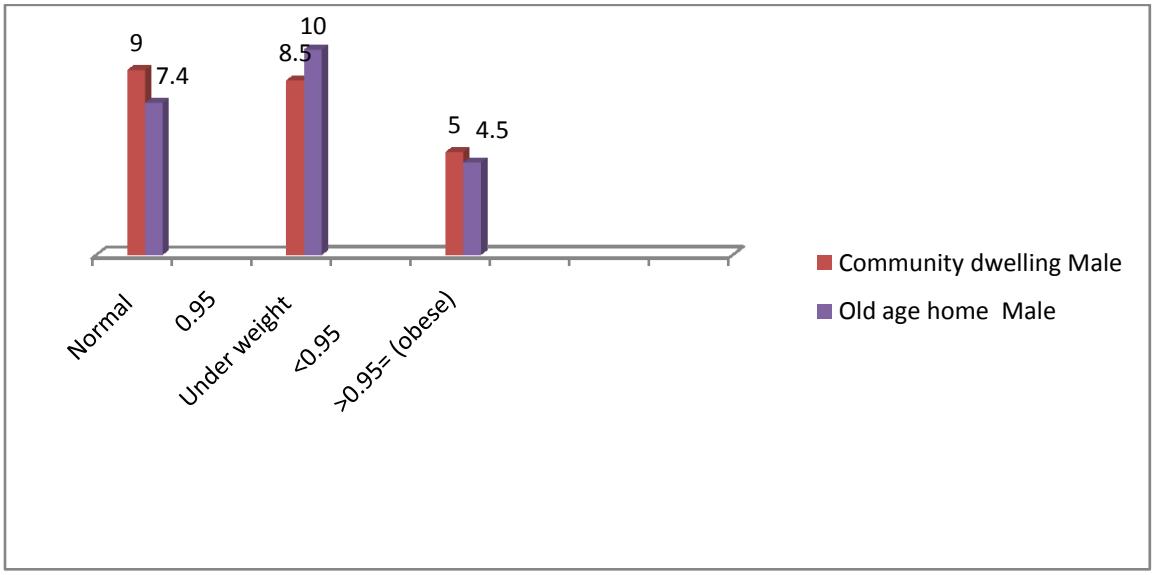

Figure 5

WAIST HIP RATIO MEASUREMENT OF THE SELECTED MALES

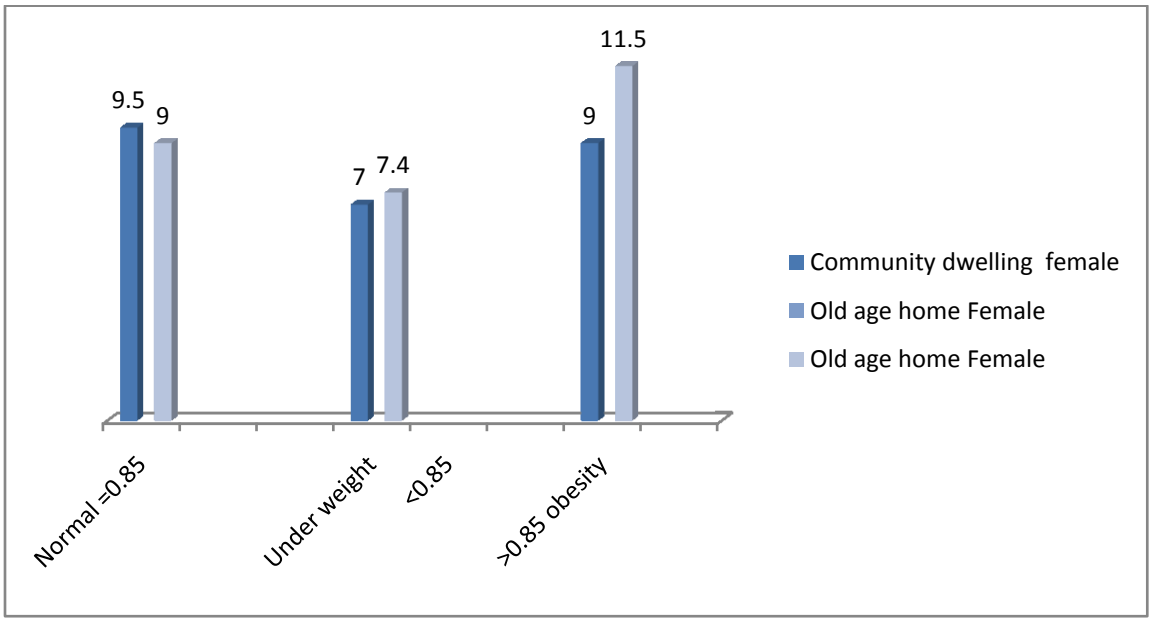

Figure 6

WAIST HIP RATIO MEASUREMENT OF THE SELECTED FEMALES

3. **Dietary habits**

   a. **Type of diet**

The results of the dietary habits of the of the selected subjects are presented in Table VIII and figure 7 and 8

TABLE VIII

DIETARY HABITS OF THE SELECTED ELDERLY

TYPES OF FOODS	Community dwelling				Old age home					
	Male	%	Female	%	Male	%	Female	%	Total	%
Vegetarian	37	18.5	34	17	29	14.5	38	19	138	69
Non – vegetarian	12	6	17	8.5	15	7.5	18	9	62	31
TOTAL	49	24.5	51	25.5	44	22	56	28	200	100

Dietary habits of the selected elderly bring out the fact that most of the elderly in both the dwellings were vegetarians (69%). The percentage of non-vegetarians was 31 percent.

In both the dwellings vegetarians to non- vegetarians ratio was more or less the same.

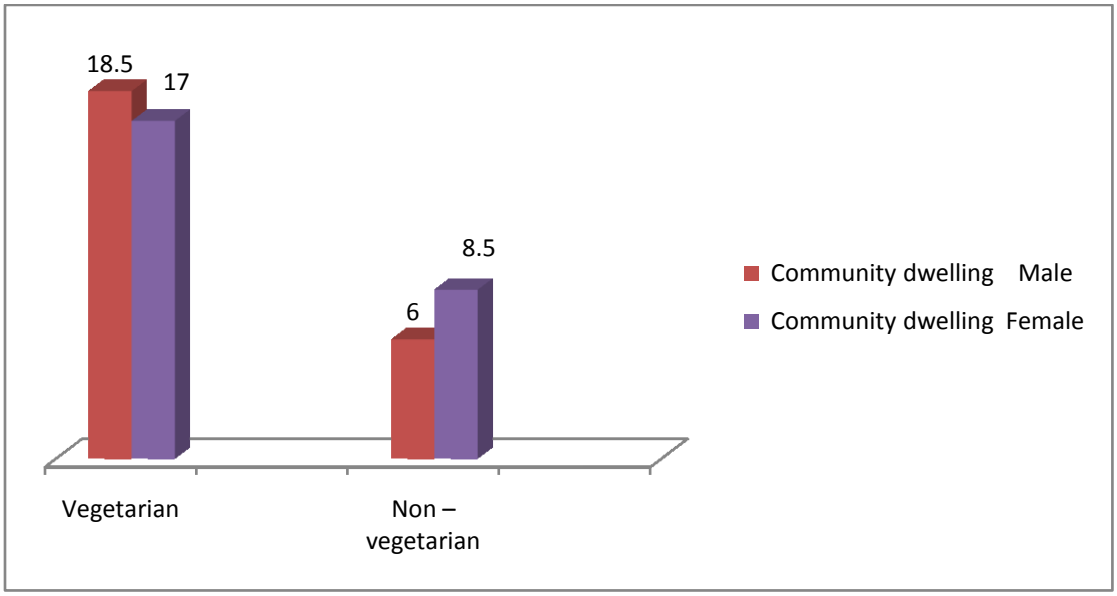

Figure 7

DIETARY HABITS OF THE SELECTED COMMMUNITY DWELLING

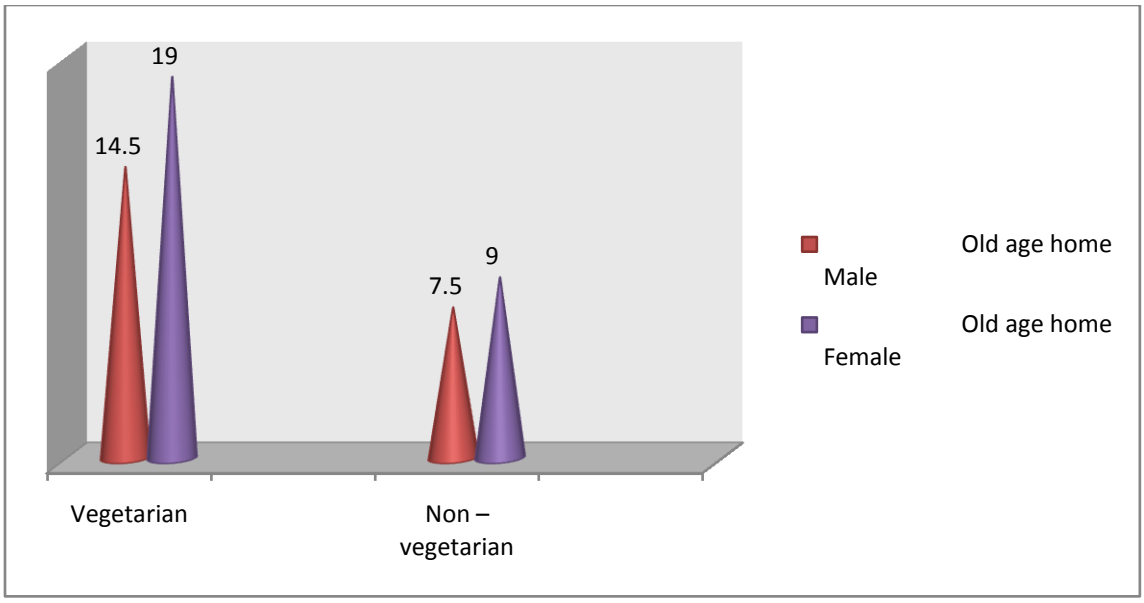

Figure 8

DIETARY HABITS OF THE SELECTED OLD AGE HOMES

b. Nutrient Intake

. To assess the nutrient intake of the selected elderly 24 hour food recall survey was used for a sub sample of 15 subjects. The mean nutrient intake of male and female subjects are presented in Table IX

TABLE IX

NUTRIENT INTAKE OF THE SELECTED ELDERLY

*Nutrient	Community Dwellings Male			Old age homes Male	
	RDA (2010)	Mean N=15	Percent Deficit/Excess	Mean N =15	Percent Deficit/Excess
Energy (kcals)	2320	2169	-7	2031	-12
Protein (g)	60	35	-42	30	-50
Fat (g)	25	22.5	-10	21	-16
Calcium (g)	600	400	-33	386	-36
Iron (mg)	17	15	-12	12	-29
Thiamin (mg)	1.2	1.2	0	1.1	-8
Riboflavin (mg)	1.4	1.4	0	1.2	-14
Niacin (mg)	16	17	+6	13	-19

Nutrient intake	Community Dwellings Female			Old age homes Female	
	RDA (2010)	Mean N=15	Deficit	Mean N =15	Deficit
Energy (kcals)	1900	1759	-7	1700	-11
Protein (g)	55	43	-22	40	-27
Fat (g)	20	18	-10	15	-25
Calcium(g)	600	380	-37	320	-47
Iron (mg)	17	12.5	-26	10	-41

Thiamin (mg)	1	1	0	1	0
Riboflavin (mg)	1.1	1.1	0	1.1	0
Niacin (mg)	16	14	-13	12	-25

*Recommended Dietary Allowance (ICMR 2010)

From table IX it is evident that the nutrient intake of both the elderly living with family in the community and old age home consumed inadequate quantities of all the nutrients. The energy intake was deficit by seven percent and twelve percent respectively for the male elderly in community dwelling and old age homes. A 50 percent deficit was found in the case of protein intake by the subjects in old age homes. Sixteen percent deficit was found in fat intake and only niacin intake was adequate in the subjects of community dwelling.

The energy intake was deficit by seven percent and eleven percent respectively for the female elderly in community dwelling and old age homes. Seventy three percent deficit was found in the case of protein. Major deficit of calcium (47%) and iron (41%) was seen in old age home elderly. Calcium deficiency could be the reason for the prevalence of osteoporosis and knee pain.

In general the percent of deficit of nutrient intake was higher in old age homes compared to community dwellers. But protein intake was drastically less which was shown in muscle wasting.

4. Clinical Assessment

The results of the clinical assessment of the selected subjects are presented in Table X.

TABLE X

SYMPTOMS OF CLINICAL EXAMINATION OF THE SELECTEDELDERLY

Organs	Male	Female	Total	%	Male	Female	Total	%
Hair Lack of luster	12	13	23	11.5	11	21	32	16
Easy pluckability	9	-	9	4.5	12	14	26	13
Pigmentation	7	11	13	6.5	8	12	20	10
No change	21	27	67	33.5	12	4	16	8
Face Pigmentation	6	3	9	3.5	13	22	35	17.5
Normal	43	48	91	45.5	31	29	60	30
Eyes Pale conjunctiva	11	14	25	12.5	12	13	15	7.5
Bitot'spot	9	8	17	8.5	22	11	33	16.5
Xerosis	2	4	6	3	8	14	22	11
No change	27	25	52	26	2	18	20	10
LIPS Angular stomatitis	12	6	18	9	27	34	61	30.5
No change	37	45	82	41	17	22	39	19.5
Teeth Mottled enamel	38	42	80	40	41	44	85	42.5
No change	11	9	20	10	3	12	15	7.5

Gums Gum problem	2	4	6	3	12	22	34	17
Normal	42	47	89	44.5	32	34	66	33
Gland Thyroid enlargement	16	22	38	19	22	14	36	18
Normal	33	29	62	31	22	42	64	32
SKIN Xerosis	49	51	100	50	44	56	100	50
Nails Koilonychias	22	29	51	25.5	34	44	78	39
Normal	27	22	49	24.5	10	12	22	11
Nervous system Psychomotor change	11	13	24	12	34	44	78	39
Mental confusion	11	-	11	5.5	23	22	45	22.5
Sensory loss	-	-	-	-	-	4	4	2
Memory loss	3	7	10	5	12	12	4	8
Normal	13	31	44	22	11	-	11	5.5
Muscular & skeletal system Muscle wasting	17	31	48	24	33	23	56	28
Knock - knees	2	-	2	1	6	5	11	5.5

Table X denotes the symptoms of nutritional deficiency with regard to nutritional deficiency. Symptoms of iron deficiency anaemia were significantly present in the

majority of the subjects .Next to anaemia, symptoms of vitamin A deficiency was seen in eyes and skin. The skin changes may be due to ageing.

Muscle wasting was prevalent among 28 percent of the selected elderly. Hair pigmentation, facial pigmentation and mottled enamel, were evident. Dryness of skin was present in all the subjects.

5. Bio chemical assessment of the selected elderly

The bio chemical tests namely blood glucose, haemoglobin and lipid profile were done for all selected elderly. Table XI presents the mean bio chemical values of all the selected subjects. Figure 9 also depicts the
bio chemical profile.

TABLE XI

MEAN BLOOD GLUCOSE, HEAMOGOLBIN AND LIPID PROFILE OF THE SELECTED ELDERLY

Criteria	Normal values *	Community dwelling (Mean ±SD)	Old age home (Mean ±SD)
BLOOD Glucose (mg/dl)	80 -140 mg/dl	161.23± 50.50	156.24 ± 43.46
Haemoglbin (g/dl)	Male – 14 to 18 g/dl Female -12 to 14g /dl	14.89 ± 5.21	13.26 ± 2.78
Total cholesterol (mg/dl)	<200mg/dl	156.62 ± 43.56	189. 93 ± 62.33
Triglycerides (mg/dl)	<150 mg/ dl	166 .4 ± 35.6	77.25 ± 26.26
HDL – C (mg/dl)	>35mg/dl	53.4 ± 12.28	55.28 ± 14.35
LDL – C (mg/dl)	<100mg/dl	120.5 ± 56.51	67.53 ± 18.48
VLDL – C (mg/dl)	<40 mg/dl	37.8 ± 18.91	32.43± 12.98

***Centre for Disease Control and Prevention (2010).**

From the mean values of bio chemical indices namely blood glucose, haemoglobin and lipid profile presented in Table X, it is evident that the values for blood glucose were high .Out of the selected 200 elderly, 157 from both the old age home and community dwelling suffered from diabetes mellitus. Hence the mean values were high showing hyperglycemia.

The mean haemoglobin values were satisfactory and were within the normal range for the sub -sample.

With regard to lipid profile except triglyceride all the other values were in the normal range compared to the normal values recommended by Centre Disease Control and Prevention, (2010).

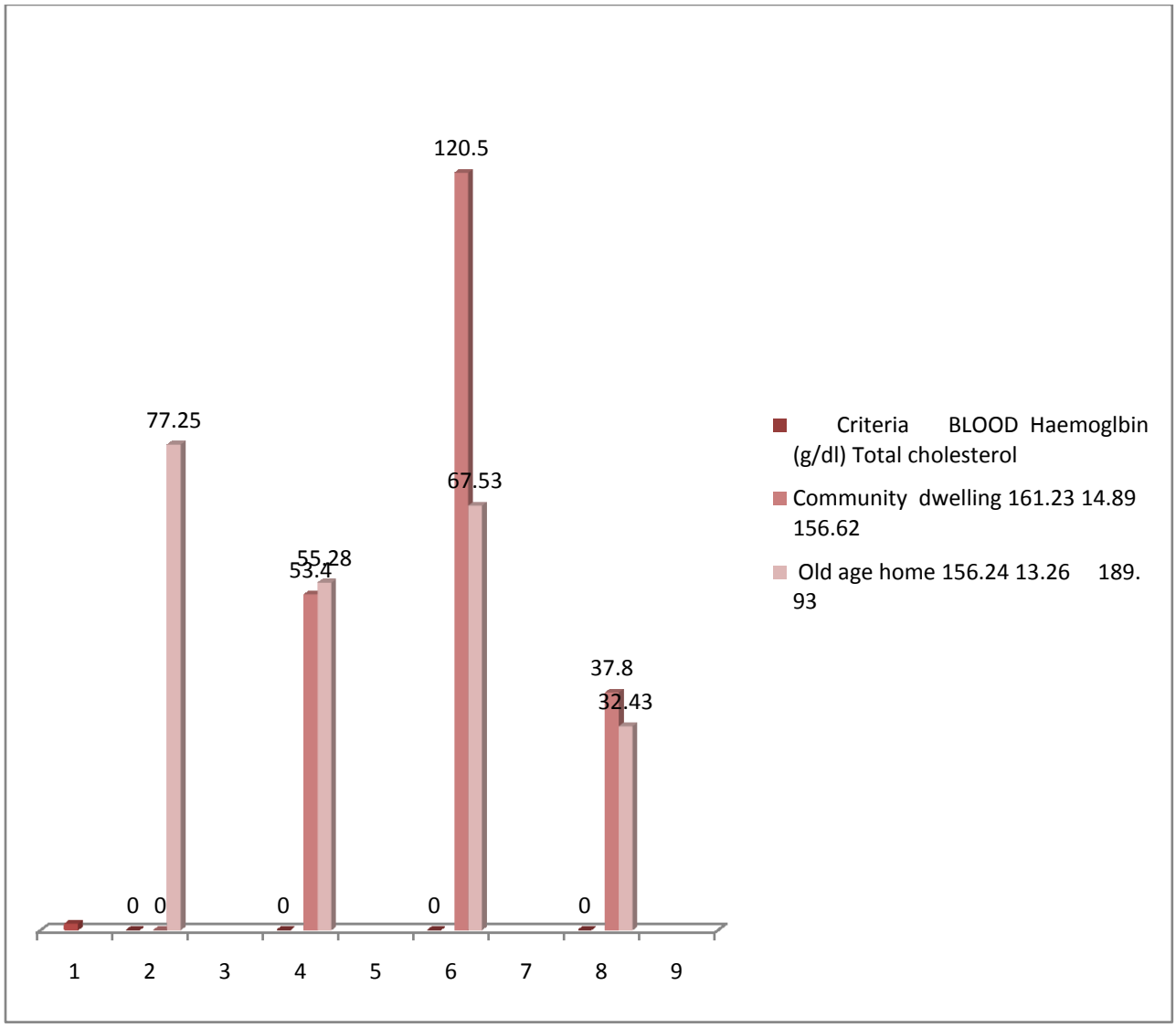

Figure 9

BLOOD LIPID PROFILE OF THE SELECTED SUB SAMPLES

C. Life style pattern of the selected elderly

The life style of the selected elderly in terms of consumption of alcoholic and non-alcoholic beverages smoking and tobacco chewing were studied. The results are presented and discussed in the following

1. Consumption of alcoholic beverages

Table XII presents the pattern of the consumption of alcoholic beverages by the selected elderly.

TABLE XII

PATTERN OF CONSUMPTION OF ALCOHOLIC BEVERAGES

Quantity (ml)	Community dwelling (MALE)							
	Daily		Weekly		Once in a month		Total (n=49)	Percent
	No	%	No	%	No	%		
>250	12	6	4	2	6	3	22	11
<250- 500	7	3.5	-	-	-	-	7	4
>500	-	-	12	6	-	-	12	6
Non-alcoholic	-	-	-	-	-	-	8	4
Total	19	10	16	8	6	3	49	25

It was observed that female subjects and those who were living in old age homes did not consume alcoholic beverages. Only those who were living in the community had the habit. Among the elderly subjects (community) 9.5 percent consumed alcohol daily to the extent of 250 ml. As the frequency reduced amount consumed increased in six percent of the subjects.

Low to moderate alcohol consumption reduced total and cardiovascular mortality (Hennekens , *et al.,*2005).

2. Consumption of non- alcoholic beverages

Table XIII presents the pattern of consumption of non- alcoholic beverages.

TABLE XIII

PATTERN OF CONSUMPTION OF NON ALCOHOLIC BEVERAGES

Non – alcoholic beverage	Community dwelling			Old age home				
	Daily No	Weekly	%	Daily No	Weekly No		Total	%
Tea	43	-	21.5	63	-	31.5	106	53
Coffee	17	-	8.5	-	1 9	9.5	36	18
Milk	-	-	-	-	-	-	12	6
Black coffee	16	-	8	-	13	6.5	29	14.5
No drink	12	-	6	5	-	2.5	17	8.5
TOTAL	88	-	35.2	68	32	16	200	100

Table XIII depicts that 21.5 percent of the elderly in community dwelling and 31.5 percent in old age homes consumed tea daily. Only six percent of the selected elderly consumed milk in community, whereas the elderly residing in old age homes did not consume milk because it was not served in the homes.

Six percent of the selected elderly belonging to community and three percent of the selected elderly in old age home did not take any type of non- alcoholic beverages.

Tea was found to be the non- alcoholic beverages consumed by more than 50 percent of the subjects.

3. Smoking

Table XIV presents the smoking pattern followed by the selected elderly.

TABLE XIV

SMOKING PATTERN OF SELECTED ELDERLY LIVING IN THE COMMUNITY

GROUP	Cigarette smoking							
	1 – 5		> 5		>10		Total (n=49)	Percent
	No	%	No	%	No	%		
Smoker	12	6	21	10.5	9	4.5	42	86
Non-smoker	-	-	-	-	-	-	7	14
Total	12	6	21	10.5	9	4.5	49	100

Data from the Table XIV, indicate that in community dwelling out of 49 male subjects majority 42 (86%) were smokers. Among the smokers six percent of smokers had the habit of smoking less than 5 cigarettes and 4.5 percent smoked more than 10. It was observed that the incidence of liver disease among these elderly subjects showed that out of 21 elderly people 42 percent suffered from problems of liver and lungs.

Elderly residing in the old age home were not allowed to smoke.

Smoking is also a major risk factor for lung disease, stroke and lower respiratory tract infectious (American lung association,2010).

4. Pan chewing

Table XV presents the pattern of the pan chewing prevailed among the selected elderly.

TABLE XV

PATTERN OF PAN CHEWING OF THE SELECTED ELDERLY

Frequency	Community dwelling				Old age homes					
	Male	%	Female	%	Male	%	Female	%	Total	%
1-3 Times	22	11	9	4.5	-	-	4	2	37	18.5
3-6 Times	16	8	13	6.5	-	-	6	3	35	17.5
NIL	11	5.5	29	14.5	44	22	46	23	130	65
Total	49	24.5	51	25.5	44	22	56	28	200	100

Table XV indicates that, in community dwelling both the male and female 31(15.5%) elderly subjects had the habit of pan chewing. Among 6.5 percent of the selected elderly both male and female had the habit of pan chewing more than three times a day.

In old age homes two percent female subjects had habit of pan chewing. Only three percent of the elderly female in old age home had the habit of chewing for more than three times a day.

Sixty five percent of the elderly both in community and old age home did not have the habit of chewing pan.

5. Level of activity

Based on the daily activities of the elderly, the level of activity of each one was classified in to sedentary, moderate and heavy activity. The results are presented in Table XVI.

TABLE XVI

LEVEL OF ACTIVITY OF THE SELECTED ELDERLY

Category	Community dwelling				Old age homes					
	Male	%	Female	%	Male	%	Female	%	Total	%
Sedentary	49	24.5	45	22.5	44	22	56	28	94	97
Moderate	-	-	6	3	-	-	-	-	6	3
Heavy	-	-	-	-	-	-	-	-	-	-
Total	49	24.5	51	25.5	44	22	56	28	200	100

It was observed that 25 percent of male elderly in community dwelling performed sedentary activity, namely security and car driving. Six percent of female elderly performed moderate activity like field work.

All the other subjects (97%) performed only sedentary activities. The result revealed that the elderly residing in community were more active than the elderly in old age homes.

6. Exercise pattern

Exercise is a important as food to body especially during old age. So, the exercise pattern of the selected elderly were studied and the consolidated report is presented in Table XVII

TABLE XVII

EXERCISE PATTERN OF THE SELECTED ELDERLY

Exercise	Community dwelling				Old age home					
	Male	%	Female	%	Male	%	Female	%	Total	%
Walking	22	11	12	6	26	13	21	10.5	81	40.5
Cycling	5	2.5	-	-	-	-	-	-	5	2.5
Gardening	11	5.5	16	8	2	1	-	-	29	14.5
Yoga	-	-	2	1	-	-	-	-	2	1
No exercise	8	4	21	10.5	11	5.5	33	16.5	73	36.5
Others	3	1.5	-	-	5	2.5	2	1	10	5
Total	49	24.5	51	25.5	44	22	56	28	200	100

From Table XVII it is evident that 11 percent of male in community dwelling were into some type of exercise mainly walking .Six percent of females in community dwelling also undertook walking. Three percent of male elderly in community were involved in cycling and one percent of female did yoga. In old age homes 13 percent of male and 11 percent of females were walking.

It was found that these elderly who were performing some type of exercise had better control of their blood pressure, reduction in body weight and relief from knee pain and felt better after walking.

It was surveyed that 11 percent of male and six percent of females in community dwelling were into some type of exercise mainly walking.

D. Health status

Health status interms of prevalence of non – communicable diseases was studied and the results are presented in Table XVIII and figure 10.

Table – XVIII

PREVALENCE OF NON- COMMUNICABLE DISEASES AMONG THE SELECTED ELDERLY

Non – communicable Disease	Community dwelling				Old age home					
	Male	%	Female	%	Male	%	Female	%	Total	%
Diabetes mellitus ,Heart disease	5	2.5	9	4.5	9	4.5	5	2.5	28	14
Diabetes mellitus, Hypertension. Knee pain	4	2	6	3	7	3.5	11	5.5	28	14
Diabetes mellitus, renal disease	3	1.5	2	1	2	1	-	-	7	3.5
Dental problem Diabetes mellitus ,Heart disease	9	4.5	4	2	4	2	4	2	21	10.5

Diabetes mellitus, vision problem	4	2	10	5	3	1.5	5	2.5	22	11
Diabetes mellitus, Osteoporosis	2	1	6	3	-	-	1	0.5	9	4.5
Diabetes mellitus,	13	6.5	6	3	12	6	11	5.5	42	21
Heart disease	3	1.5	2	1	2	1	8	4	15	7.5
Hyper tension	6	3	6	3	5	2.5	11	5.5	28	14
Total	49	24.5	51	25.5	44	22	56	28	200	100

Data on prevalence of non-communicable disease among selected elderly is presented in Table XVIII, brings forth the fact that all the selected elderly subjects had any one type of non communicable disease or combination of diseases.

Diabetes mellitus was reported to be the highest when compared to other disorders both in community (10 percent) and old age homes (12 percent).

Complication that ranked second was hypertension. Out of the 200 elderly subjects 16 percent of the elderly in old age home and six percent of the community dwelling were suffering from hypertension.

Diabetes mellitus with heart disease was next in line. Totally 14 percent of the selected elderly both in community and old age homes had heart disease mainly due to uncontrolled cholesterol level.

All the other problems such as renal problems, vision problems, osteoporosis and knee pain were associated with diabetes mellitus. It was very disheartening to note that 79 percent (157) of the selected elderly had diabetes mellitus. Others had hypertension or heart disease.

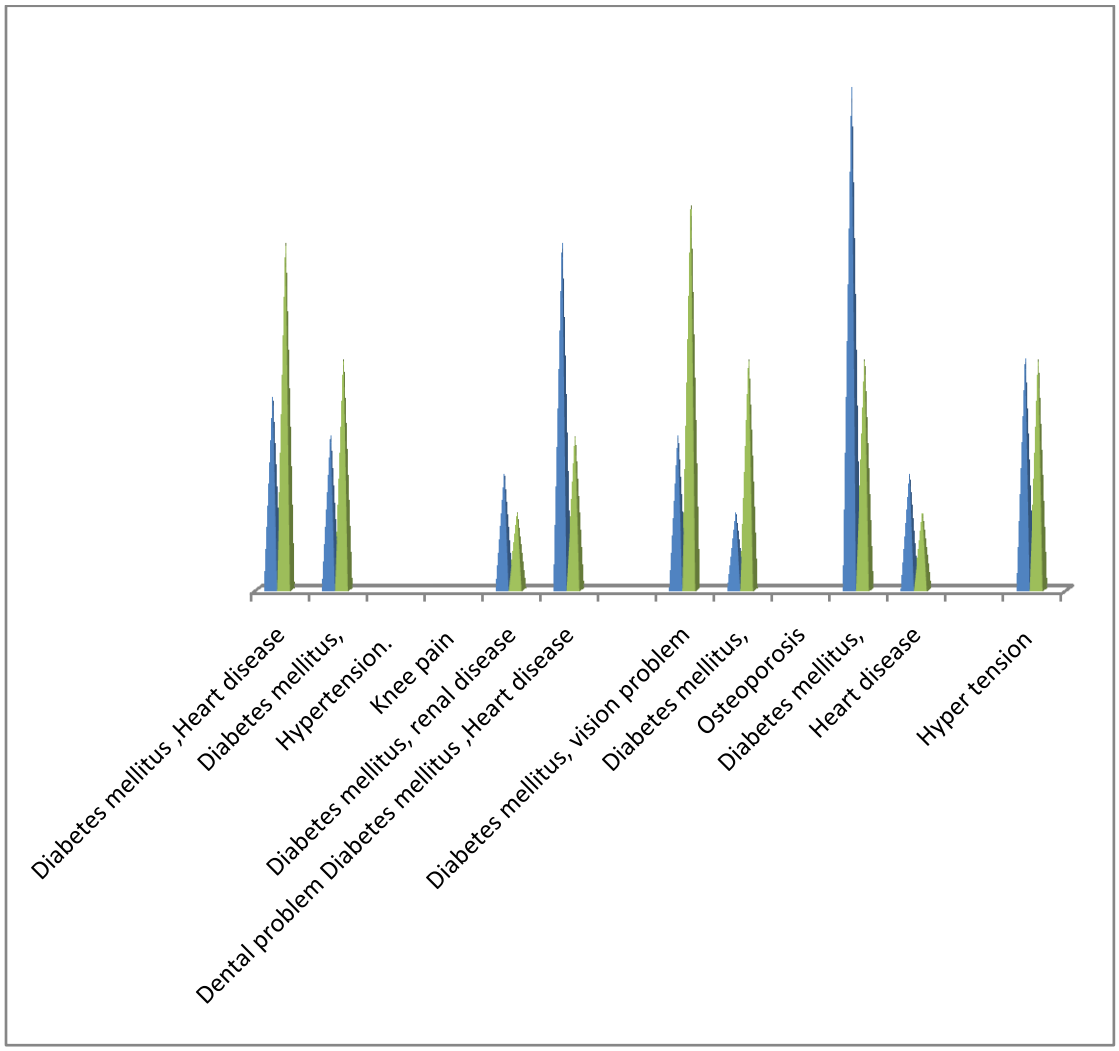

Figure 10

Prevalence Of Non- Communicable Diseases Among The Selected Elderly

SUMMARY & CONCLUSION

V SUMMARY AND CONCLUSION

The present study entitled, “Assessment of Nutritional Status, life style behaviour and Health status of Elderly in Coimbatore City” is undertaken to evaluate the quality of life and nutritional status and health condition of a selected group of elderly with the following objectives.

To assess the prevalence of malnutrition among elderly in urban areas of Coimbatore, to find out the life style behaviour, food and nutrient intake, dietary pattern and health status of elderly, and to impart nutrition education based on the health condition.

The study was conducted in Coimbatore City. Three old age homes and three urban areas in Coimbatore City were selected for the study by judgement sampling method. A total number of 200 elderly subjects, 100 each from old age homes and urban community dwelling were selected for the study. Both male and female elderly subjects in the age group of 60-100 years who were willing to participate in the study were selected.

The Mini Nutritional Assessment (MNA) proforma recommended by Nestle Nutrition Institute (2009) was utilized to classify the selected subjects into normal nutritional status, at risk of malnutrition and malnourished. The Mini Nutritional Assessment tool is a validated and reliable nutritional assessment technique recommended by Nestle Health Care Nutrition (NHCN).

An interview schedule was formulated to collect details of the subjects regarding socio-economic profile, health status, life style and nutritional status. Using personal interview method required data were collected from the selected elderly.

The anthropometric measurements namely height, weight, circumferences of waist, hip and calf were recorded for all the 200 selected subjects. From this the body mass index (BMI) and waist hip ratio (WHR) were calculated. Using the clinical

assessment proforma recommended by ICMR the symptoms related to nutritional deficiency were recorded.

The biochemical profile in terms of blood glucose, hemoglobin and lipid profile were studied and recorded for the selected sub sample. Blood pressure was measured using Sphygmomanometer. The results were analysed statistically and discussed.

The findings of the study indicated that

1. Among the selected subjects maximum number (37.5%) belonged to 60 to 70 years age group. Both in community dwelling and old age homes female subjects were more compared to male subjects. The percentage of elderly in the age group of 80 to 90 years was more in the old age home compared with community dwelling.
2. Educational status of the selected elderly revealed that 70 percent of the elderly were literates.
3. Eighteen percent of the selected elderly were working. All those who were working were living with family while those who did not go for any job after retirement lived in the old age home.
4. The main source of income of the selected elderly was from sons or daughters. Those who were employed got income as salary and four percent of the subjects received pension from the previous employment.
5. Seventy percent were vegetarians rest were non-vegetarians. Non-vegetarian foods were not allowed in old age home.
6. In general the percent of deficit of nutrient intake was higher in old age homes compared to community dwellers. But protein and calcium were predominant in the selected subjects
7. MNA score showed that 23 percent of the subjects were malnourished while 40 percent were at risk of mal nutrition. Only 37 percent were in the normal nutritional status.

8. Only one to three percent of the elderly subjects were in the obese category .Most of the elderly subjects community dwelling and old age homes in had normal Body Mass Index.
9. The waist –hip ratio of the selected elderly showed that five percent of community dwelling and eight percent of old age homes were in obese category.
10. Symptoms of Iron, Protein, Thiamin and Vitamin A deficiency were observed in clinical examination. Mottled enamel and psychomotor changes were the major problems observed.
11. As alcohol consumption was prohibited in old age homes only elderly living in community dwelling had the habit of consuming alcohol. Only 11 percent of the subjects consumed less than 250 ml of alcohol.
12. Tea was the main non-alcoholic beverage consumed by more than 50 percent of the subjects. Only a few subjects consumed milk, coffee or black coffee.
13. None of the subjects living in old age home had the habit of smoking. In the community dwelling 86 percent smoked cigarettes. Same trend was observed with regard to pan and betel nut chewing.
14. None of the subjects performed any heavy activity. Except six subjects who performed moderate activity all the others (97%) performed sedentary activity.
15. In both the dwellings the main form of exercise was walking. Only three percent of male subjects and one percent of female subjects did cycling (male) and yoga (female).
16. All the selected elderly had one or the other health problems. Diabetes was more prevalent (21%) compared to other non-communicable diseases. Next was hypertension (14.1%) followed by diabetes mellitus with heart disease, dental problems, vision problem and osteoporosis.
17. Bio chemical analysis indicated that out of the selected 200 elderly subjects totally 157 (from both the old age homes and community dwelling) had diabetes. Haemoglobin level was normal .Except triglycerides all the other parameters of lipid profile was within normal limits.

It could be concluded from the present study that many of the elders living in the old age homes were malnourished and it was also found out that their food intake was low compared with those living with family members. Loneliness and depression prevealed in inmates of old age homes. This condition was observed in the non-paid old age homes, where the elderly did not pay money. The situation may be different in the paid old age homes where the elderly are paid members who are happy and self sufficient.

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APPENDIX

INSTITUTIONAL HUMAN ETHICS COMMITTEE

Avinashilingam
Institute for Home Science and Higher Education for Women
University
(Estd. u/s 3 of UGC Act 1956)

9th March 2015

To
Ms. Shabana, A.
Department of Food Service Management and Dietetics
Avinashilingam Institute for Home Science and
Higher Education for Women
Coimbatore – 641 043

Dear Madam,

Ref : Your proposal No. IHEC/14-15/FSMD/04 entitled "Assessment of nutritional status, lifestyle behaviour and health condition of selected elderly in Coimbatore city" submitted for approval of the IHEC on 3rd January 2015.

The Institutional Human Ethics Committee of our University hereby grants approval to your research proposal No. IHEC/14-15/FSMD/04 entitled "Assessment of nutritional status, lifestyle behaviour and health condition of selected elderly in Coimbatore city" submitted by you. The Approval number for the same is AUW/IHEC-14-15/XMT-17.

We wish you all the best in your research endeavours.

Regards,

9/3/15

Dr.P.R.Padma
Member Secretary

Institutional Human Ethics Committee

APPENDIX II

INTERVIEW SCHEDULE TO ASSESS THE NUTRITIONAL STATUS, LIFE STYLE BEHAVIOUR AND HEALTH CONDITION OF ELDERLY IN COIMBATORE CITY

Name of the interviewer :

Name of the interviewee :

Address :

Sex :

Date of birth :

Age :

Occupation :

Occupational prior to retirement :

Composition of the family :

Type of the family : Joint ☐ nuclear ☐ living alone ☐

Religion and caste :

Details of the family members:

S.NO	Name of the members	Relationship	Education	Occupation	Income

Source of income:

Pension ☐

Salary ☐

House rent ☐

Investment ☐

Income from son/daughter ☐

Other earnings ☐

Social status:

High income ☐ Middle income ☐ low income ☐

Security:

Comfortable ☐ lonely ☐

Clinical examinations:

Organs	Signs	Presence
Hair	Lack of luster Thinners & sparseness Straightness Dyspigmentation Flag skin Easy pluckability	
Face	Diffuse depigmentation Naso –labial dyssebacea Moon face	
Eyes	Pale conjunctiva Bitot's spot Conjunctival xerosis Corneal xerosis Kerotomalacia Angular palpebritis	
Lips	Angular stomatitis Angular scars Cheilosis	
Tongue	Oedema Scarlet and raw tongue Magenta tongue	

	Atrophic papillae signs	
Teeth	Mottled enamel	
Gums	Spongy Bleeding gums	
Glands	Thyroid enlargement Parotid enlargement	
Skin	Xerosis Follicular hyperkerotosis Petechiae Pellagrous dermatosis Flaky –paint dermatosis Scrotal and vulval dermatosis	
Nails	Koilonychia	
Subcutaneous tissue	Oedema Amount of subcutaneous fat	
Internal system a) Gastro intestinal System b) Nervous system c) Cardio -vascular	 Hepatomegaly Psychomotor change Mental confusion Sensory loss Motor weakness Calf tenderness Loss of position sense Memory loss Cardiac enlargement Tachycardia	

Muscular & skeletal system	Musle wasting Cranoitabes Frontal & parietal bossing Epiphyseal enlargement Beading ribs Fontanelle Knock-knees or bow legs Diffuse or local skeletal Deformities Deformities of thorax	

Bio –chemical assessment:

Blood pressure (mm/hg)

Heamoglobin (g)

Blood glucose level:

Fasting blood glucose (mg)

Random blood glucose (mg)

Lipid profile:

Total cholesterol (mg)

TG (mg)

Cholesterol (mg)

HDL-C (MG)

VLDL-C (MG)

LDL-(mg

Life style pattern:

Type of beverage consumed?

Beverage	Daily	weekly	monthly	Quantity
Alcohol				
Non –alcoholic				
Tea Coffee Milk				

Do you have the habit of, (how many years?)

Smoking ☐

Pan chewing ☐

How often do you consume per day?

Type of Activity:

Sedentary ☐ Moderate ☐ Heavy ☐

Exercise:

Walking ☐

Cycling ☐

Jogging ☐

Gardening ☐

Yoga ☐

Aerobics ☐

Others (specify) ☐

HEALTH STATUS

Past medical history:

Have you undergone any surgery? Yes ☐ No ☐

If yes what type of treatment did you followed?

Present Medical History:

Do you suffer from any disorder mentioned below :(Duration)

a) Diabetes mellitus ☐

b) Hypertension ☐

c) Osteoporosis ☐

d) Heart disease ☐

e) Renal disease ☐

f) Dental Problem ☐

g) Vision problem ☐

h) Hunch back ☐

i) Any other (specify) ☐

What type of treatment do you follow?

Do you have gastro –intestinal problem?

Nausea ☐

Indigestion problem ☐

Acidity ☐

Diarrhea ☐

Constipation ☐

Flatulence ☐

How do you overcome this?

Do you have dental problem: Yes ☐ No ☐

Are you using artificial dentures? Yes ☐ No ☐

If no, how do you manage?

Do you have problem in sleeping?

Yes ☐ No ☐

If yes, reason for sleeplessness

24 hours recall method:

Timing	Menu	Amount	ingredients	Quantity
Early morning				
Break fast				
Midmorning				
lunch				
Evening				

Dinner				
Bed time				

Mention the type of food you prefer?

Normal ☐

Soft ☐

Semi solid ☐

Porridge ☐

Double boiled ☐

Spicy ☐

Low spicy ☐

Bland ☐

Mention the reason for your preference:

How do you eat hard foods?

Do you follow special foods during sickness?

Yes ☐ No ☐

If yes, give details

Condition	Food included	Food avoided
Fever		
Diabetes		

Blood pressure		
Cardiac disease		
Constipation		
Diarrhea		
Acidity		

APPENDIX III

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	NORMAL NUTRITIONAL SCORE FOR SELECTED MALE (COMMUNITY DWELLING)
1.	25
2	25
3	25
4	26
5	26
6	26
7	26
8	27
9	28
10	28
11	29
12	29
13	29
14	29
15	25
16	26
17	27
18	27
19	24
20	24

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	NORMAL NUTRITIONAL SCORE FOR SELECTED FEMALE ELDERLY (COMMUNITY DWELLING)
1.	25
2	25
3	26
4	26
5	27
6	28
7	29
8	28
9	28
10	28
11	29
12	29
13	28
14	27
15	27
16	25.5
17	27
18	28

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	NORMAL NUTRITIONAL SCORE FOR SELECTED MALE ELDERLY (OLD AGE HOME)
1.	23
2	23
3	22
4	22
5	22
6	22
7	22
8	23
9	23
10	23
11	23
12	23
13	21
14	19
15	20
16	20

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	AT RISK OF MALNUTRITON OF SELECTED MALE (COMMUNITY DWELLING)
1.	18
2	18
3	19
4	19
5	19
6	17
7	17
8	17
9	19
10	17
11	17
12	18
13	18
14	19
15	18
16	19
17	18
18	19
19	19
20	18
21	18

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	AT RISK OF MALNUTRITON OF SELECTED FEMALE (COMMUNITY DWELLING)
1.	18
2	18
3	19
4	19
5	19
6	17
7	17
8	17
9	19
10	17
11	17
12	18
13	18
14	19
15	18
16	19
17	18
18	19

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	AT RISK OF MALNUTRITON OF SELECTED MALE (OLD AGE HOME)
1.	18
2	18
3	19
4	19
5	19
6	17
7	17
8	17
9	19
10	17
11	17
12	18
13	18
14	19
15	18
16	19
17	18
18	19
19	19

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	AT RISK OF MALNUTRITON OF SELECTED FEMALE (OLD AGE HOME)
1.	18
2	18
3	19
4	19
5	19
6	17
7	17
8	17
9	19
10	17
11	17
12	18
13	18
14	19
15	18
16	19
17	18
18	19
19	19
20	18
21	19

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	LESS THAN (17) OF SELECTED MALE (COMMUNITY DWELLING)
1.	16
2	15
3	15
4	15.5
5	16.5
6	16
7	16
8	15
NO	LESS THAN (17) OF SELECTED FEMALE (COMMUNITY DWELLING)
1.	16
2	15
3	15
4	15.5
5	16.5
6	16
7	16
8	15
9	16
10	16
11	15
12	16
13	16
14	16

MINI NUTRITIONAL ASSESSMENT VALUES OF THE SELECTED ELDERLY

NO	LESS THAN (17) OF SELECTED MALE (OLD AGE HOME)
1.	16
2	15
3	15
4	15.5
5	16.5
6	16
7	16
8	15
9.	16
NO	LESS THAN (17) OF SELECTED FEMALE (OLD AGE HOME)
1.	16
2.	15
3.	15
4.	15.5
5.	16.5
6.	16
7.	16
8.	15
9.	16
10.	16
11.	15
12.	15
13.	15.5

14.	**16.5**
15.	**16**
16.	**16**