DIETARY HABITS OF SENIOR CITIZENS

By

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2000

DECLARATION

I hereby declare that this thesis entitled "**Dietary habits o senior citizens**" is a bonafide record of research work done by m during the course of research and that the thesis has not previousl formed the basis for the associateship, fellowship or other similar titl of any other University or Society.

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CERTIFICATE

Certified that this thesis entitled **"Dietary habits of Senior Citizens"** is a record of research work done independently by **Mrs. Ajitha .R** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to her.

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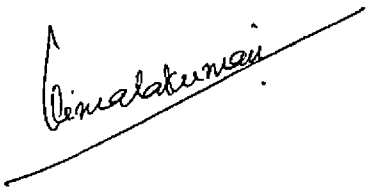

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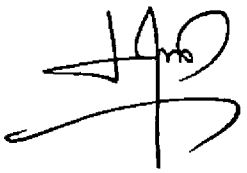

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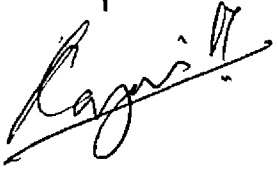

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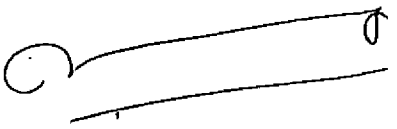

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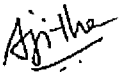

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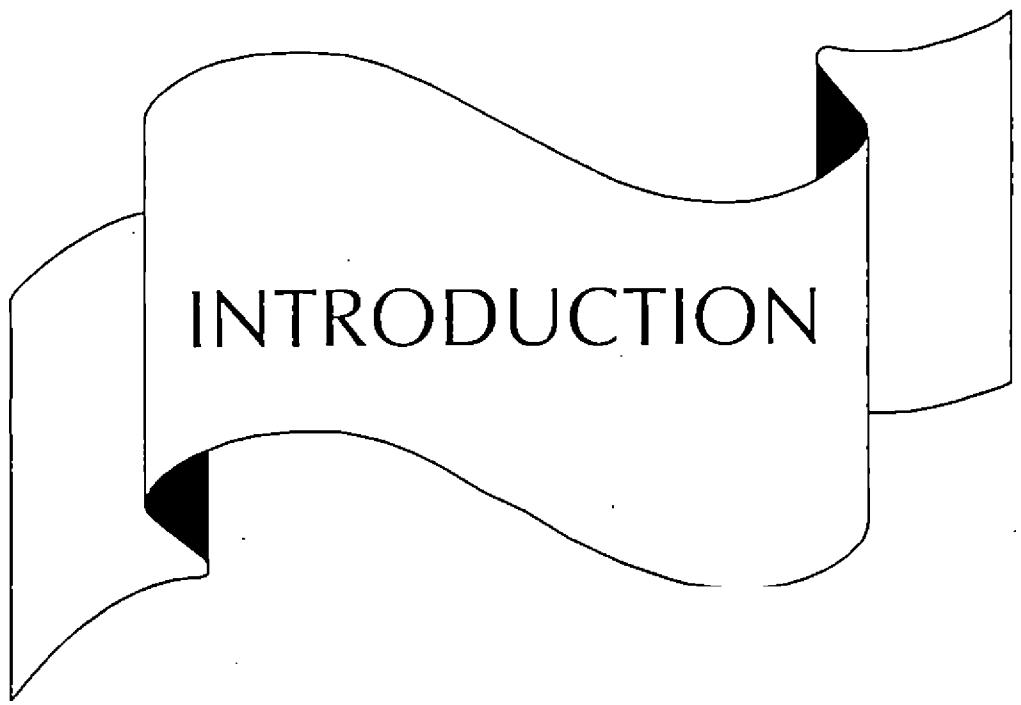
CONTENTS

Page No.

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES


INTRODUCTION

1. INTRODUCTION

"Being old is not some kind of illness but a position of pride and respect that you have earned. People should want to be old; they should look forward to it" (Taylor, 1992).

Most developing societies have witnessed a decrease in mortality in all age groups in recent years, though the degree of decline has varied from time to time. It is estimated that there would be 620 million people over 60 years by 2000 AD in the world. More than half of the world's elderly people are in the developing countries and India currently ranks fourth among the countries, which have large elderly population in absolute numbers (Chopra, 1998). In India the growth rate of the elderly population, defined as people who are above the age of 60 years, has been 3.1 per cent compared to 2.1 per cent per annum in the general population in the last decade (Bhatt and Marie, 1992). This has been brought about through control of communicable diseases, improvement of nutrition and better environmental hygiene. Declining mortality has led to enhancement of life expectancy leading to an increasing proportion of older people in the population. Kerala State in India is one such area where the rapid decline in death and birth rates together in the past three decades has resulted in a population structure less and less dominated by infants and young children. The State has already achieved a reputation with respect to highlife expectancy among men and women. Gulati and Irudayarajan (1993) have opined that in the State of Kerala the fertility and mortality decline has been faster than that in the rest of India, and therefore 18 per cent of the population is expected to be over the age of 60 years by the year 2026.

Though this is the bright side of advances that we have made, the quality of life enjoyed by senior citizens are not laudable. The elderly today are a segment who are most depressed and highly vulnerable. The incidence of higher levels of morbidity associated with functional, psychological and social problems – poor dietary intake and the presence of debilitating and metabolic derrangements and consequent anomalies are a cause of great concern. These problems have been found to influence directly or indirectly the dietary habits of the elderly.

Food habits in an aged is an outcome of the earlier food choice, food likes and dislikes and it is reported to be the result of lifetime influence of cultural, social, economical and psychological factors. Food habits of elderly play an important role in the maintenance of their health and functional capacity and more knowledge of what is consumed by old is of value in improving their quality of life (Chandra *et al.*, 1991). Diet being one of the crucial factors that affects the overall well being of the elderly, it is essential to understand the dietary habits of elderly and the factors such as social, economic, psychological, physical which might directly or indirectly influence their dietary habits.

Since the dietary practices are culture and area bound, it is necessary to study the dietary habits of a sample population from different locations in order to plan and design suitable intervention strategies to improve the quality of life of this prominent strata that constitutes nearly ten per cent of the state's population.

Therefore, this study entitled "Dietary habits of senior citizens" has been undertaken to assess the dietary habits of senior citizens as influenced by psychosocial, economic, physical and physiological factors. Barth and Amer (1989) have rightly pointed out that, there is need to study the dietary habits of the elderly, as food habits plays an important role in the maintenance of health and optimum functional capacity and more knowledge about what is consumed by old people is of value.


REVIEW OF
LITERATURE

2. REVIEW OF LITERATURE

Literature on different aspects related to the present study entitled "Dietary Habits of Senior Citizens" is furnished in this chapter under the following headings:

2.1 Who are elderly?

2.2 Demographic profile

2.3 Ageing and age-related changes among elderly

2.4 Factors affecting dietary habits of elderly

2.4.1 Risk factors

2.4.2 Dietary factors

2.4.3 Socio-economic factors

2.4.4 Psychological factors

2.4.5 Physical factors

2.1 Who are elderly?

According to Raghuramulu and Sreeramulu (1996) individuals above the age of 60 years may be called as elderly or senior citizens. While Neugarn (1988) has stated that old age is the closing period in the life span and age 60 is usually considered as the dividing line between middle and old age. Reddy (1992) had reported that the State government had marked age '65' as the dividing line between middle and the young and older elderly. John (1992) has subdivided the group of elderly into two subdivisions one being the 'young elderly' aged from 65 to 74 years and the other the 'older elderly ' who are 75 years or older.

2.2 Demographic profile

People aged 65 and older are one of the fastest growing population groups as opined by Dyson (1984). In broad global terms the rate of growth of world's older population is twice that of total population and net monthly increase of those who are above 65 years is now almost one million as stated by Andrews (1996). Solomon (1992) has reported that demographic explosion of persons over 60 years of age is a reality in developed and developing countries alike. Mansharamani (1988) has stated that India has a 'mature' community, as our population above 60 years is increasing steadily and by the turn of this century it will become an "ageing society". In India the growth rate of elderly population has been 3.1% compared to 2.1% per annum in the general population during the last decade as reported by Bhat and Marie (1992). The percentage of aged persons above 60 years in India has risen from 5 per cent in 1931 to 6.49 % in 1981. In absolute numbers from 12 million in 1901 the 60 plus population has increased to 43 million in 1981 and this was expected to increase to about 51 millions as reported by Yenthos (1990) in Geriatric India.

Nair (1996) is of the opinion that among the various states in India, the rate of aging is highest in Kerala. The proportion of 60 plus population in Kerala was around 11 per cent during 1992-93, while the all-India figure was seven. National Family Health Survey (NFHS) (1993) in its report for the year 1993 has pointed out that those above the age of 60 years constitute 9.2 per cent of the population of Kerala. This reveals that the state is aging at a faster rate than any other state in India. This trend presents challenges to health care systems and nutrition services for older individuals as opined by Gulati and Irudayarajan (1993).

2.3 Ageing and age related changes among elderly

Choudhry (1966) has reported that old age sets in with the process of ageing. Nutrition and ageing is a fascinating field of research and good food can minimize the traumatic physiological changes that accompany ageing as reported by Schlienger *et al.* (1995). Rosenberg (1992) has stated that ageing will not be understood as a single biological process, but rather as a complex mixture of programmed changes influenced by environmental and dietary factors and habits.

Evans (1992) is of the opinion that advancing adult age is associated with profound changes in body composition, and resistance training is an effective means of preserving the functional status while Keys *et al.* (1973) have shown a decrease in basal metabolic rate due to changes in body composition. Cohn *et al.* (1980) had revealed that there is a striking decline in lean body mass which occurs over the decades of adult life and there is accumulation of fat in the body. The loss of lean-body mass is from skeletal muscle, as demonstrated by the large reduction in urinary output of muscle derived creatine and three methyl histidine by the elderly (Uauy *et al.* 1978). While Larsson (1978) has reported that there is selective loss of type II fibres in elderly muscle which in turn reduces the muscle glycogen stress that results in diminished strength.

Changes in the body composition due to aging is reported to bring in changes in the morbidity pattern also. Singh *et al.* (1996) had reported from a study on 1070 elderly patients conducted at Varanasi, that arthritis (615) was the commonest disease in the elderly followed by hypertension (510), visual problem (400), Ischemic heart disease (350), hearing impairment (300), chronic bronchitis (238), diabetes mellitus (280), tuberculosis (220), peptic ulcer syndrome (210), varicose vein (200) and urinary problem (154) in the decreasing order. Many of them were found to suffer from two or more diseases. Kawamoto (1994) reported that most frequent complaints and health problems

encountered among the senior citizen were acute infections of the upper respiratory tract. Chang *et al.* (1995) opined that most frequently occurring problem reported by nursing specialists among elderly were pain, risk of infection, impairment of skin integrity and it has been observed that those with the history of allergy were more likely to have a high risk of infection.

Kersetetter *et al.* (1992) had reported that infections are a common problem among old and that results in anorexia, poor dietary intake and malnutrition, which predisposes the individual to another infection. Immunologic capacity decreases remarkably, due to atrophy of the thymus and this would be one of the reasons for repeated incidence of infection among elderly as stated by Goldstein (1979). Tomio-Tada (1992) had reported that the age associated decline of immune function increases the susceptibility of elderly to infectious agents. Mari (1993) had reported that diseases of geriatric age such as diabetes mellitus, ischemic heart disease and parkinson's disease may cause sexual dysfunction also. Tennant *et al.* (1995) reported that knee problems in people aged above 60 is increasing and total knee replacement using modern surgical design helped to reduce the disability and dependency in a large number of people in Japan.

Grujic *et al.* (1997) had stated that poverty and illness are the main two problems aged people have to deal with, where as exhaustic pains, difficulty in moving around, poor vision, heart and breathing problems are the most frequent health problems. Sengstaken and Keng (1993) had projected that chronic pain is a common problem among geriatric nursing home residents and is frequently undetected. Potty (1996) opined that as a result of ageing there is disturbance of heart rhythm and decrease in vital capacity and he has ascertained many other changes like decalcification of bone, stiffening of joints and ligaments, psychiatric morbidity, difficulties in swallowing and digestion, inflammatory renal pathology and reduced blood flow to kidney.

The prevalence of atrophic gastritis was found to increase from 21 per cent among those aged 60 to 69 years to 31 per cent among 70 to 79 years and 37 per cent in those older than 80 years(Krasinski *et al.* 1987). While Kassarjian and Russel (1989) are of the opinion that achlorhydria, decreased intrinsic factor as a result of ageing increased the risk of bacteria over growth in the small intestine. The prevalence of constipation increases substantially after 65 years of age and contributes significantly to morbidity (Castle 1989). Johnston (1994) had stated that sleep problems in elderly are so common that nearly half of all hypnotic prescription written are for persons over 65 years old.

Risk factors

Mowe and Bohmer (1996) are of the opinion that under nutrition is a major risk factor among elderly patients increasing their morbidity and mortality. Mion *et al.* (1994) have also reported that malnutrition is a major risk for morbidity and mortality among elderly and had further stated that it is a multi factorial problem. Accordiing to Mion *et al.* (1994) malnutrition in elderly is a multifactorial problem involving physical, physiological, psycho social and economic factors. Mowe and Bohmer (1996) had also remarked that under nutrition is a major problem among hospitalized elderly patients and that reduced appetite, taste, dental problems, difficulties in shopping, cooking were common among the elderly before hospitalization that had led to hospitalization.

Ollenschlager (1993) is of the opinion that nutrition related diseases are the primary health problem not only of aged, but also of whole population in industrialized countries. Prinsley (1986) reported that nutritional problems in elderly can result from environmental risks, age related changes in the gastro-intestinal tract, and as an effect of disease or as a side effect of medication, while Bildlack *et al.* (1986) stated that nutritional problems of elderly are due to physical decline, low economic status and limited food intake and to many disease processes and treatment of those diseases. Roe (1984) reported

that certain prescribed drugs causes malabsorption of some nutrients or abnormal metabolism that results in malnutrition.

Palmer (1990) remarked that drug induced failure to thrive, is a result of reduction in food intake, nausea and anorexia. Alcohol consumption and smoking have a direct effect on appetite, inhibiting desire for food, thereby limiting intake of nutrients and alcohol related mortality is higher among elderly as stated by Gomez (1990).

Dietary factors

As stated by Betts (1985) the sensory perception of taste was seen as one of the most powerful values shaping the food choices of elderly. Duffy *et al.* (1995) had observed that olfactory dysfunction in elderly creates lower interest in food related activities, lower preference for foods with predominant sour/bitter taste. Sullivan *et al.* (1993) had remarked that poor oral health may be an important contributing factor to the development of significant involuntary weight loss among frail elderly. Fronton (1989) reported that poor dental health resulted in limited diet composed of soft foods, which lack texture and variety. These foods are low in fibre and unappealingly monotonous and lack of fibre leads to gastro intestinal complaints also. Monitary consideration, personal system convenience, physical well-being and managing social context ideals are other values that influences the food choice of elderly (Briley, 1989).

Grigorow *et al.* (1985) opined that diet of elderly should contain plenty of varied cereals, legumes, fruits and vegetables. Whole grain bakery products are preferred. They have also further stated that use of high fat milk products and cream should be restricted and tea is a recommended beverage. Hildebrandt *et al.* (1997) found that elderly persons with reduced number of functional units avoided stringy foods (meat), crunchy foods (vegetables) and dry solid foods. Rorick and Scrimshaw (1979) have reported that milk

and dairy products are often avoided by the elderly who may associate them to gastro-intestinal complaints.

Dietary survey conducted by Brodeur *et al.* (1993) revealed a lower intake of fruits and vegetables and high fibre foods among elderly with poor masticatory performance. Kerstetter *et al.* (1993) opined that establishing reliable nutrient requirements for individuals over the age of 65 years is a difficult task and deficiencies or sub-optimal intake of water soluble vitamins, Ca, Zn, Cu, Cr and water are reported in groups of older adults. The nutrients of concern for inadequate intake were Ca, vitamin D and vitamin A. The relation between nutrient intake and bone mineral state was studied in 72 Korean men and 124 Korean women over 65 years of age by Han and Kim (1988) and they reported that those with satisfactory nutrient intake had bone density above that of normal persons and those with poor nutrient intake had poor osteoporotic pattern while Arnaud and Sanchez (1990) have reported that calcium absorption, adaptation to low calcium diets and decreased skin synthesis of Pro Vitamin D are significantly decreased in the elderly.

Mc Gandy *et al.* (1965) reported that amounts of many individual dietary nutrients needed to maintain optimal health in old age requires quantification as elderly tend to consume less food. Andrews *et al.* (1994) reported that older age is a vulnerable age from the nutritional point of view; nutritional deficiency are frequent and their consequences are serious. Chronic diseases are common in elderly and might contribute to micro and macro nutrient deficiencies in elderly (Vellas 1991). Roger *et al.* (1989) had opined that dietary deficiencies, especially of energy, protein, fibre, vitamins were common among elderly. Morgan *et al.* (1986) reported that low nutrient intake contributed to poor anthropometric measures and biochemical nutritional state. Ollenschlager (1993) is of the opinion that nutrition related diseases are the primary health problem of the aged and hence nutrition counselling, early diagnosis and therapy of nutritional risk factors are

essential to improve the quality of life. Lee *et al.* (1996) reported that nutrient intake of rural southern elderly in India were significantly lower in energy and calcium and that they consumed fewer than three meals. Kindt (1994) had stated that reduced nutrient and energy intake may increase the occurrence of under nutrition. While Young (1992) reported that total energy intake decrease progressively from approximately 11.3 mega Jules (2700 Kcal) at 30 years to 8.8 Mega joules (2100 Kcal) at 80 years. While Mary and Helen (1985) reported that daily energy intake of elderly people with ill-fitting dentures is 200 – 300 Kcal less than for those with adequate dentition. Anon (1979) reported that intake of iron and calcium was very low among elderly.

Garry and Hunt (1996) reported that biochemical assessment of water soluble vitamins in elderly showed good correlation with vitamin intake from diet and supplements, while Stewart (1989) reported that use of multiple vitamin pills Vitamin E and C increased. The use of calcium and potassium supplements doubled and zinc supplements increased over 300 per cent. Kupfer *et al.* (1985) are of the opinion that gastric atrophy had significant effect on nutritional requirements for calcium and vitamin B_{12}. Baker *et al.* (1979) opined that long term debilitating conditions such as chronic bronchitis, emphysema lowers the intake of nutrients leading to poor nutritional status.

Lee *et al.* (1996) stated that meal skippers snacked more frequently and their nutrient intake was significantly lower than those of three meal eaters. Solitude, depression are the reasons reported by them for skipping the meals. While Kusaka *et al.* (1992) had reported that breakfast has an important role in maintenance of satisfactory nutrient status and is advisable to improve this meal, both qualitatively and quantitatively especially for independent old people. From a study among 58 institutionalized subjects and 50 independent subjects Ikeda *et al.* (1992) had revealed that none of the institution subjects and only 72 per cent of independent subjects, omitted breakfast. Redondo *et al* (1996) have commented that institutionalised subjects spent more time at breakfast and

their beakfast included more of fruits, fibre and carbohydrates. But Woo *et al.* (1989) is of the opinion that institutional subjects had lower daily protein energy intake and there is more evidence of protein-calorie malnutrition among elderly living in institutions.

A dietary survey conducted by Scythes *et al.* (1989) among 307 men and 312 women above 60 years revealed that the energy intake of many participants was low while the fat intake was high. Maisey *et al.* (1995) had stated that men had higher intake than women of energy and most nutrients but patterns of variation across the week were similar for both sexes. They have further stated that intake of meat, meat products, fish and vegetables varied across the week, but the other main food groups showed no significant variation. Iton *et al.* (1989) ascertained that mean dietary ascorbic acid intake was higher among women than men. Norlen *et al.* (1993) opined that edentulous women had higher intake of fat and higher coffee consumption than dentate ones and they further stated that individuals with high intake of energy and carbohydrate had more decayed tooth surface than those with low consumption. Casper (1995) is of the view that nutritional status in old age is multifactorial and dependent not only on appetite and availability of diverse food but also on socio-economic, psycho, physiologic, dietary and other factors.

Socio economic factors

Daponte (1995) had reported that the role of family members was extremely important in preventing or lessening food insecurity among the elderly. Living alone is found to be a risk factor for poor dietary intake particularly among older men as stated by Davis *et al.*, (1985). It was found that living alone had the greatest negative impact on dietary habits and nutrient intake of elderly men as reported by Gordon (1996). Abbasi and Rudman (1993) have reported that diet of elderly persons living alone composed of scant type of foods and opined that a significant number of these individuals are suffering from under nutrition. Miller (1978) found that persons living alone consumed

fewer servings of most foods and are more likely to choose easily prepared food items. Men who lived with a spouse consumed more of most food groups except alcohol as stated by Murphy *et al.* (1990). While Ryan *et al.* (1989) opined that women who lived with a spouse consumed 2.30 servings of protein foods and those who lived alone consumed only 0.22 servings. Stuckey *et al.* (1984) stated that single man living alone were those who were most at risk. While Nordstrom *et al.* (1983) have reported that old persons most at risk, were mainly women, those with the least education and those who had recently changed their life style either by moving from private housing to high rise flat. Duran *et al.* (1990) reported that poverty and living conditions resulted in reduced food intake in elderly which directly or indirectly affects the nutritional status and quality of life of elderly. Tucker and Rush (1992) had reported that low income is related to low dietary diversity that would lead to low nutrient intake. Thompson (1988) had reported that poverty restricts access to adequate diet and the purchase of good quality foods leading to malnourishment in elderly. Laura *et al.* (1996) have commented that poverty limits the food choice of elderly and the elderly had to buy inexpensive food rather than nutritious foods. Retirement is often associated with changes in eating pattern and reduced income will often result in altered food purchase as stated by Holdsworth (1985).

Psychological factors

Davis *et al.* (1990) has reported that loss of spouse and bereavement had a significant effect on nutritional status of elderly. Mc Intosh *et al.* (1984) reported that recent berevement or divorce may have an immediate negative impact on dietary quality. This could be attributed to psychological as well as social changes associated with such events in the lives of elderly. Yen (1989) had stated that the nutritional consequence of depression characterised by erratic pattern, with some people eating very little and other eating more than usual.

Ian-Darnton-Hill (1992) had ascertained that dementia of any cause contributes to loss of appetite, loss of enthusiasm to cook and eat food.

Exton-Smith (1980) reported that ignorance of the basic principles of adequate nutrition can lead to unbalanced nutrient intake especially in case of widowed men who have never cooked a meal. Inadequate cooking skills especially among men and disinterest in cooking foods contribute to poor nutritional status among elderly (Anon, 1979).

Physical factors

Kovar *et al.* (1984) reported that physical disability, poor dentition and depression resulted in poor food intake among elderly.

English (1989) reported that false teeth had significantly limited the food choice and inclination to consume foods that require chewing. The nutritional status of elderly is said to be affected by changes in dentition, as vegetables, fruits, meat are groups indispensable in the daily diet of elderly wearing complete dentures as opined by Karlsson and Carlsson (1990).

While Frank and Zeisel (1988) reported that dysphagia and other difficulties caused by dentures can contribute to failure to thrive by hindering eating and producing social embarassment.

Anne (1996) had opined that physical disability restrict the capacity to purchase, cook or eat a varied diet and contribute to nutritional inadequacies.

Frongullo *et al.* (1992) opined that physical disability causes heavy dependence on others, which increases anxiety that sometimes results in long periods of starvation leading to malnutrition while Hurny (1987) reported that patients with sensory aphasia and mild brain syndrome had problems of obtaining and preparing food.

Shephard (1987) opined that women who reported regular exercising had higher food intake than those who never or seldom did exercising. Darnton *et al.* (1991) had ascertained that an increasing lack of physical activity without modifying the diet can lead to obesity. Wolfe *et al.* (1996) were of the opinion that restricted mobility also limited the ability to use some of the food management strategies that otherwise might be used to cope with limited financial resources. Parker (1992) ascertained that poor health and restricted mobility increased the need for certain types of foods and meal patterns leading to food insecurity in the form of anxiety about being unable to obtain them.

MATERIALS AND METHODS

3. MATERIALS AND METHODS

The objective of the study was to assess the dietary habits of senior citizens as influenced by psychosocial, economic, physical and physiological factors. To achieve the above objective the study entitled "Dietary habits of the elderly" consisted of the following steps:

3.1 Selection of area

3.2 Selection of subject

3.3 Conduct of the study

3.3.1 Socio-economic survey of respondents and their families

3.3.2 Survey of the personal characteristics of the individuals

3.3.3 Measurement of the anthropometric profile of the respondents

3.3.4 Assessment of the clinical profile of the subjects

3.3.5 Assessment of the physical, functional and psychological status of the respondents

3.3.6 Dietary survey

3.4 Statistical analysis of the data.

3.1 Selection of area

The area selected for the study was the northern constituency of Trivandrum Corporation as urban area and Kalliyoor Panchayat of Southern constituency as the rural area.

3.2 Selection of subjects

Two hundred elderly citizens belonging to the age group of 65 to 75 years were selected from northern constituency of Thiruvananthapuram city and Kalliyoor Panchyat of Southern constituency through purposive sampling technique from the electoral roll of Trivandrum district. Subjects of both sexes were included in the study.

3.3 Conduct of the study

3.3.1 Socio-economic survey

According to Arora (1991) the socio economic background of the respondents such as social, economic, religious and family background in general, have a very distinct part to play in determining the attitudes and behavioral patterns of the individuals. Hence the socio economic status of the respondents were ascertained. Sirshi (1985) suggests that to assess the socio-economic status details regarding the type of family, religion, caste, income, expenditure pattern, education, occupation are to be ascertained. Two separate schedules, one for assessing the socio-economic status of the individual respondents and the other for assessing the socio-economic status of their families were designed, pre tested, modified and used for the survey (Appendix I and II).

The information on the socio economic status was collected using the above schedules by personal interview technique as suggested by Gupta (1987). The respondents were interviewed in the presence of other family members.

3.3.2 Personal habits

Information on personal habits was collected to see if any of these habits have influenced the dietary habits of the respondents. Personal habits assessed in this study included smoking, alcohol abuse, tobacco chewing and physical exercise. The information on personal habits was collected by personal interview technique, using a separate schedule, which were pretested, modified and used for the survey (Appendix III).

3.3.3 Anthropometric measurement

Beaton *et al.* (1979) have reported that anthropometry is useful because it provides the best general proxy for constraints to human welfare of the poorest, including inadequacies, infections and other environmental health risks. Anthropometric measurements used in this study includes measurement of height, weight, triceps skinfold, mid-upper arm circumference and hip and waist circumferences. These were measured using standardized techniques as detailed below.

(a) Measurement of weight

Weight was measured using a platform balance. The accuracy of the scale was checked frequently. The person was made to stand on the platform without touching elsewhere. Care was taken to use the balance on a flat surface. Weight was taken in the morning, after emptying the bladder, with ordinary clothing and without wearing shoes (Jelliffee, 1966).

(b) Measurement of height

Height of the respondents were recorded using a stadiometer employing the technique suggested by Jellifee (1966).

From the recorded weight and height, Body Mass Index (BMI) was computed, using the formula Weight (Kg)/Height (M^2).

(c) Triceps skinfold (TST)

The importance of measuring body composition in relation to problems of nutrition is now becoming more apparent. Measurement of skin fold thickness is one of the parameters used in this study to determine body composition. Skin fold thickness is a simple means of measuring subcutaneous fat and therefore of body composition as stated by Swaminathan (1984). Triceps skinfold thickness was determined using a Triceps fat skinfold caliper (Langae). As the fat in this region is not uniform the site was carefully selected half way down the arm between the tip of acromion process of the scapula and the olecranon process of the ulna. The measurement of skinfold thickness was made with arm hanging relaxed at the side. The skinfold parallel to the long axis was picked up between the thumb and forefinger, about one centimeter above the midpoint taking care not to include the underlying muscle (Jelliffee, 1966).

(d) Mid upper arm circumference (MUAC)

Measurement of mid upper arm circumference is the most useful, practical method for assessing muscle mass as this region is easily accessible and measurement requires only a flexible fibre glass tape as reported by Gopaldas and Seshadri (1987). The mid upper arm circumference was taken on the left hand. The mid point between the tip of the olecranon of the fore arm bone, ulna, is located with the arm flexed at the elbow and marked with marker pen. The arm is then left hanging freely. The fibre glass tape is placed embracing around the arm without exerting too much pressure on the soft tissues. The reading is taken to the nearest centimeter as per the technique suggested by Jellifee (1966).

(e) Waist-hip circumference

According to Lean *et al.* (1995) waist circumference is used as a measurement for indicating the need for weight management and in the present study the circumference of waist was measured by passing a fibre glass tape around the waist. For hip measurement, the circumference of hip at the maximum point of proleus was measured using fibre glass tape as per the technique suggested by Chandha *et al.* (1995). After recording waist and hip measurement of the respondents, their waist-hip ratio was calculated, by dividing the circumference of waist by the circumference of hip as suggested by Chandha *et al.* (1995).

Clinical profile

Clinical examination is one of the essential parts of all nutritional surveys, since the ultimate objective is to assess levels of health of individuals and population groups as influenced by the diet they consume (Swaminathan, 1990). According to Swaminathan (1990) clinical examination is the most important part of the nutritional status assessment as one gets the direct information of the signs and symptoms of dietary deficiency prevalent among people.

In this study the prevalence of clinical signs and symptoms among the subject due to dietary deficiencies or excess were assessed to find out the effect of dietary pattern on their clinical profile.

The "RAND HIS" symptom list and a general examination schedule developed by Natarajan (1987) were used to study the clinical status of the elderly. The clinical examination was done by a trained clinician using the above schedule.

RAND HIS symptom list was scored on a 3 point continuum (0, 1, 2) and a score of 'zero' was given to those who did not have the symptom, and a score of 'one' to those who had the symptom but did not see a doctor and 'two' to those who had the symptom and therefore saw a doctor. Using this format the maximum score that can be obtained will be 148 and the minimum score would be 'zero'.

Another general examination schedule developed by Natarajan (1987) was also used to find out the deficiency diseases. The presence of disease manifestations listed in the schedule was scored on a two-point continuum (0, 1). A score of zero was given to those who did not have the specified deficiency disease and a score of one to those who had the deficiency disease. Using this format the maximum score that can be obtained will be 30 and the minimum score would be zero for an individual.

3.3.4 Physical, functional and psychological profile

Physical, functional and psychological status of the respondents were assessed as these would affect food selection as well as consumption pattern which in turn would reflect the dietary habits of the elderly as stated by Rosa *et al.* (1996). Functional, psychological and physical assessment in older persons is useful in identifying problems that can be solved with better nutrition (Stuck *et al.*, 1993). Schedules used to assess the physical, functional and psychological profile of respondents are detailed below.

(a) Physical profile

To assess the general physical health of the respondents, a modified version of self-administered Questionnaire of RAND HIS (Brook *et al.*, 1979) was used. The information collected on physical health as perceived by the respondents were scored by interviewing them in the presence of family members. The responses were scored on a

four point continuum for six questions and on a two point continum for three questions which would fetch a maximum score of 30 and minimum score of nine.

(b) Functional profile

To assess the functional status of the respondents the "DUKE QARS multidimensional functional assessment questionnaire" (Fillenbaum, 1984) was used. Functional status of the respondents were obtained by interviewing the respondents in the presence of other family members and scoring the responses on the spot, in the questionnaire. The questionnaire consisted of questions on Physical Activities of Daily Living (PADL) and Instrumental Activities of Daily Living (IADL). The scores for the individual answers from each subject were summed up to arrive at the individual's total score. This score indicates the level of independence a subject has in carrying out Instrumental Activities of Daily Living (IADL) and Physical Activities of Daily Living (PADL). Adding the PADL and IADL scores, Domain Index Score was worked out for each individual.

There were seven questions under IADL; they were scored on a 3 point continuum (0, 1, 2) so that it would fetch a maximum score of '14' and a minimum score of zero. There were seven questions under PADL; they were scored on a 3 point continuum (0, 1, 2) with a maximum score of '14' and a minimum score of zero. The maximum score for Domain Index would be '28' and the minimum would be zero.

(c) Psychological profile

Poor mental health directly or indirectly influence dietary intake among elderly. The psychological profile of the respondents were studied using field trial version of "WHOQOL – BREF" format developed by World Health Organization

(WHO, 1991). WHOQOL-BREF contains 26 questions which are grouped in to four domains. Each domain represents one character. D_1 (Physical health), D_2 (Psychological), D_3 (Social relationships), D_4 (Environmental). The 26 questions were scored on a five point continuum (1-5). There were seven questions in the first domain, with maximum score of 35 and minimum score of seven; there were six questions on second domain, with maximum score of 30 and minimum score of six; there were three questions in the third domain with maximum score of 15 and minimum score of 3; and there were eight questions in the fourth domain, with maximum score of 40 and minimum score of eight. The responses to the questions in each domain were scored and total domain scores for each domain was worked out. The four domain scores denote an individual's perception of quality of life in each particular domain. Domain scores are scaled in the positive direction (higher score denotes better quality of life). The responses were obtained by interviewing the respondents in the presence of family members.

3.3.5 Dietary survey

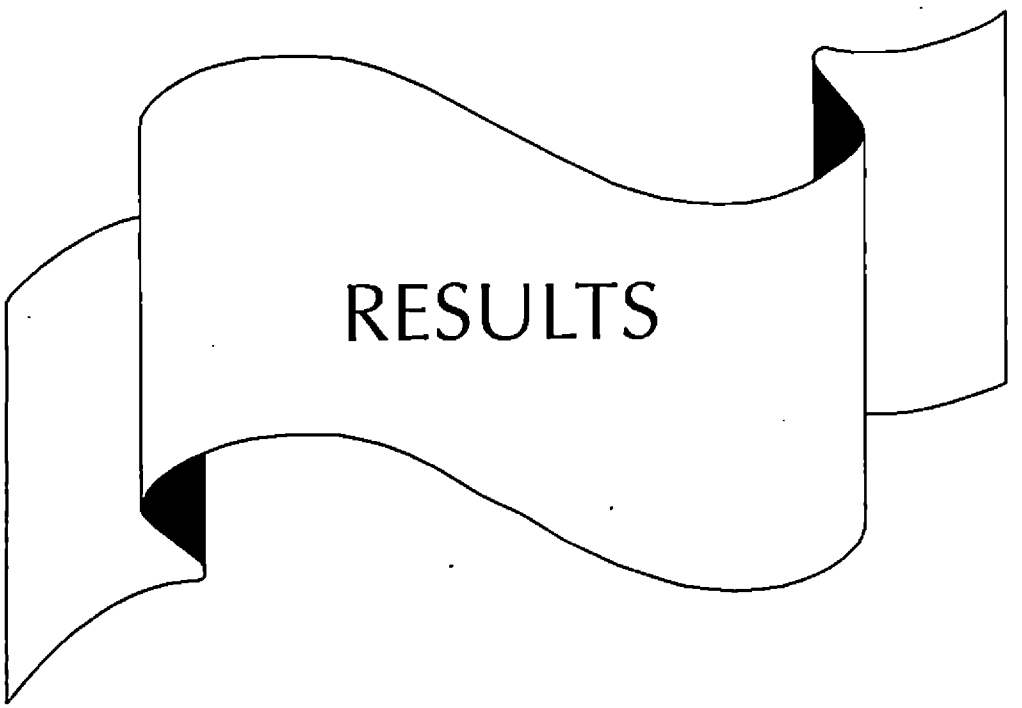
Swaminathan (1984) has reported that diet surveys on individuals or groups provides essential information on nutrient intake levels, sources of nutrients, food habits and attitude towards food.

A specially designed questionnaire pre-tested and modified suitably was used to collect information from the two hundred subjects on their dietary pattern and food habits (Appendix IV). The questionnaire consisted of questions regarding the meal pattern, food preferences, the frequency of use of various food items and food preparations commonly used. Questions pertaining to the modifications in the diet the respondents had made to suit changes induced by ageing was also included in the schedule.

The survey was conducted by interviewing the respondents in the presence of family members.

3.4 Statistical analysis of the data

The data collected were subjected to statistical analysis to find out the association between dietary habits and other variables like socio-economic, personal habits, psychological and physical health, anthropometric and clinical profile of the subjects with the help of 'Chi-square' test. Correlations between non-dietary variables were also done. Students 't' test was also used to study the significant difference of the important variables of rural and urban citizens as well as the difference between male and female citizens, as per the methodology given by Snuckder and Cockran (1980).


RESULTS

4. RESULTS

The results of the present study entitled dietary habits of senior citizens is presented under the following headings.

4.1 Socio-economic profile of the respondents

4.2 Socio-economic profile of the family

4.3 Survey of the personal characteristics of the individuals.

4.4 Measurement of the anthropometric profile of the respondents.

4.5 Assessment of the clinical profile of the subjects.

4.6 Assessment of perception about health

4.7 Assessment of functional ability.

4.8 Assessment of psychological status of the respondents.

4.9 Dietary survey.

4.10 Statistical analysis

4.1 Socio economic and personal profile of the individual

The socio economic profile of the individual senior citizens and their families were studied as they have a profound influence on the dietary habits of the elderly.

Personal profile of the individual

In order to study the personal profile age, sex and marital status, of the respondents were enumerated and the details are given below

4.1.1. Age and sex of the respondents

The data given in Table 1 revealed that 67 per cent of the subjects were between the age of 65-70 while 33 per cent were between the age of 71-75 and the mean age of the respondents was found to be 68. As depicted in the table 54.5 per cent of the respondents were males and 45.5 per cent were females. The survey indicates that there were more female subjects among rural respondents compared to the urban subjects selected for the study.

Table 1. Age and sex wise distribution of respondents

	Urban	Rural	Total
Age (in years)			
65 to 70	67 (67.0)	67 (67.0)	134 (67.0)
71 to 75	33 (33.0)	33 (33.0)	66 (33.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)
Sex			
Male	60 (60.0)	49 (49.0)	109 (54.5)
Female	40 (40.0)	51 (51.0)	91 (33.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

4.1.2 Marital status of the respondents

Table 2. Marital status of the respondents

Marital status	Urban		Rural		Total	
Unmarried	2	(2.0)	5	(5.0)	7	(3.5)
Married	54	(54.0)	40	(40.0)	94	(47.0)
Widowed	33	(33.0)	42	(42.0)	75	(37.5)
Separated	6	(6.0)	8	(8.0)	14	(7.0)
Divorced	5	(5.0)	5	(5.0)	10	(5.0)
Total	100	(100.0)	100	(100.0)	200	(100.0)

Figures in parenthesis indicates percentage

Marital status of the respondents as presented in Table 2 though reveals that 96.5 per cent were married, only about 47 per cent were living with their spouses now. The overall data revealed that 37.5 per cent were widowed while 12 per cent were found to be divorced (7%) or separated (5%). Majority of the urban respondents(54 per cent) were married and living with their spouse than their rural counterparts (40 per cent) but widowhood was seen more among rural citizens (42 per cent)

A sex wise comparison of the data collected revealed that there were more elderly spinsters (2.5%) than unmarried males (1%). Thirty per cent of males and 17 per cent of the females who are married are still living with their spouse. The data also revealed that there were an equal number of male (18%) and female subjects (19%) who were widowed. It was observed that 3 per cent of the males and 2.5 per cent of the females had lost their life partners. The separation between the couples was noted among 5 per cent of female and 2 per cent of male subjects of the study.

4.1.3 Educational status of the respondents

Educational status of the respondents are given in Table 3.

Table 3. Educational status of the respondents

Level of Education	Urban	Rural	Total
Illiterate	—	17 (17.0)	17 (8.5)
Primary level	7 (7.0)	38 (38.0)	45 (22.5)
Secondary school education	3 (3.0)	22 (22.0)	25 (12.5)
High school education	12 (12.0)	11 (11.0)	23 (11.5)
Pre-degree	20 (20.0)	5 (5.0)	25 (12.5)
Pre-degree + Technical qualification	13 (13.0)	5 (5.0)	18 (9.0)
Graduation	20 (20.0)	2 (2.0)	22 (11.0)
Graduation + Technical qualification	2 (2.0)	—	2 (1.0)
Post graduation	15 (15.0)	—	15 (7.5)
Professionally qualified	8 (8.0)	—	8 (4.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures given in parenthesis indicates percentage

The educational status projected in Table 3 crystallize the fact that 17 per cent of the respondents were illiterate and all of them belonged to the rural area. Higher educational status was attained by urban citizens. For example 55 per cent of the urban senior citizens had college level of education, while only a minor percentage (12%) had attained this level of education among the rural citizens. Technically and professionally qualified persons were more among the urban citizens (23%) than the rural ones (5%). Sex-wise comparison of educational status revealed that male subjects (29%) had higher educational status than the female counterparts (15%). More over illiteracy was more prevalent among female citizens (6%).

4.1.4. Religion and caste

Religion and Caste-wise distribution of the respondents are given in Table 4

Table 4. Religion and caste wise distribution of the respondents

(a) Religion	Urban	Rural	Total
Hindu	72 (72.0)	45 (45.0)	117 (58.5)
Christian	22 (22.0)	51 (51.0)	73 (36.5)
Muslim	6 (6.0)	4 (4.0)	10 (5.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)
(b) Caste			
Backward	20 (20.0)	35 (35.0)	55 (27.5)
Forward	74 (74.0)	25 (25.0)	99 (49.5)
Scheduled Caste	6(6.0)	40(40.0)	46 (23.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

The religion of subjects as summarized in Table 4. brings out the fact that more than half of the respondents (58.5%) were Hindus while the Christians constituted 36.5 per cent and Muslims formed a minority of 5 per cent. The data also revealed that the urban population had a higher percentage of Hindus (72%) compared to other religious groups, while the rural area had a prepondarance of Christians over Hindus. Among the 200 senior citizens surveyed 49.5 per cent belonged to forward castes while 23 per cent were found to belong to scheduled caste communities. The caste based demographic analysis brought out the fact that those belonging to backward class, mainly scheduled castes, lived mostly in rural areas. The urban area had a prepondarance of forward castes (74%) over other backward and scheduled castes.

4.1.5 Employment status of the respondents

Employment status of the respondents is given in Table 5.

Table 5. Current employment status of the respondents

Type of employment	Urban	Rural	Total
No employment	58 (58.0)	55 (55.0)	113 (56.5)
Managing own business	17 (17.0)	4 (4.0)	21 (10.5)
Managing own agricultural land	7 (7.0)	9 (9.0)	16 (8.0)
Doing part time work in private organizations	6 (6.0)	--	6 (3.0)
Casual labour	12 (12.0)	32 (32.0)	44 (22.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Current employment status of the respondents is given in Table 5 indicates that there were no major variation in the number of elderly citizens currently employed from rural (45%) and urban (49%) areas. Most of the females (78.0%) were found to be unemployed, while (60.4%) of the male senior citizens were found to be currently employed in business or are working as agricultural labourers.

Distribution of respondents based on the type of past employment is given in the Table 6.

Table 6. Distribution of respondents based on the type of past employment

Type of employment	Urban	Rural	Total
No Job	24 (24.0)	31 (31.0)	55 (27.5)
Teacher	4 (4.0)	2 (2.0)	6 (3.0)
Managing own business	8 (8.0)	6 (6.0)	14 (7.0)
Managing own Ag. Land	3 (3.0)	10 (10.0)	13 (6.5)
Casual labourer	6 (6.0)	44 (44.0)	50 (25.0)
Factory worker	4 (4.0)	2 (2.0)	6 (3.0)
Govt. employee	51 (51.0)	5 (5.0)	56 (28.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Table 6 depicts the type of employment in which the subjects were involved in the past. As observed from the table, 24 per cent of urban and a slightly higher figure of 31 per cent of rural citizens were found to be jobless. It was observed that more of urban citizens were government employees while a major section of the rural subjects (44%) were found to be working as casual labourers.

4.1.6. Economic status of the respondents

Economic status of the respondents is given in Table 7.

Table 7. Total monthly income earned by the respondents from all sources

Monthly income (Rs.)	Urban	Rural	Total
No income	--	17 (17.0)	17 (8.5)
Below 1000	5 (5.0)	33 (33.0)	38 (19.0
1001 – 2000	15 (15.0)	34 (34.0)	49 (24.5)
2001 – 3000	17 (17.0)	10 (10.0)	27 (13.5)
3001 – 4000	16 (16.0)	4 (4.0)	20 (10.0)
4001 – 5000	14 (14.0)	2 (2.0)	16 (8.0)
5001 – 6000	10 (10.0)	--	10 (5.0)
Above 6000	23 (23.0)	--	23 (11.5)

Figures in parenthesis indicates percentage

The total monthly income from all sources, earned by the senior citizens are given in Table 7. The monthly income varied from Rs. 1000 to Rs. 6000. The general data revealed the truth that only 8.5 per cent had no income of their own and all of them belonged to rural area. The income accrued by 91.5 per cent comprised of money received by the respondents as contribution from their children (3.5 per cent) money from pension (50 per cent), interest from deposits (6 per cent), from agriculture lands (30 per cent) and from rented property (3 per cent). Thirty three per cent of the rural citizens earned an income less than Rs. 1000 while the urban picture shows that only 5 per cent earned an income less than Rs. 1000 and 23 per cent had an income above Rs. 6000. The rural picture depicts that there is not even a single person who earned this level of income. It was found from the data that 17 per cent of the female subjects earned no income of their own.

Distribution of respondents based on income from current employment is given in Table 8.

Table 8. Distribution of respondents based on income from current employment

Income from current employment	Urban	Rural	Total
No income from the current employment	58 (58.0)	55 (55.0)	113 (56.5)
Below Rs. 1,000	--	11 (11.0)	11 (5.5)
Rs. 1,001 to 2,000	2 (2.0)	19 (19.0)	21 (10.5)
Rs. 2,001 to 3,000	8 (8.0)	12 (12.0)	20 (10.0)
Rs. 3,001 to 4,000	11 (11.0)	3 (3.0)	14 (7.0)
Rs. 4,001 to 5,000	8 (8.0)	--	8 (4.0)
Rs. 5,001 to 6,000	10 (10.0)	--	10 (5.0)
Above 6,000	3 (3.0)	--	3 (1.5)
Total	100	100	200 (100)

Figures in parenthesis indicates percentage

Figures given in Table 8 reveals the income the respondents are getting from their current employment. It is seen that the income varied from Rs. 1000 to 6000. It is found that none of the urban subjects earned an income less than 1000, while 11 per cent earned an income below 1000 among rural citizens.

4.1.7. Freedom to spend money

Though it is shown in Table 8 that majority (91.5 per cent) of the senior citizens had income of their own, circumstantial evidence as well as observation had revealed the fact that many had to depend on their family members for money because of lack of freedom to spend. Data collected also revealed that out of the total subjects surveyed 51 per cent reported that they had freedom to spend money. Data further revealed the fact that urban citizens had more freedom to spend money (62 per cent) when compared to rural counterparts (40 per cent). It was found that more (32.5 per cent) of the male subjects had freedom to spend money when compared to female citizens (18.5 per cent).

4.1.8. Personal expenditure pattern

Distribution of respondents based on their personal expenditure is given in Table 9.

Table 9. Distribution of respondents based on their personal expenditure

Personal expenditure	Urban	Rural	Total
Below 100	15 (15.0)	16 (16.0)	31 (15.5)
101 – 200	14 (14.0)	22 (22.0)	36 (18.0)
201 – 300	21 (21.0)	10 (10.0)	31 (15..5)
301 – 400	12 (12.0)	20 (20.0)	28 (14.0)
401 – 500	13 (13.0)	15 (15.0)	28 (14.0)
Above 500	25 (25.0)	17 (17.0)	40 (20.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

It can be seen from Table 9 that the personal expenditure (monthly) of senior citizens varied over a wide range from Rs. 100 to Rs. 500. Among the 200 respondents surveyed 15.5 per cent had an expenditure below 100 rupees, and 20 per cent had it above 500 rupees per month. Twenty five per cent of the urban citizens had personal expenditure above 500 per month, but only 17 per cent of rural citizens had personal expenditure above 500.

4.1.9. Nature of saving and amount saved

Distribution of respondents based on nature of savings is given in Table 10.

As revealed from Table 10, 40 per cent of urban citizens and 65 per cent of rural citizens did not possess any savings. One noticeable feature was that the saving habit was more among urban citizens than rural citizens. Regarding the nature of saving practices followed by the respondents, savings in bank was prevalent both in urban (33%) and rural (12%)areas. Nature of saving in the form of chitti was found more among rural (13%) than in urban (6%) areas. Regarding the frequency of saving monthly saving pattern was commonly observed both among urban and rural citizens.

Table 10. Distribution of the respondents based on the nature of saving

Nature of savings	Urban	Rural	Total
Chitty	6 (6.0)	13 (13.0)	19 (9.5)
Bank deposits	33 (33.0)	12 (12.0)	45 (22.5)
Stocks/shares	2 (2.0)	--	2 (1.0)
Insurance	2 (2.0)	--	2 (1.0)
Post office savings	5 (5.0)	10 (10.0)	15 (7.5)
Chitti + Bank deposits	3 (3.0)	--	3 (1.5)
Post office + bank deposits	4 (4.0)	--	4 (2.0)
Bank deposits + insurance + chitti	2 (2.0)	--	2 (1.0)
Stocks & shares + bank deposits	3 (3.0)	--	3 (1.5)
No savings	40 (40.0)	65 (65.0)	105 (52.5)
Total	100 (100.0)	100 (100.0)	200 (100)

Figures in parenthesis indicates percentage

Distribution of respondents based on amount saved per month is given in Table 11.

Table 11. Distribution of respondents based on amount saved per month

Amount saved (in Rs.)	Urban	Rural	Total
No saving	40 (40.0)	60 (60.0)	100 (50.0)
Below 500	1 (1.0)	29 (29.0)	30 (15.0)
501 – 1000	6 (6.0)	4 (4.0)	10 (5.0)
1001 – 2000	20 (20.0)	2 (2.0)	22 (11.0)
2001 – 3000	12 (12.0)	--	12 (6.0)
3001 – 4000	3 (3.0)	--	3 (1.5)
4001 – 5000	14 (14.0)	--	14 (7.0)
Above 5000	4 (4.0)	--	4 (2.0)
Total	100.0 (100.0)	100.0 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Figures given in Table 11 reveals the amount of money saved per month by the respondents. It varied from Rs. 500 to Rs. 5000 per month. The data revealed that 40 per cent of urban and 65 per cent of rural respondents (Total 52.5 %) had no savings for themselves, which brings out a notable difference between the urban and rural citizens regarding their saving habit.

4.1.10. Personal assets of the respondents

Distribution of respondents based on the possession of personal assets is given in Table 12.

Table 12. Distribution of respondents based on the possession of personal assets

Personal assets	Urban	Rural	Total
No personal assets	13 (13.0)	26 (26.0)	39 (19.5)
Inherited land + house	8 (8.0)	11 (11.0)	19 (9.5)
Land + house purchased	19 (19.0)	28 (28.0)	47 (23.5)
Inherited land + house + bank investments	6 (6.0)	5 (5.0)	11 (5.5)
Land, house (purchased) + investments	19 (19.0)	16 (16.0)	35 (17.5)
Land, house, vehicle + investments	16 (16.0)	6 (6.0)	22 (11.0)
Inherited land + bank investment	12 (12.0)	8 (8.0)	20 (10.0)
Land + house + stock & shares	5 (5.0)	--	5 (2.5)
Bank investment	2 (2.0)	--	2 (1.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Table 12 depicts the distribution of respondents based on the possession of personal assets. As projected in the table more of rural citizens (26 %) had no personal assets when compared to urban dwellers (13 %). It was noted that land and a house were the major possessions of a majority of rural citizens (28 %). While the urban citizens had land, house and other investments. Possession of land, house, vehicle and investments were found among 16 per cent of urban citizens while only 6 per cent of rural citizens had the above assets. It was noted that majority of men had personal assets of their own (51 %) than women (39 %).

4.1.11 Economic liabilities

Economic liabilities of respondents based on the type of economic liability is given in Table 13.

Table 13. Distribution of respondents based on the type of economic liability

Liability	Urban	Rural	Total
No liability	76 (76.0)	62 (62.0)	133 (66.5)
Loan repayment			
House loan	7 (7.0)	11 (11.0)	18 (9.0)
Vehicle loan	3 (3.0)	--	3 (1.5)
Land loan	5 (5.0)	6 (6.0)	11 (5.5)
Debt (personal)	9 (9.0)	21 (21.0)	31 (15.5)
Total	100.0 (100.0)	100.0 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Among the 200 respondents surveyed, 66.5 per cent had no liability while 31 per cent had liability in the form of debts, pending payments on account of house, vehicle and land loans. It was found that liability was more among the rural citizens than the urban citizens.

4.1.12 Living Pattern

Distribution of respondents based with whom they are living is given in Table 14.

Table 14. Distribution of respondents based with whom they are living

With whom they are living	Urban	Rural	Total
Subject alone	3 (3.0)	6 (6.0)	9 (4.5)
Subject + spouse	10 (10.0)	7 (7.0)	17 (8.5)
Subject + daughters + sons	6 (6.0)	6 (6.0)	2 (6.0)
Subject + spouse + son + daughter + inlaws	8 (8.0)	24 (24.0)	32 (16.0)
Subject + spouse + son + daughter	10 (10.0)	4 (4.0)	14 (7.0)
Subject + spouse + daughter + in laws	9 (9.0)	3 (3.0)	12 (6.0)
Subject + spouse + sons + in laws	19 (19.0)	2 (2.0)	21 (10.5)
Subject + daughter + in laws	22 (22.0)	12 (12.0)	34 (17.0)
Subject + son + in laws	7 (7.0)	34 (34.0)	41 (20.5)
Relatives	6 (6.0)	2 (2.0)	8 (4.0)
Total	100	100	200 (100)

Figures in parenthesis indicates percentage

An evaluation of the contents of the Table 14 reveals that only 6 per cent of the rural and 3 per cent of urban citizens lived alone. Others were found to be living with their own kith and kin. However, joint family system was observed more among rural respondents (24 per cent) when compared to urban subjects (8 per cent).

Distribution of respondents based on residential facilities is given in the Table 15.

Table 15. Distribution of respondents based on their residence

Living in	Urban	Rural	Total
Own House	72 (72.0)	65 (65.0)	137 (68.5)
Son's house	7 (7.0)	17 (17.0)	24 (12.0)
Daughter's house	12 (12.0)	6 (6.0)	18 (9.0)
Soninlaw's house	3 (3.0)	4 (4.0)	7 (3.5)
Daughter in laws house	--	6 (6.0)	6 (3.0)
Relatives house	6 (6.0)	2 (2.0)	8 (4.0)
Total	100	100	200 (100)

Figures in parenthesis indicates percentage

As depicted in Table 15 majority of urban (72%) and rural citizens(65%) had their own house. It was found that the remaining subjects lived with their own children or with their close relatives.

Majority of rural respondents shared the room with other members of the family (62%). Sharing the room with grand children was found more among urban respondents (28%) when compared to rural counterparts (8%).

4.1.13 Social network among senior citizens

Data collected on social contacts established by the subjects revealed that 70 per cent of urban citizens and 46 per cent rural citizens had friends as their companions. It was found that 48 per cent of urban and 26 per cent of rural citizens meet their friends daily.

It was revealed that most of the urban (76 per cent) and rural (87 per cent) citizens were not engaged in social/voluntary services/activities in the community only. A minor percentage of 21 per cent urban and 12 per cent rural senior citizens were engaged in certain social/voluntary services as members of local organisations.

Leisure time activities

Distribution of subjects based on how they spend their leisure time is given in Table 16.

Table 16. Distribution of subjects based on their leisure time activities

Leisure time activities	Urban	Rural	Total
Always busy and have no leisure	3 (3.0)	11 (11.0)	14 (7.0)
Helping in cooking and in other house hold chores	28 (28.0)	39 (39.0)	67 (33.5)
Doing work outside the house such as Gardening, caring birds/animals etc.	10 (10.0)	20 (20.0)	30 (15.0)
Engaged in meditation/reading books	19 (19.0)	8 (8.0)	27 (13.5)
Visiting places of worship	30 (30.0)	17 (17.0)	47 (23.5)
Visiting friends	10 (10.0)	5 (5.0)	15 (7.5)
Total	100 (100.0)	100 (100.0)	100 (100.0)

Figures in parenthesis indicates percentage

Table 16 depicts the fact that three per cent of urban and 11 per cent of rural citizens said that they were always busy and are fully engaged in some sort of work. It was found that majority of urban citizens spend their leisure time in visiting places of worship (30%) or by helping in household chores (28%) or by engaging in meditation or reading books (19%). Among rural citizens 39 per cent reported that they help in the kitchen or do work outside the house (20 per cent) or visit places of worship (17 per cent) during their leisure time.

4.2. Socio-economic status of the families

4.2.1. Type and size of the family

The type of family in which the selected elderly lives, with whom they live, the size of the family in which they live etc may partially or wholly influence their dietary habits. The data on the type of family are given in Table 17. It was found that 42.5 per cent of the respondents lived in the traditional joint families. The joint family system was followed by 70 per cent of the rural families, while it was observed only among 15 per cent of the urban respondents surveyed. Data obtained for urban and rural families reveal the fact that majority of the urban families(86%) had 2 to 5 members and majority of the rural families(61%) had more than 5 members. On the whole 59.5 percent of the subjects (both rural and urban) had 2 to 5 members in the family indicating that more than half of the respondents had no problem of isolation.

Distribution of the families according to the type and size of the families of the subjects is given in Table 17.

Table 17. Distribution of the families according to the type and size of families

	Distribution of families		
	Urban	Rural	Total
(a) Type of family			
Nuclear	85 (85.0)	30 (30.0)	115 (57.5)
Joint	15 (15.0)	70 (70.0)	85 (42.5)
Total	100 (100.0)	100 (100.0)	200 (100.0)
(b) Family size			
One member only	3 (3.0)	6 (6.0)	9 (4.5)
Two to five members	86 (86.0)	33 (33.0)	119 (59.5)
More than five members	11 (11.0)	61 (61.0)	72 (36.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

4.2.2 Age and Sex wise distribution of the family members of respondents

Age and Sex wise distribution of the family members is given in Table 18.

Table 18. Age and sex-wise distribution of the family members of the respondents

Age (years)		Distribution within the male population	Distribution within the female population	Total Urban + rural
< 20	Urban	80 (28.5)	101 (33.7)	181 (31.3)
				471 (33.4)
	Rural	130 (35.2)	160 (34.7)	290 (34.9)
20 – 60	Urban	110 (39.3)	130 (43.5)	240 (41.4)
				590 (41.9)
	Rural	160 (43.3)	190 (41.2)	350 (42.3)
Above 60	Urban	90 (32.1)	68 (22.7)	158 (27.3)
				348 (24.7)
	Rural	79 (21.4)	111 (24.0)	190 (22.8)
Total	Urban	280 (100.0)	299 (100.0)	579 (100.0)
				1409 (100.0)
	Rural	369 (100.0)	461 (100.0)	830 (100.0)

Figures in parenthesis indicates percentage.

The age and sex based distribution of the population as presented in Table 18 reveals that the 200 families surveyed (urban and rural) had a total population of 1409 members. Further analysis of the data revealed that of the total population 31.3 per cent from urban families and 34.9 per cent from the rural families were below 20 years. While 41.4 per cent of urban and 42.3 per cent of rural families were adult members. It was also found that 27.3 per cent of urban and 22.8 per cent rural, were above the age of 50. When male and female population were analyzed it was found that female population predominated over male population both among urban (299) and rural (461) households surveyed.

4.2.3 Employment status

Further socio-economic analysis of the families revealed that among urban families 45 per cent had two employed adults, while among rural group 50 per cent had more than two adult members employed. In general it may be noticed that all the families had atleast one member employed and that more than 40 per cent of the 200 families surveyed had more than two adults employed.

4.2.4 Economic status of the family members

In the present study total family income was taken into consideration because it determines the family status and socio-economic strata of the society to which they belong. Table 19 reveals the distribution of families with respect to their total monthly income.

Table 19. Distribution of families according to total monthly income

Monthly income from all sources	Urban	Rural	Total
Less than 1000	--	3 (3.0)	3 (1.5)
1000 – 2000	--	3 (3.0)	3 (1.5)
2001 – 3000	1 (1.0)	4 (4.0)	5 (2.5)
3001 – 4000	2 (2.0)	20 (20.0)	22 (11.0)
4001 – 5000	6 (6.0)	32 (32.0)	38 (19.0)
Above 5000	91 (91.0)	38 (38.0)	129 (64.5)
Total	100 (100.0)	100 (100.0)	200.0 (100.0)

Figures in parenthesis indicates percentage.

The monthly income of urban families varied from of Rs. 2500 to Rs. 20,000 and from Rs. 300 to Rs. 10,000 among rural dwellers. Out of 200 families surveyed 64.5 percent had an income above Rs. 5000. Out of the 100 urban families surveyed 91 percent had income of this order. While this level of income was noted only among 38

percent of rural families. Majority of the rural families (62%) had income ranging from Rs. 300 to 5000. In general, the financial status of the urban respondents were found to be more sound than the rural respondents.

Further socio-economic analysis of the families revealed that among urban families 45 per cent had two employed adults, while among rural group 50 per cent had more than two adult members employed. In general, it may be noticed that all the families had at least one member employed and that more than 40 per cent of the 200 families surveyed had more than two adults employed.

4.2.5 Total family expenditure

Family expenditure pattern of 200 families surveyed is presented in Table 20. As seen in the case of family income the expenditure pattern also oscillated over a range of Rs. 2000 to Rs. 16000 for urban families and from Rs. 700 to Rs. 8000 for rural dwellers. Majority of the urban families (72%) and 17 per cent of the rural families had their total expenditure above Rs. 5000. Half of the rural families on an average had an expenditure between 1000 to 5000 rupees per month; while only six per cent of the rural families had it below Rs. 2000/-. The above fact indicates that the urban families had higher monthly expenditure compared to rural families.

Table 20. Distribution of families according to total family expenditure

Total expenditure	Urban	Rural	Total
Less than or equal to 1000	--	3 (3.0)	3 (1.5)
1001 – 2000	--	3 (3.0)	3 (1.5)
2001 – 3000	8 (8.0)	7 (7.0)	15 (7.5)
3001 – 4000	5 (5.0)	20 (20.0)	25 (12.5)
4001 – 5000	15 (15.0)	50 (50.0)	65 (32.5)
Above 5000	72 (72.0)	17 (17.0)	89 (44.5)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

4.2.6 Food expenditure pattern

The money spent on food items was collected, and the details are depicted in Table 21.

Table 21. Distribution of families according to the amount spent on food

Amount spent on food	Urban	Rural	Total
Less than or equal to 1000	--	4 (4.0)	4 (2.0)
1001 – 2000	6 (6.0)	15 (15.0)	21 (10.5)
2001 – 3000	18 (18.0)	62 (62.0)	80 (40.0)
3001 – 4000	25 (25.0)	18 (18.0)	43 (21.5)
4001 – 5000	33 (33.0)	1 (1.0)	34 (17.0)
Above 5000	18 (18.0)	--	18 (9.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

The food expenditure ranged from Rs. 1000 to Rs. 7500 among urban dwellers and from Rs. 500 to Rs. 4000 among rural clients. Among the 200 families surveyed only 18 per cent had food expenditure above Rs. 5000 and all of them lived in the urban area. Only 2 per cent had monthly expenditure less than Rs. 1000 and they belonged to the rural area. Data on expenditure with reference to food also indicates that the urban families who had a higher income were spending more amount on food.

4.2.7 Monthly expenditure pattern on non-food items

Data presented in the Table 22 reveals that 40 per cent of the urban families were spending 300 to 400Rs on clothing, while 41 per cent were spending less than 100Rs and 89 per cent were spending Rs.101 – 200 for it, among rural population. Regarding housing majority of the urban families (48 per cent) spent more than Rs. 400 for housing. But among the rural families (58 per cent) were spending Rs. 100 to 200 for meeting their housing needs.

Table 22. Total monthly expenditure pattern of the families on non-food items (in Rupees)

Monthly Expenditure in Rs.	Clothing	Housing	Education	Transportation	Medical	Entertainment
≤ 100						
Urban	6	8	10	7	3	16
Rural	41	18	18	12	14	66
101-200						
Urban	12	10	13	8	13	43
Rural	48	58	55	49	52	26
201-300						
Urban	36	18	4	9	19	21
Rural	11	13	9	22	16	8
301-400						
Urban	40	16	26	31	33	8
Rural	--	7	10	11	10	--
Above 400						
Urban	6	48	47	45	32	12
Rural	--	4	8	6	8	--

The expenditure incurred on education was more among urban families; while forty-seven percent were spending more than 400 Rs. for education, in the rural area and 55 per cent of the families were spending Rs. 100 – 200 for their children's education. The expenditure incurred on maintenance of health was more among urban families. Sixty-five per cent of the urban families were spending more than Rs. 300 for their medical needs while the rural picture depicts the fact that only 33 per cent of the rural families were spending more than Rs. 300 for their medical needs. Regarding their expenditure on entertainment it is seen that expenditure incurred on entertainment was more among urban citizens (Rs. 200 to 400).

4.2.8 Savings

Distribution of families based on nature of savings is given in Table 23.

Table 23. Distribution of the families based on nature of savings

Nature of savings	Urban	Rural	Total
No savings	--	52 (52.0)	52 (26.0)
Bank	36 (36.0)	11 (11.0)	47 (23.5)
Stock and shares	2 (2.0)	--	2 (1.0)
Chitty funds	18 (18.0)	21 (21.0)	39 (19.5)
Insurance	16 (16.0)	4 (4.0)	20 (10.0)
Post office	28 (28.0)	12 (12.0)	40 (20.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Information regarding the nature of savings as revealed in Table 23 indicates that while all the urban families had the habit of savings, only 48 per cent of the rural families had this habit. Thirty six per cent and twenty eight per cent of the urban families had put their savings in bank and post-office accounts respectively. But the rural data reveals the fact that most of the rural families (21%) had put their savings in chit funds.

4.2.9 Economic Liability

Distribution of families based on their economic liability is given in Table 24.

Table 24. Distribution of respondents based on type of liability

Type of liability	Urban	Rural	Total
No liability	66 (66.0)	47 (47.0)	113 (56.5)
Loan repayment			
House loan	21 (21.0)	6 (6.0)	27 (13.5)
Vehicle loan	4 (4.0)	1 (1.0)	5 (2.5)
Land loan	3 (3.0)	2 (2.0)	5 (2.5)
Debt	6 (6.0)	44 (44.0)	50 (25.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

As shown in Table 24, 34 per cent of urban dwellers and 53 per cent of rural dwellers had one or other kind of liability. The liability incurred by majority of the urban families were house loan repayment (21 per cent) while that of rural families it was repayment of debt (44 per cent).

Living conditions

The living conditions like nature of house, source of lighting, availability of water supply, availability of latrine facility etc in one way or the other enhances the quality of life enjoyed by the elderly, and hence such details collected from the respondents.

Distribution of families based on nature of house is given in Table 25.

Table 25. Distribution of families based on nature of house

Nature of house	Urban	Rural	Total
Terrace	66 (66.0)	11 (11.0)	77 (38.5)
Mud wall & thatched roof	--	39 (39.0)	39 (19.5)
Mud wall & tiled roof	--	16 (16.0)	16 (8.0)
Brick wall & thatched roof	--	19 (19.0)	19 (9.5)
Brick wall & tiled roof	28 (28.0)	7 (7.0)	35 (17.5)
Brick wall & sheet roof	6 (6.0)	8 (8.0)	14 (7.0)
Total	100.0 (100.0)	100.0 (100.0)	200.0 (100.0)

Figures in parenthesis indicates percentage

It is seen that 66 per cent of the urban families and 12 percent of rural families lived in concrete houses. Majority of rural families were found to live in houses having mud walls and thatched or tiled roof. All the urban houses were found to be electrified while only 70 per cent of rural houses were electrified.

It was also found that all the urban houses had a well or a pipe connection from the public water supply system. In case of the rural homes 33% were depending on road side taps under public water supply system or a common well (24%) in the area.

Among the 200 families surveyed 7.5 percent had no latrine and no drainage facility, while 42.5 percent had a latrine but no drainage and all these families belonged to the rural area. Further analysis of the data revealed that only 16 percent of the rural families had latrine facility inside their homes. It was found that all the urban families surveyed had latrine and drainage facility.

4.3 Personal habits of the respondents

Personal habits like, exercise, cigarette smoking, frequency of use of alcohol, and tobacco may influence food consumption pattern and appetite of the elderly, hence the details regarding such personal habits of respondents were collected and are detailed below:

4.3.1 Exercise

Details pertaining to the habit of doing exercise and its duration were recorded. As seen in Table 26, among the 200 respondents surveyed, it was found that 69 per cent were not in the habit of taking specific exercise; while 23 per cent took exercise regularly. Among the 100 urban respondents surveyed, 50 per cent of the male respondents were in the habit of doing exercise; while it was rare among the urban and rural females.

When the rural and urban subjects were compared, among the 100 rural respondents only 12 per cent were in the habit of taking exercise. This in turn reveals that the habit of doing exercise was poor among rural citizens and there was a predominance of rural males over rural females in the habit of doing exercise.

The data collected also revealed that more of the senior citizens (62.5%) belonging to age group of 65 to 70 years were in the habit of doing exercise than those in the age group of 70-75 (37.5%).

Duration of exercise varied from less than 30 minutes to two hours. It was found that 30% urban citizens spend one hour doing exercise against 8.3% of rural citizens.

Distribution of respondents based on their frequency and duration of exercise is given in Table 26.

Table 26. Distribution of respondents according to the frequency and duration of exercise

Frequency of taking exercise	Urban	Rural	Total
Never	50 (50.0)	88 (88.0)	138 (69.0)
Occasionally	11 (11.0)	5 (5.0)	16 (8.0)
Regularly	39 (39.0)	7 (7.0)	46 (23.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)
Duration	Urban (N)	Rural (N)	Total (N)
Below 30 minutes	13 (26.0)	4 (33.3)	17 (27.4)
30 minutes but below one hour	22 (44.0)	6 (50.0)	28 (45.1)
One hour	15 (30.0)	1 (8.3)	16 (25.8)
One to two hour	0	1 (8.3)	1 (1.6)

Figures in parenthesis indicates percentage.

4.3.2 Alcohol consumption habit of the respondents

Alcohol consumption influences the appetite and thereby the food and nutrient intake of the elderly, hence the frequency of use of alcohol in relation to the quantity was recorded. It was observed that 75 per cent were non- users of alcohol and only 20 per cent used it regularly and all of them were males.

Alcohol consumption was common among both urban and rural senior citizens belonging to the age group of 65-70 rather than those in the age group of 70-75. It was found that the habit of alcohol consumption was slightly higher among the rural senior citizens (27%) than among the urban citizens (23%). Though a minority of the subjects 20%

were using alcohol, only 10% were in the habit of consuming the same on a regular basis. Regarding the quantity of alcohol consumed it was found that it varied from 50 to 200 ml per day and rural respondents consumed more quantity of alcohol than the urban respondents

4.3.3 Smoking habit of the respondents

Cigarette smoking has an important effect on food intake as it influences their appetite; so the smoking habit of the subjects in relation to the frequency of use of cigarette were also recorded. Among the 200 respondents surveyed 69 per cent were not in the habit of smoking, while 20 per cent were in the habit of smoking cigarette or beedi regularly and all of them were males. This habit was common among urban and rural citizens belonging to the age group of 65-70. It was also observed that there were more smokers among the rural respondents 37 per cent than among urban respondents 25 per cent.

4.3.4 Tobacco chewing habit of the respondents

Tobacco chewing habit of senior citizens surveyed are given in table 38. It was noted that tobacco chewing habit was observed more among the senior citizens belonging to the age group of 65-70 and [illegible], the habit of tobacco chewing was higher among rural dwellers (76%) when compared to urban dwellers (41%). Regarding the sex-wise differentiation, the habit of chewing tobacco was more common among females especially those from rural areas than males or urbanites.

The personal habits of urban and rural respondents in general revealed that, the habit of taking exercise was common among the urban senior citizens than the rural and was more among males than the females, but regarding the smoking habit and use of tobacco, it was more among the rural subjects. The alcohol consumption habit was almost the same among urban and rural subjects, while the use of tobacco was found more among women especially those from rural area.

4.4 Anthropometric measurements

Anthropometry was used as a tool to assess the nutritional status, which gives an indication to adequacy or inadequacy of food intake to a certain extend. Anthropometric parameters like weight, height, mid upper arm circumference, triceps skin fold, waist and hip circumferences of all the subjects were measured and the actual values are presented in Appendices V, VI, VII and VIII.

4.4.1 Weight and height of the respondents

Distribution of subjects based on their mean body weight and height are given in Table 27.

Table 27. Distribution of subjects based on their mean body weight and height

Age (Years)	Urban		Rural		'T' Value
	No	Mean weight (kg)	No	Mean weight (kg)	
6570	67	51.0	67	51.3	0.96
7175	33	52.3	33	46.8	4.34*
Age	Mean Height		Mean height		'T' Value
6570	67	156.82	67	151.42	4.22*
7175	33	153.42	33	153.20	3.34*

* Significant 5 per cent

The weight of the urban subjects ranged between 34 to 85 kg with an average value of 52.44 kg. It was found to range between 38 to 70 kg among rural subjects and their average weight was 49.58 kg. While the height ranged between 140 cm to

182 cm among urban subjects and between 137 cm to 172 cm among rural citizens. The average height of urban citizens was 156.5 cm against a corresponding value of 153.7 cm for the rural counterparts.

As depicted in Table 27, the mean weight in the two age groups was found to be 51.0 kg and 52.3 kg respectively among urban subjects and that of rural it was 51.3 kg and 46.8kg.

The mean height of subjects belonging to the two different age groups was 156.8 cm and 155.4cm among urban citizens and 151.42 cm and153.2 cm among rural citizens respectively.

It was found that there was no significant difference between weight of urban and rural citizens in the age group of 65-70. But significant difference was noted among urban and rural citizens in the mean weight in the age group of 71-75. Regarding height significant difference was noted both among urban and rural citizens in the two age groups.

Age-wise differentiation reveals the fact that urban citizens had higher mean weight than rural citizens in the age group of 71-75. Another noticeable observation was that there was slight variation in the mean weights in the age group 65-70 and 71-75 among urban citizens. But among rural citizens the mean weights in the 71-75 age category was lower than those in the 65-70 age category. Regarding height the rural citizens in the two age categories had lower mean heights when compared to their urban counterparts.

Distribution of subjects based on the sex and the mean body weight and height are given in Table 28.

Table 28. Distribution of subjects based on the sex and the mean body weight and height

Sex	Urban		Rural		'T' Value
	No	Mean weight	No	Mean weight	
Male	60	51.7	49	48.8	5.56*
Female	40	54.3	51	50.1	4.33*
Sex	No	Mean height	No	Mean height	'T' Value
Male	60	164.3	49	154.3	4.95*
Female	40	156.2	51	153.4	3.92*

* Significant at 5 per cent.

As observed from the Table 28, mean weight of male and female subjects were 51.7 kg and 54.3 kg among urban citizens and among rural citizens it was 48.8 kg and 50.1 kg respectively. While the mean height of male and females were 164.3 cm and 156.2 cm among urban citizens among rural counterparts it was 154.4 cm and 153.3 cm respectively.

Significant difference was noted in the mean weight and heights among urban male and rural males and also between urban females and rural females as indicated in Table 28.

The sex-wise differentiation of data reveals the fact that the females in the urban and rural groups have significantly higher weights than their male counterparts and regarding height, females were significantly shorter than their male counterparts both in urban and rural areas. While the overall result reveals the fact that urban citizens are better off than their rural counterparts, both in weight and height. When the age difference was taken into consideration those in the age group of 65-70 group had lower mean weight than those aged 71-75, in the urban population. But a reverse phenomena was observed in the rural population.

4.4.2 Body Mass Index

From the recorded weight and height of the respondents, body mass index was computed, and the values are given in Appendix (V and VI).

The distribution of subjects according to the above classification is presented in Table 29.

Table 29. Distribution of subjects based on Body Mass Index

BMI Class	No. of subjects		
	Urban	Rural	Total
< 24 (under weight)	50 (50.0)	63 (63.0)	113 (56.5)
24-29 (acceptable wt)	45 (45.0)	35 (35.0)	80 (40.0)
> 29 (over weight)	5 (5.0)	2 (2.0)	7 (3.5)
Total	100	100	200 (100)

Figures in parenthesis indicates percentage

Body Mass Index of urban and rural citizens ranged between 15.5-31.3 and 16.5-30.1 respectively. The average of BMI was 24.3 and 22.4 respectively for urban and rural dwellers on the basis of recent epidemologic data, the values of 24 and 29 are believed to be appropriate cut offs for estimation of under and over weight in elderly population (Harris *et al.* 1988). Based on this estimation 63 per cent of rural and 50 per cent of the urban dwellers were under weight. Overweight was found more among urban dwellers (5 per cent) than the rural dwellers (2 per cent).

Distribution of subjects based on age, sex and mean Body Mass Index is given in Table 30.

Fig. No. 1

Classification of respondents based on Body Mass Index

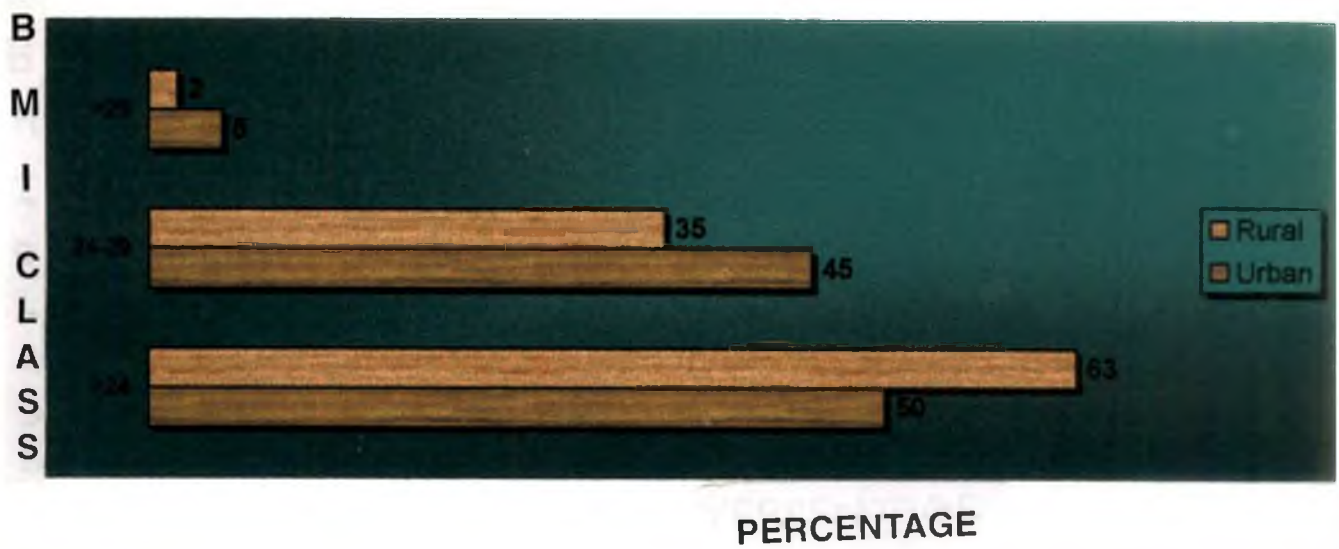


Table 30. Distribution of subjects based on age, sex and mean Body Mass Index

Age (Years)	Urban No	Urban Mean (BMI)	Rural No	Rural Mean (BMI)	'T' Value
65-70	67	24.0	67	22.6	4.17*
71-75	33	23.2	33	22.0	1.96
Sex					
Male	60	24.3	49	21.8	4.45*
Female	40	23.0	51	22.4	2.98

* Significant at 5 per cent level.

As observed from the Table 30, the mean Body Mass Index for urban citizens belonging to the two age groups (65-70 and 71-75) was 24.0 and 23.2 respectively and in rural area it was 22.6 and 22.05.

The age wise data reveals the fact that the mean Body Mass Index of urban citizens in the age group of 65-70 was significantly higher than that of rural citizens (4.17). However this difference was not found to be significant among the older citizens aged 71-75.

Data presented in the table, further discloses the fact that the Body Mass Index of urban male and female subjects were 24.3 and 23.0 and it was 21.8 and 22.4 respectively for the rural subjects. The data reveals that the BMI of urban male citizens were significantly higher than that of their rural counterparts. Though there was slight variation in the BMI of urban and rural females, the difference was not statistically significant. The sex wise differentiation reveals the fact that male and female citizens in the urban area had higher mean Body Mass Index than their respective counterparts.

In fact it could be said that 45 % of urban and 35 % of rural citizens are in the acceptable weight category and therefore have an optimal nutritional status (based on Body Mass Index).

4.4.3 Mid upper arm circumference of the respondents (MUAC)

The Mid Upper Arm Circumference of the subjects were recorded and the data is presented in Appendix (V and VI). In the present study it was observed that mid upper arm circumference of urban and rural respondents ranged from 19 to 34cm and 17 to 31cm respectively. The average of mid upper arm circumference for urban citizens (24.64cm) were slightly higher than that of rural respondents (23.85cm).

Distribution of subjects based on the age, sex and the mean mid upper arm circumference of the respondents is given in Table 31.

Table 31. Distribution of subjects based on the age, sex and the mean mid upper arm circumference

Age (Years)	Urban		Rural		'T' value
	No	Mean (MUAC)	No	Mean (MUAC)	
65-70	67	24.4	67	23.5	3.15*
71-75	33	25.3	33	22.5	3.26*
Sex					
Male	60	24.78	49	23.10	5.32*
Female	40	25.50	51	24.04	2.45

* Significant at 5 per cent level

It is seen from the Table 31, that the mean mid upper arm circumference for urban citizens belonging to the two age groups (65-70 and 71-75) was 24.4 cm and 25.3cm respectively and in rural area it was 23.5cm and 22.5 cm respectively. The overall data on MUAC reveals that the MUAC of citizens belonging to 65-70 age group was greater than that of 71-75 age group in rural area, while the reverse phenomenon was observed among urban citizens. The age based variation in MUAC seems to be significant both in urban and rural categories.

Data presented in the Table 31, reveals the fact that the values for urban male and female citizens were 24.78 cm and 25.5 cm and for rural male and female respondents it were 23.10 cm and 24.04 cm respectively. The sex wise data reveals the fact that females in urban as well as rural area were found to have higher mid upper arm circumference than their male counterparts.

The data reveals that there is significant variation in the mean MUAC between the urban and rural male citizens, while the variation seems to be insignificant in the case of females.

4.4.4 Triceps Skin fold Thickness of the respondents (TST)

Data on skin fold thickness of respondents are presented in Appendix. Triceps skin fold thickness ranged between 8.0-16.5mm among rural dwellers and 9.5 – 22mm for urban dwellers. The mean triceps skin fold thickness for urban subjects was 14.52mm and that of rural were 13.37mm which indicates that the urban subjects had higher TST values than the rural subjects. Distribution of subjects based on age, sex and mean triceps skinfold thickness is given in Table 32.

Table 32. Distribution of subjects based on age and mean triceps skin fold thickness

Age	Urban		Rural		'T' value
	No	Mean (TST)	No	Mean (TST)	
65-70	67	14.0	67	13.6	3.21*
71-75	33	13.3	33	12.7	4.41*
Sex					
Male	60	14.48	49	13.32	1.86*
Female	40	14.64	51	14.38	0.26

* Significant at 5 per cent level

From the table, above it can be seen that the mean TST values of urban subjects in the age groups 65-70 and 71-75 years were 14.0mm and 13.3mm and of rural subject it was 13.6mm and 12.7mm respectively. Both urban and rural citizens belonging to 71-75 age group had lesser triceps skin fold thickness when compared to those in the 65-70 group and the difference seems to be significant at 5 per cent level

The mean TST values for male and female urban citizens were 14.48 mm and 14.64 mm. Those from rural area had a value of 13.32 mm and 14.38 mm.

The female citizens both in urban and rural area were found to have higher TST than their counterparts.

4.4.5 Waist Hip Ratio (WHR)

After documenting the waist and hip measurements of the respondents, the waist-hip ratio was calculated and the details are presented in Appendix.

Distribution of respondents with respect to their age, sex and waist-hip ratio is given in Table 33.

Table 33. Distribution of respondents with respect to their age, sex and waist-hip ratio

Age	Urban		Rural		'T' value
	No	Mean (WHR)	No	Mean (WHR)	
65-70	67	0.81	67	0.80	0.92
71-75	33	0.79	33	0.75	3.69
Sex					
Male	60	0.81	49	0.77	2.28*
Female	40	0.83	51	0.81	1.36*

* Significant at 5 % level

It was observed from Table 33, that the mean waist hip ratio for urban citizens belonging to the two age groups were 0.81 and 0.79 respectively. In rural area it is found to be 0.80 and 0.75 respectively. The mean waist hip ratio of both urban and rural citizens belonging to 71-75 group was lower than that of the subjects belonging to the age group of 65-70 years.

As shown in the table, the values for urban male and female citizens were 0.81 and 0.83 and that of their rural counterparts were 0.77 and 0.81 respectively. In the present study the females in both urban and rural area had higher mean waist hip ratio than their male counterparts.

The overall Anthropometric data reveals the fact that, urban citizens were comparatively better than their rural counterparts. Those in 65-70 age group were better than those in 71-75 age group in both situations. It was also found that the female citizens had better mean weight, mid upper arm circumference, triceps skinfold thickness and waist hip ratio.

In conclusion, based on the anthropometric measurements, the nutritional status of majority of elderly presents a grim picture and efforts are needed to be initiated to improve the nutritional status, specially of rural citizens.

4.5 Clinical Profile

Clinical examination was done to find out the prevalence of health problems and other nutritional deficiency diseases. The scores obtained by individual respondents for presence of symptoms of ill health are presented in Appendix XI.

4.5.1 Prevalence of different health problems related to different systems of body

Distribution of respondents based on the prevalence of health problem related to different systems of the body is given in Table 34.

Table 34. Prevalence of health problems related to different systems of the body

System	Respondents Urban	Rural	Total
Cardiovascular	34 (34.0)	17 (17.0)	51 (25.5)
Locomotor	20 (20.0)	14 (14.0)	34 (17.0)
Respiratory	7 (7.0)	27 (27.0)	34 (17.0)
Central Nervous	5 (5.0)	8 (8.0)	13 (6.5)
Gastrointestinal	11 (11.0)	15 (15.0)	26 (13.0)
Urogenital	4 (4.0)	10 (10.0)	14 (7.0)
Endocrine	19 (19.0)	9 (9.0)	28 (14.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Among the 200 respondents surveyed, there was not even a single senior citizen who was free from one or other kind of health disorder, which may be the reflection of ageing process on human body. It was found that prevalence of problems related to cardiovascular (34%), locomotor (20%), and endocrine systems (19%) were more among urban citizens, when compared to rural citizens (17%, 14%, 19% respectively). Regarding the sex difference in the prevalence of disorders pertaining to cardiovascular (20%), respiratory (12.5%) and endocrine (10%) systems were more among males than females (5.5%), 4.5%, and 4% respectively). But locomotor (12%), nervous (5%), and urogenital (6%) systems related disorders were more prevalent among female elderly when compared to men. But the data reveals that the prevalence of gastro-intestinal problems was somewhat similar in both sexes studied. The occurrence of hypersensitivity reactions, fever, cold was not common among the urban and rural citizens surveyed.

4.5.1.1 Problems related to cardiovascular system

The data collected on clinical status were further analysed and the distribution of respondents based on the problems related to cardiovascular systems is given in Table 35.

Table 35. Distribution of respondents based on the problems related to cardiovascular system

Symptoms	Urban		Rural		Total
	Had it but did not see a doctor	Had it & saw a doctor	Had it but did not see a doctor	Had it & saw a doctor	
Shortness of breath (during walking/ while doing light work)	1 (1.0)	2 (2.0)	2 (2.0)	---	5 (2.5)
Tightness/ discomfort in the chest.	---	4 (4.0)	---	---	4 (2.0)
Palpitation	---	---	---	---	---
Swelling of legs	---	---	2 (2.0)	---	2 (1.0)
Swelling of ankles	---	---	2 (2.0)	---	2 (1.0)
Varicose vein	---	---	1 (1.0)	---	1 (0.5)
Hypertension	4 (4.0)	13 (13.0)	4 (4.0)	3 (3.0)	24 (12.0)
Heart pain	---	10 (10.0)	---	3 (3.0)	13 (6.5)
Total	5 (5.0)	29 (29.0)	11 (11.0)	6 (6.0)	51 (25.5)

Figures in parenthesis indicates percentage

The Table 35, depicts the fact that among the 200 senior citizens surveyed cardiovascular problems were prevalent among 25.5%. Among them hypertension (12%) and heart pain (6.5%) were common. The prevalence of hypertension(17%) and heart disease(10%) was more among urban group than the rural group. It was found that majority of urban respondents (29%) approached a doctor because of cardio-vascular problem against 6% in rural area.

4.5.1.2. Problems related to locomotor system

Distribution of respondents based on the locomotor problems is given in Table 36.

Table 36. Distribution of respondents based on their locomotor problems

Symptoms	Urban		Rural		Total
	Had it but did not see a doctor	Had it & saw a doctor	Had it but did not see a doctor	Had it & saw a doctor	
Stiffness of joints	---	2(2.0)	---	---	2(1.0)
Pain in legs while walking	1(1.0)	---	---	---	1(0.5)
Tremor of hands	2(2.0)	---	---	---	2(1.0)
Rheumatic pains	---	---	1(1.0)	2(2.0)	3(1.5)
Arthritis	2(2.0)	5(5.0)	1(1.0)	2(2.0)	10(5.0)
Osteoporosis	4(4.0)	6(6.0)	3(3.0)	3(3.0)	16(8.0)
Total	9(9.0)	13(13.0)	5(5.0)	7(7.0)	34(17.0)

Figures in parenthesis indicates percentage

The above table highlights the fact that, among the locomotor disorders, osteoporosis was the commonest (8%), followed by arthritis (5%). Regarding the urban and rural differentiation, osteoporosis as well as arthritis were more among urban citizens [(10% and 7% respectively]. Osteoporosis was found among 13 per cent of female and 3 per cent of male and arthritis was found among 8 per cent of female and 2 per cent of male respondents. Rheumatic pain was reported by 2 per cent of females and 1 per cent of male subjects. Regarding locomotor problems also more of urban citizens (13%) saw a doctor than rural subjects (7%).

4.5.1.3. Respiratory Problems

As shown in the Table 37, cough (7.5%) and asthma (6%) were the commonest respiratory disorders and more of the rural citizens experienced the respiratory disorders; cough being prevalent among (13%) of rural and (2%) urban citizens and asthma was found, among (9%) of rural and (3%) of urban citizens.

Table 37. Distribution of respondents based on the respiratory problems

Symptoms	Urban		Rural		Total
	Had it but did not see a doctor	Had it & saw a doctor	Had it but did not see a doctor	Had it & saw a doctor	
Cough	---	2(2.0)	9(9.0)	4(4.0)	15(7.5)
Blood in cough	---	1(1.0)	---	1(1.0)	2(1.0)
Difficulty in breathing	---	1(1.0)	---	---	1(0.5)
Wheezing	---	---	2(2.0)	---	2(1.0)
T.B	---	1(1.0)	---	2(2.0)	3(1.5)
Asthma	1(1.0)	2(2.0)	4(4.0)	4(4.0)	11(5.5)
Total	1(1.0)	7(7.0)	15(15.0)	11(11.0)	34(17.0)

Figures in parenthesis indicates percentage

4.5.1.4. Nervous problems

Distribution of respondents based on the nervous problems is given in Table 38.

As depicted in Table 38, the incidence of nervous disorder was reported only by 6.5 per cent of the respondents surveyed, and among them hearing problems 2.5 per cent and worsening of memory 2.5 per cent were the common problems. Disorders like disturbance of consciousness (2 %) and difficulty in maintenance of balance (1 %) were reported only by rural citizens.

Table 38. Distribution of respondents based on the nervous problems

Symptoms	Urban		Rural		Total
	Had it but did not see a doctor	Had it & saw a doctor	Had it but did not see a doctor	Had it & saw a doctor	
Disturbance of consciousness	---	---	2(2.0)	---	2(1.0)
Hearing problem	2(2.0)	---	3(3.0)	---	3(1.5)
Worsening of memory	3(3.0)	---	2(2.0)	---	5(2.5)
Difficulty in maintenance of balance	---	---	1(1.0)	---	1(0.5)
Total	5(5.0)	---	8(8.0)	---	13(6.5)

Figures in parenthesis indicates percentage

4.5.1.5. Gastro-intestinal problems

Distribution of respondents based on the gastro-intestinal problems is given in the Table 39.

Data given in Table 39, reveals that gastro-intestinal problems were comparatively higher among rural citizens and that constipation was the commonest (7%) complaint when compared to urban dwellers. Stomach upset (2.5%) and ulcer (2.5%) were also reported by few of the respondents. The percentage of respondents, who saw a doctor because of gastro-intestinal complaints were less both among urban and rural citizens.

Table 39. Distribution of respondents based on the gastro-intestinal problems

Symptoms	Urban		Rural		Total
	Had it but did not see a doctor	Had it & saw a doctor	Had it but did not see a doctor	Had it & saw a doctor	
Stomach upset	2(2.0)	---	3(3.0)	---	5(2.5)
Constipation	2(2.0)	3(3.0)	6(6.0)	3(3.0)	14(7.0)
Ulcer	3(3.0)	---	---	2(2.0)	5(2.5)
Heart burn after ingestion of food	---	1(1.0)	---	---	1(1.0)
Bowel alternately constipated or loose	---	---	1(1.0)	---	1(0.5)
Total		7(7.0)	4(4.0)	10(10.0) 5(5.0)	26(13.0)

Figures in parenthesis indicates percentage

4.5.1.6 Genito-urniary problems

Distribution of respondents based on the genito-urinary problems is given in Table 40.

Genito-urinary disorders were reported only by 7 per cent of the respondents surveyed. Among them, 1.5per cent had changes in the frequency of urination, while 2 per cent of the females prolapse. Genito-urinary problems were found more among rural (10%) than urban (4%) citizens. Respondents who saw a doctor because of genito-urinary disorder was 2 per cent among urban and none among rural respondents.

Table 40. Distribution of respondents based on the genito-urinary problems

Symptoms	Urban		Rural		Total
	Had it but did not see a doctor	Had it & saw a doctor	Had it but did not see a doctor	Had it & saw a doctor	
Changes in frequency of urination	---	---	3(3.0)	---	3(3.0)
Incontinence day/ night/both urine/ faeces	1(1.0)	---	---	---	1(0.5)
Female					
Prolapse	---	2(2.0)	2(2.0)	---	4(2.0)
Passing of urine while Laughing/coughing	1(1.0)	---	2(2.0)	---	3(1.5)
Male					
Difficulty in passing urine or prostrate trouble	---	---	3(3.0)	---	3(1.5)
Total	2(2.0)	2(2.0)	10(10.0)	---	14(7.0)

Figures in parenthesis indicates percentage

The health problem when enumerated in general revealed the fact that cardio-vascular, locomotor and endocrine problems were more prevalent among urban citizens and problems like respiratory, cardiac and gastro-intestinal were more among rural citizens. However the prevalence of morbidity seems to be low.

Apart from the symptoms of specific disorders the respondents were requested to indicate general health related complaints as perceived by them at the time of clinical check-up.

Distribution of respondents based on the general complaints is given in Table 41.

Table 41. Distribution of respondents based on the general complaints

General complaints of the elderly

Symptoms	Urban	Rural	Total
Fatigue	32(32.0)	51(51.0)	83(41.5)
Alteration in weight	12(12.0)	16(16.0)	28(14.0)
Lack of appetite	25(25.0)	15(15.0)	40(20.0)
Abnormal sweating	3(3.0)	2(2.0)	5(2.5)
Sleeplessness	28(28.0)	16(16.0)	44(22.0)
Total	100	100	200(100)

Figures in parenthesis indicates percentage

The above data from Table 41 reveals that fatigue was the most common complaint among the elderly, (41.5%) followed by sleeplessness (22%), lack of appetite (20%) and alteration in weight (14%). A few (2.5%) had reported the problem of abnormal sweating. Difficulties associated with sleeplessness (28%) and lack of appetite (25%) were reported by a higher percentage of urban citizens when compared to the rural counterparts (16% and 15%). Alteration in weight was observed more among rural citizens (16%) than urban citizens (12%).

Sex wise differentiation revealed that fatigue (25 %), alteration in weight (9 %) and lack of appetite (20 %) were prevalent to a higher extent among female citizens, than the males; while abnormal sweating was found only among male citizens. Higher percentage of male citizens (16 %) experienced sleeplessness, than females (6 %).

As the study was conducted to assess the dietary habits of the senior citizens, presence of deficiency symptoms were examined by a physician.

4.5.2. Deficiency manifestations

Distribution of respondents based on the presence of deficiency diseases is given in Table 42 and the scores assigned to each individual is given in Appendix X.

Table 42. Distribution of respondents based on the presence of deficiency diseases

Deficiency manifestations	Urban	Rural	Total
Anaemia	32(32.0)	40(40.0)	72(36.0)
Xeropthalmia	---	4(4.0)	4(2.0)
Cataract	29(29.0)	34(34.0)	63(31.5)
Angular Stomatitis	6(6.0)	10(10.0)	16(8.0)
Cheilosis	3(3.0)	7(7.0)	10(5.0)
Spongy bleeding gums	3(3.0)	4(4.0)	7(3.5)
Scrotal dermatitis	---	1(1.0)	1(0.5)
No deficiency signs	15(15.0)	---	15(7.5)
Total	100	100	200

Figures in parenthesis indicates percentage

The details given in Table 42, indicates that, out of 200 elderly citizens studied, only 15 citizens were not suffering from any kind of deficiency manifestations and they all belonged to the urban area. The observations made on the remaining 185 subjects had symptoms of anaemia, cataract, angular stomatitis, cheilosis and spongy bleeding gums. Anaemia was found to be the major nutritional problem and was widespread among the rural subjects (40 %) when compared to urban subjects (32 %). The percentage prevalence of cataract, xeropthalmia, angular stomatitis and cheilosis was higher among rural citizens than the urban subjects.

Glossitis (18 %) furring (4 %) and magenta colour tongue (10 %) were noticed among urban and rural citizens. Goitre was seen in 4 per cent of urban and 8 per cent of

rural citizens (among 6% of females and 2% of males). Presence of lymph es was 8 per cent urban region against 2 per cent in the rural area.

It was also observed that the prevalence of anaemia was more among the female subjects (25 %) when compared to male subjects (11 %). In the present study the incidence of cataract was slightly higher among the male subjects (17.5 %) than the female subjects (14 %). Angular stomatitis spongy bleeding gums and cheilosis were more common among male subjects than female respondents.

Hair loss was seen among 38 per cent of male and 62 per cent of female respondents studied. Boils and rashes were present on the skin of 11 per cent of urban and 32 per cent of rural respondents. Itching of skin was reported by 22 per cent of urban and 42 per cent of rural respondents. Regarding the texture of skin, it was noted that the skin has lost its natural texture and had wrinkled appearance in 67per cent of the respondent.

It is a well known fact that the dental status of the geriatric group will affect the food habits of the elderly. It was noted that in urban area 51 per cent of the respondents were wearing false dentures as against 21 per cent in the rural area. The percentage of partially edentulous and edentulous citizens were 26 per cent among rural as against 13 per cent in urban area. More of male citizens had true dentures (52 %) as against female citizens (37 %). Tartar deposition, dental caries, gingitivitis were prevalent more among rural citizens (33 %) than their urban counterparts (10 %). Dental flurosis was not seen in any of respondents studied.

In general the results on health profile focuses on the fact that majority of the senior citizens were suffering from one or other kind of system disorders or deficiency manifestations. The presence of anemia, cataract and B complex and C deficiencies were common among the elderly surveyed.

4.6. Perception about physical health

Physical health directly or indirectly has an impact on the dietary habits of elderly. If the health of elderly is good, it is in turn reflected in their food habits; food selection and food intake. Physical health to some extend would decide one's ability to purchase or cook food. The scores obtained by the respondents on their perception about health are given in Appendix IX.

The perception of the respondents on their physical health was catagorised in to four groups and the details are given in Table 43.

Table 43. Distribution of subjects based on the perception about physical health

Response of the subjects	Urban	Rural	Total
Excellent	14(14.0)	10(10.0)	24(12.0)
Good	19(19.0)	22(22.0)	41(20.5)
Fair	34(34.0)	29(29.0)	63(31.5)
Poor	33(33.0)	39(39.0)	72(36.0)
Total	100(100.0)	100(100.0)	200(100.0)

Figures in parenthesis indicates percentage

Data depicted in Table 43 revealed that only 12 per cent stated that their health is excellent; while 36 per cent are of the view that their health is poor. This indicates that more than one fourth of the population covered are of the view that they have poor physical health. When urban rural variation was taken into consideration more of rural subjects (39 %) reported that they have poor health compared to urban subjects (33 %). Sex differentiation with respect to the perception about physical health revealed that only 9 per cent of females and 13 per cent of males reported their health as "excellent", while 49.4 per cent of females and 27 per cent of males reported that their health was "poor". The grading of physical health into good and fair category proved that 21.1 per cent of males and 19.7 per cent females were in good health and 39.4 per cent males and 21.9 per cent of females were in "fair" category. Distribution of subjects based on their perception of health during the past year is given in Table 44.

Fig. No. 3 **Classification of respondents based on perception about health**

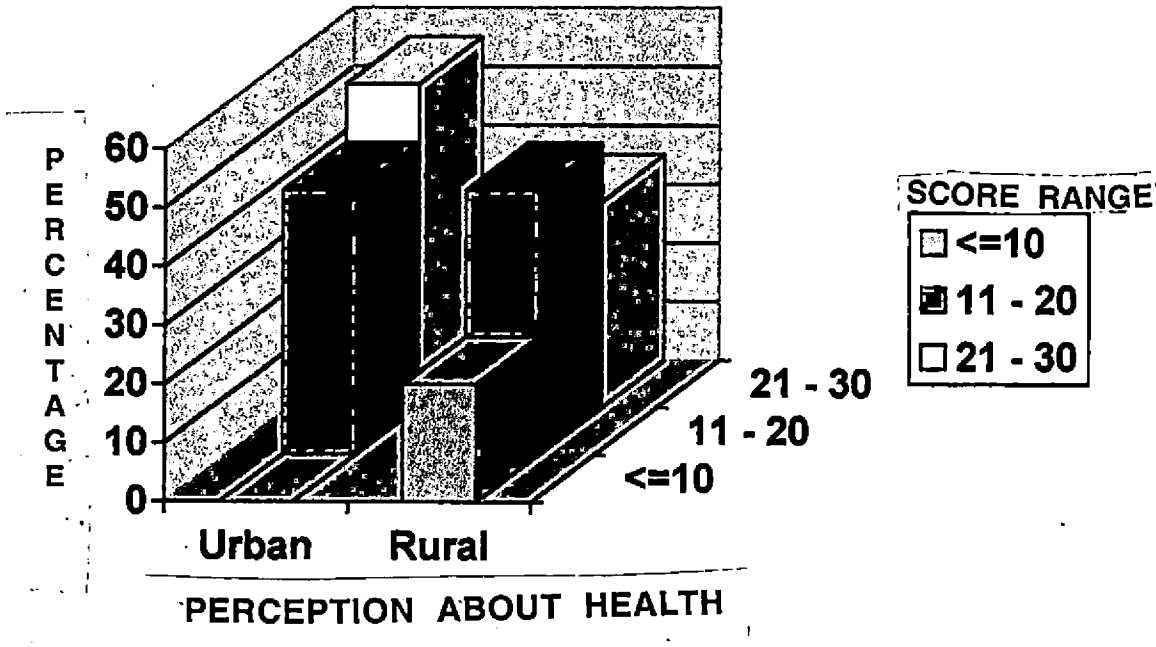


Table 44. Distribution of the subjects on the basis of their health during the past year

Response of the subject	Urban	Rural	Total
Better	22(22.0)	24(24.0)	46(23.0)
About the same	26(26.0)	37(37.0)	63(31.5)
Worse	36(36.0)	29(29.0)	65(32.5)
Cannot say	16(16.0)	10(10.0)	26(13.0)
Total	100(100.0)	100(100.0)	200(100.0)

Figures in parenthesis indicates percentage

When compared to previous year 33 per cent were of the opinion that they have better health than last year, while 32 per cent stated that their health status has worsened. The others have remained in the same status as they were during the previous year as shown in Table 44. It is seen that about 13 per cent were not in a position to say whether there is any change in their health status from the past year to the current year.

Regarding the urban rural differentiation 36 per cent of the urban subjects reported that their health status has worsened while only 29 per cent of the rural subjects stated that their health has deteriorated. Only 22 per cent of the urban and 24 per cent of rural subjects had stated that they have better health status than the previous year. Thirty two per cent of the male subjects were of the opinion that their health was better but 43.9 per cent of the female subjects had stated that their health had worsened, against 22.9 per cent males. About 18 per cent of the females were not in a position to say whether their health had improved or deteriorated. Distribution of subjects based on duration of confinement indoors is given in Table 45.

Table 45. Distribution of subjects based on duration of confinement indoors

Duration of confinement	Urban	Rural	Total
Never	65 (65.0)	57 (57.0)	122 (61.0)
Less than one month	8 (8.0)	20 (20.0)	28 (14.0)
1 – 3 months	12 (12.0)	12 (12.0)	24 (12.0)
More than 3 months	15 (15.0)	11 (11.0)	26 (13.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

The data revealed that among the 200 subjects surveyed, 39 per cent were confined to the house as a result of poor physical health. The survey also revealed that the period of confinement was not more than three months and that only just 13 per cent of the subjects were confined to the four walls of the houses for more than three months. The urban-rural picture depicts that 65 per cent of urban and 57 per cent of rural subjects were not confined to the house. It was found that more of females were confined indoors (26 %) when compared to males (13 %) as a result of poor physical health. Distribution of subjects based on their confinement in bed or chair is given in Table 46.

Table 46. Distribution of subjects based on their confinement in bed or chair

Duration of confinement	Urban	Rural	Total
Never	84 (84.0)	90 (90.0)	174 (87.0)
Less than one month	3 (3.0)	2 (2.0)	5 (2.5)
1 – 3 months	4 (4.0)	5 (5.0)	9 (4.5)
More than 3 months	9 (9.0)	3 (3.0)	12 (6.0)
Total	100(100.0)	100(100.0)	200(100.0)

Figures in parenthesis indicates percentage

The data presented in Table 46 revealed that 87 per cent were not confined to bed or chair due to poor health. It was found that more of urban subjects 16 per cent were confined to bed or chair than rural subjects 10 per cent. Among those confined to bed 6 and 7 per cent were found to be males and females respectively and they have been confined to bed for more than three months. Distribution of subjects on the basis of withdrawal from vigorous activity is given in Table 47.

Table 47. Distribution of subjects on the basis of withdrawal from vigorous activity

Responses of the subject	Urban	Rural	Total
Never	33 (33.0)	55 (55.0)	88 (44.0)
Less than one month	12 (12.0)	19 (19.0)	31 (15.5)
1- 3 months	26 (26.0)	10 (10.0)	36 (18.0)
More than 3 months	29 (29.0)	16 (15.0)	45 (22.5)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

It was interesting to note that though all the subjects were senior citizens, as shown in Table 47, 44 per cent of the subjects had stated that they have not withdrawn themselves from vigorous physical activity. However, as generally recognized more of rural subjects (55 %) compared to urban (33 %) subjects, were engaged in vigorous activity at the age 65 years and above. The involvement in vigorous physical activity was observed more among male senior citizens especially among rural males (34 %) as against females (22 %).

The above data on the whole revels that the general health status of more than 60 per cent of the subjects were good or excellent and that rural or urban life style had not affected their health, while more of the rural subjects were found to lead an active life at an age that is between 65-75.

The information on physical health as perceived by the respondents, were also scored on a four point continuum for six questions and on a two point continuum for three questions which would fetch a maximum score of 30 and a minimum score of 9. The scores also revealed that the urban subjects had a mean score of 21.08 as against a score of 18.0 among rural citizens, which in turn indicates that the physical health status of urban citizens were comparatively better than rural citizens. The difference in mean health score of urban and rural dwellers were found to be statistically significant ($\alpha = 4.45$)

4.7 Functional ability of senior citizens

Deterioration of functional and mental capacity is one of the major problems faced by the elderly, which in turn affects their well being. Functional disability observed among the elderly imposes social stress within the family leading to drudgery and even conflict. This situation may ultimately affect the dietary pattern, hence there was a need to study the functional ability of senior citizens.

Distribution of subjects based on IADL scores is given in Table 48.

Table 48. Distribution of subjects based on the IADL scores

RANGE	Rural	Urban	Total
Less than 5	11.0 (11.0)	5.0 (5.0)	16.0 (8.0)
6 – 10	42.0 (42.0)	42.0 (42.0)	84.0 (42.0)
11 – 14	47.0 (47.0)	53.0 (53.0)	100.0 (50.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

IADL was measured using the respective schedule suggested under OARS – M.D and then the responses were scored on three point continuum, with the minimum score of 7 and a maximum score of 14. The activities measured included whether they can, get to places out of walking distance, go for shopping, prepare their own meals, do their own household works, take ones medicine and handle money. The subjects were asked to say whether they can do the above activities without any help or with some help or whether they can not do it at all for themselves. The individual scores are given in Appendix XII. Table 48 gives the variation in scores obtained by the urban and rural dwellers. Among the 200 subjects surveyed, only just half had scores 'above 11' which indicates their independence. However less number of persons from rural areas had scores higher than '11' compared to their urban counterparts, and also they were the ones who had score below 5 which indicates greater dependency for performing activities that are to be carried out daily by an individual living in a family/ community.

Fig. No. 4

Classification of respondents based scores for Instrumental activities for daily living(IADL)

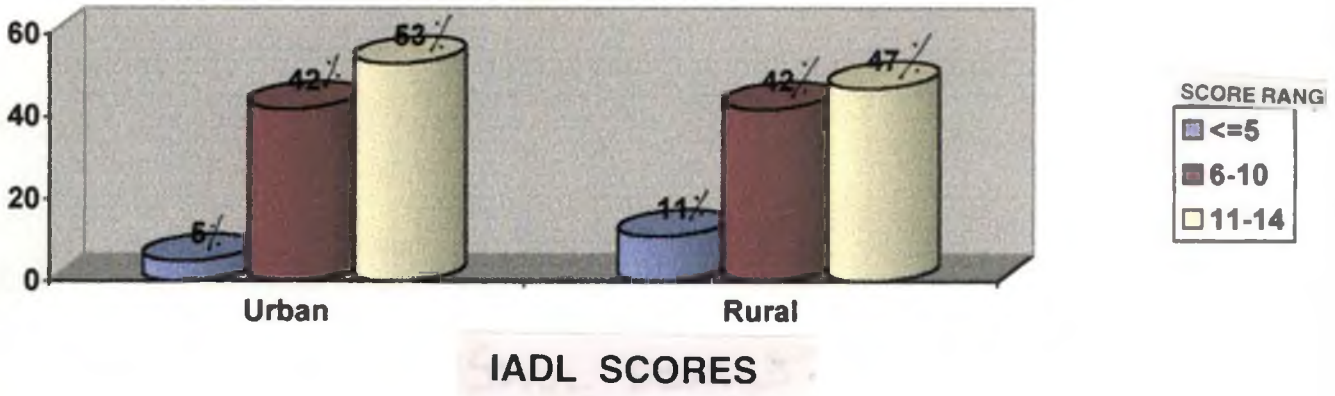


Fig. No. 4

Sexwise distribution of subjects based on their IADL scores

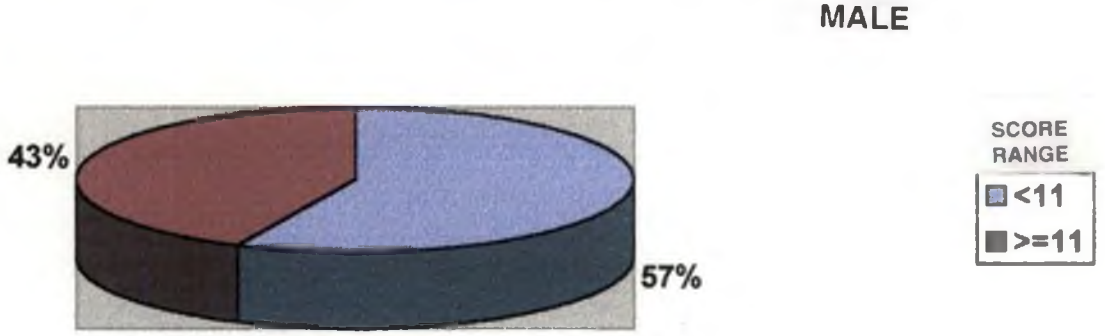
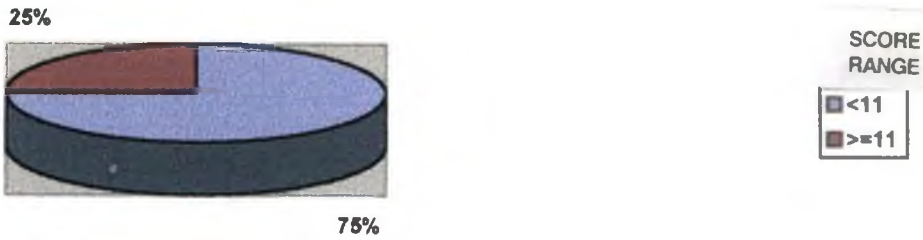


Fig. No. 5

Sexwise distribution of subjects based on their IADL scores-Female



Distribution of subjects based on PADL scores is given in Table 66.

Table 66 Distribution of subjects based on PADL socres

RANGE	Rural	Urban	Total
Less than 5	5.0(5.0)	0	5.0(2.5)
6 – 10	20.0(20.0)	19.0(19.0)	39.0(19.5)
11 – 14	75.0(75.0)	81.0(81.0)	156.0(78.0)
Total	100(100.0)	100(100.0)	200(100.0)

Figures in parenthesis indicates percentage.

Table 49. Percentage distribution based on their ability to perform Instrumental activities of daily living

Statements	Without help			With some help			Completely unable		
	U	R	U+R	U	R	U+R	U	R	U +R
Can you use the Telephone	52	26	78	30 (39.0)	22	52	18 (26.0)	52	70 (35.0)
Can you get to places out of walking distance	58	67	125	34 (62.5)	24	58	8 (29.0)	9	17 (8.5)
Can you go shopping for groceries or clothes	47	43	90	31 (45.0)	28	59	22 (29.5)	29	51 (25.5)
Can you prepare your own meals	22	38	60	30 (30.0)	22	52	48 (26.0)	40	88 (44.0)
Can you do your house-work	38	34	72	45 (36.0)	48	93	17 (46.5)	18	35 (17.5)
Can you take your own medicine	62	18	80	19 (40.0)	54	73	19 (36.5)	28	47 (23.5)
Can you Handle your Own money	52	46	98	26 (49.0)	22	48	22 (24.0)	32	54 (27.0)

Figures in parenthesis indicates percentage

Table 49 indicates the percentage of respondents who can do various other tasks (Instrumental Activities of Daily living), without help, with some help. It was found that among urban citizens the tasks which they find it difficult to perform were preparation of meals and doing household tasks. Only 22 per cent and 38 per cent of the subjects out of 200 citizens surveyed were able to prepare meals and household tasks respectively without help. It was found that the tasks which they find difficult to perform without help were using the telephone, and only 26 per cent of the rural respondents were able to use telephone without help, other activities where they experience difficulty were, preparation of meals (38%), doing household work(34%), and in taking medicine (18 %) finding it difficult to read the labels and prescriptions and taking it according to the correct dose. Regarding sex wise differentiation it was found that, male citizens predominated in doing activities like getting to places out of walking distance, (64.2 %) and taking medicines (42.2) independently. While female citizens predominated in doing the household work (53.3%, preparing meals (60.0%) and going for shopping for groceries or clothes (46.6%) independently. Regarding the handling to money both the male (49.5%) and female (48.5 %) were efficient in handling the money.

The responses of both urban and rural subjects were scored on three point continuum. The mean score obtained for urban were 9.2 and that of rural citizens were 8.1. There was statistically significant difference in the mean scores obtained by urban and rural citizens ($\alpha = 2.18$).

Distribution of subjects based on PADL scores is given in Table 50.

Table 50. Distribution of subjects based on PADL socres

RANGE	Rural	Urban	Total
Less than 5	5.0 (5.0)	0	5.0 (2.5)
6 – 10	20.0 (20.0)	19.0 (19.0)	39.0 (19.5)
11 – 14	75.0 (75.0)	81.0 (81.0)	156.0 (78.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Physical activities of daily living (PADL) refers to the physical capacity of senior citizens in performing various individual tasks. PADL was measured using the respective schedules suggested under OARS – M.D and then the responses were scored on three point continuum, with a minimum score of '7' and a maximum score of '14.' The activities measured include whether they can eat, dress and undress, take care of their own appearance, walk, get in and out of bed, take bath, or have trouble in getting to the bathroom on time. Individual scores are given in Appendix XII. The data given in Table 50 reveals that among the 200 respondents surveyed, 79 per cent had scores above 11. It was found that more of the urban subjects had scores above 11 and none from the urban area had scores less than 5.

Table 51 indicates the percentage of respondents regarding their Physical activities of daily living (PADL). The data projected in Table 51 emphasis the fact that majority of urban and rural respondents were able to perform the physical activities of daily living by themselves. Both urban (24%) and rural respondents (17%) need some help in walking. Trouble in getting to the bathroom on time was indicated by 9% of urban and 4% of rural respondents. The activities where both urban and rural citizens need some help were mainly walking 29 per cen in urban and 22 per cent in the rural area. Next to it is getting to the bathroom in time, urban 9 per cent and rural 10 per cent followed by difficulties in eating 6 per cent in urban and 9 per cent in rural taking care of their own appearance 7 per cent in urban and 9 per cent in rural area.

Regarding the sex wise differentiation it was found that more of the male subjects experienced difficulty in getting in and out of bed (7%), and taking care of their own appearance (10%), but regarding other activities such eating, dressing by themselves and walking females experienced more difficulty than males.

The responses of both urban and rural subjects were scored on three-point continuum. The mean score obtained for urban citizens was 11.71 and that of rural was 11.02. There was statistically significant difference in mean scores obtained between urban and rural citizens with ($\alpha = 1.96$).

Table 51. Percentage distribution of respondents based on their Physical activities of daily living (PADL)

Statements	Without help			With some help			Completely unable		
	U	R	U+R	U	R	U+R	U	R	U+R
Can you eat	94	91	185 (92.5)	6	9	15 (7.5)	-	-	-
Can you dress and undress yourself	94	93	187 (93.5)	7	4	11 (5.5)	-	2 (1.0)	2.0
Can you take care of your own appearance	94	90	184 (92.0)	7	5	12 (6.0)	-	4	4.0 (2.0)
Can you walk	74	75	149 (74.5)	29	17	46 (23.0)	-	5	5.0 (2.5)
Can you get in and out of bed	95	93	188 (94.0)	5	7	12 (6.0)	-	-	-
Can you take a bath or shower	94	90	184 (92.0)	7	6	13 (6.5)	-	3	3 (1.5)
Do you have trouble in getting to the bathroom on time	91	90	181 (90.5)	9	10	19 (9.5)	-	-	-

Figures in parenthesis indicates percentage

Fig. No. 6

Classification of respondents based on scores for physical activity of daily living(PADL)

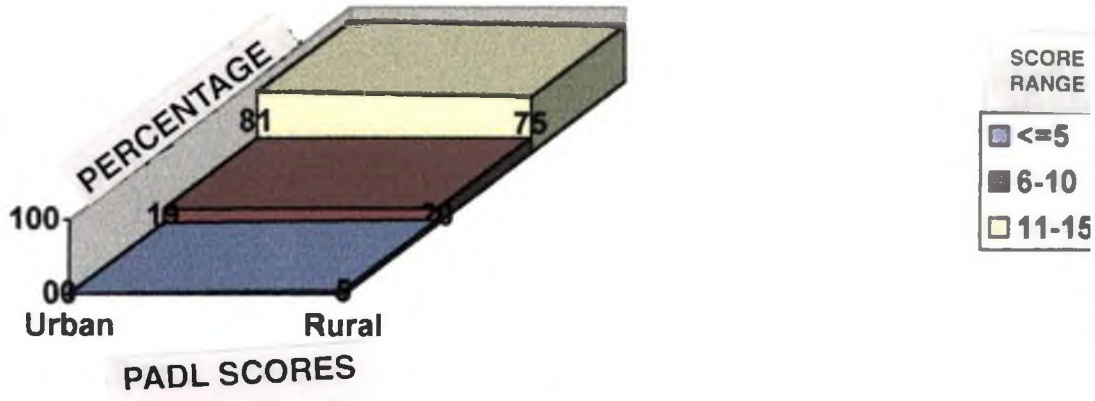
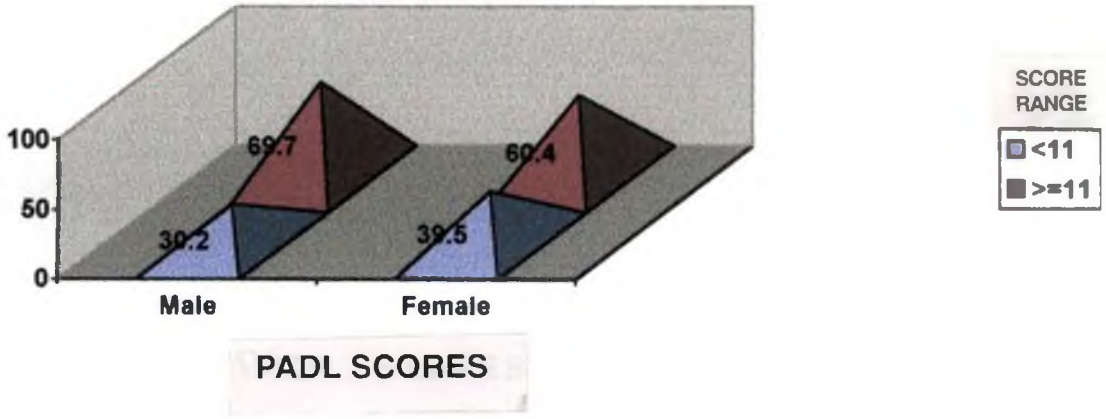


Fig. No. 7

Sexwise distribution of subjcts based on their PADL scores



The sum total of IADL and PADL scores gives the domain scores. Distribution of subjects based on domain scores is given in Table 52.

Table 52. Distribution of subjects based on domain scores

RANGE	Rural	Urban	Total
0 – 10	10.0 (10.0)	2.0 (2.0)	12.0 (6.0)
10 – 20	37.0 (37.0)	29.0 (29.0)	66.0 (33.0)
20 – 30	53.0 (53.0)	69.0 (69.0)	122.0 (61.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Among the 200 respondents surveyed, 61 per cent had scores above 20 and 6 per cent had scores above 10. It was observed that more of rural subjects had scores below 10, which shows their weakness.

4.8 Psychological status of respondents

Deterioration of mental capacity is one of the major problems faced by the elderly, which in turn affects the well-being and food habits of the elderly. Good mental condition is dependent on many other factors, which are divided into four domains such as physical health as perceived by the subjects, psychological health, social relationship and environment which indirectly influences the food habits.

4.8.1 Physical health

Distribution of subjects based on scores for physical health is given in Table 53.

Table 53. Frequency distribution of subjects based on scores for physical health

Domain scores (range)	Urban	Rural	Total
0 – 10	4.0 (4.0)	5.0 (5.0)	9.0 (4.5)
11 – 20	23.0 (23.0)	41.0 (41.0)	64.0 (32.0)
21 – 30	64.0 (64.0)	52.0 (52.0)	116.0 (58.0)
31 – 40	9.0 (9.0)	2.0 (2.0)	11.0 (5.5)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Domain one represents physical health status of the respondents as perceived by the subjects. This domain contain seven facets like energy and fatigue, mobility, pain and discomfort, sleep and rest, work capacity etc. The general scoring system used in this gives a maximum score of 35 and a minimum score of seven.

As depicted in Table 53 among the 200 respondents surveyed, only five per cent had scores above 30. Majority of the respondents (58%) had scores between 20-30. The mean score obtained for urban dwellers was '22' and for rural dwellers it was 20. Urban subjects (9%) had higher scores (above 30) than the rural subjects.

4.8.2 Psychological health

Distribution of respondents based on scores for psychological health is given in Table 54.

Table 54. Frequency distribution based on scores for psychological health

Domain scores (range)	Urban	Rural	Total
0 – 10	20.0(20.00)	1.0(1.0)	21.0(10.5)
11 – 20	46.0(46.0)	51.0(51.0)	97.0(48.5)
21 – 30	34.0(34.0)	48.0(48.0)	82.0(41.0)
Total	100(100.0)	100(100.0)	200(100.0)

Figures in parenthesis indicates percentage

Domain two represents psychological status of the respondents as perceived by the subjects. This domain contains six facets like bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality/religion/personal beliefs, thinking, learning, memory and concentration. The general scoring system used in this gives a maximum score of 30 and a minimum score of '6'. Among the 200 respondents surveyed 41% had scores above 20. Mean score obtained for urban citizens were 15.0 and those of rural citizens were 21.0.

4.8.3 Social relationship

Distribution of subjects based on scores for social relationship is given in Table 55.

Table 55. Frequency distribution of subjects based on scores for social relationship

Domain scores (Range)	Urban	Rural	Total
0 – 5	0	1.0 (1.0)	1.0 (1.0)
6 – 10	31.0 (31.0)	73.0 (73.0)	104.0 (52.0)
11 – 15	69.0 (69.0)	26.0 (26.0)	95.0 (47.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Domain three represents the social relationships of the respondents. This domain contains facets like personal relationships, social support and sexual activity. The general scoring system used in this gives a maximum score of '15' and a minimum score of '3'.

As observed from the above Table 55 among the 200 respondents surveyed 52% had scores in the range of 5 – 10. The mean score obtained for urban dwellers was 11 and for rural dwellers it was 9. Majority of the urban dwellers (69%) had scores in the range of 10 – 15.

Distribution of subjects based on scores for environment is given in Table 56.

Table 56. Frequency distribution of subjects based on scores for Environment

Domain scores (Range)	Urban	Rural	Total
0 – 10	0	3.0 (3.0)	3.0 (1.5)
11 – 20	17.0 (17.0)	40.0 (40.0)	57.0 (28.5)
21 – 30	59.0 (59.0)	50.0 (50.0)	109.0 (54.5)
31 – 40	24.0 (24.0)	7.0 (7.0)	31.0 (15.5)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Domain four represents the environmental situation. This domain contains facets like financial resources, home environment, physical environment, transport and social care. The general scoring system used in this gives a maximum score of '40' and a minimum score of '8'

As revealed in the Table 56 among the 200 respondents surveyed 54.5 per cent had scores above 20 out of 40. Mean score for urban was '26' and for rural it was '22'. Only 7 per cent of rural subjects had scores above 30. There was not even a single person who had scores less than 10 in the case of urban subjects.

4.9 DIETARY HABITS OF SENIOR CITIZENS

Food habits of elderly play an important role in the maintenance of health and functional capacity and more knowledge of what is consumed by old is of value and hence details regarding dietary habits was enumerated below.

4.9.1 Dietary pattern

Distribution of respondents based on their current dietary pattern is given in Table 57.

Table 57. Distribution of respondents based on their current dietary pattern

Current pattern	Urban	Rural	Total
Vegetarian	20 (20.0)	5(5.0)	25(12.0)
Non-vegetarian	65(65.0)	95(95.0)	160 (80.0)
Lacto-vegetarian	10 (10.0)	0 (0.0)	10 (5.0)
Ovo-vegetarian	5(5.0)	0 (0.0)	5(2.5)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Table 57 shows the distribution of subjects with special reference to their current dietary pattern. Among the 200 respondents surveyed 80 per cent were non-vegetarians. The remaining minority were lacto-vegetarians (5 %) and ovo-vegetarians (3 %). It may be noted that among rural subjects 95 per cent were non-vegetarians. Though non-vegetarians, lacto and ovo-vegetarians were found only among the urban senior citizens.

The respondents were further categorized into different groups based on the type of foods used in the daily dietary pattern. Such details are presented in Table 58.

As depicted in Table 58, it is found that 30 per cent of urban respondents were avoiding fish, egg and meat as they belong to the category of complete vegetarians and lacto vegetarians. Only 22% of urban respondents were consuming milk as well as fish; and 13 per cent were consuming milk, fish and egg, while only seven per cent were consuming milk, egg, meat as well as fish. But the rural data reveals the fact that while 38 per cent of rural citizens used only fish, 24 per cent were consuming milk and fish. The rural data further reveals that only five per cent of rural respondents were complete

vegetarians while nine per cent were in the habit of consuming all non-vegetarian foods such as milk, meat, egg and fish.

Table 58. Distribution of respondents based on dietary pattern

Category	Urban	Rural	Total
Consumes only foods of vegetable origin	20 (20.0)	5 (5.0)	25 (12.5)
Consumes milk and milk products	10 (10.0)	---	10 (5.0)
Consumes egg only	5 (5.0)	---	5 (2.5)
Consumes fish only	8 (8.0)	38 (38.0)	46 (23.0)
Consumes milk and fish	22 (22.0)	24 (24.0)	46 (23.0)
Consumes milk, fish and egg	13 (13.0)	---	13 (6.5)
Consumes fish and egg	3 (3.0)	19 (19.0)	22 (11.0)
Consumes fish and meat	12 (12.0)	5 (5.0)	17 (8.5)
Consumes milk, egg, meat and fish	7 (7.0)	---	7 (3.5)
Consumes fish, meat and egg	---	9 (9.0)	9 (4.5)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Data presented in Table 59, denotes that 24 per cent had been following the current dietary pattern from childhood, while 21 per cent had followed the reported diet pattern only after attaining adulthood. However, 59 per cent seems to have changed their dietary pattern due to aging.

Table 59. Distribution of respondents based on the duration of practicing a particular dietary pattern

Duration	Urban	Rural	Total
More than 10 years	55 (55.0)	22 (22.0)	77 (39.0)
More than 5 years	10 (10.0)	3 (3.0)	13 (7.0)
Less than 5 years	5 (5.0)	6 (6.0)	11 (5.0)
Less than 1 year	4 (4.0)	4 (4.0)	8 (4.0)
From childhood	6 (6.0)	43 (43.0)	49 (24.0)
From adulthood	20 (20.0)	22 (22.0)	42 (21.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

The daily dietary pattern of the subjects when analysed revealed that 85 per cent were taking three meal a day as shown in Table 60. It is interesting to note that 5 per cent of rural subjects ate five times a day, while 8 per cent of urban subjects ate only twice a day.

Table 60. Distribution of respondents based on the number of meals consumed

Frequency of meals	Urban	Rural	Total
Two times	8 (8.0)	3 (3.0)	11 (5.5)
Three times	85 (85.0)	86 (86.0)	171 (85.0)
Four times	7 (7.0)	6 (6.0)	13 (6.5)
Five times	0	5 (5.0)	5 (2.5)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Out of the 200 respondents interviewed, 55% are of the opinion that there was no day to day variation in heaviness of meals consumed by them.

Regarding the urban, rural differences, majority of the rural subjects (70 %) are of the opinion that there is no variation in the heaviness of meals as against 40 per cent of urban subjects. Lunch is the heaviest meal, while dinner or breakfast was reported to be the lightest of the major meals consumed by them.

It was observed that 43 per cent of the urban respondents have fixed time schedule for taking the major meals such as breakfast, lunch, tea and dinner. But the picture is reverse when the rural senior citizens were surveyed; it was found that only 12 per cent reported that they had fixed time schedule for taking major meals. The overall data indicates that only 27.5 per cent of the respondents were found to follow a regular time schedule for taking meals, and others took food according to their convenience and 44 per cent of the elderly subjects were found to spent more than 15 minutes in consuming their major meals. The urban – rural difference in this aspect revealed that majority of urban elderly (55 per cent) spent more than 15 minutes in consuming the major meals, but only 33 per cent of rural respondents spent more than 15 minutes in consuming the major meals.

4.9.2 Frequency of use of foods

In order to find out the general dietary pattern, details of frequency of use of different food items were collected and scored as per the method suggested by Reaburn *et al.* (1979). Frequency of use of different food items by the citizens can be used as an indicator of nutritional adequacy. As one grows old the process of aging could influence the use of different food items. The food use frequency scores of Urban/Rural citizens are given in Table 61a. As it may be seen from the table, food groups like cereals especially rice and wheat formed the essential part of the regular diet of all the respondents. But the consumption of semolina, and maida was not very frequent among the respondents.

Though different types of pulses were included in the diet of the elderly, the pulses such as green gram was consumed on a daily basis only by 10 per cent of urban

respondents. It was found that other pulses such as Bengal gram whole (13 %), black gram (37 %), green gram (36 %) were consumed twice in a week by urban respondents and another fraction of urban respondents consumed pulses such as Bengal gram whole (31 %), black gram (51 %), green gram (40 %), green gram dhal (22 %) and red gram dhal (25 %) only once in a week while the rural data reveals the fact that pulses such as Bengal gram whole (81 %), green gram dhal (72 %) were consumed only occasionally.

Table 61a. Frequency of use of various foods by the respondents

Food items		Daily	Thrice in a week	Twice in a week	Once in a week	Occasionally	Never
Cereals	(U)	15	13	34	32	6	—
Wheat	(R)	5	29	45	20	1	—
Semolina	(U)	3	1	10	27	31	28
	(R)	—	—	1	3	59	37
Maida	(U)	—	—	—	13	54	33
	(R)	—	—	1	29	46	24
Pulses							
Bengal gram	(U)	—	4	13	31	46	—
whole	(R)	—	—	—	12	81	7
Black gram	(U)	—	9	37	51	3	—
	(R)	—	1	16	61	22	—
Green gram	(U)	10	7	36	40	7	—
	(R)	10	1	22	2	25	40
Green gram	(U)	—	—	3	22	36	39
dhal	(R)	—	—	—	10	72	18
Red gram	(U)	—	—	19	25	37	19
dhal	(R)	—	—	6	50	34	10
Green leafy	(U)	—	—	14	35	51	—
Vegetable	(R)	18	45	35	2	—	—

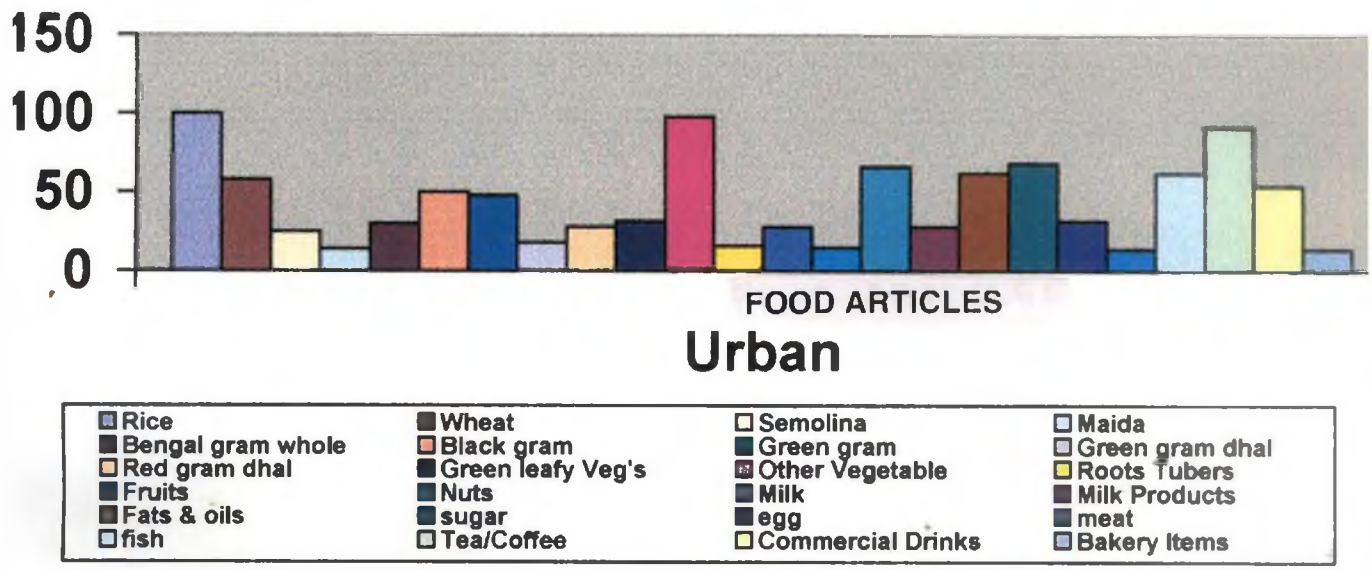
Table 61a (Contd....)

Food items		Daily	Thrice in a week	Twice in a week	Once in a week	Occasionally	Never
Other Vegetables	(U)	98	—	1	—	1	—
	(R)	19	12	3	66	—	—
Roots & tubers	(U)	—	—	3	14	44	39
	(R)	56	30	7	—	—	7
Fruits	(U)	10	—	14	9	32	35
	(R)	3	—	—	6	58	33
Nuts & oil seeds	(U)	—	—	2	9	48	41
	(R)	—	—	—	7	9	84
Milk	(U)	65	1	—	—	1	33
	(R)	29	—	—	—	—	71
Milk products	(U)	25	—	—	—	15	60
	(R)	22	—	—	—	—	78
Fats & oils	(U)	60	—	—	2	15	20
	(R)	99	—	—	—	—	1
Sugar & jaggery	(U)	68	—	—	—	—	32
	(R)	92	—	—	—	—	8
Egg	(U)	1	11	9	12	9	58
	(R)	—	—	1	12	61	26
Meat	(U)	—	1	4	14	21	60
	(R)	—	—	3	6	11	80
Fish	(U)	60	2	—	—	—	38
	(R)	95	—	—	—	—	5
Tea/coffee	(U)	91	—	—	—	1	8
	(R)	100	—	—	—	—	—
Commercial health drinks	(U)	54	1	—	—	2	43
	(R)	17	—	—	—	—	83
Bakery items	(U)	—	—	5	11	35	49
	(R)	—	—	—	6	21	73

Figures in parenthesis indicates percentage

Fig. No. 8

Average food frequency scores for different food articles -Urban.



It was noted from the Table 61a that majority of urban respondents (51 %) consumed green leafy vegetables occasionally and another 35 per cent consumed it once in a week. None of the urban respondents surveyed consumed leafy vegetables on daily basis while when the rural data were examined it was found that green leafy vegetables were consumed daily by 18 per cent and 45 per cent consumed it thrice a week and another 35 per cent consumed it twice a week. It was interesting to note that on the whole vegetables were consumed on daily basis by 98 per cent of the urban respondents while daily consumption of vegetables was reported only by 19 per cent of rural respondents.

The data further reveals that among the vegetables the use of roots and tubers was not frequent among the urban elderly. Only 17 per cent consumed it on a weekly basis while 44 per cent had it occasionally and another 39 per cent completely avoided roots and tubers. The consumption of roots and tubers was more among rural citizens than urban; viz: 56 per cent consumed roots and tubers on a daily basis and only 7 per cent avoided roots and tubers, in the rural area.

Frequency of consumption of fruits on daily basis was observed among 10 per cent of urban respondents while 35 per cent avoided fruits; 55 per cent consumed it once in a week. Fruits were consumed by 58 per cent of the rural respondents occasionally and only 3 per cent were in the habit of consuming them daily.

Nuts and oil seeds(except coconut) was found to be the item least frequently used by both the urban and rural respondents.

It was noted that 65 per cent of the urban and 29 per cent of rural respondents consumed milk on a daily basis. Daily use of milk products was noted among 25 per cent of urban and 22 per cent of rural citizens and majority of urban (60 per cent) and rural (78 per cent) subjects avoided milk products.

It was surprising to note that 20 per cent of urban citizens completely avoided fats and oils in their daily diet while 99 per cent of rural respondents included oils in their diet mainly for seasoning purposes. Sugar formed an essential item of the regular menu for 68 per cent of urban respondents, while 32 per cent completely avoided sugar and sugar containing foods while among rural respondents 92 per cent consumed it on a daily basis.

It was found that egg was never used by 58 per cent of urban respondents and only one per cent consumed egg daily while 32 per cent used it once in a week. But the rural picture reveals the fact that 61 per cent took it occasionally and 26 per cent completely avoided it. Fish formed another essential component of the diet of the elderly rather than meat. Fish was consumed daily by 60 per cent of urban citizens and 95 per cent of rural citizens. Meat was avoided by 60 per cent of urban and 80 per cent of rural citizens while 21 per cent of urban and 11 per cent of rural consumed meat occasionally. None of the urban and rural citizens was found to consume meat daily.

Tea/Coffee was consumed by 91 per cent of urban and cent per cent of rural respondents. Commercial health drinks was used by 54 per cent of urban and 17 per cent of rural citizens daily.

Bakery items were avoided by 49 per cent of urban and 73 per cent of rural elderly.

To make the facts presented in above Table 61a more precise, food use frequency scores were calculated based on the frequency of use of various food items by the respondents. The mean scores and the percentage scores for various food articles are presented in Table 61b.

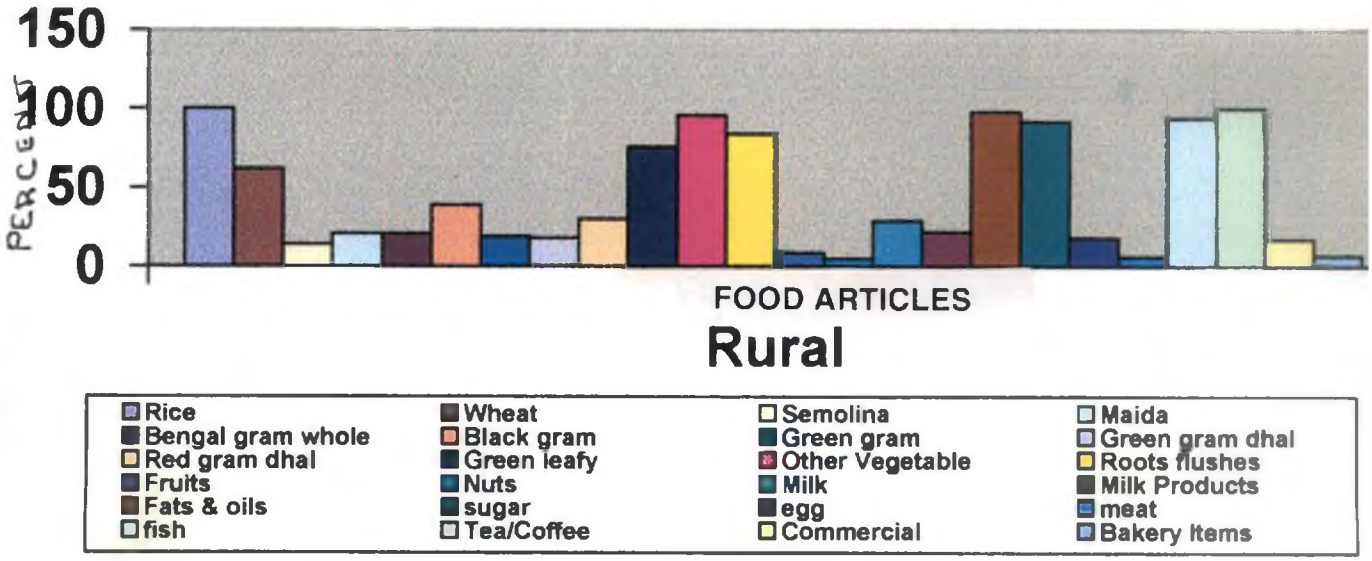
Table 61b. (Contd...)

Food items		Mean score	Mean percentage score over total score
Fruits	(U)	1.4	28
	(R)	0.45	9
Nuts & oil seeds	(U)	0.72	14.4
	(R)	0.23	5.0
Milk	(U)	3.3	66
	(R)	1.45	29
Milk products	(U)	1.4	28
	(R)	1.1	22
Fats & oils	(U)	3.1	62
	(R)	4.9	98
Sugar & jaggery	(U)	3.4	68
	(R)	4.6	92
Egg	(U)	1.6	32
	(R)	0.8	18
Meat	(U)	0.69	14
	(R)	0.32	6
Fish	(U)	3.08	62
	(R)	4.7	94
Tea/coffee	(U)	4.6	91
	(R)	5	100
Commercial health drinks	(U)	2.7	54
	(R)	0.85	17
Bakery items	(U)	0.72	14.4
	(R)	0.33	7

Figures in parenthesis indicates percentage

As indicated in Table 61b, among cereals, rice had a mean score of "five", among urban respondents, while items like rice, tea/coffee obtained a mean score of

Average food frequency score for various food articles· Rural



five among rural citizens. Food items like vegetables and tea/coffee were found to have a mean score of 4.90 and 4.60 among urban and rural citizens, items like roots and tubers, fats and oils, sugar and jaggery and fish were found to obtain mean scores of 4.2,4.9,4.6 and 4.7 respectively.

Based on the percentage scores for various food articles they were classified into most frequently used, moderately used, less frequently used and least frequently used foods. Such details are presented in Table 62.

Table 62. Classification of foods based on food use frequency score

Particulars		Food items
Daily used foods (76-100)	(U)	Rice, Vegetables, Tea/Coffee
	(R)	Rice, Green Leafy Vegetables, Roots & Tubers, Fats & Oils, Sugar & Jaggery, Fish , Tea/Coffee.
Moderately used foods (51-75)	(U)	Wheat, Milk, Fats & oils, Sugar, Fish, Commercial preparations.
	(R)	Wheat
Less frequently used foods (26–50)	(U)	Fruits, Milk products, Egg, Bengal gram whole, Black gram, Green gram, Red gram dhal & Green Leafy Vegetables.
	(R)	Black gram, Milk, Vegetables
Least frequently used foods ≤ 25	(U)	Semolina, Maida, Green gram dhal, Roots & Tubers, Nuts & Oil seeds, Meat & Bakery items.
	(R)	Semolina, Maida, Bengal gram whole, Green gram, Green gram dhal, Fruits, Nuts & oil seeds, Milk products, Egg, Meat, Commercial preparations.

As observed from Table 62, daily used foods among urban citizens were rice, vegetables and tea/coffee and among rural citizens it were rice, green leafy vegetables, roots and tubers, fats and oils, sugar and jaggery, fish and tea/coffee. The moderately used foods among urban citizens were wheat, milk, fats and oils, sugar, fish and commercial preparations while among rural citizens the moderately used food was wheat. Less frequently used foods among urban citizens were fruits, milk products, egg, bengal gram whole, black gram, green gram, red gram dhal, and green leafy vegetables. Less frequently used foods among rural citizens were black gram, milk, and vegetables. Least frequently used food among urban citizens were semolina, maida, green gram dhal, roots and tubers, nuts and oil seeds, meat, and bakery items while among rural citizens it were semolina, maida, bengal gram whole, green gram, green gram dhal, fruits, nuts and oil seeds, milk products, egg, meat and commercial preparations.

4.9.3 Daily meal pattern of the respondents

The daily meal pattern of the respondents were further studied using the dietary recall method. The average daily dietary pattern of urban citizens are presented in Table 63 and that of rural citizens are presented in Table 64.

The data presented in Table 63 and 64 reveals that 77 per cent of urban respondents consumed tea with milk early in the morning, while 48 per cent of rural respondents consumed black tea another 43 per cent of rural respondents consumed tea with milk in the morning. It was found that 80 per cent of urban respondents consumed either preparations made from cereals with a side dish containing coconut as breakfast. Either coffee, tea or milk was also consumed with breakfast. Among rural respondents surveyed 73 per cent reported that they consumed cereal preparations, (Rice) with dhal or coconut and black tea or tea during breakfast. Wheat preparations were included in the morning meal by 8 per cent of urban and rural citizens.

Table 63. Daily meal pattern of the Urban senior citizens (N=100)

Categories of food	Early morning	Breakfast	Lunch	Snack	Dinner
Black coffee	12	—	—	—	—
Black tea withlime juice	4	—	—	—	—
Tea	77	—	—	91	—
Previous day's left over food	—	7	4	—	—
Rice preparation with coconut preparation and coffee/ tea/ milk	—	80	—	—	25
Wheat preparation with coffee/ tea / milk.	—	8	—	—	16
Rice, tapioca and Fish	—	—	3	—	—
Rice, fish, leafy-vegetable preparation with coconut	—	—	4	—	—
Rice, fish, vegetables and coconut	—	—	52	—	23
Rice, vegetables preparation and curd	—	—	29	—	2
Rice, fish, dhal and vegetable preparation	—	—	5	—	3
Rice, leafy-vegetable preparation	—	—	3	—	12
Rice, dhal preparation	—	—	—	—	10
Wheat gruel	—	—	—	—	6
Not taking any food	7	5	—	9	3
Total	100	100	100	100	100

Table 64. Daily meal pattern of the rural senior citizens (N=100)

Type of food	Early morning	Breakfast	Lunch	Snack	Dinner
Black tea	48	—	—	38	—
Jaggery tea	4	—	—	—	—
Tea	43	—	—	62	—
Previous day's left over food	—	16	7	—	—
Rice preparation and dhal or with coconut preparation with coffee/tea/milk.	—	73	—	—	6
Wheat preparation with coffee/tea/milk	—	8	—	—	2
Rice, topioca, fish, coconut	—	—	47	—	41
Rice, fish, leafy vegetable preparation, coconut	—	—	34	—	8
Rice, fish, vegetables coconut	—	—	12	—	12
Rice, vegetable preparations	—	—	7	—	—
Rice, leafy-vegetable preparation	—	—	—	—	18
Rice, dhal (greengram) preparations	—	—	—	—	10
Wheat gruel	—	—	—	—	3
Not taking any food	5	3	—	—	—
Total	100	100	100	100	100

It was observed that left over rice (cooked) was eaten by 7 per cent of urban and 16 per cent of rural citizens, as the main item of breakfast. Another noticeable observation was that 5 per cent of urban and 3 per cent of rural were not taking any breakfast.

It was noted that rice, fish curry, and a vegetable preparation with coconut were the items for lunch for 52 per cent of urban respondents; rice, vegetables and a coconut preparation alone taken by 29 per cent of urban citizens, while 47 per cent of rural respondents had rice, tapioca, fish curry and a coconut preparation as the components of their daily lunch while 7 per cent took previous day's left over food and another 34 per cent took rice, fish curry and a leafy vegetable preparation.

In the evening 38 per cent of rural citizens consumed black tea while 91 per cent of urban and 62 per cent of the rural respondents had tea with milk. It was found that 9 per cent of urban citizens avoided tea in the evening.

When the meal pattern for dinner were examined – rice, fish curry, a vegetable and a coconut preparation were consumed by 23 per cent of urban citizens; rice gruel, green gram, and or a vegetable preparation were taken by 22 per cent. Wheat gruel was taken by 6 per cent and preparations such as idli, dosa or steam cake were consumed by 41 per cent of urban respondents. It was found that 3 per cent of urban citizens avoided dinner.

When the rural picture was examined it was found that the menu for lunch and dinner were same for 61 per cent of rural respondents, while 8 per cent preferred breakfast preparation for dinner and 28 per cent preferred to consume rice gruel at supper. Few of the respondents (3 %) consumed wheat gruel (Porridge) as the major item of supper.

Though this is the meal pattern followed by urban and rural citizens, details regarding the consumption of foods in between the major meals were enumerated.

Among the 200 respondents surveyed 71 per cent were not consuming any food in between major meals. Foods in between major meals were taken more by urban (35 %) than rural respondents (23 %). Foods which were taken in addition to major meals were health drinks, tea / coffee, fruits, rice soup, poached egg, rice/semolina porridge, vegetable soup, coconut water and less frequently bakery items.

Further analysis of the data revealed that snacking habit decreases as age increases.

Enquiry on their daily schedule revealed that 54 per cent took other items other than food after consuming the major meals. Both the urban and rural respondents took medicines or health tonic, daily after consumption of major meals.

Distribution of respondents based on the habit of taking supplements is given in Table 65.

Table 65. Distribution of respondents based on the habit of taking supplements

Habit of taking supplements	Urban	Rural	Total
No supplements	22 (22.0)	65 (65.0)	87 (43.0)
Vitamin/minerals tablets	28 (28.0)	9 (9.0)	37 (19.0)
Ayurvedic medicines	10 (10.0)	18 (18.0)	28 (14.0)
Health tonic	40 (40.0)	8 (8.0)	48 (24.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Among the 200 respondents surveyed 43 per cent were not in the habit of taking any supplements. When the rural-urban variation in the consumption of nutrient supplements was assessed, it was found that 78 per cent of urban subjects and 35 per cent of rural subjects took supplements which indicates that this habit is more prevalent among urban dwellers. The supplements included vitamin/mineral tablets, Ayurvedic medicines and health tonics.

The following aspects viz., food preference, habit of dining out, assistance in cooking etc. which may have an indirect influence on the dietary pattern of the senior citizens were also taken into account to find out whether they had any influence on the general dietary habits of the senior citizens.

Distribution of respondents based on who cooks the foods is given in Table 66.

Table 66. Distribution of respondents based on who cooks the foods

Cooks the food	Urban	Rural	Total
Wife	30 (30.0)	22 (22.0)	52 (26.0)
Self	20 (20.0)	23 (23.0)	43 (21.0)
Daughter	30 (30.0)	26 (26.0)	56 (28.0)
Daughter in law	14 (14.0)	27 (27.0)	41 (21.0)
Relatives	6 (6.0)	2 (2.0)	8 (4.0)
Total	100.0 (100.0)	100.0 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Self cooking was done only by 21 per cent while 26 per cent of the respondents had their wives to cook their food. The above data reveals that for 28 per cent of the respondents the food was cooked by their daughters. Only four per

cent of the respondents had depended on other relatives to cook the food for them. Regarding the urban rural differentiation self cooking was done only by 20 per cent of urban and 23 per cent of rural subjects and for others the cooking was done by other family members. Sex differentiation depicts the fact that 6.4 per cent of male citizens did self cooking while 37 per cent of females cooked the food for themselves.

Those citizens who were unable to cook (among those citizens who had no one to cook for them) and few others, had the habit of dining out.

Distribution of respondents based on the habit of dining out is given in Table 67.

Table 67. Distribution of respondents based on the habit of dining out

a. Habit of dining out	Urban	Rural	Total
Yes	15 (15.0)	30 (30.0)	45 (23.0)
No	85 (85.0)	70 (70.0)	155 (77.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)
b. Frequency of dining out	Urban	Rural	Total
Daily	0	22	22
Once in a week	3	—	3
Once in a month	7	5	12
Vary rarely	5	3	8
Total	15.0	30.0	45.0

Figures in parenthesis indicates percentage

Among the 200 respondents surveyed, 77 per cent were not in the habit of dining out. It was found that 30 per cent of rural subjects and 15 per cent of the urban subjects dined out indicating the fact that this habit is prevalent more among the rural

senior citizens than their urban counterparts. Out of the 30 percent of rural subjects who dined out, 22 per cent dined out daily while others did it once in a month or very rarely.

Though 58 per cent of urban and 37 per cent of rural citizens reported that their diets were monotonous, it was interesting to note certain preferences voiced by some citizens surveyed. The details are presented in Table 68.

Table 68. Preference for preparations

Preferences for food/ Preparations	Urban	Rural	Total
Yes	42 (42.0)	21 (21.0)	63 (31.5)
No	58 (58.0)	79 (79.0)	137 (68.5)
Total	100	100	200 (100)
Frequency of use of the Preferred preparations	Urban	Rural	Total
Daily	12 (12.0)	3 (3.0)	15 (27.0)
Weekly	24 (24.0)	7 (7.0)	31 (23.8)
Monthly	6 (6.0)	11 (11.0)	17 (49.2)

Figures in parenthesis indicates percentage

Preferences for particular preparations was exhibited more by urban elderly (42 %), when compared to rural respondents (21 %). The frequency of consumption of the preferred foods varied widely among the respondents. But majority (68.5 %) of respondents did not have preferences for foods/ preparations. The preparations / foods liked by urban respondents were payasam, fish fry, half boiled egg, vada, bittergourd, bread sandwich, wheat/rice ada, dhal and vegetable preparations; while the rural respondents, liked payasam, salted fish curry and rice/wheat ada. Foods disliked by

urban and rural respondents were fried items, meat preparations and heavily spiced foods.

Enquiry on dietary habits followed by the subjects revealed that they had made changes in their general dietary pattern due to aging (since minimum of two years to maximum of more than five years). It was found that more of urban citizens have made modifications in diet due to disease or as a part of religious beliefs, while more of rural citizens have made changes in their dietary pattern due to physical, psychological and socio-economic problems.

Detailed enquiry revealed that changes have been introduced in the dietary pattern due to various changes associated with aging such as physical, psychological, social etc as given in Table 69.

Table 69. Changes that have induced modifications in dietary pattern

Reasons for change in dietary pattern	Urban (N=100)	Rural (N=100)
Disease	64 (64.0)	28 (28.0)
Physical problems	20 (20.0)	39 (39.0)
Psychological problems	6 (6.0)	8 (8.0)
Religious practices	5 (5.0)	—
Socio-economic reasons	14 (14.0)	60 (60.0)
Socio-cultural reasons	3 (3.0)	4 (4.0)

Figures in parenthesis indicates percentage

As indicated in Table 69 majority of urban respondents (64 per cent) and 5 per cent of urban citizens have introduced changes in their dietary pattern as the result

of disease and religious practices respectively. But the changes made in the dietary pattern due to socio-economic (60 per cent), physical (39 per cent), psychological (8 per cent) and socio-cultural (4 per cent) were more among rural citizens when compared to urban citizens, physical (20 per cent), socio-economic (14 per cent), psychological (6 per cent) and socio cultural (3 per cent).

Dietary modifications made due to the above changes are further detailed below.

Dietary modifications as the result of disease

Analysis of the data collected on dietary modifications revealed the fact that most of the senior citizens had made changes in their diet as result of different kinds of diseases. It was noted that 34 per cent of urban citizens were victims of cardiovascular diseases and they have made changes in their dietary pattern such as avoidance of fried foods, specially chips pickles, pappads, snacks and ready to eat foods (brought from shops) egg yolk, and other salted preserves. They also consumed a diet generally low in salt because of cardiovascular diseases. Seven per cent of urban citizens avoided tea/coffee. Among the 34 per cent of cardiac patients, 14 per cent reported that such changes have been made in their diet since more than five years. About 10 members reported that the changes were made since more than nine years; while 3 members reported that the changes have been made from adulthood.

Among the rural citizens, only 9 per cent had made changes in their dietary pattern. These citizens avoided fried and salty foods. A particular time schedule for consuming all the three major meals has been followed by them, and all of them reported that they have made these changes since the past 10 years.

Due to gastro-intestinal problems (such as ulcer) 3 per cent of urban citizens (2 male and one female) had avoided, raw foods, highly spiced foods, too hot and

cold foods, and all of them followed a particular time schedule for their meals. All the three senior citizens reported that they were lacto-vegetarians. They mostly consumed a soft, balanced diet. This change in their dietary pattern had been made for a period of more than 5 years. None of the rural respondents had made any change in their dietary pattern as the result of gastro-intestinal problems.

It was found that due to diabetes 19 per cent of urban citizens, and 9 per cent rural citizens had made changes in their dietary pattern. Among the urban citizens 5 per cent were obese diabetics. Both urban and rural diabetic patients avoided sweets and carbohydrate rich foods. Ten per cent of urban citizens reported that they took amaranth or bittergourd juice or rava gruel in between the major meals. All of them reported that they had reduced the quantity of food consumed by them. Both urban and rural diabetic patients took tea/coffee without sugar. In the case of 5 per cent of obese diabetic patients, they avoided fried foods and sweets also. They reported that they skipped their breakfast or dinner in order to reduce their weight. It was found that all the diabetic citizens of urban and rural area consumed wheat preparations at night in the form of wheat gruel, dosa or porridge or steam cake or chapathi.

It was found that 11 urban senior members have made changes in their dietary pattern as the result of diabetes since 8 years and remaining 8 members since five years. All the rural citizens have made the changes since five years.

Allergy towards foods was noticed among 8 per cent urban citizens and 10 per cent rural citizens (5 males 3 females, 8 males and 2 females respectively). The allergic urban citizens avoided egg, green gram, bengal gram, milk and certain fruits like pineapple, grapes and papaya. Ten per cent of the rural citizens avoided egg and milk in their diet due to allergy. Allergy towards specific foods were seen among 4 per cent of urban citizens from childhood and another 4 per cent developed it during adulthood. All the 10 rural citizens were prone to allergy from adulthood.

Changes made in the dietary pattern as the result of physical changes.

As a result of edentulous condition noticed among 13 per cent of urban and 26 per cent of rural citizens they avoided foods which are difficult to chew such as meat, high fibre foods, nuts, raw foods (especially vegetables and fruits). They reported that the rice and vegetables were boiled into a soft texture to facilitate easy consumption. Pulses like green gram, bengal gram were reported to be double cooked and wheat preparations such as chappathi were soaked in milk or tea to facilitate easy consumption. Fleshy foods like meat were pressure cooked or cooked for a long time for easy chewing. Foods which are hard to chew were made into small pieces before chewing. It was also observed that at times items such as chips, murukku, nuts which are hard to munch were ground into a powder form. Both urban and rural citizens also reported that items such as chips, murukku and nuts were immersed in tea/coffee for sometime before consumption.

Another disability noticed among six per cent of rural (4females and 2males) and three per cent of urban (all females) citizens was loss of vision. Because of this disability the above subjects reported that they were not able to select or decide the quantity of food to be consumed. They wanted the foods to be highly flavoured. They also commented that they were not able to prepare foods according to their interest, and taste because of lack of proper vision. They also reported that lack of vision had resulted in social isolation and inability to select food since they were not able to go for shopping to buy food.

Inability to prepare food was noticed among 48 per cent of urban and 40 per cent of rural respondents. They reported (mostly females) that they were not able to cook their food all by themselves, according to their taste likes and interest. Hence they had to depend on others.

Four per cent of urban citizens (2 females and 2 males) and 7 per cent of rural citizens (3 females and 4 males) reported that as a result of tremor of hands they were unable to take food properly and needed some help while eating. Five per cent of urban (3males and 2 females) and 7 per cent of rural (4males and 3 females) citizens were unable to get in and out of bed and needed help. For breakfast they preferred to eat items such as bread or boiled banana (ripe) or gruel and for dinner they preferred to consume rice or wheat gruel or any other liquid food. All of them reported that the quantity of food eaten by them was very little. One reason cited by them for eating little quantity was loss of appetite and loneliness. They felt that restricted mobility caused heavy dependence on other family members in obtaining food. They have made changes in their food habits since three years.

The changes made in the dietary pattern as a result of psychological change.

As a result of psychological problems such as loneliness, change of place of residence and mental disorder few of the senior citizens had made changes in their meal pattern. Feeling of loneliness was experienced more by those senior citizens who were living alone rather than those who were living with their family members. It was found that 3 per cent of urban (2 males and one female) and 6 per cent of rural citizens (4 males and 2 females) were living alone. Due to the feeling of loneliness, they skipped their meals, mainly breakfast or dinner and they had no regularity in consumption of their daily meals. They preferred to take ready-made or easily prepared food items or milk or sometimes they were forced to take food from outside. They also opined that they ate very little quantity of food.

As the result of changes of place of residence the psychological status of 3 per cent of urban citizens were affected and all of them were females. These senior citizens have changed their homes from rural settings to urban settings. They reported

that they were forced to change their traditional meal pattern. Due to change of residence they had to adapt to the new ways of cooking foods or had to depend more on readymade food items. So these citizens ate very little. At times they even skipped their daily meals. Sometimes for dinner they took a cup of milk or a banana.

As the result of mental disorder (dementia, depression) found among 2 per cent of rural female citizens, their family members reported that the above subjects were eating 5 times or more or sometimes ate less than three times and they had no regular time intervals for taking their meals. Such mental disorders were not observed among urban citizens.

Dietary modifications as the result of changes in Socio-economic status.

Dietary modifications made as the result of changes in socio-economic status, was seen reflected more in the diet of rural elderly than their urban counterparts. Majority of the urban citizens did not have heavy economic problems. But the rural citizens reported that the chief economic problem which they are facing is the lack of income which resulted in poverty. As a result of this problem they had changed their dietary pattern. Among the rural elderly 60 per cent reported that due to poverty, they were not able to purchase or consume costly nutritious foods, such as pulses, milk, meat, commercial preparations or supplements. These changes in the dietary pattern were made by 23 per cent of rural citizens for a period of more than 12 years, while 37 per cent of them reported that they had made the changes since 8 years.

Only a minority of urban citizens (14 per cent) were affected by the problem of lack of income. Due to financial constraints, they avoided costly foods.

Dietary modifications as the result of religious practices

Dietary modifications as the result of religious practices was observed by 5 per cent of urban citizens (4 females and one male) and none of the rural citizens reported that they have made changes in their dietary pattern as the result of religious practices. These urban citizens avoided fish, meat, egg in their meals. They observed fast on important religious days since 10 years.

Changes made in the dietary pattern as the result of socio-cultural problems

The socio-cultural problems such as inadequate cooking skills or facility to cook was experienced by 3 per cent of urban citizens (2 males and one female) and 4 per cent of rural citizens (4 males) and they reported that due to insufficient cooking skills they used ready to serve items, processed foods, fruits or items that can be cooked easily. Sometimes they do not even cook their daily meals and would dine out, and all of them also reported that because of difficulties in cooking they ate very little of the food already cooked, or they ate foods cooked on the previous day.

To sum up, it is seen that the subjects had modified their dietary pattern to suit changes induced by geriatric alterations in their health status along with their physiological, mental, psychological, cultural, and social profile brought in by physical as well as environmental living conditions. Therefore their dietary pattern in general seems to be very simple and relatively ill-balanced and inadequate.

As one grows old, they make changes in the consistency of food stuffs suitable to their taste and physical and physiological conditions. It was found that 88 per cent of urban and 81 per cent of rural preferred steamed items for breakfast, so that they can be masticated without much strain. While 7 per cent of urban and

19 per cent of rural citizens took the previous day's left over rice soup for breakfast, for lunch 4 per cent of urban and 7 per cent of rural preferred previous day's left over rice soup. Others consumed solid diet. For dinner, it was found that 38 per cent of urban citizens used steamed items, 28 per cent used semi-liquid diet (gruel form). While among rural citizens only 8 per cent used steamed items and 31 per cent preferred semi-liquid diet (gruel form) while remaining 61 per cent consumed solid diet during dinner.

As the consistency of foods are influenced by the method of cooking employed in processing different foods into preparations and an enquiry made into the methods of cooking. Cooking methods practiced by urban and rural citizens are given in Table 70.

Table 70. Cooking methods practiced by urban and rural (N=200) citizens

Food groups	Boiling		Boiling and straining in excess water		Cooking under pressure		Shallow frying deep frying		Boiling and shallow frying	
	U	R	U	R	U	R	U	R	U	R
Cereals	—	—	74	100	26	—	—	—	—	—
Pulses	37	100	—	—	63	—	—	—	—	—
Green leafy vegetables	82	85	—	—	—	—	—	—	18	15
Other vegetables	65	100	—	—	—	—	13	—	—	—
Roots and Tubers	100	100	—	—	—	—	—	—	—	—
Fleshy foods	68	88	—	—	32	12	—	—	—	—
Egg	100	100	—	—	—	—	—	—	—	—
Milk	100	100	—	—	—	—	—	—	—	—

Regarding the cooking methods followed, by the urban and rural families boiling was the commonly adopted method for cooking cereals, pulses, vegetables, egg, milk and roots and tubers.

Excess water boiling and straining was the commonly preferred method for preparing cereals among 74 per cent urban and 100 per cent rural citizens. While 26 per cent of urban families used pressure cooking for cooking of cereals, majority of urban citizens (63%) made use of pressure cookers for pulse preparations. All the rural subjects used only boiling method for pulse preparations. For cooking green leafy vegetables 82 per cent of urban and 85 per cent of rural citizens used boiling method.

In the case of fleshy foods such as meat, 32 per cent of urban and 12 per cent rural citizens preferred pressure cooking. Boiling was the main method of cooking egg and milk by all the urban and rural respondents surveyed.

Further analysis of the collected data revealed that, steaming was preferred for breakfast among 88 per cent urban and 81 per cent rural citizens. For lunch urban citizens used boiling, pressure cooking and shallow frying methods. But rural respondents preferred boiling method. For dinner 38 per cent of urban and 8 per cent of rural elderly citizens preferred steamed items. It was also reported that cooking methods such as steaming, boiling and pressure cooking were preferred because, such foods are soft in nature and they are easy to consume.

Among the urban subjects 58 per cent were of the opinion that the preparations included in their daily diets were monotonous while 63 per cent of the rural folks reported that their diet had variety.

An enquiry was made whether the senior citizens required modifications in the type of vessels/ needed for taking food. It was noted that only 26 per cent of urban

respondents and 4 per cent of the rural respondents used separate vessels for eating food. The type of utensils used by all the urban respondents were steel vessels and glass wares, but 16 per cent of the rural respondents, preferred to eat their food in plantain leaves. It was noticed that most of them did not use special vessels to consume food.

Distribution of respondents based on the place of eating is given in Table 71.

Table 71. Distribution of respondents based on the place of taking food

Place of consumption	Urban	Rural	Total
Dining room	62 (62.0)	35 (35.0)	97 (48.0)
In one's own room	18 (18.0)	17 (17.0)	35 (17.0)
Kitchen	20 (20.0)	39 (39.0)	59 (30.0)
Varanda	0	9 (9.0)	9 (5.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

Data presented in Table 71 reveals that majority of the urban senior citizens (62 per cent) were found to consume their meals in the dining room as against a minor percentage (17 per cent) who were taking their meals in one's own room or kitchen (20 per cent). While among rural respondents 17 per cent were found to consume food in their own room; 39 per cent had it in the kitchen and a minor percentage (9 per cent) took food in the Verandah of the house. Regarding the sex wise differentiation 62 per cent of males preferred to consume food in the dining room and only 38 per cent preferred to consume food in the dining room.

Distribution of respondents with whom they take food is given in Table 72.

Table 72. Distribution of respondents with whom they take food

Taking off food	Urban	Rural	Total
With Kins	37 (37.0)	31 (31.0)	68 (34.0)
With Spouse	28 (28.0)	8 (8.0)	36 (18.0)
With Children and Grand children	18 (18.0)	48 (48.0)	66 (33.0)
Alone	13 (13.0)	11 (11.0)	24 (12.0)
With Relatives	4 (4.0)	2 (2.0)	6 (3.0)
Total	100 (100.0)	100 (100.0)	200 (100.0)

Figures in parenthesis indicates percentage

As cited in Table 72, 37 per cent of urban citizens were found to take food with their kins but among rural citizens 48 per cent had it with their children and grandchildren. But 28 per cent of urban respondents took food with their spouse. When rural picture was examined only 8 per cent took food with their spouse.

From the overall general dietary pattern it could be inferred that, few of urban citizens were vegetarians, but most of rural citizens were non-vegetarians. More of urban respondents consumed supplements and followed fixed time schedule for consuming meals than rural citizens. But dietary modifications due to disease were observed more among urban citizens, while changes due to the result of physical, psychological changes were observed more among rural citizens. The dietary pattern in general seems to be simple and adequate for urban citizens (except for some modifications) but those of rural citizens it was found to be ill-balanced and inadequate, as economic problem was faced by majority of rural citizens (60%) and this in turn had influenced their dietary pattern.

4.10 Statistical analysis

The details regarding the correlation between personal characteristics and functional ability is given in Table 73.

Table 73. Correlation between personal characteristics and functional ability

Characteristics		IADL	PADL	Domain score
Age	(R)	-0.15	-0.20**	0.03
	(U)	0.12	-0.26**	0.22
Sex	(R)	-0.08	-0.05	-0.11
	(U)	0.32**	0.29**	0.34**
Current employment	(R)	-0.05	-0.27**	-0.13
	(U)	-0.12	0.04	-0.09
Total income	(R)	-0.06	-0.04	-0.05
	(U)	0.17	0.01	0.10
Personal expenditure	(R)	0.00	0.11	0.45
	(U)	0.25**	0.17	0.23**

** - Significant at 1 per cent (0.2567)

Personal characteristics like age, sex, current employment, personal income and personal expenditure were correlated with functional ability characters like IADL, PADL and Domain Scores.

As observed from the Table 73 age and the current employment status was found to have a significant negative relationship (r = -0.27) (-0.20) on PADL among rural elderly. But among urban respondents age, sex and personal expenditure are found to have a significant influence on functional ability characters. Age has a significant negative influence on PADL (r = -0.26). When sex was correlated with functional ability, it was found that it had a significant positive relationship with IADL

(r= 0.32), PADL (r=0.29) and domain score (r = 0.34). Personal expenditure had significant influence on IADL (r = 0.25) and Domain (r = 0.23) scores of urban respondents.

Correlation between personal characters and general health status is given in the Table 74.

Table 74. Correlation between personal characteristics and general health status

Characteristics		Deficiency manifestations	Symptoms of ill-health	Perception health
Age	(R)	0.09	0.36**	-0.21**
	(U)	-0.12	0.27**	-0.25**
Sex	(R)	-0.08	0.14	-0.16
	(U)	-0.05	-0.14	0.14
Current employment	(R)	0.09	-0.25**	-0.24**
	(U)	-0.08	-0.04	0.10
Total income	(R)	-0.22**	0.13	-0.16
	(U)	0.04	0.04	0.02
Personal expenditure	(R)	0.02	0.04	-0.12
	(U)	-0.15	0.02	0.23 **

** - Significant at 1 percent

Age, sex, current employment, personal expenditure (money spent on medicine, transport, cosmetics etc.) and personal income of the subjects were correlated with general health status indicators like perception about health, deficiency manifestations and symptoms of ill-health.

As evaluated from the Table 74, among rural respondents the personal characters like age, current employment and total income have significant influence on general health status characters. It was found that there exists a significant positive relationship between

age and symptoms of ill-health (r = 0.36) and negative relationship between age and perception about health (r = -0.21). Symptoms of ill-health (r = -0.25) had a significant negative influence on current employment and perception about health has a negative influence on their current employment status (r = -0.24). Total income was found to be related to the presence of deficiency manifestations (r = -0.22). When the urban picture was examined only age and personal expenditure were found to be related to general health status. Age showed a significant relationship with the presence of symptoms of ill-health (r = 0.27). Age was also found to negatively influence the perception of respondents about their own health (r=- 0.25). Perception about health by the respondents in turn was also found to positively influence their personal expenditure (money spent on medicine, transport etc.), (r = 0.23).

Correlation between Personal characteristics and Anthropometric characteristics is given in Table 75.

Table 75. Correlation between Personal characteristics and Anthropometry

Characteristics		BMI	Triceps	W.H ratio	MUAC
Age	(R)	0.13	-0.26**	-0.05	0.07
	(U)	0.16	-0.19*	-0.02	0.01
Sex	(R)	0.05	-0.06	-0.15	0.05
	(U)	0.16	0.03	0.06	0.07
Current employment	(R)	0.09	0.12	0.03	0.04
	(U)	-0.04	0.05	0.14	0.06
Total income	(R)	0.01	0.05	-0.07	0.06
	(U)	-0.09	-0.13	0.04	0.13
Personal expenditure	(R)	0.01	0.13	0.12	0.16
	(U)	-0.18	-0.14	0.18	0.05

* - Significant at 5 per cent **- Significant at 1 per cent

Personal characteristics like age, sex, current employment, total income, and personal expenditure were correlated with anthropometric characteristics such as BMI, TST, WHR and MUAC. Analysis of the data revealed that there was a significant negative influence of age on triceps of both rural (r = -0.26) and urban (r = -0.19) counterparts. But none of other personal characteristics had any influence on anthropometric characteristics.

The correlation between Personal characteristics and mental health is given in Table 76.

Table 76. Correlation between Personal Characteristics and Mental Health

Characteristics		Physical	Psychological	Social	Environment
Age	(R)	0.32**	0.03	-0.17	0.15
	(U)	0.46**	-0.07	-0.11	-0.07
Sex	(R)	0.12	0.07	-0.18	0.03
	(U)	-0.10	-0.29**	-0.02	0.04
Current employment	(R)	0.35**	-0.11	0.04	0.00
	(U)	0.13	0.09	0.05	0.04
Total income	(R)	0.12	-0.03	-0.01	0.15
	(U)	0.10	0.01	-0.28**	0.18
Personal expenditure	(R)	0.07	0.05	0.03	0.02
	(U)	0.14	0.11	0.09	0.06

** - Significant at 1 per cent

Personal characteristics like age, sex, current employment, total income and personal expenditure were correlated with mental health status characters such as physical, psychological, social and environmental health.

The results projected in Table 76 revealed the fact that age had significant and positive influence on physical characteristics of both rural (r = 0.32) and urban (r = 0.46) citizens. But sex had significant negative influence on the psychological status of the urban respondents (r = -0.29). Current employment was found to show a significant influence on physical characteristics of rural respondents (r = 0.35). While total income had shown a significant but negative influence on the social characteristics of urban respondents (r = -0.28) alone.

The correlation between general health status and anthropometric characteristics is given in Table 77.

Table 77. Correlation between general health status and anthropometric characteristics

Characteristics		BMI	Triceps	Waist-hip Ratio	Mid upper arm circumference
Perception about health	(R)	0.02	0.03	-0.06	0.22
	(U)	-0.12	0.09	0.13	0.11
Deficiency manifestation	(R)	0.10	0.11	0.01	0.06
	(U)	0.06	0.10	0.12	-0.07
Symptoms of ill health	(R)	-0.23*	0.05	0.14	0.00
	(U)	-0.27**	0.09	0.08	0.06

* - Significant at 5 per cent ** - Significant at 1 per cent

The results shown in Table 77 reveals the fact that general health characters like perception about health, deficiency manifestations had no significant influence on the anthropometric characters of both rural and urban respondents . But symptoms of ill-health has significant negative influence on Body mass index (BMI) of both rural (r = -0.23) and urban (r = -0.27) citizens.

Correlation between functional ability and general health status is given in Table 78.

Table 78. Correlation between functional ability and general health status

Characteristics		IADL	PADL	Domain
Perception about health	(R)	0.03	0.85**	0.85**
	(U)	0.08	0.02	0.06
Deficiency manifestations	(R)	0.07	-0.29**	-0.20*
	(U)	-0.04	0.01	0.06
Symptoms of ill-health	(R)	-0.01	0.02	0.06
	(U)	0.02	0.06	0.08

*-Significant at 5 per cent **- Significant at 1 per cent

Functional ability characters like instrumental activities of daily living (IADL), physical activities of daily living (PADL), and domain scores (IADL + PADL) were correlated with general health status characters like deficiency manifestations, symptoms of ill-health and perception of health to see whether the functional ability is influenced by general health status.

There was a highly significant positive correlation between perception of respondents about their health and physical activities of daily living ($r = 0.85$) and among rural citizens.

Among the rural citizens a significant negative relationship was observed between PADL and deficiency manifestations ($r = -0.29$).

Correlation between functional ability and mental health status are given in Table 79.

Table 79. Correlation between functional ability and mental health status

Characteristics		Physical	Psychological	Social	Environment
IADL	(R)	-0.00	-0.07	-0.11	-0.12
	(U)	0.05	6.07	0.11	-0.04
PADL	(R)	-0.11	-0.23*	-0.08	-0.08
	(U)	-0.00	0.05	0.19	-0.02
Domain (IADL+PADL)	(R)	-0.06	-0.15	-0.11	-0.10
	(U)	0.03	0.08	0.07	-0.03

* - Significant at 5 percent

The functional ability characters like IADL, PADL and domain scores (IADL + PADL), were correlated with mental health status of the respondents grouped in to four domains namely physical (D_1), Psychological (D_2), Social relationships (D_3) and Environment (D_4).

Analysis of the data revealed that, there was a significant negative association (r=-0.23) between the psychological status and physical activities of daily living, (PADL) performed by the rural citizens. However, no such associations were observed among the urban subjects. Correlation between functional ability and anthropometric characteristics are given in the Table 80.

Table 80. Correlation between functional ability and anthropometric characteristics

Characteristics		BMI	Triceps	W/H ratio	MUAC
PADL	(R)	-0.01	0.05	0.01	0.02
	(U)	0.04	-0.03	0.19	0.10
IADL	(R)	-0.03	0.12	0.08	0.03
	(U)	-0.19	-0.03	0.03	0.04
Domain	(R)	-0.05	0.07	0.06	0.06
	(U)	0.08	-0.04	0.12	0.05

Functional ability characters assessed through IADL, PADL and Domain scores were correlated with anthropometric characteristics of the respondents like body mass index, triceps skinfold thickness, waist- hip ratio and mid upper arm circumference. The correlation analysis revealed that the anthropometric measurements had no significant association with functional ability among the rural as well as urban respondents.

The correlation between general health status and mental health of senior citizens surveyed is given in Table 81.

Table 81. Correlation between general health status and mental health status

Characteristics	Physical	Psychological	Social	Environment
Perception about health				
(R)	0.05	0.08	0.23*	0.20*
(U)	0.10	0.20*	0.10	0.19*
Deficiency manifestations				
(R)	-0.24*	-0.09	0.05	-0.13
(U)	-0.07	-0.05	-0.00	0.01
Symptoms of ill health				
(R)	-0.11	0.08	-0.05	-0.19*
(U)	-0.08	0.02	-0.03	-0.29**

*- Significant at 5 percent **- Significant at 1 per cent

General health status assessed through their own perception about health deficiency manifestations and with other symptoms of ill-health were correlated with the mental health status of the respondents categorized into four domains namely physical health (D_1), psychological (D_2), Social relationships (D_3), and environment (D_4).

The rural picture revealed the fact that the perception the individual had about his health was found to have a significant positive association with his social as well as personal relationships (r = 0.23) and the environment in which the rural citizens live were also found to have a significant positive influence on perception about health (r= 0.20)and also on symptoms of ill health exhibited by them (r=-0.19). A significant negative relationship (r = -0.24) was also observed between physical health characteristics (D_1) and the presence of deficiency manifestations.

But the urban picture reveals the fact that there is a significant positive association (r = 0.20) between psychological status and the perception of the elderly with respect to their own health status. As observed with the rural citizens the environment in which they live was also found to have a significant positive influence on their perception about health (r = 0.19) and a negative influence on symptoms of ill-health (r = -0.29) respectively.

In general, analysis of data reveals that the environment in which the elderly lives has a significant and positive role in determining the feeling of well-being among both rural and urban citizens and this in turn is found to influence the mental health status of the person concerned.

As observed from the Table 82 among urban respondents age had significant influence on the current dietary pattern ($\alpha^2 = 5.99$), number of meals taken ($\alpha^2 = 5.18$) and place of taking meals ($\alpha^2 = 8.52$). As far as the meal pattern was concerned, age had significant influence on the consumption of roots and tubers ($\alpha^2 = 6.19$), milk ($\alpha^2 = 12.5$) milk products ($\alpha^2 = 4.90$), egg ($\alpha^2 = 10.4$), fish ($\alpha^2 = 5.16$), pulses ($\alpha^2 = 6.66$) and commercial health preparations ($\alpha^2 = 4.30$). There was significant variation between male and female citizens in the habit of dining out ($\alpha^2 = 9.67$) and frequency of dining out ($\alpha^2 = 6.40$).

Table 82. Association between dietary habits and selected socio-economic variables like Age, Sex, Religion, Current employment and freedom to spend the money

		Age α^2	Sex α^2	Religion α^2	Current employment money α^2	Freedom to spend α^2
Current dietary pattern	(U)	5.99*	1.05	0.05	0.08	1.25
	(R)	3.99*	2.32	1.05	0.09	1.22
Number of meals	(U)	2.18	2.90	1.66	2.16	3.16
	(R)	4.92*	0.86	0.35	0.21	1.26
Supplements	(U)	0.44	4.16	2.79	3.12	1.24
	(R)	1.25	2.30	1.61	1.70	1.77
Dining out	(U)	3.66	9.67*	3.21	1.21	2.22
	(R)	1.11	7.34*	0.18	6.32*	1.76
Frequency of dining out	(U)	3.95	6.40*	0.58	5.22*	1.56
	(R)	1.22	10.15*	0.54	1.70	1.20
Allergy	(U)	1.26	0.19	0.53	3.26	1.05
	(R)	0.50	3.25	1.34	0.70	0.89
Cooking the food	(U)	0.20	2.79	0.31	4.25	0.63
	(R)	0.29	3.66	0.77	1.77	5.52
Place of consuming food	(U)	8.52*	3.81	3.22	3.66	0.97
	(R)	0.85	2.83	1.00	3.25	2.61
Frequency of use of different groups						
Cereals	(U)	3.21	5.32	3.89	4.32	3.29
	(R)	4.42	4.93	4.40	2.21	2.12
Pulses	(U)	6.66*	2.54	2.12	4.01	4.34
	(R)	6.01*	3.21	1.05	5.32	3.21
Green leafy-vegetable	(U)	5.38	0.73	3.04	3.44	0.17
	(R)	0.94	4.49	0.06	0.12	0.06
Other vegetable	(U)	0.34	2.50	2.66	1.17	0.15
	(R)	3.89	2.49	3.11	4.89	1.54
Roots & tubers	(U)	6.19*	4.37	3.77	4.06	1.48
	(R)	0.77	1.03	2.50	10.27*	1.02

Table 82 (Contd....)

		Age α^2	Sex α^2	Religion α^2	Current employment money α^2	Freedom to spend α^2
Fruits	(U)	3.25	1.60	2.29	4.56	3.87
	(R)	0.74	1.63	0.29	2.88	3.29
Nuts & oil seeds	(U)	0.36	5.53	3.64	2.65	0.58
	(R)	2.37	0.79	0.28	4.25	1.30
Milk	(U)	12.5*	4.56	3.40	5.63	8.40*
	(R)	4.35*	0.23	2.55	3.62	6.06*
Milk products	(U)	14.90*	1.64	0.38	1.62	4.52
	(R)	0.79	3.60	3.72	5.44	0.91
Fats and oils	(U)	5.51	5.29	0.39	2.31	1.86
	(R)	0.19	0.76	1.75	3.80	1.70
Sugar & Jaggery	(U)	0.83	0.21	3.45	1.26	0.70
	(R)	0.16	0.58	2.02	2.39	0.08
Egg	(U)	10.4*	0.58	2.68	0.85	2.45
	(R)	8.66*	0.26	0.44	3.55	0.38
Meat	(U)	7.34	1.09	1.35	2.51	1.21
	(R)	6.38*	2.49	1.64	2.31	0.29
Fish	(U)	5.16*	3.46	1.06	2.13	3.11
	(R)	2.46	0.42	0.87	3.21	2.37
Tea/Coffee	(U)	0.62	1.50	3.18	2.25	1.16
	(R)	0.21	4.84	3.26	4.55	3.27
Commercial health preparations	(U)	12.30*	3.02	0.42	3.43	15.44*
	(R)	4.06	0.12	1.19	2.44	0.18
Bakery items	(U)	3.60	0.30	2.44	2.25	2.97
	(R)	0.12	0.81	0.48	0.33	3.43

* - Significant at 5% ** - Significant at 1%

Current employment was found to have a significant influence on the number of meals taken out ($\alpha^2 = 5.22$). Freedom to spend money also had significant influence on frequency of use of milk ($\alpha^2 = 8.41$) and commercial preparations ($\alpha^2 = 5.44$).

As far as the rural citizens were concerned age was found to significant influence the current dietary pattern ($\alpha^2 = 3.99$), number of meals ($\alpha^2 = 4.92$) consumed. Age also had significant influence on the consumption of milk ($\alpha^2 = 4.35$), meat ($a^2 = 6.38$) and egg ($\alpha^2 = 4.66$) and pulses ($\alpha^2 = 6.01$). As observed with urban citizens there was also a significant variation between male and female citizens in the habit of dining out ($\alpha^2 = 7.34$) and frequency of dining out ($\alpha^2 = 10.15$). Current employment had significant influence on the consumption of roots and tubers ($\alpha^2 = 10.27$) and habit of dining out ($\alpha^2 = 6.32$). While the freedom to spend money had significant influence on the consumption of milk ($\alpha^2 = 6.06$).

Table 83 depicts the association between dietary habits and selected socio-economic variables like Type of family, family size, family income and family expenditure pattern. Type of family has significant influence on their current dietary pattern ($\alpha^2 = 6.69$) and place of taking their meals ($\alpha^2 = 4.90$) as far as the urban citizens were concerned. Family size was also found to have a significant influence on the person who cooks the food ($\alpha^2 = 11.28$). Total family income was found to have a significant influence on the use of supplements ($\alpha^2 = 9.67$) and frequency of use of cereals ($\alpha^2 = 5.12$), pulses ($\alpha^2 = 6.63$), milk ($\alpha^2 = 8.97$), vegetables ($\alpha^2 = 5.63$) and commercial preparations ($\alpha^2 = 13.77$). Food expenditure has significant influence on the frequency of use of cereals ($\alpha^2 = 6.63$), pulses ($\alpha^2 = 8.53$), vegetables ($\alpha^2 = 6.67$), milk ($\alpha^2 = 6.17$) and fish ($\alpha^2 = 6.68$).

Table 83. Association between dietary habits and socio-economic factors of family such as type of family, family size, total family income and food expenditure.

Dietary characteristics		Type of family α^2	Family size α^2	Total family income α^2	Food expenditure pattern α^2
Current dietary pattern	(U)	6.69*	3.21	1.95	4.11
	(R)	0.01	0.04	0.44	0.25
Number of meals	(U)	2.12	2.16	0.48	1.04
	(R)	2.83	3.22	0.79	5.34
Supplements	(U)	0.85	0.15	9.67*	3.21
	(R)	2.32	3.11	11.93*	4.66
Dining out	(U)	1.38	4.93	0.86	2.15
	(R)	0.45	4.23	4.22*	1.15
Frequency of dining out	(U)	0.33	1.15	0.55	1.36
	(R)	4.32	0.85	8.52*	0.85
Allergy	(U)	1.28	1.64	1.43	0.37
	(R)	0.06	4.31	1.23	0.25
Person who cooks the food	(U)	0.16	11.28*	2.48	3.62
	(R)	0.10	2.81	3.41	3.26
Place of consuming the food	(U)	4.90*	4.04	0.10	2.38
	(R)	1.25	2.25	0.85	0.99
Frequency of use of different groups					
Cereals	(U)	1.43	2.13	5.12*	6.63*
	(R)	0.01	4.12	4.38*	5.12*
Pulses	(U)	3.21	1.83	6.63*	8.53*
	(R)	1.21	3.21	4.32*	2.53
Green leafy vegetables	(U)	2.65	3.37	2.37	1.10
	(R)	1.32	4.81	1.28	0.10
Other vegetables	(U)	3.12	1.69	5.62*	6.67*
	(R)	2.13	0.69	5.20*	3.67

Table 83 (Contd....)

Dietary characteristics		Type of family α^2	Family size α^2	Total family income α^2	Food expenditure pattern α^2
Roots & tubers	(U)	0.53	4.01	3.64	4.52
	(R)	3.40	3.21	1.15	1.32
Fruits	(U)	0.56	2.71	2.35	0.46
	(R)	0.12	1.89	1.55	0.22
Nuts & oil seeds	(U)	0.25	2.53	0.97	2.42
	(R)	1.10	1.83	1.20	3.88
Milk	(U)	4.90	0.28	8.97*	6.17*
	(R)	1.26	1.22	5.53*	3.11
Milk products	(U)	0.11	0.87	0.72	3.21
	(R)	1.05	2.53	0.66	1.21
Fats & oils	(U)	1.41	2.12	3.45	2.99
	(R)	0.21	2.31	1.45	3.99
Sugar & Jaggery	(U)	3.29	4.67	3.28	3.65
	(R)	3.21	1.23	1.27	6.15*
Egg	(U)	4.21	3.51	4.61	3.66
	(R)	1.11	1.11	1.61	2.22
Meat	(U)	0.66	3.72	5.12*	4.65
	(R)	0.35	0.92	1.89	3.69
Fish	(U)	3.68	3.88	2.09	6.68*
	(R)	1.25	4.85	6.09*	6.60*
Tea/Coffee	(U)	3.29	4.66	3.89	2.89
	(R)	1.25	3.12	1.82	3.02
Commercial health preparations	(U)	3.51	3.26	13.77*	1.86
	(R)	1.26	0.06	1.26	0.56
Bakery items	(U)	0.08	1.09	3.75	2.51
	(R)	0.12	1.91	2.77	2.11

* - Significant at 5% ** - Significant at 1%

Among the hundred rural citizens surveyed, the dietary variables such as the habit of dining out and number of meals taken from outside had significant influence on the total family income (α^2 = 9.22) and (α^2 = 8.52) and the income had significant influence on the frequency of use of cereals (α^2 = 4.38), pulses (α^2 = 4.32), vegetable (α^2 = 5.20) milk (α^2 = 5.53), fish (α^2= 6.09) and food expenditure had significant influence on the frequency of use of cereals (α^2 = 5.12) sugar and jaggery (α^2 = 6.15) and fish (α^2 = 6.60).

It was also found that the dietary variables examined had no significant influence on the Triceps skinfold thickness and waist/hip ratio of of both urban and rural senior citizens.

As observed from the Table 84 perception of health by urban citizens had significant influence on the current dietary pattern (α^2 = 8.22), where as among rural citizens perception of health was significantly related to the habit of dining out (α^2 = 6.18) and number of times they dined out (α^2 = 5.33). Dining out (α^2 = 6.19) and frequency of dining out (α^2 = 5.62) had significant influence on the Body Mass Index of urban respondents. But when the rural picture was examined it was noticed that the number of meals consumed per day (α^2 = 7.26) and the habit of dining out (α^2 = 7.54) and frequency of dining out (α^2 = 6.85) had a significant bearing on the Body Mass Index. The place of consuming the food by urban citizens (α^2 = 5.85) was found to be significantly influenced by their perception of health.

Table 84. Association between dietary variables and selected Anthropometric characters such as Waist-hip ratio, Triceps Skin fold, Body Mass Index and Perception of health

Dietary Characteristics		BMI α^2	Waist hip Ratio α^2	Triceps α^2	Perception of health α^2
Current dietary pattern	(U)	1.82	0.65	2.88	8.22*
	(R)	1.99	0.22	3.55	0.21
Number of meals	(U)	0.28	0.33	1.16	0.53
	(R)	7.26*	0.23	0.12	0.63
Supplements	(U)	1.97	1.33	2.15	13.69*
	(R)	0.18	0.36	0.12	6.24*
Dining out	(U)	6.19*	1.55	0.04	1.57
	(R)	7.54*	2.47	1.24	6.18*
Frequency of dining out	(U)	5.62*	4.20	1.34	1.04
	(R)	6.85*	4.04	2.25	5.33*
Allergy	(U)	2.28	0.27	0.22	3.50
	(R)	3.20	0.47	0.15	0.40
Cooking the food	(U)	0.93	0.28	3.28	1.68
	(R)	0.91	1.50	0.44	0.47
Place of consuming the food	(U)	3.98	2.18	0.91	5.85*
	(R)	2.82	1.73	4.74	0.14
Frequency of use of different groups					
Cereals	(U)	1.85	3.26	0.28	1.88
	(R)	1.22	1.11	0.17	0.26
Pulses	(U)	0.13	1.81	1.12	0.06
	(R)	0.06	2.21	0.87	0.12
Green leafy vegetables	(U)	0.88	1.16	4.97	3.05
	(R)	0.49	1.89	1.55	4.91
Other vegetables	(U)	2.41	0.50	2.42	0.52
	(R)	0.92	1.54	1.38	3.18

Table 84 (Contd...)

Dietary Characteristics		BMI α^2	Waist hip Ratio α^2	Triceps α^2	Perception of health α^2
Roots & Tubers	(U)	0.24	0.14	3.77	1.72
	(R)	0.31	3.51	6.63	0.18
Fruits	(U)	0.95	2.73	2.16	11.9*
	(R)	0.22	0.43	0.94	4.85
Nuts &oil seeds	(U)	0.91	1.53	0.21	0.45
	(R)	0.38	0.80	1.58	0.63
Milk	(U)	0.23	1.39	4.41	9.18*
	(R)	0.57	0.48	0.60	4.39*
Milk products	(U)	2.59	3.59	2.16	1.78
	(R)	1.96	1.83	2.08	3.26
Fats & oils	(U)	0.36	3.88	0.71	0.25
	(R)	1.43	1.54	2.10	2.30
Sugar & Jaggery	(U)	0.12	0.17	1.26	0.57
	(R)	1.58	3.58	3.95	2.90
Egg	(U)	0.28	0.85	0.01	7.36*
	(R)	0.98	1.62	1.73	1.36
Meat	(U)	0.84	2.61	4.14	3.61
	(R)	0.51	2.04	0.77	0.14
Fish	(U)	3.16	1.38	2.11	2.81
	(R)	1.12	3.21	3.12	4.11
Tea/Coffee	(U)	0.35	0.96	1.84	0.36
	(R)	2.60	1.24	3.26	2.33
Commercial health preparations	(U)	1.54	0.50	0.29	16.04*
	(R)	0.28	0.17	4.43	5.25*
Bakery items	(U)	0.55	0.40	0.14	3.48
	(R)	1.38	0.48	1.42	4.30

*- Significant at 5 % **- Significant at 1 %

Regarding the consumption pattern of urban and rural citizens, it was found that consumption of milk ($\alpha^2 = 9.18$), egg ($\alpha^2 = 7.36$), Supplements ($\alpha^2 = 13.66$), fruits ($\alpha^2 = 11.9$) and commercial health preparations ($\alpha^2 = 16.04$) had significant influence on the perception of health status of urban respondents, and the consumption of roots and tubers especially tapioca had significant influence on the triceps ($\alpha^2 = 6.63$) of rural respondents. Less consumption of milk ($\alpha^2 = 4.39$), Commercial health preparations ($\alpha^2 = 5.25$), Supplements ($\alpha^2 = 6.24$) directly affected the health status of rural respondents.

Influence of dietary habits on Physiological characters were studied for urban and rural citizens separately. It was observed from the table 106 that the variable such as use of supplements ($\alpha^2 = 6.17$), habit of dining out ($\alpha^2 = 4.47$) had significant influence on the physical activities of daily living of urban citizens. While among rural citizens the number of meals taken is found to have significant influence on Instrumental activities of daily living ($\alpha^2 = 9.33$). The use of supplements ($\alpha^2 = 6.11$) among urban citizens was found to have a significant influence on the reduced prevalence of deficiency diseases. The number of meals taken out by rural citizens was found to have significant influence on the absence of deficiency diseases ($\alpha^2 = 9.33$).

As observed from the Table 85 habit of eating out ($\alpha^2 = 6.49$) and its frequency ($\alpha^2 = 4.17$) had significant influence on the incidence of ill health among urban and rural ($\alpha^2 = 9.16$ and 6.05) citizens respectively. The less use of supplements had significant impact on the presence of more symptoms of ill-health among rural respondents ($\alpha^2 = 12.94$) when compared to urban citizens. The consumption of cereals ($\alpha^2 = 7.04$ and $a^2 = 6.82$) had significant influence on the PADL of urban and rural citizens. Milk ($\alpha^2 = 6.32$) were found to have significant influence on the PADL of urban citizens. Less consumption of pulses ($\alpha^2 = 6.00$), fruits ($\alpha^2 = 6.42$), milk ($\alpha^2 = 5.37$) meat ($\alpha^2 = 4.26$), commercial health preparations ($\alpha^2 = 4.84$) and supplements ($\alpha^2 = 4.34$) have a significant influence on the presence of deficiency diseases among rural elderly.

Table 85. Association between dietary habits and physiological characters such as IADL, PADL, deficiency manifestations, Domain and symptoms of ill health

Dietary Characteristics		IADL α^2	PADL α^2	Deficiency manifestation α^2	Domain α^2	Symptoms of ill-health α^2
Current dietary pattern	(U)	0.09	3.15	2.16	2.99	1.82
	(R)	0.17	0.10	1.54	0.93	0.12
Number of meals	(U)	0.10	1.33	3.02	1.23	1.60
	(R)	9.33*	1.14	0.29	0.94	2.91
Use of supplements	(U)	0.30	6.17*	6.11*	2.03	3.62
	(R)	1.57	1.10	4.34*	1.33	12.94*
Dining out	(U)	0.79	4.47*	0.86	0.61	6.49*
	(R)	0.51	2.95	1.70	3.59	9.16*
Frequency dining out	(U)	0.40	2.69	2.17	0.97	4.17*
	(R)	2.33	0.23	9.33*	0.12	6.05*
Allergy	(U)	0.27	0.17	0.12	0.42	0.19
	(R)	1.21	0.18	1.14	0.85	1.59
Person cooking the food	(U)	3.29	0.87	2.89	2.00	5.40
	(R)	1.35	2.07	3.25	3.82	0.99
Place of consuming the food	(U)	2.93	1.90	0.28	3.34	3.95
	(R)	2.16	1.65	2.55	3.24	2.78
Frequency of use of different food groups						
Cereals	(U)	5.56	7.04*	3.18	4.18	3.24
	(R)	3.21	6.82*	2.08	2.13	1.79
Pulses	(U)	3.64	2.36	4.13	2.07	6.00
	(R)	0.18	1.52	2.72	3.13	5.00
Green leafy vegetables	(U)	0.29	2.38	3.64	3.30	2.21
	(R)	3.29	1.42	2.64	2.93	1.90
Other vegetables	(U)	0.38	2.88	2.07	1.02	1.01
	(R)	2.49	4.32	1.27	1.96	3.21

Table 85 (Contd...)

Dietary Characteristics		IADL α^2	PADL α^2	Deficiency manifestation α^2	Domain α^2	Symptoms of ill-health α^2
Roots & tubers	(U)	1.04	3.18	2.18	3.51	2.67
	(R)	2.16	3.89	1.71	1.13	0.85
Fruits	(U)	3.12	8.98*	4.84	3.88	3.78
	(R)	0.28	1.03	6.42*	0.36	0.24
Nuts & oil seeds	(U)	1.14	2.40	0.29	5.89	2.59
	(R)	0.12	0.27	0.27	3.20	1.86
Milk	(U)	2.34	6.32*	1.67	0.95	4.93
	(R)	3.02	0.37	5.37*	0.33	4.47
Milk products	(U)	0.82	1.69	0.55	1.69	1.92
	(R)	0.76	2.13	4.33	0.94	3.29
Fats & Oils	(U)	1.84	0.69	1.84	2.89	0.36
	(R)	2.10	3.90	1.90	2.74	0.22
Sugar & Jaggery	(U)	1.03	0.24	0.27	2.28	0.64
	(R)	0.01	0.32	0.01	3.25	0.03
Egg	(U)	1.57	4.78	3.21	0.47	3.29
	(R)	4.19	4.15	3.26	1.37	0.40
Meat	(U)	1.96	1.94	3.60	2.28	1.26
	(R)	1.47	1.79	4.26*	1.34	3.90
Fish	(U)	3.51	3.06	3.68	0.28	3.85
	(R)	0.32	3.10	1.74	0.10	0.27
Tea/Coffee	(U)	1.54	1.51	0.19	1.15	2.05
	(R)	3.29	2.89	3.84	2.70	3.63
Commercial health preparations	(U)	1.26	4.26	0.19	1.15	2.05
	(R)	2.61	3.08	4.84*	2.70	1.89
Bakery items	(U)	3.74	0.78	0.15	0.48	0.71
	(R)	2.96	0.58	3.57	2.65	2.20

* - Significant at 5% ** - Significant at 1 %

Table 86. Association between selected dietary variables and Physical, Psychological, Social, and Environmental characters

		Domain 1 Physical α^2	Domain 2 Psychological α^2	Domain 3 Social α^2	Domain 4 Environment α^2
Current dietary pattern	(U)	3.28	3.35	4.28	5.95
	(R)	2.11	0.47	5.88	2.87
Number of meals	(U)	0.18	2.02	2.25	0.13
	(R)	0.12	0.65	2.78	1.86
Supplements	(U)	1.11	3.08	0.29	1.94
	(R)	4.93	2.65	1.33	7.89
Dining out	(U)	1.27	4.94*	3.36	0.86
	(R)	6.68	0.97	2.06	0.65
Frequency of dining out	(U)	1.18	3.03	2.00	4.36
	(R)	2.35	0.74	3.29	2.78
Allergy	(U)	0.69	9.53*	0.01	1.04
	(R)	0.45	5.50*	0.59	0.59
Cooking the food	(U)	3.02	4.25	0.97	2.91
	(R)	2.38	3.63	0.73	5.77
Place of consuming the food	(U)	0.80	2.53	0.32	4.92
	(R)	0.09	0.87	6.79	0.85
Frequency of use of different groups					
Cereals	(U)	3.32	2.63	1.04	2.12
	(R)	3.12	1.66	1.04	3.45
Pulses	(U)	1.12	2.25	3.15	2.15
	(R)	0.91	1.65	1.37	1.04
Green leafy vegetables	(U)	0.98	1.98	3.00	3.87
	(R)	3.68	4.13	2.42	0.63
Other vegetables	(U)	1.90	1.16	1.02	1.04
	(R)	0.70	3.49	2.83	0.77

Table 86 (Contd...)

		Domain 1 Physical α^2	Domain 2 Psychological α^2	Domain 3 Social α^2	Domain 4 Environment α^2
Roots & Tubers	(U)	0.82	0.18	2.42	0.98
	(R)	6.51*	0.18	0.73	0.18
Fruits	(U)	0.24	0.22	1.20	1.60
	(R)	2.82	0.59	4.80	2.07
Nuts &oil seeds	(U)	1.81	0.17	1.47	0.77
	(R)	0.52	0.34	1.34	1.28
Milk	(U)	6.46*	0.19	0.56	3.48
	(R)	2.97	0.12	2.21	2.06
Milk products	(U)	1.54	0.97	3.676	6.95
	(R)	0.21	0.72	1.86	3.97
Fats & oils	(U)	2.12	3.99	2.52	1.46
	(R)	3.47	0.48	3.52	0.05
Sugar & Jaggery	(U)	0.33	3.69	2.20	3.10
	(R)	1.18	4.57	1.46	0.22
Egg	(U)	1.97	0.27	2.30	0.28
	(R)	2.27	1.45	2.27	0.98
Meat	(U)	4.32	2.49	3.16	0.39
	(R)	1.35	0.13	0.32	0.15
Fish	(U)	6.73*	0.12	0.11	0.89
	(R)	7.13*	1.20	3.26	2.29
Tea/Coffee	(U)	1.61	1.83	3.69	0.14
	(R)	3.62	2.83	2.19	1.47
Commercial health preparations	(U)	6.67*	0.81	4.45	0.99
	(R)	0.58	1.48	2.03	2.03
Bakery items	(U)	0.33	1.33	1.05	2.05
	(R)	1.87	2.71	0.59	0.97

* - Significant at 5 % ** - Significant at 1 %

As observed from the Table 86 in the case of urban citizens the dietary variables such as habit of dining out ($\alpha^2 = 4.94$) and presence of allergy towards food had a ($\alpha^2 = 9.53$) significant impact on the psychological status of urban respondents. When the rural data were analysed allergy towards food ($\alpha^2 = 5.50$) had a significant bearing on the psychological status of the respondents.

Regarding the influence of dietary variables on social relationships, the result obtained from urban dwellers highlights the fact that social relationships does not have significant influence on the dietary variables studied, but in the case of rural respondents social relationships had significant influence on the current dietary pattern ($\alpha^2 = 5.88$) and number of meals consumed ($\alpha^2 = 7.78$).

The data as observed from the Table 86 further reveals the fact that the environment in which they are living had significant influence on the current dietary pattern ($\alpha^2 = 5.95$).

Regarding the consumption of foods it was found that consumption of milk ($\alpha^2 = 6.46$), fish ($\alpha^2 = 6.73$) and commercial health preparations ($\alpha^2 = 6.67$) had significantly influenced the physical characteristics (Domain – 1) of urban respondents and consumption of roots and tubers ($\alpha^2 = 6.51$) and fish ($\alpha^2 = 7.13$) had significant influence on the physical characteristics of rural respondents.

As observed from the Table 87 in the case of urban and rural citizens, the frequency of taking alcohol was found to have profound influence on the number of meals consumed ($\alpha^2 = 5.99$). The data for rural area also revealed that the habit of dining out ($\alpha^2 = 14.54$) had significant influence on the frequency of consumption of alcohol.

Table 87. Association between dietary variables and personal habits like frequency of taking exercise, frequency of taking alcohol, quantity of alcohol, smoking and tobacco use

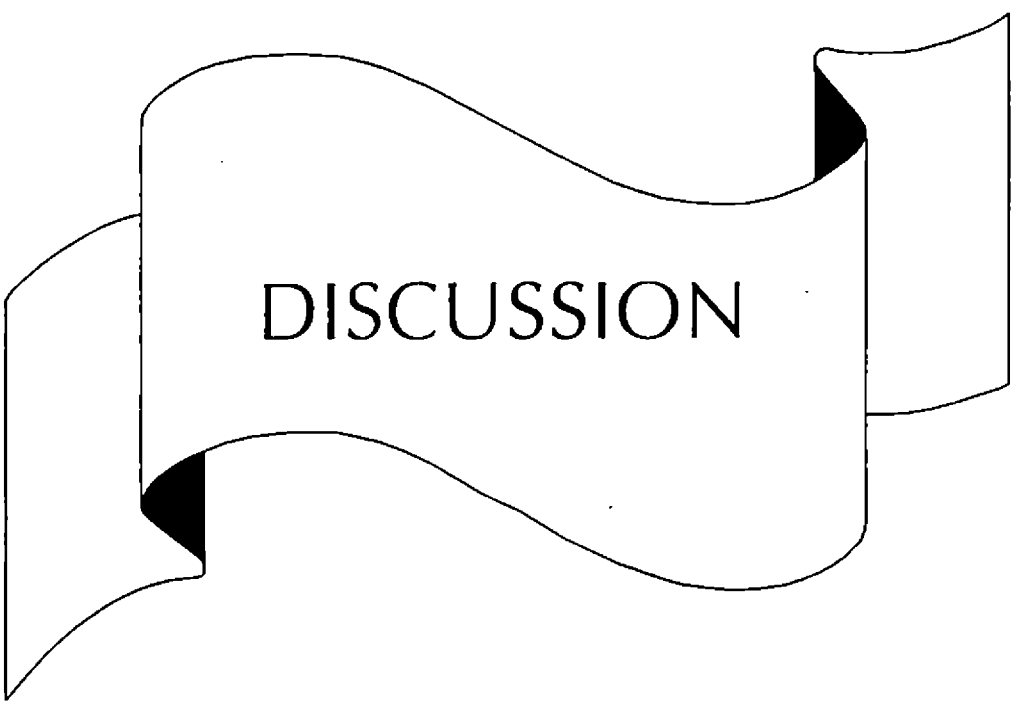
Dietary variables		Exercise α^2	Frequency of taking alcohol α^2	Smoking α^2	Tobacco α^2
Current dietary pattern	(U)	2.25	1.65	2.27	0.67
	(R)	0.27	0.50	2.10	0.01
Number of meals	(U)	4.95	5.99*	2.82	2.12
	(R)	5.84	6.63*	0.61	3.99
Supplements	(U)	3.59	3.40	4.57	1.87
	(R)	0.11	3.65	0.91	2.88
Dining out	(U)	0.69	0.84	2.93	1.67
	(R)	2.03	14.54*	0.10	2.49
Frequency of dining out	(U)	0.16	2.54	2.74	0.09
	(R)	5.12	4.54	0.47	2.25
Allergy	(U)	2.74	0.52	0.19	0.31
	(R)	0.11	3.13	5.19	0.31
Cooking the food	(U)	9.84	0.11	0.71	1.03
	(R)	0.32	0.41	0.45	0.38
Place of consuming the food	(U)	1.97	6.03	0.26	0.41
	(R)	0.45	1.34	1.72	2.53
Frequency of use of different groups					
Cereals	(U)	3.21	4.01	2.11	0.12
	(R)	1.22	4.31	2.07	3.08
Pulses	(U)	3.91	2.13	3.12	3.21
	(R)	2.01	4.81	2.09	4.05
Green leafy vegetables	(U)	0.57	0.05	2.47	3.65
	(R)	2.69	0.78	2.31	1.33
Other vegetables	(U)	0.47	0.14	0.25	4.25
	(R)	2.88	0.91	1.14	2.84

Table 87 (Contd...)

Dietary variables		Exercise α^2	Frequency of taking alcohol α^2	Smoking α^2	Tobacco α^2
Roots & Tubers	(U)	3.35	4.01	0.41	1.53
	(R)	3.47	1.54	0.45	0.14
Fruits	(U)	1.38	0.90	2.35	0.69
	(R)	1.74	1.80	0.12	2.17
Nuts &oil seeds	(U)	3.61	2.13	0.35	0.10
	(R)	0.10	0.14	2.72	1.50
Milk	(U)	3.11	2.01	0.12	0.12
	(R)	1.68	3.74	0.94	0.23
Milk products	(U)	2.74	3.68	0.11	1.84
	(R)	0.10	3.01	1.19	4.56
Fats & oils	(U)	3.01	1.98	0.33	1.53
	(R)	2.27	0.19	0.50	0.76
Sugar & Jaggery	(U)	0.46	0.57	0.43	2.93
	(R)	1.41	0.20	0.12	3.97
Egg	(U)	2.98	3.13	0.23	0.14
	(R)	0.16	1.75	2.62	4.43
Meat	(U)	1.83	0.13	3.30	0.11
	(R)	0.22	0.20	0.38	0.10
Fish	(U)	9.71	2.13	0.98	0.04
	(R)	0.11	3.13	3.13	6.21
Tea/Coffee	(U)	0.71	2.24	0.16	3.86
	(R)	2.22	3.13	1.46	4.86
Commercial health preparations	(U)	3.91	1.21	0.82	0.79
	(R)	0.50	0.54	4.72	0.40
Bakery items	(U)	2.11	4.99	3.22	1.22
	(R)	1.68	3.74	0.94	0.60

* - Significant at 5%

It was noticed that the personal habits of the rural and urban respondents had no influence on the consumption of different foods and also on the dietary variables studied.


DISCUSSION

5. DISCUSSION

Basically, ideal nutrition requirements of an elderly person in good health differs little from those of younger individuals, while Lazarys *et al.* (1995) opined that older subjects may be more established in their dietary habits than younger subjects. Knowledge of dietary practices is a prerequisite for research on the resultant nutrient patterns of any society. Such information is vital for correcting detrimental food patterns, developing intervention plans and for the generation of new research questions as opined by Ghadirian *et al.* (1995). Food habits constitute one of the most obvious distinguishing features between populations and are influenced by, the cultural behaviours expressed by a society as reported by Masse and Vanier (1991).

Since the study aims to analyse the dietary habits of senior citizens as influenced by socio-economic, physical, psychological/mental, functional, personal habits, and their own perception about health, the current dietary pattern of the rural and urban elderly along with the modifications they have made in their diet from their earlier days and due to aging were enumerated and the information gathered is discussed in detail in this chapter.

In nearly 60-65 years of one's life, habits specially those pertaining to diet usually get moulded by factors like heredity, health, family, education, occupation and numerous other social, economic and cultural factors. The elderly are set in their ways and it is difficult to totally modify their pattern of eating at this stage.

Diet is seen as a key environmental and modifiable factor contributing to the development of many chronic and acute (eg. infections) disabling diseases.

Rosenberg (1994) is of the opinion that as long as elderly people stay healthy and do not have serious risk factors, they seem to keep good food habits and nutritional status up into their eighties and nineties.

While examining the current dietary pattern of elderly, it was found that majority of urban (95 %) and rural respondents (65 %) were non-vegetarians. A study done by Natarajan (1999) among elderly citizens from Madras also found that majority of the elderly (76.4 %) were non-vegetarians and 82.9 per cent of the elderly had three meals a day. While analyzing the meal pattern of the elderly it was found that majority of urban (85 %) and rural respondents (86 %) had meals three times a day.

In spite of their regular pattern 25 per cent of urban and 15 per cent of rural respondents had lack of appetite frequently or occasionally, which was said to affect their diet pattern. It was noted that lack of appetite was prevalent more among female citizens than males. Payette and Donald (1994) after studying the dietary pattern of 290 elderly from Canada, had also reported that more than 90 per cent of participants reported regular consumption of three meals per day. The author had further stated that a larger proportion of the population in spite of their regular pattern reported that they had a poor appetite and men more often than women reported this problem. The observation made in the present study seems to deviate from the findings presented by Payette and Donald (1994) as far the appetite is concerned.

In the present study the number of respondents consuming two meals per day were only eight and three per cent of urban and rural citizens respectively. Contradictory to the above finding a study done by Jayashree *et al.* (1996) among 50 aged men and women in Aurangabad showed that meals were taken only twice a day by 50 per cent of the subjects. It was also interesting to note in the present study that those who had two meals a day, resorted to it in order to reduce body weight or due to lack of appetite, and also because of loneliness.

Few respondents had also resorted to eating four and five times due to increased appetite or may also be due to the problem of dementia which was found among 2 per cent of rural citizens. Cohen (1993) has stated that occasionally patients with dementia over eat. Yen (1989) had stated that the nutritional consequence of depression is associated with erratic eating pattern, with some people eating very little and others eating more than usual.

It was found that 74 per cent of urban citizens and 35 per cent of rural citizens have changed the dietary pattern followed by them from childhood, through adulthood. The urban citizens were found to be more health conscious than rural citizens. It was astonishing to find that few have made alteration in the diet just due to the feeling that they are "getting old" and they followed a particular dietary pattern suited to their general health. They have made the changes in the dietary pattern mainly due to disease, psychological and physical problems. Majority of urban and rural citizens were following this dietary pattern for a period of more than 10 years.

'Snacking' habit was found to be low among elderly citizens surveyed. Consuming foods in between major meals was observed among 35 per cent of urban and 23 per cent of rural citizens. Foods taken by them were health drinks, fruits porridge, poached egg and less frequently bakery items. It is commonly stated that "snack" foods provide empty calories and insignificant quantities of other nutrients. But the data presented in the present study suggested that foods which contribute to the pattern of "snacking" or foods which were eaten by the elderly in between the meals contribute significantly to the nutrient quality of the diet. Lee *et al.* (1996) is of the opinion that it is the meal skippers who snacked more frequently and their nutrient intakes were significantly lower than those of three meal eaters. Perhaps in the present study also meal skipping pattern was found among subjects living alone (4.5 per cent) and it was also found that they snacked more frequently when compared to other subjects. Contradictory to the observations

made in the present study Payette and Donald (1994) in her study among Canadian elderly reported that 54 per cent usually consumed snacks during the day.

It was found that 78 per cent of the urban citizens had the habit of taking supplements. Betts and Rezek (1989) opined that urban elderly persons are more susceptible to advertisements and Doctor's advice, implying that supplements are needed to prevent health problems and other nutrient deficiency diseases. Ortega *et al.* (1994) reported that old age is a vulnerable stage from the nutritional point of view as, the nutritional deficiencies are frequent and their consequences are serious; while Payette and Donald (1994) had reported that only few subjects (23 %) were regular users of vitamin or mineral supplements in her study among Canadian elderly. The urban data does not support the above finding.

Lack of awareness, less exposure and low income may be the reason for lesser use of health supplements by rural citizens.

Chronically ill elderly, who have lower dietary and an increased need for specific nutrients, as suggested by their increased lean body mass loss, nutritional supplementation is encouraged, as suggested by the positive effects of complete oral supplementation or mineral and vitamin supplements on the immune function as suggested by Lesourd *et al.* (1990) though this practice is not followed in rural areas of Kerala .In general healthy older individuals should be encouraged to eat diets with a high nutrient density, instead of consuming supplements.

Habit of dining out was found among 15 per cent of urban and 30 per cent of rural citizens; among them 22 citizens dined out daily by eating food from fast food centers or hotels. Their meals are likely to contain more fat and energy than meals prepared at home and poor hygiene observed while cooking food in hotels can be a risk factor that

may affect their health. The elderly citizens must be encouraged to eat food from their homes. So the family members should take in to consideration the food preferences of older members while planning the daily menu.

Since majority of urban (94 %) and rural (97 %) respondents were residing with their family members, there do not arise the problem of cooking the food except for those living alone, especially the male citizens, who have insufficient cooking skills. But "self-cooking" of food was practiced by 20 per cent of urban and 23 per cent of rural citizens. They are of the opinion that as the result of self-cooking they can cook the food according to their preference, likes and taste.

It was interesting to note that most of urban and rural citizens prefer to eat food along with their children. They felt that it is the time when the family members get together.

Specific time schedule for taking meals was observed among 43 per cent of urban and 12 per cent of rural citizens, while others took food according to their convenience. Some citizens (16 %) reported that if they do not take meals at specific time, they experienced shivering of hands, and weakness.

It was found that 62 per cent of urban and 42 of rural respondents selected their own food. Limited income among rural respondents is one factor that affects their food selection.

The information regarding the food habit with respect to the frequency of use of various foods, were analysed. It was found that rice was used daily by both of urban and rural citizens. Rice being the staple food in Kerala, formed the bulk of the diet of both urban and rural dwellers. Wheat was also used by both urban and rural dwellers. The diabetic patients preferred to consume wheat based diets.

The habit of inclusion of pulses on a daily basis was observed only among 10 per cent of both urban and rural respondents. However, when 83 per cent of urban respondents consumed pulses once in a week, only 25 per cent of rural citizens consumed it even once in a week indicating that pulse consumption was generally low among rural citizens. It was further observed that the pulses were avoided or consumed rarely because it was believed to cause flatulence. The financial constraints faced by the respondents as well as the high cost of pulses are found to be the reasons for lower level of pulse consumption among rural respondents.

Regarding the consumption of green leafy vegetables poor consumption of green leafy vegetables was found among urban citizens when compared to rural citizens. Increased consumption of green leafy vegetables in rural area may be due to the fact that they are cheap and are easily and locally available. Similar observation was also noted in a study conducted by Natarajan (1999) who has also reported a higher consumption of green leafy vegetables among rural subjects than those from urban area. Vegetables had a place in the diet of majority of urban citizens. However, the consumption of other vegetables was found to be inadequate among rural elderly, since majority of rural citizens (66 %) were consuming them only just once in a week. Consumption of pulses and vegetables was reported to be occasional in rural households of Uttar Pradesh, also (Anonymous 1987).

Regarding the consumption of fruits 10 per cent consumed it daily and 23 per cent on a weekly basis and 32 per cent occasionally among urban citizens. But among rural citizens more than half of the subjects (58 %) consumed it only occasionally. The current study also revealed that fruits were avoided by the urban citizens due to infirmity and poor masticating ability. Diabetic subjects reported that they purposely avoided fruits so as to reduce their blood sugar level. But rural elderly reported that they could not eat fruits regularly due to financial constraints, as well as poor availability, and problems

related to mastication. In this context it may also be noted that edentulous and partially edentulous citizens were more in the rural area. The incidence of morbidity was also higher among rural citizens. Therefore less frequent use of fruits by the rural subjects could be primarily attributed to disease and also to financial constraints and absence of teeth. NNMB (1994) has reported that the consumption of fruits was much below RDA, among the rural population of Thiruvananthapuram.

Ortega *et al.* (1994) from their study conducted among Spanish elderly people reported that consumption of fruit is less than that recommended. Our observations were similar to those mentioned above. Contradictory to the above observation, Katherine *et al.* (1995), in her study among senior elderly reported a higher intake of fruits among those over 65 years when compared to those under age 65 years. This observation was also supported by the observation of Schlienger *et al.* (1995).

Milk as a beverage was consumed by 65 per cent of urban and 29 per cent of rural citizens on daily basis. Milk as a beverage was used by those respondents who hailed from middle and high income families. Consumption of milk products was less among urban (25 per cent) and rural respondents (22 per cent). Milk, the so called complete food was found to be neglected mainly due to financial constraints. Natarajan (1999) had stated that milk was considered as an essential item of food by majority of the elderly subjects surveyed by him. This observation is in line with the results of urban elderly who considered milk as essential part of their diet. But rural data does not support the above finding.

Fats and oils were found to be mainly used only for seasoning virtually by 50 per cent of urban and 99 per cent of rural citizens. On personal discussion, it was clarified that the urban respondents avoided it, due to disease condition, as they felt that fat would enhance cholesterol which may act as a risk factor for cardiovascular diseases.

The lowered use of oil also could be attributed to variations in culinary practices, type of foods that are cooked and the cultural practices and food habits prevailing in the area.

Sugar was used on daily basis as an ingredient of tea by 68 per cent of urban and 92 of rural citizens. Sugar was avoided mainly by urban and rural citizens due to health problems such as diabetes.

Regarding the consumption of fleshy foods, it was found that 58 per cent of urban citizens avoided egg and others took egg on a weekly basis, while it was found that 61 per cent of rural citizens took egg only occasionally. Among the 58 per cent of urban citizens who avoided egg, 20 per cent were complete vegetarians and another 10 per cent were lacto-vegetarians.

From a study conducted by Lew Ting(1997) regarding egg phobia in four retirement homes among Chinese elderly in Los Angeles and Taipei, it was revealed that practices of egg-restriction was prevalent in all the four homes.

The urban respondents had avoided egg mainly because of its cholestrolemic nature since it has become a commonly discussed issue in the daily lives of elderly. Awareness about cholesterol as a risk factor in the development of cardio-vascular diseases, has been increased recently and mass media, family members and health professionals are observed to play important roles in constructing egg-consumption behaviour among elderly. Health related misconcepts had also paved way in the development of dislike towards egg. The rural respondents took egg only occasionally due to financial constraints and illness.

While fish was consumed daily by 60 per cent of urban and 95 per cent of rural citizens, meat was avoided by 60 per cent of urban and 80 per cent of rural citizens, and the remaining consumed it occasionally.

Preference for fish rather than meat could be attributed to easy availability, and cheapness when compared to meat. Apart from milk and pulses, the major protein source of Keralites seems to be fish. Consuming large amounts of fish is a habit of Keralites. Being an integral part of their tradition and culture, the preference for eating fish, rather than meat and egg continues even into the old age. The high consumption of fish is seen both among urban and rural citizens. This could be attributed to the protective effect of small amount of fish in relation to coronary heart disease as reported by Kromhart *et al.* (1995). A study done by Krogh *et al.* (1993) among 945 elderly Italians reported that there was a preponderance of vegetables rather than animal foods by the elderly. NNMB reports of 1994 also is in tune with the above findings. They have reported that the intake of fleshy food was high in Thiruvananthapuram (113g) and it constituted mostly of fish. High fish intake was noted even among the city dwellers of Thiruvananthapuram as per NNMB (1996) reports.

Mc Intosh *et al.* (1995) after conducting a dietary survey among 424 elderly Houstonians, opined that, social network, health status, food attitude, physician induced changes, mass media are the source of influence for red meat reduction among elderly. In the present study also reduction in the use of meat was found both among urban and rural citizens. Meat reduction in the present study was found to be related to the dental status, financial constraints as well as advice by the physician.

Tea was consumed by 91 per cent of urban respondents, and all of rural respondents and some respondents reported consumption of tea, mainly (Black tea/coffee) 4-5 times a day, as they say that it is a good refreshing agent.

Commercial health drinks and preparations were used by 54 per cent of urban respondents. Only a minor percentage (17 %) from the rural area consumed them on

daily basis. Lack of awareness, ignorance and financial constraints were found to be the reasons for poor consumption of such commercial preparations.

Bakery items do not find an important place in the diet of elderly. Such items were taken occasionally, due to problems of ill-health and some have developed a dislike towards it, due to changes in preferences induced by aging.

In conclusion it could be said that, consumption of pulses, milk, fish, vegetables was found to be higher among urban citizens, while the diet of rural elderly was inadequate in protective foods like pulses, milk, fruits and vegetables. This reduced consumption can manifest in dietary inadequacy. Main reason for avoiding or minimizing the use of milk, pulses and fruits were found to be financial constraints, disease, ignorance and lack of knowledge about nutritions and balanced diet.

Examination of the meal pattern of urban and rural citizens, recorded using three consecutive days dietary recall method, it was found that the general meals were cereal based. Among the urban and rural respondents surveyed, 80 per cent of urban and 73 per cent of rural subjects preferred cereal preparations along with Blacktea/ coffee in the morning for Breakfast. Similar observations were quoted in a study done by Andres *et al.* (1994) where the diet of the selected elderly was cereal based and items like rice, ragi porridge, idli, dosai, wheat uppama and chapathi were eaten for breakfast. Black tea/coffee was consumed more by rural elderly. The main reason for avoiding the use of milk, was the low income earned by the families, and some do not prefer to use milk in tea. Majority of urban citizens (91 %) consumed tea.

For lunch, it was observed that 52 per cent of urban citizens used a combination of cereals, vegetables, dhal and fish. Similar meal pattern was reported by Srinivasan *et al.* (1991) among urban elderly in Madras, where the lunch, consisted of rice with dhal

curry, vegetables, rasam and curd or buttermilk. When the rural picture was examined, the use of tapioca and fish were high. The present study is also in line with reports of Lina and Reddy (1984) who endorsed that a typical Kerala dietary pattern would be based on rice, fish, tapioca and coconut. In the present study 47 per cent of rural citizens were following a diet pattern based on rice, tapioca, fish and coconut. This combination is preferred due to low cost of these food items and their locally availability.

For dinner it was found that 41 per cent of urban respondents preferred breakfast items similar observations were noted by Savithri (1993) that dinner items includes those mentioned as breakfast items. But the menu for lunch and dinner were same for 61 per cent rural respondents.

Srinivasan *et al.* (1991) analysed the nutritional status of rural families in Tamil Nadu and reported that their diet consisted of cereals (rice) and some vegetables. Fleshy foods such as meat, fish were consumed rarely. But in a study conducted by Yoshida and Wakayashi (1987) on dietary behaviour of Japanese elderly it was found that more senior citizens were found to eat rice at 3 daily meals along with fatty fish. However the diet consumed by the subjects of the present study though not fully balanced is one which has rice, vegetables and fish.

Kazutomo Imahori (1992) has reported that Japan has gained its position as the nation with the highest longevity in the world in part because of the current eating habits of the Japanese people: an excellently balanced ratio of animal to vegetable protein, retaining rice as the main dish and keeping the highest fish intake in the world.

Since majority of urban and rural citizens are living with their family members, their meal pattern to some extent was similar to that of their family members. However both the urban and rural citizens have made changes in their dietary pattern followed by

them form childhood through adulthood due to diseases, psychological, physical, socio-economic problems and religious practices.

Given the potentially long lead time the promotional phase of damage from the degenerative disease processes may be favourably or unfavourably modified by diet as reported by Guigoz (1985). Scientific investigation of the relationship between diet and several of the commonly occurring chronic diseases has provided evidence to the fact that diet can play a role in the development of these diseases Fujita (1992). Nutrient and non-nutrient constituents of the diet (fibre, cholesterol, sugar, salt) consumed within certain ranges are implicated in promotion or inhibition of degenerative processes and chronic diseases.

Guigoz (1985) had reported that chronic degenerative diseases, such as atherosclerosis appear to be influenced by nutrition. Payette *et al.* (1991) reported that many elderly Americans have modified their dietary patterns due to chronic or degenerative diseases. The observations of the present study is consistent with the above finding. Further Fujita (1992) had reported that accelerated westernizing of dietary and eating habits has increased incidence of some degenerative disease such as cardio-vascular disorders among Japanese elderly. This could be true in the case of elderly subjects of urban origin in the present study.

Those citizens with degenerative chronic diseases have modified their dietary pattern to suit their health conditions as diet is seen as a key environmental and modifiable factor contributing to the development of many chronic (eg. cancer, Cardiovascular disease) and acute (eg. infections) disease. Johnson and Kligman (1992) had reported disease prevention through dietary management as a cost effective approach to promoting healthy aging. Majority of urban citizens (64 %) had made changes in their dietary pattern due to disease while majority of rural citizens (60 %) had made changes in their diet due

to socio-economic problems. Due to psychological problems 6 per cent of urban and 8 per cent of rural citizens have modified their diet.

In the present study it was noticed that some of the elderly have made changes in their dietary pattern as the result of physical problems. The main physical problem that had hindered food choice and preference was their dental status. Stieglitz (1949) reported that number of teeth decreases with age while Fronton (1989) reported that poor dental health resulted in limited diet composed of soft foods which lack texture and variety. English (1989) had reported that false teeth had significantly limited the food choice and inclination to consume foods that require chewing.

In the present study in the urban area 51 per cent were wearing false dentures as against 21 per cent in rural area. Edentulous and partially edentulous citizens were 26 per cent among rural households as against 13 per cent in urban area.

Masticatory efficiency of removable dentures is much less than that of complete natural dentition. Mastication is important to good nutrition in the elderly. Elderly people with missing teeth or wearing ill-fitting dentures will be impeded in crushing their food. Dormenval (1995) had opined that poor masticatory function which could jeoparadise the reversibility of malnutrition and can lead to increased morbidity and morality. However Giep *et al.* (1996) are of the view that dental state may not be a direct cause of poor nutrition but a contributing factor in those elderly who have other risk factors.

During the survey both urban and rural respondents wearing ill-fitting and false dentures and those who are edentulous and partially edentulous reported that their food selection is mostly limited to soft and easily ingested food. They reported poor masticatory performance and due to this tough foods such as meat, fruits, coarse foods or raw vegetables were avoided. Similar trend was noticed in a study conducted by Hildebrandt

et al. (1997) on 602 elderly in Michegan. The author reported that elderly persons with reduced number of functional units and those wearing false dentures reported difficulty in chewing, avoidance of stringy foods (meat), crunchy foods (vegetables) and dry solid foods (bread).

Similar observations were made by Bo/deur *et al.* (1993) among 367 elderly individuals in Canada. He reported lower intakes of fruits and raw vegetables and high fibre foods with poor masticatory performance. Similar findings was also found in the present study both among urban and rural population. A reduced consumption of high fibre foods could therefore induce the development of gastro-intestinal disorders in edentulous elderly subjects with deficient masticatory performance. In the present study also gastro-intestinal problems were slightly higher among rural citizens when compared to urban subjects. One reason for this may be the presence of more edentulous citizens in rural area. Consumption of a good diet depends on the ability to chew properly and bite with dentures. Poor dental status is reflected in poor dietary habits and this in turn affects the quality of life of elderly. As Nagao (1992) opined, that denture wearers and edentulous individuals often ate only soft foods resulting in a narrow, nutritionally unbalanced diet. Thus comprised dental function results in the swallowing of poorly chewed food, avoidance of food, and dietary inadequacies, which in turn affects the health and nutritional status of elderly.

However dental caries and tartar deposit were more among rural citizens which could be due to poor oral hygiene, smoking and chewing habit that are found more among them. In a survey conducted by NNMB (1984) also a high incidence of dental caries is reported from Kerala.

It could be said that poor oral health status affects food choices and thus nutritional status. Treating oral health problems are important in improving the health and quality of life of elderly.

Another physical disability noticed among 5 per cent of urban and 7 per cent of rural citizens were inability to get in and out of bed. Yet another physical disability noticed among six per cent of rural and three per cent of urban citizens was loss of vision. They reported personal isolation and the quantity of foods consumed by them were less. Keys *et al.* (1973) had reported that due to loss of vision the subjects had to depend heavily on others and they had complained of lack of appetite also. Similar observations was also noted in the present study among urban subjects.

Inability to prepare foods was found to be another handicap among 48 per cent of urban and 40 per cent of rural respondents in maintaining their dietary pattern. However 30 per cent of urban and 22 per cent of rural citizens reported that they can prepare meals with some help. Co-ordinated hand movements are reduced as age increases, and hence they need help to cook foods. The female citizens opined that they cannot cook food according to their taste and preference due to lack of physical fitness. Frongullo *et al.* (1992) opined that physical disability causes heavy dependence on others which increases anxiety that sometimes results in long periods of starvation leading to malnutrition. A study done by Wolfe *et al.* (1996) among rural white and urban black elderly in New York, revealed that, restricted mobility due to physical disabilities contributed to food insecurity by interfering with both the ability to obtain food and the ability to prepare food and increased the need for certain types of foods. The observations made in the present study is in tune with the observation made by Wolfe *et al.* (1996). These physical disabilities thus could contribute directly or indirectly to reduced food intake and poor nutritional status among elderly. As functional limitations contribute to under nutrition, nutritional supplementation has proven to be effective and beneficial as reported by Efthimiou (1988).

Mental problems like depression dementia were not prevalent both among urban and rural citizens surveyed. This could be due to the fact that majority of urban and rural

respondents were staying with their family and hence had no social isolation. Mental disorder was however found among 2 per cent of rural citizens. These problems could also contribute to poor appetite, and loss of enthusiasm to eat leading to malnutrition. Kerstetter *et al.* (1992) in their study among institutionalized older elderly in United States reported that depression and dementia are commonly seen in older persons and contributes to poor appetite and malnutrition. It was also reported that the institutionalized elderly face problems of depression and dementia rather than those home living elderly. Young *et al.* (1992) also revealed the same fact that depression is more common with increasing age and is also said to be associated with those living in nursing homes, leading to increased mortality. Similar observations were noted in a study conducted by Baker *et al.* (1979) among dutch residents which revealed that psychological problems were found more among institutionalized elderly (33 per cent) than home living elderly (17 per cent).

However, the present data does not support the above fact, as the study was conducted among home living elderly. But the above studies reveals the fact that depression and dementia were more among institutionalized than among home living elderly.

Another psychological problem found among three per cent of urban citizens of the present study were those imposed by changes in living arrangements. The elderly prefer traditional dishes and moreover they prefer dishes made with the best natural, fresh ingredients rather than highly processed packed foods. When their living arrangements are transferred to urban setting, they are compelled to change their dietary pattern. As a result of loneliness experienced by 3 per cent of urban and 6 per cent of rural citizens, they have made changes in their dietary pattern. Due to the feeling of loneliness they skipped their meals; mainly breakfast or dinner and no regularity was observed in the consumption of daily meals. They preferred to take food outside or opted for easily prepared food items. A lonely person decides that it is not really worthwhile to cook a

meal for one person. Lack of interest in cooking and inadequate cooking skills especially among men may be the reason for skipping meals by the elderly residing alone. But while staying with the family members or with their spouse they may be forced to eat their daily meals and may not skip their meals. The nearness of family members was found to be extremely important in preventing or lessening food insecurity since family could be called on for emergency with food or money. A survey conducted by Wolfe *et al.* (1996) among rural elderly reported that many elderly who had no children or none living near by expressed greater food anxiety and sometimes had to go without supper.

Ghandirian *et al.* (1995) found that 10 per cent of old people living alone omitted breakfast or had insufficient breakfasts. These authors reported consumption of only a glass of milk or fruit juice by eight per cent of that population. In a study conducted by Redondo *et al.* (1996) among institutionalised and independent elderly regarding their breakfast habits it was found that the total percentage of subjects who took an inadequate breakfast (ie providing less than 20 per cent of calorie expenditure) was high, the figure was much higher amongst independent subjects (62.7 %) than institutionalized subjects (43.1 %); in fact independent subjects sometimes missed breakfast completely or took only a very light breakfast.

While Davis *et al.* (1990) reported that several recent reports have raised concerns about the nutritional quality of the diets of persons who live alone particularly of men . If these trends continue into the future, an increasing proportion of the older population may be at risk of poor nutritional status. In a study in Sydney by Stuckey *et al.* (1984) it was reported that single men and women living alone were those who were most at risk of poor nutrition. Survey results of Stuckey supports the findings made in the present study.

The most important single non-biological factor affecting the health of the elderly is the economic condition of the individual followed by nutrition. Poor economic condition

predisposes the elderly to make changes in their dietary pattern. Individuals from low socio-economic brackets are at greater risk of poor dietary intake. Low income is related to low dietary diversity and low nutrient intake.

In the present study 14 per cent of urban and 60 per cent of rural citizens have made changes in their pattern due to low socio-economic status. As the result of the socio-economic problem they were not able to purchase or consume costly nutritious food eg. pulses, milk, commercial preparations and supplements. While a study conducted by Ahmed *et al.* (1993) among 275 elderly in four MCH centers in ZaguZig reported that main socio-economic problem was limited income and the results showed that the low social class families had poor consideration as regards nutrition of elderly, regular visit to physician and personal hygiene. A study done by Horwath (1989) on dietary intake of elderly population revealed that elderly from the poor households share risk of food scarcity and infectious diseases. From a study conducted among United States' 115 elderly Tucker, *et al.* (1995) reported that due to low income their subjects avoided fruits, polyunsaturated fats, and animal foods, supplements and commercial health preparations.

Our data also throws light into the observations made by the above authors. In the present study also dietary inadequacies were seen among low income households leading to nutrient deficiencies among rural elderly. Low income affects the purchasing power and this in turn affects their food security thus limiting their food choices thereby leading to malnutrition.

Dietary modifications as the result of religious practice namely fasting was observed only among five per cent of urban citizens. But in a study done by Jayashree *et al.* (1996) on 50 men and women regarding the knowledge, attitudes and practices of the aged, found that fasting was very common among those surveyed and the selection of

food during fast was wrong. The findings made in the present study is not in line with the above observations. Less number of citizens undergoing fast were found in the present study mainly due to health problems, physical disabilities and other problems that accompanies aging, and physician's advice.

The dietary pattern of individuals or groups are influenced by several factors such as socio-economic, personal habits, physical, functional, and psychological. Tucker and Rush (1992) had reported that low income is related to low dietary diversity that would lead to low nutrient intake. Ian-Darton-Hill (1992) had ascertained that dementia of any cause contributes to loss of appetite, loss of enthusiasm to cook and eat food. While Kovar *et al.* (1984) reported that physical disability, poor dentition and depression resulted in poor food intake among elderly.

The socio-economic status of the family in which the elderly subjects live have direct as well as indirect influence on their dietary habits and the details regarding it are discussed below.

The Socio-economic and demographic changes in the society in general are increasingly affecting the capacity of the family to maintain its care giving role. Socio-economic security is a critical factor for healthy aging. The family should be the greatest single source of support for the elderly. It was observed that 85 per cent urban families were nuclear and 70 per cent of rural families had joint family system. Joint family system was observed more among rural population. But the data from the ICMR Task Force project on health care of the rural aged conducted in Madurai (N=1910) revealed that more than 64 per cent of the sample fell under "not at all joint". Human society is unique with the institution of family being a vital and fundamental unit of social life. Modern forces like urbanization, industrialization, consequential occupation mobility, the emergence of two career families, the growing individuality and gradual weakening of kinship ties

have a greater bearing on the family background of the aged (Suryanarayana 1996). It has been observed that in the nuclear family, the per capita availability of food and other resources would be higher than that of joint families and hence small family norm pattern among urban citizens is likely to influence their dietary habits and nutritional status. Urbanisation which resulted in disintegration of joint family system could contribute to the improvement in food habits (Dupin 1974). But Nayar (1996) had reported that ancient India, with her joint family system, never considered the aged as a burden and the whole nature of the joint family system was such that the old, the infirm and ill were automatically taken care off. But with the emergence of nuclear family system, money and comfortable living becomes more important to the common man than better inter-personal relationship. Hence the elderly, once they became no longer productive were seen as a burden by other members of the families.

When the demographic profile of the families were analysed it was found that population above the age of 50 were low both in urban (27.3) and rural (22.8) area. While adult population predominated both among urban and rural areas it was noted that the child population was low when compared to adults. A similar trend was reported by the Kerala Statistical Institute (1992), in their survey, where they observed a decrease in the per cent of population in the younger generation. It is interesting to note that the families surveyed (both in urban and rural) have comparatively more of females than males. The ratio between male and female in the present study is 280: 299 in urban area and 369: 461 in rural area. A very noticeable difference in the sex ratio among rural area was observed. This follows the general sex ratio of Kerala, or of Thiruvananthapuram district, where, according to census figures, there are more females than males. According to Devi (1989), Kerala is the only state in India where the female out number the males in the population. The States' sex ratio is 1040 females to every 1000 males (NFHS 1992-93), a similar trend is reflected in this study also.

When the family size was analysed majority of urban families (86 %) had 2 to 5 members and 61 per cent of rural families had more than five members. Majority of urban families in the present study can be categorized under small family with one to five members in each family. There were 3 per cent and 6 per cent single member families among urban and rural households respectively. So loneliness is not a major problem among the senior citizens surveyed since majority are living with their families. David (1996) had opined that India's 80 per cent are living in villages and that the joint family system is seen more in villages. She further stated that due to the joint family system, the problem for the old people is not so tough. Our findings are consistent with the findings made by David (1996), which revealed the prevalence of joint families more in the rural areas. According to Brodey (1981) in a less- urbanized community, where joint system still persists, the elderly face nutritional, health and economic problems sustained by an interlocking network, consisting of relatives and neighbours. They provide support whenever needed. With increasing urbanization and the emergence of nuclear families, there is a tendency for these support system to break down. In the present study type of family especially nuclear family in which the majority of urban respondents are living had significant influence on their current dietary pattern ($\alpha^2 = 6.69$) and place of taking their meals ($\alpha^2 = 4.90$). It was found that 85 per cent of urban and 30 per cent of rural citizens belonging to small family norm had reported their perception of health to be good which was again reflected by better anthropometric indicators such as height, weight, and BMI. This could be due to improved dietary habits found among small families.

When an enquiry was made into the employment status of the families of the both urban and rural citizens it was found that more than two members were employed in families of the rural area. This in turn pinpoints to the prevalence and advantages of the joint family system, where more members are employed and there are more heads to feed. The employment status of the population is an important determining factor with

respect to health status, dietary habits, and nutritional status of the population surveyed as pointed out by Reddy *et al.* (1990). High level of employment is prevalent among rural area. The income variation that is seen among urban and rural citizens could be attributed mainly to the nature and type of work in which they are involved. At the same time the number of heads they have to feed is more especially the dependant children, and the old who have poor health and have low functional ability. In a rural set up as seen from the current study, most of the subjects were agricultural labourers, and they had more members to support since 70 per cent were having joint families as against 15 per cent of urban respondents. Apart from this fact the rural citizens earned a lower income through daily wages. Irregular availability of jobs, seasonality of job and lack of skill to take up other income generating activity during lean periods of employment tends to lower their per capita monthly income further. As also shown in Table 12 the rural citizens have lesser personal or family assets from which they can draw additional income. Assets were found to influence the economic status of the urban citizens. Thus those citizens belonging to low income family had low mean food frequency scores for various food articles like vegetables, fruits, milk, meat and commercial health drinks and their perception about health was poor. The prevalence of symptoms of ill health was also high among them. Moreover because of low income they were unable to make use of better medical facilities to cure their health disorders. Their poor health status is reflected in the low scores obtained by them for general health, IADL and PADL. All these in turn affects the nutritional status of elderly negatively.

According to Arora (1991) income is an important indicator of the social and economic status of an individual. Family income determines the family's status and socio-economic strata of the society to which they belong. When the urban and rural monthly income data were analysed a wide disparity was seen in their income. The minimum income of the urban area was Rs. 2500 and of rural area was Rs. 800. In the present study, the economic status of urban families were better off than that of rural families.

The urban families had a higher level of income as most of them were Government employees, business people or were engaged in white collared jobs. But majority of rural members were occupied as carpenters, labourers, farmers, and or were doing petty jobs earning low wages on a daily basis. The income of the urban families were not only from employment, but also from their personal assets. The income earned by rural dwellers from their personal possessions were comparatively low. Still it could be noted that 38 per cent of rural dwellers earned an income above Rs. 5000 per month.

The monthly expenditure pattern of the families were found to increase in accordance with the rise in income. Food expenditure was the major item of family expenditure both among urban and rural families surveyed. Similar results have been reported by several workers; a survey conducted by NIN (1985) revealed that in low income groups over 90 per cent of the family income is used up for providing the essentials such as food, clothing and shelter. Godawari *et al.* (1987) found that in Tamil Nadu around 65 per cent of the families spent 60 to 80 per cent of their income on food. According to Devadas (1991), in Tamil Nadu, a maximum portion of the income (61.80 per cent) is spent on food by families of low socio-economic strata. Stephane (1984) revealed that the expenditure on food is high, constituting 60 to 70 per cent of the total monthly expenditure of an average Indian. In a study conducted by Kaur and Mann (1988) among low socio-economic group families in Punjab similar results were reported wherein the major item of expenditure was food. Quiogne (1970) found that lower the income, higher was the percentage of income spent on food.

In the present study statistical analysis of the data revealed a significant relationship between income and total family expenditure among urban families ($r = 0.658^{*}$) and among rural families ($r = 0.602^{*}$). A significant association was also found to exist between total family income and food expenditure pattern. Similar observations were also found in a study done by Suma (1999) where she revealed that as the income

of the families increased, there was a significant positive (r = 0.889) increase in the food expenditure pattern. Wong *et al.* (1985) also found a direct relation between the amount of family income and expenditure on food.

In the present study a significant correlation was found to exist between the income and frequency of consumption of cereals ($\alpha^2 = 5.12^*$) pulses ($\alpha^2 = 6.63^*$) milk ($\alpha^2 = 8.97^*$) vegetables ($\alpha^2 = 5.62^*$) and commercial preparations ($\alpha^2 = 13.77$) and use of pharmaceutical supplements ($\alpha^2 = 9.67$)among urban senior citizens surveyed. Among rural citizens the income was significantly associated with frequency of consumption of cereals ($\alpha^2 = 4.38^*$) pulses ($\alpha^2 = 4.32^*$) vegetables ($\alpha^2 = 5.20$) milk ($\alpha^2 = 5.53$) and fish ($\alpha^2 = 6.08^*$).

Family income is found to affect the consumption of food stuffs and in turn the nutritional status of the elderly, both urban and rural. Family income is found to determine the habit of dining out ($\alpha^2 = 9.22$) and number of meals taken ($\alpha^2 = 8.52$) by rural citizens. Purchasing power as influenced by the income, plays an important role in determining the daily diet of the elderly. Financial inadequacies results in inadequate diets and reduced income seems to be associated with alteration in food purchasing pattern which directly affects the dietary pattern . Thompson (1988) had reported that poverty restricts access to adequate diet and the purchase of good quality foods leading to malnourishment in elderly.

Thus the low income, low employment status, and larger family size are found to negatively influence the dietary pattern of rural citizens.

Regarding the nature of savings, it was noted that all the urban families and only half of the rural families had savings of their own. The remaining half of the families were not in a position to save, as their income was hardly sufficient to meet their daily needs.

One of the reasons attributed to their poor saving habit was the debts incurred by them. The Kerala Statistical Institute (1992) reported that on an average the rural households had a larger per cent (63.80 per cent) of households with debt as compared to the urban households. Low rate of saving in rural areas may also be due to joint families which have more members whose basic needs have to be satisfied. This coupled with general trend of unemployment and under employment aggrevates the economic problem and the hand to mouth existence of majority of the families leads to such a situation that saving money for needy times is not one of their priority items of family budget. When the income earned by the members is insufficient to maintain their family they resort to borrowing from others.

The physical amenities available within the house goes a long way in deciding the quality of life and also in reducing drudgery, and providing a healthful living environment. Housing conditions or / and facilities available in the household influences the quality of life enjoyed by the elderly. Poor housing is reported to cause many health and nutritional problems. Several studies have indicated that lack of portable water supply and absence of sanitary facilities for disposal of waste would lead to poor health and consequent decrease in the nutritional status (Prinsley 1986).

In the present study water was available to the rural families by means of roadside taps or common wells. In urban families all the houses had their own source of water supply. All houses of the urban subjects were electrified, while among rural families 30 per cent were not provided with electricity. This result is in tune with the observations reported by Ranganath (1996).

In the present study latrine facility was available to urban and rural of households. This finding is inconsistent with the observations made by Ranganath (1996) where the lavatory facilities was not available to 61.50 per cent families.

Poor housing condition that creates infections, infections are a common problem among old and that results in anorexia, poor dietary intake and malnutrition, which predisposes the individual to another infection. However, in the present study no clear cut association could be established between housing condition (and availability of water) with dietary status of rural and urban citizens.

It has been proven beyond doubt that, personal characteristics of the individual have direct as well as indirect influence on the dietary habits of the subjects.

Age is another factor that affects the dietary habits and nutritional status of elderly. Age is recognized as a factor which influences social life. In the current study which was conducted among the elderly population two different age categories were considered *viz.*, 65-69 and 70-75 and analysis of the data revealed that age had significant negative influence on the PADL of both rural ($r = -0.20$) and urban ($r = -0.26$)citizens. As ages advances the symptoms of illhealth increases; these inturn affects the PADL. Similar observations were also noted in a study conducted by Rosa *et al.* (1996) where she observed strong correlation between age and IADL and PADL. As age increases there are greater chances for functional deterioration. Chumlea (1994) stated that there exists a complex relationship between age and resistance to acute and chronic diseases. Similarly in the current study also significant positive correlation was found between age and symptoms of ill-health both among rural ($r = 0.36$) and urban ($r = 0.27$) subjects. There also exists a correlation between age and perception about health ($r = 0.21$) among rural and urban ($r = 0.95$) citizens. Age was also found to have a significant correlation with characteristics good physical health among both rural ($r = 0.32$) and urban ($r = 0.46$) citizens. As one ages the chances of ill health increases, and poor health imposes stress and strain on them and they perceive their health to be poor.

Age seems to act as a barrier in the frequency of inclusion of various food stuffs in their daily diet. Among urban citizens the consumption of roots and tubers ($\alpha^2 = 6.19$), milk ($\alpha^2 = 12.5$), milk products ($\alpha^2 = 4.90$), egg ($\alpha^2 = 10.4$), fish ($\alpha^2 = 5.16$) and pulses ($\alpha^2 = 6.66$) are found to decrease with increase in age. Among rural citizens age had significant influence on the consumption of milk ($\alpha^2 = 4.35$), meat ($\alpha^2 = 6.38$), egg ($\alpha^2 = 4.66$) and pulses ($\alpha^2 = 6.01$). As age increases there are changes in the physical conditions; such as absence of teeth or use of false teeth which might influence the choice of various foods. Similarly alteration in health condition, due to incidence of diseases might have brought in a change in choice of food. Above all individual preferences or likes and dislikes for various foods might also influence the food choice.

Gender plays an important role in determining the quality of life of the elderly. In the present study in the urban area, male citizens were more in number (60 per cent) and in rural setting the number of females were (51 per cent) slightly higher than males (49 per cent). Sex had significant positive influence on IADL ($r = 0.32$), PADL ($r = 0.29$) and on domain scores ($r = 0.34$) of urban citizens. Sex was found to have significant but negative influence on the psychological status of the urban respondents ($r = -0.290$). This was reflected from the fact that urban respondents have lower mean score (20.0) for their psychological status when compared to rural citizens (26.0).

Sex was also found to significantly influence the dietary habits of senior citizens. There was significant variation between male and female citizens in the habit of dining out ($\alpha^2 = 9.67$) and frequency of dining out ($\alpha^2 = 6.40$) among urban ($\alpha^2 = 7.34$) and among rural citizens ($\alpha^2 = 10.15$). Males preferred to consume food from hotels and other fast food centers than females, because of their social network, and the chances of going out than females.

Next to sex, marital status of the respondents were studied. Majority of urban respondents (54 %) were married and were living with their spouse. But widowhood

was observed more among rural citizens (42 per cent) against 33 per cent of urban subjects. In the present study there were an equal number of males (18 per cent) and females (19 per cent) who were widowed, but a study conducted by Vijayakumar *et al.* (1994) among the elderly in Trivandrum district revealed that 20.1 per cent of males and 68.1 per cent of females were widowed. Such high percentage of widow hood was not found among women included in the present study. Gulati (1989) reported that approximately 4 per cent of females and 3 per cent of males in the age group 60 years and above, in Thiruvananthapuram district were never married; our data also supports the above fact, where there were more elderly spinsters (2.5 per cent) than unmarried males (1 per cent). Many research studies reveals that marital status influences the psychological status of the respondents and this in turn influences the dietary habits of the senior citizens. Separation, divorce or widowhood affects their mental health as well as their well being which in turn affects the dietary habits of elderly. Presence of spouse plays an important role in determining the daily diet of elderly and it is likely that, women make the foodstuffs available to their husbands.

There was no statistically significant relationship between religion, caste, and dietary variables studied. Area of residence is an important social factor to be considered while studying the dietary habits as regional variation is shown to have a profound influence on consumption pattern, meal pattern, preference for foods all of which could influence the health status of the respondents. The data revealed variations in the food use frequency and meal pattern between rural and urban respondents.

The level of education of the respondents is an important variable which determines their social status, awareness pertaining to health care and pattern of food consumption. The level of education varied both among urban and rural respondents as well as among male and female citizens. Moreover Park and Park (1991) has stated that educational status and literacy rates have been proven to be powerful determinants of

nutritional status. Educational level is a strong predictor of dietary quality. Exton-Smith (1980) reported that the ignorance of the basic principles of adequate nutrition can lead to unbalanced nutrient intake (least inclusion of milk, fruits, whole grains and vegetables) and they further stated that educational interventions may help to prevent the associated decreases in dietary quality.

In the present study urban citizens had a higher educational status than their rural counterparts. This may be due to mass poverty and seeking of jobs to meet their needs at an earlier age by rural citizens. The observations made in the present study throws light on the above fact, that male subjects had higher or better education than females. Vijayakumar *et al.* (1994) has also reported that the graduates and professionally trained people constituted 13.1 per cent of males and 3.9 per cent females interviewed by them. This in turn reflects the disparity between the sexes in educational status in Kerala among the elderly. Moreover illiteracy was more prevalent among female citizens (6 per cent) than males (2.5 per cent). This is in line with the view of Kinsella (1988) who stated that elderly people are often illiterate, particularly women. It was observed during the survey that those respondents who had higher education had better food consumption pattern and proper selection of food, restricting those foods that hampers their health thus making their diets more balanced .

With respect to employment status it was found that there were no major variation in the number of elderly citizens, currently employed between rural (45 %) and urban (49 %). However it was found that more of the females were found to be unemployed than males. This is in line with the observations made by Vijayakumar *et al.* (1994) who had stated that 27.2 per cent males and only 11.6 per cent females were participating in income generation activities. This is indicative of the traditional role of the male as the bread winner of the family which continues even into the old age. A study conducted by Devasahayam (1988) in Tamil Nadu also indicates the fact that the

percentage of unemployed females (67.3 per cent) are more than the males (33.3 per cent). Current employment was found to have a significant influence on the consumption of meals from outside the house both among urban (α^2 =5.22) and rural citizens (α^2 = 6.32).

If there are more chances to work outside there are more chances to eat from hotels or fast food centers. This may also pave way to eating rich foods and may influence their nutritional status. Current employment was found to have a significant influence on the consumption of roots and tubers (α^2 = 10.27). Mostly the rural citizens were currently employed. Most of them were labourers (32 %) involving themselves in strenuous physical activity, which demands more food and tapioca being cheaply available can produce bulk as well give them energy, and this could be the reason for the above significant relationship between employment status and consumption of roots and tubers by rural citizens.

Symptoms of ill-health were found to have significant negative influence on the current employment status of rural respondents (r = -0.25). On the other hand those who had fewer health problem went out for employment in the rural area. Among the urban citizens such a correlation was not observed. This may be due to the fact that the urban cliantele had more health problems such as diabetes, cardio-vascular diseases which might be preventing them from going out to work. On the other hand this could also be due to the higher economic status of the urban citizens over the rural counterparts, and due to greater economic independence enjoyed by them as well as the freedom enjoyed by them to spend their own money; as observed from the study.

The current employment status, to some extent gives an indirect indication of the physical health as well as the independent nature of the elderly citizens surveyed. Current employment was found to show a significant influence on physical health of rural

respondents (r = 0.35). As most of the rural citizens who were currently employed were labourers doing heavy strenuous activity this in turn might affect their physical health. Strenuous activity and absence of adequate foods also could deteriorate their physical health. Economic handicap also could negatively influence their health status indirectly, since most of them belonged to low socio-economic status.

It was found that the income earned by those senior citizens of rural and urban area who had employment, had to give their income to the family members. However the male subjects (32.5 per cent) had more freedom to spend money when compared to female citizens (18.5 per cent). Dependency rate was found to be high among rural citizens, (60 per cent). If they had freedom to spend money, they can buy foods according to their taste, likes and need not have to depend on other family members. Freedom to spend money was found to have a significant influence on the use of milk ($\alpha^2 = 8.41$) and commercial health preparations ($\alpha^2 = 5.44$) among urban and rural citizens ($\alpha^2 = 6.06$).

Though 65 per cent of urban and 35 per cent of rural citizens had savings of their own, savings and assets was not found to have any effect on their dietary habits, as it is their family members who determines their diets.

Living arrangements can also influence the dietary habits of elderly, since social support systems can influence the dietary quality as reported by Mc Intosh (1984). Little is known about the mechanism of declining quality that appear to accompany a change in living arrangements from living with spouse to living alone. Recent bereavement or divorce may have a negative impact on dietary quality, which may endure or may be only transient. In the present study majority of urban (97 %) and rural elderly (94 %) are staying with their family. Men who lived with a spouse consumed more of different food groups except alcohol as stated by Murphy *et al.* (1990). The key determinant of living arrangements for an individual, particularly the aged, is familial contact. Hence the family environment

in terms of living arrangements play a crucial role in determining the mental and physical health of the aged and these (mental and physical) factors in turn influences the dietary habits of the senior citizens. Family members were extremely important in preventing or lessening food insecurity among the elderly, since they have other family members to cook the foods according to the taste and likes of the elderly. Making available of those foods liked by them at the required time can go a long way in lessening food insecurity among the elderly and this itself could improve their dietary status. The social and psychological security and happiness induced by living and eating together with kin and kith would also contribute to better nutrition.

In the present study subjects living alone were 3 per cent and 6 per cent in urban and rural areas respectively. Diets of those citizens were found to have scanty, nutritionally ill-balanced rather than those staying with their families. While those citizens living alone there is a tendency to skip meals or forcing them to eat the left over food as explained in table 59 and 60. In the present study the problem of isolation is less. However, the subject and spouse (couples) living alone was found to be more among (10 per cent) urban when compared to (7 per cent) rural citizens. A study done by Audinarayana *et al.* (1996) revealed that half of the married live by themselves (i.e., with spouse only). While a study conducted by Vasanthakumari and Prema Kumari (1998) in Coimbatore revealed that more than 50 per cent of respondents were living with their spouse. The above two findings are contradictory to the observations made in the present study where most of the subjects are living along with their family members. However a study conducted by Myers and PengDu (1996) among Chinese older people in rural area of Beijing also revealed that a majority of older persons still reside with children, especially sons.

Personal habits like exercise, smoking, frequency of use of alcohol and tobacco may influence the food consumption pattern and appetite of the elderly. According to RamanKutty *et al.* (1993) information aspects such as smoking, alcohol use and tobacco

chewing should be deemed as important as they are one of the contributory causes to a number of chronic and fatal diseases. Kovar and Feinlieb (1991) had reported that non-smoking, increasing exercise, attention to diet etc could be expected to add healthier years to living. Inter-individual variations among respondents in their habits and personality depends on two factors; one is genetic and the other is environment. The genetic influence may reflect more on the anthropometric measurement, while the personal characteristics which are acquired may have varying influence. Hence the personal habits of the respondents which may have a bearing on the health and the nutritional status of the individual were examined.

Habit of taking exercise affects the health status and nutritional status of the elderly (Guthrie 1986). Analysis of the data revealed the fact that 50 per cent of urban and 12 per cent of rural citizens were in the habit of taking exercise. Brisk walking and light exercises were followed by the urban and rural citizens. The habit of taking exercise among females were rare. Majority of senior citizens (62.5 %) in the age group of 65-70 were in the habit of taking exercise than those in the age group of 71-75 (37.5 %). It may be due to the fact that as age increases their poor physical health or mental health status may prohibit them from taking exercise. Exercise is less prevalent among rural citizens. This could be due to the fact that they are involved more in other kinds of vigorous physical activity in the form of employment (as labourers) rather than taking regular exercises. Munro (1992) opines that there is an obvious decrease in the overall level of physical activity, with aging, but it is a complex process and the inter-individual variability is enormous and there is a great deal of subjective and indirect information implying that on an average, there may be a significant reduction in activity from young adulthood onwards. While Astrand and Saltin (1988) in their two Swedish studies demonstrated clearly that there is a considerable fall in maximal exercise capacity, in cardiac output, and stroke volume with aging.

Regarding the involvement of urban and rural senior citizens in physical activity, more of rural subjects (55 per cent) were engaged in vigorous activity at the age of 65 years and above, than the urban subjects of the same age.

Natarajan (1999) had reported that compared to urban citizens the rural subjects are involved in greater physical activity and they walk more than the urban citizens. More male citizens (34 per cent) than females (22 per cent) were involved in vigorous physical activity. Similar observations were noted in a study conducted by Devasahayam(1988). He reported that though there are more aged females in the labour force they are unable to do more days of work and vigorous physical tasks due to their physical conditions, which requires further enquiry.

Lesser physical activity among female citizens may be due to locomotor problems among them as reported by John (1992) who opined that degenerative arthritic changes may be so important among elderly citizens in inhibiting physical activity. Because of lesser physical activity prevalent among female citizens there is a tendency for reduced appetite as table 58 reveals the fact that one of the general complaint of female elderly was lack of appetite which might lead to reduced food consumption. On the other hand lack of physical activity might be the reason for the females to have higher body weight than male citizens as shown in Table 50. Thus physical activity in turn might affect the nutritional status of elderly.

Alcohol consumption is a socio-cultural habit which influences the appetite of elderly and inturn their health status and quality of life. In the present study alcohol consumption was common among both urban and rural senior citizens belonging to the age group of 65-70 rather than those in the age group 71-75. Our finding is fairly consistent with the observation made by Tucker *et al.* (1995) in her study on dietary intake of older men, that alcohol intake was significantly lower among the oldest age group (70-85 years).

Another observation made in her study was that alcohol intake was significantly higher among those with higher household income. This feature is not apparent in the present study where the habit of alcohol consumption was slightly higher among rural senior citizens (27 %) than among the urban citizens(23 %) and the rural citizens did not have higher household income, when compared with urban dwellers.

The presence of lower percentage of alcohol consumers among urban citizens could be due to medical reasons or due to the advice from family members, and may also be due to their higher education and knowledge about the hazards of alcohol consumption.

Lavecchia *et al.* (1992) had reported that alcohol consumption was more common in less educated individuals. Rural citizens here have a lower educational status than the urban citizens and are not much bothered about their health; and they also lack medical supervision. Lavecchia *et al.* (1992) further reported that alcohol consumption as an important correlate of dietary pattern. Similar observation was also found in our study. The frequency of consumption of alcohol was found to have a significant influence on the number of meals consumed by the urban (α^2= 5.99) as well as rural (α^2= 6.63) male citizens included in this study. Moreover the consumption of alcohol is found to be significantly influenced by the frequency of dining out. Along with alcohol they might consume foods from outside which would contain more fat, saturated fats and cholesterol than that present in the meals prepared at home. Therefore providing food at home and discouraging of eating from hotels might reduce the ill-effects of alcohol consumption. Alcohol being calorie rich (1 gm of alcohol provides 7 Kcals) has a tendency to reduce the appetite, resulting in a comparative reduction in the intake of other fibre rich foods. It was also found that the alcoholics had gastro-intestinal problems and cardiac problems. A significant positive correlation was found between alcohol consumption and appetite in a study conducted by Lisa (1996) among adults engaged in moderate activity. Similar observation was also noted in the present study.

Smoking is another vice, which has been brought to the limelight by the scientific community elaborately along with its detrimental effect on health and longevity. Cigarette smoking influences the appetite of the elderly. It was observed that there were more smokers among the rural respondents (37 per cent) than among urban respondents (25 per cent). The percentage of smokers was slightly higher in this study when compared to the observations made by Vijayakumar *et al.* (1994) where nearly 15 per cent were current smokers and by Natarajan (1996) were only 14 per cent (13 per cent smoked regularly and 1 per cent smoked occasionally) were smokers.

It could be that the habit of smoking is less common among urban respondents than rural citizens because the urban elderly are likely to give up this due to medical reasons, and awareness about the deleterious effect of smoking on health; while the rural citizens are less likely to follow the doctors advice and are not very much aware of the health hazards of smoking. The habit of smoking was found to be more among rural citizens who also suffered more from respiratory problems like cough and asthma. Gamsky *et al.* (1992) also made similar observations where he found higher prevalence of chronic cough, chronic phlegm and wheezing among smokers. Cross-sectional data shows that cigarette smokers consume diets different from those who do not smoke as reported by Fulton *et al.* (1988) and Margettes and Jackson (1993) . Thompson *et al.* (1992) observed that cigarette smoking is associated with a different meal pattern. However in the present study no such associations were observed between dietary variables and smoking habit.

When the tobacco chewing habit of the elderly were examined it was found that habit of tobacco chewing was higher among the rural dwellers (76 %) when compared to urban dwellers (41 %) and more common among females than males. Our data supports the findings made by Natarajan (1999) in a study conducted in Madras. But in his study the habit was found only among 16 per cent of females and 10 per cent of males.

Mahadevan *et al.* (1992) opinioned that among Kurichias generally old men and women used to chew tobacco and its frequency ranges from six to eight times per day and the total intake of tobacco amounts to six inches in size.

In a study conducted by Vijayakumar *et al.* (1994) it was found that 20.9 per cent of men and 32.8 per cent of women habitually chewed tobacco along with betel leaves. Our observations are in line with the above finding. Study conducted by Ranganath (1996) among women coir workers, mostly residing in rural areas, she observed that tobacco chewing was found to be increasing as the age advanced with the maximum proportion of users being in the oldest age group. Similar observations was found in the present study also.

Tobacco chewing habit was more among rural citizens, because it may be a habit practiced by them from a younger age itself, and they may find it difficult to stop this habit, at old age. But the urban citizens might have stopped this habit because of better level of education, or due to doctor's advice. This might also be due to the fact that urban elderly are more aware of the injurious effects of tobacco chewing on health, since such facts have been highlighted very widely through the mass media to which the urban elderly are more exposed than their rural counterparts. However in the present study tobacco chewing habit had no profound significant influence on the dietary variables studied.

The adequacy of the diets consumed by the elderly could be estimated only through the health status enjoyed by the selected subjects. Hence the health status of the subjects as influenced by their dietary habits were evaluated in three ways. Initially their own perception of health was scored to find out what do they feel about their current health status. If their perception on health is good, it may mean that they may continue to follow the dietary habits so far followed by them; on the other hand if their own perception about their health is poor, that it self could be taken as a reason for their current dietary

habits – because, diet is closely related to perception of health. Hence the association between current dietary status and the perception of health by the elderly were assessed.

An enquiry on the perception about health compared to previous year when made it was found that 36 per cent of the urban and 29 per cent of rural subjects reported that their health status had worsened. About forty nine per cent of female subjects had also stated that their health had worsened when compared to the previous years. This is in line with the observations cited by Kannan *et al.* (1991) who found higher morbidity among women. Vijaykumar *et al.* (1994) are also of the opinion that morbidity is higher among women. Further analysis of data also revealed that majority of urban and rural male subjects were not confined indoors. But more of females were confined indoor (26 per cent) when compared to males (13.0 per cent). This could also be due to higher morbidity among females. This could also be due to the fact that locomotor problems were more prevalent among female citizens in the present study. Moreover, confinement to the four walls of the household might be a social practice of the region.

Majority of urban and rural subjects were not seen confined to bed or chair. However confinement to bed was more among urban subjects (16 per cent) which may be due to cardiac problems and locomotor problems which required complete rest as insisted by doctors, and cardiac problems were found more among urban citizens. The duration of confinement to bed was also less among rural citizens (10 per cent). Though the rural population had health problems they were observed to be not willing to stay indoors.

As stated earlier, dietary habits are closely linked to morbidity pattern which again is an indicator of health status. In order to assess the health status of the subjects as influenced by their dietary pattern, their clinical profile was analysed. The Clinical status of the senior citizens was evaluated in two ways. Initially, it was analysed

than rural citizens. This finding is in line with the observations made in the present study. A study conducted by Singh *et al.* (1996), among rural elderly at Varanasi revealed that arthritis and osteoporosis were the commonest diseases in rural elderly.

Several research studies reveal that bone loss is far greater in elderly women than in men of same age and hence have to face several locomotor problems. Sex based differentiation, of the data revealed that osteoporosis (13 per cent female and 3 per cent male) arthritis and rheumatic pain (8 per cent females and 2 per cent males) were more common among females when compared to males respectively. According to Silberg (1979) prevalence of osteoarthritis and osteoporosis in women steadily increases with age and it affects mainly women more than men. Similar trend is found in the present study also. Moreover pelvic deformity was observed only among 12 per cent of urban female citizens. The reasons attributed to the prevalence of locomotor problems more among urban than rural citizens may be due to the consumption of less green leafy vegetables which is an excellent source of calcium. When the frequency of use of green leafy vegetables was examined the consumption was less among urban citizens, when compared to 80 per cent of rural citizens who consumed it, 2 to 3 times in a week. Betal chewing habit of the rural citizens with (addition of calcium carbonate) could also be the reason for lesser incidence of bone related problems among the rural citizens. Natarajan (1999) has also recorded similar observations from his studies conducted among geriatric population in urban and rural areas of Andhra Pradesh. However Adams *et al.* (1970) have not found significant variation in the incidence of bone related problems, the prevalence of osteoporosis in Western countries as cited by the author is 20 per cent and 23 per cent in elderly male and female respectively. From the studies done in India by Natarajan (1987) it is seen that there is very little difference in the incidence of osteoporosis among men and women in India when compared to western countries (21.5 %). He has reported that the incidence of osteoporosis is only 1 per cent less in males.

A study conducted by Fujita (1992) among Japanese elderly opined that osteoporosis is significantly lower among Japanese female than in women of western countries. Our data does not support the above fact and our observations are in line with the observations made in the western countries where osteoporosis is higher in elderly women than men. Leask *et al.* (1973) are of the opinion that serum calcium tends to fall with increasing age and could be one of the reasons for weakening of bones resulting in more locomotor problems among women. These authors had further stated that decrease in serum calcium levels might be the effect of menopause and loss of the estrogenic stimulus.

In the present study next to locomotor symptoms, respiratory problems were found among seven per cent of urban and 27 per cent of rural citizens. Kawamoto (1994) is of the opinion that the most frequent and acute health problem found among 1916 patients in rural areas were acute infections of the upper respiratory tract followed by diseases of the stomach and duodenum. Our data supports the above mentioned fact, as respiratory problems (27 %) and gastrointestinal problems (15 %) were higher among rural citizens. From a study conducted by Natarajan (1999) on 100 elderly subjects from Madras revealed that more of elderly males suffered from respiratory disorders (20.9 %) than female elderly (15.79 %). Similar observations were also found in the present study.

Higher incidence of respiratory problems among rural citizens could be due to exposure to dust, or poor environmental conditions or infections. Increase in respiratory problems among males could be due to their early initiation to smoking habit. Poor food intake, heavy workload, in association with infection and poor living conditions could easily precipitate respiratory disorders in the elderly. As the result of respiratory disorders they have not changed their dietary pattern. However, the presence of asthma in few of the subjects had led to reduction in number of meals as well as the quantity of food consumed per meal.

Gastrointestinal problems (constipation, ulcer and stomach upset) were found among 11 and 15 per cent of urban and rural respondents respectively. It was also observed that constipation was more (9 %) among rural than the urban citizens (7 %). Data from a study conducted by Natarajan (1999) denotes lower incidence of constipation among elderly. The higher incidence of constipation and stomach upset in rural area in the present study might be due to lack of fibre rich foods, such as raw fruits and vegetables and poor mastication due to the absence of teeth. Stomach upsets could be attributed directly to infection and indirectly to poor habits such as smoking and alcohol consumption which were found more in rural citizens examined.

Next to gastrointestinal problems, the nervous problems such as disturbance of consciousness, hearing problem and worsening of memory were observed only among 5 per cent of urban and 8 per cent of rural citizens.

In the present study hearing problems were reported by two per cent of urban and three per cent of rural citizens. But Parving *et al.* (1997) in his study among Copenhagen urban respondents reported that the estimated prevalence of self reported hearing problems ranged between 33 per cent and 66 per cent of their respondents and that the above problem increased with increasing age. Our findings were inconsistent with the observations made by Parving (1997).

From a study conducted by Rajasekharan (1996) in Thiruvananthapuram district the presence of neurological disorders such as Alzheimer's, stroke and motor neuron disease were observed among 18.7 per cent of his respondents.

From a study conducted by Cape and Gibson (1994) it was found that over 60 per cent of their subjects who were residing in nursing homes had neurological diseases. However in the present study the neurological problems were observed only among 2 to 8 per cent of the urban and rural population surveyed.

Thus in the present study, the incidence of neurological problems were very low and this could be due to the support that the subjects received from their family as 97 per cent of urban and 94 per cent of rural respondents were living with their families. There is no doubt that the family and their dietary pattern plays an important role in maintaining the neurological set up of the respondents.

Problems related to the Genito-urinary tract were observed among four per cent of urban and 10 per cent of rural citizens. Wolfe *et al.* (1994) had reported an high incidence of problems related to micturition. It could be seen that more of rural citizens (10 %) and females (9 %) were affected by urogenital disorders when compared to men (5 %) and urban dwellers (4 %).

Diseases related to endocrine system such as Diabetes mellitus was observed among 19 per cent of urban and 9 per cent of rural citizens, and the related symptoms were more among male citizens (10 %) than female (4 %) subjects in the present study.

Similar observations were found in the studies conducted by Jayasree (1996) were prevalence of diabetes was higher among male citizens than female citizens. Morley (1993) had reported that at 65 years of age Diabetes mellitus is more common in the females and above 65 years of age it was more common in males. However dissimilar results were reported by Mahadevan *et al.* (1992) in his study among Kurichia elderly that none of the tribal elderly had the evidence of Diabetes mellitus as shown by blood sugar and urine examination.

The incidence of diabetes in the elderly could be due to a decrease in glucose tolerance with age, peripheral tissue insulin sensitivity, late insulin secretion and or altered hepatic glucose output as suggested by Vernon (1992). Dietary habits with a prepondence of carbohydrate rich foods, passed on through generations could also lead to the incidence of diabetes.

Aging starts with the onset of diseases. These health hazards can have their own impact on food habits, food intake, food practices which might affect their nutritional status and well being of elderly.

In the present study a significant positive correlation was observed between the environment in which the rural respondents ($r = 0.198$) and urban respondents live ($r = 0.29$) with symptoms of ill health or disease. Similar observations were noted by Raj and Prasad (1982) in a study on health status of aged conducted in three villages of Rajasthan. Environment in which the respondents live, can create disease prone state due to poor sanitation and hygiene, lack of proper disposal of excreta and waste. It is a known fact that aging is a vulnerable period and older people are at greater risk than any other age group apart from infancy to the hostile elements in the environment.

The habit of taking food from outside was found to have a significant influence in precipitation of ill health both among urban ($\alpha^2 = 6.49$) and rural citizens ($\alpha^2 = 9.16$) in the present study. Food may be prepared in fast food centers and other hotels under insanitary conditions and these can produce diseases among the respondents.

The clinical status of the senior citizens were also evaluated for the presence of deficiency disorders. Thirty two per cent of urban and forty per cent of rural respondents had anaemia. Anaemia was higher among the female subjects (25 %) than males (11 %). Our observations are in line with observations made by Natarajan (1987). Iron deficiency anemia, is also well known to be associated with parasitic infestation. Park and Park (1991) has reported that infestation does not occur in the healthy individual whose iron intake is adequate. During the survey majority of rural households surveyed had poor environmental sanitation. Perhaps this could be one of the reason for prevalence of anaemia among rural citizens. While examining the food consumption pattern, it was found that the consumption of iron rich, Vitamin C rich foods were less among rural citizens, which could

also lead to anaemia. Excess consumption of tea, alcohol and smoking which were observed more among rural citizens could also be a reason for anaemia. Anaemia can also be a symptoms of other underlying disease.

Cataract was observed among 29 per cent of urban and 34 per cent of rural citizens, and the incidence was more among male citizens (17.5 %) than females (14 %). Cataract is a very common problem in the elderly worldwide as stated by Jacques *et al.* (1991) who had reported that there is a three fold higher risk of central cataract in those with poor vitamin C intake. Purohit (1974) observed that 37.2 per cent of the aged people had cataract in rural Rajasthan and all of them were males. However the data from the present study indicates that cataract is present both in males and females and the variation between the sexes was not conspicuous. The higher prevalence of cataract among rural citizens, could be attributed to Vitamin A deficiency (retinol/carotene) and vitamin C as these are the most limiting nutrients found in rural diets. This could also be due to the poor consumption of meat, egg, milk and fruits. Dietary recall has also revealed that their diets do not supply adequate amounts of vitamin C. It is of significance to note that though non-vegetarian by habit, their diets are predominated by fish and many rural citizens have omitted meat and egg, which might have precipitated the above state of affairs. Bhatt and Dahia (1985) have reported that majority of Indian diets are deficient in Vitamin A. Direct sunlight reaching the eyes of rural respondents, at an younger age can also be one of the reasons for cataract as stated by Natarajan (1999).

Vitamin deficiencies such as angular stomatitis (10 %), Cheilosis (7 %) and spongy bleeding gums (4 %), Glossitis (7 %) furring (4 %), magenta colour tongue (10 %) were observed more among rural citizens. These can be attributed to a diet deficient in water-soluble vitamins. This could also be due to economic constraints, and absence of pharmaceutical vitamin supplements.

Another noticeable observation was that a significant negative relationship (r = -0.247) between physical health characteristics and presence of deficiency manifestations among rural elderly. One or more nutrient deficiencies affects the physical health, as the period of old age is a vulnerable one. Nutritional deficiency contribute to the pathogenesis of a number of common diseases and disease prone condition affects the physical health status of elderly. The use of supplements by urban citizens was found to have a significant influence on the absence of deficiency manifestations ($\alpha^2 = 6.11$). Garry and Hunt (1996) had reported that biochemical assessment of water soluble vitamins in elderly showed good correlation with vitamin intake from diet and supplements and low prevalence of vitamin deficiency diseases. Absence of deficiency diseases ($\alpha^2 = 9.33$) was found among rural citizens who took food from outside as the foods taken from outside may be rich in all nutrients compared to home diets. Frequency of use of fruits ($\alpha^2 = 6.42$), milk ($\alpha^2 = 5.37$) meat ($\alpha^2 = 4.26$) and commercial health drinks ($\alpha^2 = 4.84$) were rare among rural citizens, and this has in turn precipitated the presence of more deficiency symptoms among rural elderly. The above food items are rich in Vitamin A, B and C and these nutrient deficiency diseases were present more among rural citizens.

Diet has been acclaimed to be one of the primary factors that helps to promote growth and maintains life. The adequacy of diet consumed by the elderly can also be estimated through their anthropometric profile. Persons receiving good food and who are maintaining optimal dietary habits are expected to maintain the structure, form and composition of the body, even while aging, when compared to those who have poor dietary pattern (Rosenberg 1994). Hence to find out the adequacy of the diets the anthropometric profile of the subjects were recorded and compared with NNMB (1996) data since no standards were available for comparison. The details pertaining to the nutritional status of elderly subjects as influenced by their diet are discussed below.

There is limited but increasing body of knowledge on the normal status and changes that occur in body size and composition with old age. Anthropometry was used in the study as a tool to measure their nutritional status. Anthropometric data pertaining to weight, height, mid upper arm circumference, triceps skin fold thickness and waist hip ratio of urban and rural citizens revealed interesting facts.

Weight and height measured periodically are simple and useful indicators of body composition. Data on weight revealed wide variation both among urban and rural citizens as shown in Table 40.

According to NNMB (1996) reports the mean weight of rural male and female elderly citizens were 50.4 and 45.1kg respectively. While in the present study the mean weight of rural male was 48.8 kg and female was 50.1 kg. The mean weight of male subjects of this study was found to be lower than that reported by NNMB (1996) and reverse phenomenon was seen among females. This also indicates that rural females had higher body weights compared to their urban counterparts.

Study done by Sarojini *et al.* (1990) revealed the fact that females were found to have lower weight than males but her above observation was inconsistent with the observations made in the present study, where weight of female elderly was more than that of male elderly. However this data is in line with the observation of John (1992). According to the above authors alterations in weight is complex and it differs between sexes, so that men appear to have a slightly lower body weight at 65-78 years than at 40 years of age; whereas women frequently showed an increase in body weight over this period. In the present study men had lesser body weight than women.

Sarojini *et al.* (1990) had reported that the mean weight of elderly subjects in 70's and above was significantly lower than that of 65 to 69 age group. In the present

study the rural data is fairly consistent with the above observation where one could see a decrease in weight with age. But the urban data is contradictory where there is a slight increase in the mean weight of the 71-75 age group, when compared to those belonging to age group of 65-69 years.

Scientific observations have revealed the fact that weight decreases above 70 years which could be attributed to progressive loss of skeletal muscle and also probably fat. This is true for the average population consisting of both men and women. Difference in weight between sexes could be due to their genetic variability, occupational status, personal habits, lack of exercise especially among women. Chumlea *et al.* (1994) writes that body weight is easily affected by short term environmental aspects of life in addition to the effects of acute and chronic diseases or under nutrition. Such factors also might have influenced the body weight of the subjects of this study.

Regarding height, it ranged between 140 cm to 182 cm among urban subjects and between 137 cm to 172 cm among rural citizens. Wide variations in height was noticed among both urban and rural citizens. The mean height among those aged 65-70 and 71-75 was 156.82 and 155.42 among urban citizens and among rural subjects it was 151.42 and 153.20 cm respectively.

John (1992) had reported that most cross sectional data shows a decrease in height, which may be as much as 5 to 7 cm for some groups between 30 and 70 years of age. Among urban population a slight decrease in height was observed in the 71-75 group. Contradictory to this among rural population one could see that the mean height was more in 71-75 group than those in the age group of 65-70.

Data from a study conducted by Sarojini *et al.* (1990) also shows a slight decrease in mean height in the 70-75 age category which was 156.26 cm than in 65-69

age category which was 158.05 cm. This observation is in line with the observation made among urban citizens of the current study.

Several studies reveal the fact that large differences in heights occur with aging. Studies done by Abraham *et al.* (1979) and Rosenbaunm *et al.* (1985) have proven that height decreases with age and weight increases with age.

The sex wise differentiation of data reveals the fact that mean height for urban male and female citizens were 164.3 cm and 156.2 cm and for rural it were 154.3 and 153.4 respectively.

The height of urban and rural male and female citizens were compared with NNMB (1996) data. It was found that for rural citizens, the mean height for males and females were 160 and 147.5 cm respectively while the mean height of males of rural population in the present study was 154.3 cm which was lower than that of NNMB data (160 cm). And the mean height for females in the present study was 153.4 cm, which were greater than that of NNMB data (147.5 cm).

Overall research studies have proven the fact that women were smaller than men. In a study conducted by Sarojini *et al.* (1990) the mean height of elderly male subjects (162.06 cm) was significantly more than females (160.56cm). In the present study also same trend was observed both among urban and rural citizens, where the females had lower height than males.

The data on Body Mass Index of the respondents revealed the fact that 50 per cent of urban and 63 per cent rural citizens were under weight. These low BMI values reflects low body fat reserves and possibly under nutrition. It can be taken as an indication of poor health or as the symptom of aging, or an undiagnosed disease.

The prevalence of obesity was less among urban and rural citizens studied. While in a study conducted by Lisette *et al.* (1992) among elderly in 19 towns of Europe revealed that, the prevalence of body mass indices exceeding 30kg/m^2 was higher. This may be due to their rich food habits, and good living conditions. Citizens belonging to normal weight category was more among urban citizens. A slightly lower BMI was found in the 71-75 category among urban citizens. The mean BMI among rural citizens in the two age groups were same (22.6 and 22.0 respectively).

The sex wise categorisation revealed that the mean body mass index of male citizens were slightly higher in the urban area and the reverse phenomenon was observed among rural citizens. Morley (1993) had reported that older females have a higher body mass index. This finding is in line with the observations made in the present study among rural citizens.

The difference in mean BMI of male and female citizens, could be attributed to variations in energy intake and expenditure, which in turn is controlled by food intake and physical activity. A significant negative correlation was observed between symptoms of ill health and body mass index of both urban ($r = -0.27^*$) and rural ($r = -0.234^*$) citizens. Body weight is easily affected by short term environmental aspects of life in addition to the effects of acute or chronic diseases or under nutrition or malnutrition. Disease can impair absorption as well as bio-availability of nutrients, which in turn might result in under nutrition or malnutrition, thus negatively influencing the nutritional status of elderly. Similar observations were also noted in a study done by Payette and Donald (1994) among 300 elderly respondents in Sherbrooke (Canada).

On analysis the data from the present study revealed that dining out ($\alpha^2 = 6.19$ and $\alpha^2 = 7.54$) and frequency of dining out ($\alpha^2 = 5.62$ and $\alpha^2 = 6.85$) had significant influence on the Body Mass Index, of both urban and rural respondents. Similar

observations were also reported in a study conducted by Irin Rosenberg (1992) among 100 elderly in USA. Hotels, or fast food centers provides food rich in quality and are tasty. Hence those citizens eating from outside frequently may have increased weight, which in turn influences their Body Mass Index.

The number of meals consumed per day ($\alpha^2 = 7.26$) was also found to have a significant bearing on the Body Mass Index, as consuming more meals per day might have contributed to increase in weight, or consuming less number of meals, had resulted in under weight condition, affecting the Body Mass Index.

The upper arm circumference is an integrated measure for the skeletal, muscular and the subcutaneous tissue components. In the present study it was observed that the mid upper arm circumference of the respondents ranged from 19 to 34 cm and 17 to 31 cm among urban and rural respondents respectively.

The mean mid upper arm circumference of respondents in the 65-70 and 71-75 group among urban were 24.4 and 25.3, and among rural it was 23.5 and 22.5 cm respectively. A study done by Sarojini *et al.* (1990) also revealed that the mean mid upper arm circumference in 65-69 group was lower than that of 70-74 group. Urban data of the present study, also reveals the same trend. Muscle wasting found among elderly citizens, due to protein energy malnutrition, may be a reason for low MUAC value in 71-75 group among rural citizens. Higher in weight which was found among urban citizens of 70-75 year old category itself could be one of the reasons for higher mean MUAC value noticed among urban citizens than that of 65-70 year old category.

Among the rural citizens the Mean Mid Upper Arm Circumference for male and female citizens were 23.1 cm and 24.04 cm and when these values were compared with

NNMB (1996) values for rural Keralites (24.8 cm and 24.3 cm) it was found that the rural male citizens in the present study had slightly lower mean values when compared to NNMB data for rural males. But the females of the present study and those of NNMB study had comparable mean values.

But Sarojini *et al.* (1990) found that the Mean Mid Upper Arm Circumference were similar for both sexes studied (23.89 and 23.49 cm).

Measurements of skin fold thickness gives an indication of how much energy reserves are available in the body. These reserves are in the form of fat and are mainly found at the subcutaneous layer of the body. The skin fold thickness ranged between 9.5mm –22 mm for urban dwellers and 8.0 mm –16.5 mm for rural dwellers.

When the mean value for Triceps skinfold thickness of two age groups were examined it, were 14.0 and 13.3 mm for urban and 13.6 and 12.7 mm for rural citizens. A significant negative influence of age on triceps was noted both among urban (r = -0.26) and rural (r = -0.198) citizens. Similar observation was also noted by Sarojini *et al.* (1990) Bishop *et al.* (1981) and Burr and Philips (1984). The fat fold thickness decreases as age advances.

Progressive reduction in intake of energy may be the reason for lower fat fold thickness as age advances. Chumlea *et al.* (1984) have reported that there is loss of muscle tissue and redistribution of fat to the trunk with aging. They have also stated that changes in body composition and adipose tissue distribution with age may be associated with changes in various physiologic functions that affect metabolism, nutrient intake, physical activity and chronic diseases. Chumlea and Guo (1992) opined that changes in fat free mass and total and percent body fat may also be due in part to decreased levels of physical activity in elderly persons.

The mean triceps skin fold thickness values for male and female citizens in urban and rural areas were 14.48 and 14.64 and 13.32 and 14.38 mm respectively. Though there was no sex based difference in the TST values among urban population, among the rural citizens, females (14.38) had slightly higher fat fold than males (13.32 mm). Lisette *et al.* (1992) has also reported that women had thicker triceps skin fold than men.

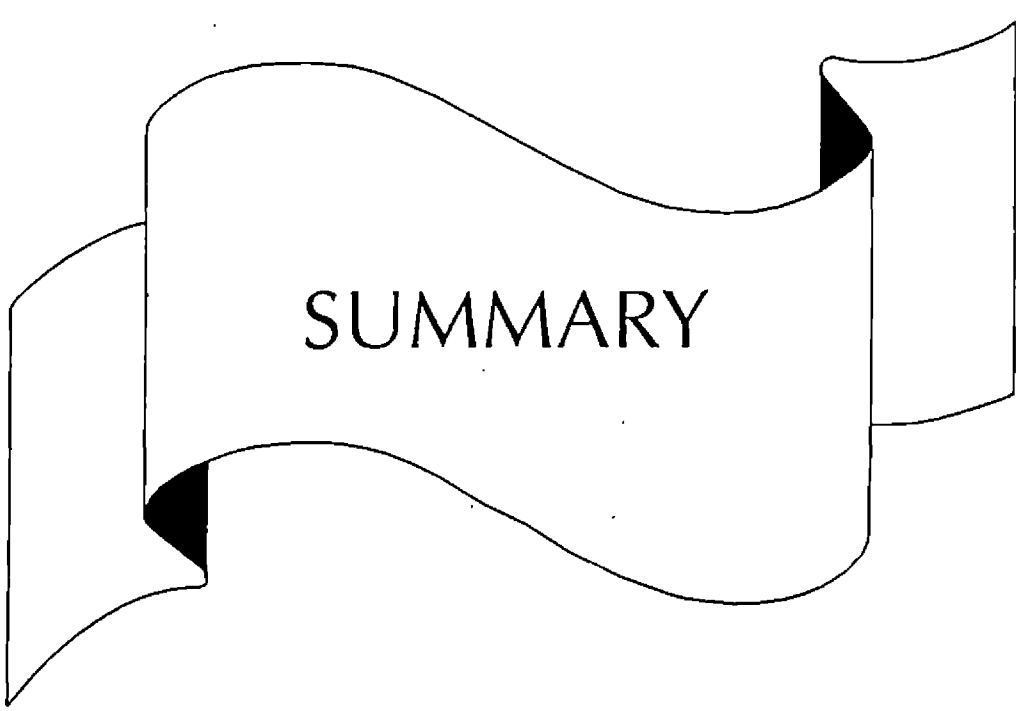
When rural TST mean values were compared with NNMB (1996) data for rural Keralites it was found that NNMB values for males were 8.5mm and for females it was 13.3 mm. In the present study also females had slightly higher TST (14.38mm) than men (13.32 mm). Noticeable difference was found in the mean triceps value in rural males, when the NNMB data was compared with values obtained in the present study. This may be attributed to the variation in nutritional status, and physical activity of the respondents. Lower physical activity and positive energy balance among females may be the reason for them to have thicker triceps.

The waist hip ratio(WHR) is used for measuring abdominal obesity and gluteal femoral types of obesity. The mean waist hip ratio of urban and rural citizens of the two age groups were 0.81 and 0.79 and 0.80 and 0.75 respectively. A decrease in the waist hip ratio with increase in age was noticed both among urban and rural citizens. This may be due to muscle wasting. But when the sex wise data were examined the mean WHR for male and female citizens in urban and rural area were 0.81 and 0.83 and 0.77 and 0.81respectively. It was seen that the female citizens of both urban and rural area had higher waist hip ratio than the males.

But in a study conducted by Lisette (1992) in Europe it was found that women had lower waist hip ratio than males, which is contradictory to the findings of the present study. This variation could be attributed to variation in the physical characteristics and dietary habits of the subjects who belong to two different parts of the world.

Analysis of the dietary data revealed that the habit of dining out was found to have significant impact on the waist hip ratio among urban respondents ($\alpha^2 = 11.05$). This may be due to consumption of energy dense foods from restaurants.

Thus we may assume that the commonly accepted anthropometric indicators of nutritional status such as height, weight, MUAC and TST are influenced by both food intake as well as non-nutritional factors such as diseases, climate, living conditions and other environmental factors which changes the body composition with advancing age.


SUMMARY

6. SUMMARY AND CONCLUSION

The study entitled "Dietary habits of senior citizens" was carried out to assess the existing dietary habits of rural and urban senior citizens as influenced by psychological, economic, physical and physiological factors.

The study threw light on the socio-economic, functional, psychological, clinical, anthropometric status of the subjects and their perception about their own health in general along with their daily meal pattern, frequency of use of foods, foods preferred and the dietary modifications made by them as a result of aging.

Two hundred elderly citizens in the age group of 65 to 75 years from urban (100) and rural (100) area of Thiruvananthapuram were selected through purposive sampling technique from the electoral roll of Trivandrum constituency. Subjects of both sexes were included in the study.

It was found that 67 per cent of urban as well as rural citizens belonged to the age group of 65-70 and the remaining 33 per cent belonged to 71-75 age category. Male citizens predominated in urban area (60 %) than in rural area (49 %), while the distribution of male and female subjects (51 %) were somewhat similar in rural area. When the marital status of urban and rural citizens were examined it was found that 54 per cent were married and were living with their spouse, while among rural citizens 40 per cent were married and were living with their spouse. There were an equal number of male (18 per cent) and female subjects (19 per cent) who were widowed. But widowhood was seen

more among rural subjects (42 per cent) when compared to urban citizens (33 per cent) while it was found that 5 per cent of rural citizens and 2 per cent of urban citizens were not married.

Urban data reveals the predominance of Hindus (72 per cent) and in rural area there were more Christians (51 per cent). Most of urban citizens belonged to forward caste while in the rural area there were more subjects belonging to Scheduled and Backward groups. Most of urban citizens belonged to nuclear families while most of rural citizens belonged to joint families.

Regarding the economic status of the urban and rural respondents it was noted that 17 per cent of the rural subjects had no income of their own. The monthly income varied from Rs. 1000 to Rs. 6000. It was found that 63 per cent of urban respondents earned an income above Rs. 3000, while only 6 per cent of rural respondents earned an income above Rs. 3000. Seventeen per cent of female subjects earned no income of their own.

Enquiry on the educational status crystallized the fact that 17 per cent of respondents from rural area, were illiterate while 55 per cent of the urban senior citizens had college level of education. Male subjects had higher educational status than the female counterparts. There was no major variation in the number of elderly citizens currently employed, from rural (45 %) and urban areas (49 %). However most of the females (78 %) were found to be unemployed; while 60.4 per cent of male senior citizens were found to be currently employed in business while 7 per cent of urban and 9 per cent of rural citizens were involved in managing their own agricultural land.

Economic liability was found to be more among rural families (53 %) than urban families. This liability also affects the steady flow of income, which increases their

dependency. The economic position of the urban respondents were better off than rural respondents and 60 per cent of rural families belonged to low income families. The hand to month existence was precipitated by lack of savings coupled with borrowing money, which brought in economic instability. The socio-economic problems among rural families are aggrevated by the seasonality of employment. Thus the state of poverty is in turn reflected in their meal pattern and frequency of use of various foods.

The above mentioned economic factors have negatively affected the nutritional status of elderly. It was found that majority of rural respondents have modified their diet according to their level of income.

Though all the urban (100 %) and 83 per cent of rural respondents had some source of income, only 62 per cent of urban and 40 per cent of rural citizens had the freedom to spent money, and they had to depend on other family members to meet their personal needs. It was found that 25 per cent of urban and 17 per cent of rural subjects had their personal expenditure above Rs. 500 per month.

The facts indicated that there was major variations between rural and urban elderly, as well as male and female elderly, as far as their economic, social and personal profile were examined, which were found to influence their dietary pattern directly and or indirectly.

As the major objective of the study was to assess the food habits of the senior citizens, the dietary habits of these senior citizens were analysed, in relation to their social, functional and mental status. The study revealed that 65 per cent of urban and 95 per cent of rural citizens were non-vegetarians. Majority of urban (85 %) and rural citizens (86 %) took meals three times a day. It was found that 60 per cent of urban and 30 per cent of rural reported variation in the meal pattern within the day of which lunch was the

heaviest, dinner or breakfast being the lightest meals. The urban data revealed that only 43 per cent of urban and 12 per cent of rural had specific time schedule for taking the major meals.

Regarding the frequency of use of different food groups, it was found that cereals (rice) were used daily by all urban and rural respondents and pulse consumption was found to be comparatively lesser among rural citizens. Majority of urban respondents (51 %) consumed green leafy vegetables. Regarding the frequency of use of foods, the daily used foods were rice, vegetables, tea/coffee among urban dwellers and among rural citizens it were rice, green leafy vegetables, roots and tubers, fats and oils, sugar and jaggery, fish, tea/coffee. While moderately used foods were wheat, milk, fats and oils, sugar, fish and commercial health preparations, among urban citizens. Less frequently used foods among urban respondents were fruits, milk products, egg, bengal gram whole, black gram, green gram, red gram dhal and green leafy vegetables, while among rural groups black gram, milk and vegetables were the less used foods. Least frequently used foods among urban citizens were semolina, maida, green gram dhal, roots and tubers, nuts and oil seeds, meat and bakery items. While among rural citizens it were semolina, maida, bengal gram whole, green gram, green gram dhal, fruits, nuts and oil seeds, milk products, egg, meat and commercial health preparations.

In the morning, 80 per cent of urban respondents consumed cereal preparations along with a side dish containing coconut with tea/coffee/milk. While 73 per cent of rural subjects preferred rice preparations. Wheat preparations were also included by eight per cent each of urban and rural citizens. Five per cent of urban and three per cent of rural subjects were found to skip breakfast. For lunch rice, fish curry and a vegetable preparation were the items for 52 per cent of urban subjects, while rice, a vegetable preparation and coconut preparation along with curd formed the components of lunch of 29 per cent of urban citizens. Fourty seven per cent of rural had rice, tapioca, fish curry

and a coconut preparation another, 34 per cent took rice, fish curry and a leafy vegetable preparation for lunch. For dinner, 22 per cent consumed rice gruel, green gram and a vegetable preparation. Wheat gruel (6 %) or preparations such as idli, dosa or steam cake were consumed by 41 per cent of urban subjects. Thirty eight per cent also used steamed items specially during diner since they found it easy to digest especially at night. Twenty eight per cent consumed semiliquid/liquid diet at night to facilitate easy digestion. It was found that special preference for foods/preparations were exhibited by 42 per cent of urban and 21 per cent of rural citizens. While the menu for lunch and dinner were same for 61 per cent of rural respondents, the habit of dining out was found among 15 per cent of urban and 30 per cent of rural citizens.

Though the above mentioned facts gives an insight to the general current dietary habits of urban and rural subjects, it was noticed that several of the subjects seemed to have made modifications in their diet over the past years to suit the changes imposed by aging. It was found that majority of urban citizens (64 per cent of urban and 28 per cent of rural subjects) had modified their diet due to disease while 60 per cent of rural respondents reported that they have modified their diet due to socio-economic constraints. About 40 per cent of rural and 20 per cent of urban elderly reported that due to physical problems such as dental status, loss of vision, tremor of hands, inability to get in and out of bed they have modified their diet pattern. The result indicated that three to five per cent of the subjects have made changes in their diets due to socio-cultural problems(inadequate cooking skills) or due to religious reasons (fasting).

The subjects had reported that they had made changes in the consistency of food stuffs to suit to their physical as well as physiological conditions or due to psychological problems imposed by loneliness, change of place of residence and mental disorders. It was found that 88 per cent of urban and 81 per cent of rural had made

modifications in consistency of the food. They consumed steamed items, which are easy to swallow. Modifications in consistency was made more by urban citizens than by rural citizens.

Factors such as personal habits, psychological, social, clinical and perception about health were found to influence the dietary habits of senior citizens. The study revealed that citizens belonging to the age group of 65-70 were in the habit of taking exercise. But it was found that 55 per cent of rural citizens were involved in greater physical activity in the form of employment (as labourers) rather than resorting to doing any type of regular exercise. However exercise was found to have no statistically significant influence on the dietary pattern of the elderly. Alcohol consumption was found more among of rural citizens, than urban dwellers and alcohol consumption habit was found to have a statistically significant influence on the number of meals consumed both by urban and rural citizens. It was further noticed that the habit of dining out had profound significant influence on alcohol consumption. Regarding smoking which was found more among rural citizens it was found that smoking had contributed to respiratory problems which has negatively affected their health. However smoking habit had no significant influence on the dietary habits. The tobacco chewing habit found more among rural females also did not show any influence on the dietary habits studied.

The influence of dietary habits of the elderly and its adequacy on the health of the subjects were examined through anthropometric and clinical examination. It was found that both urban and rural citizens in the 65-70 age category had similar mean weights and those citizens in urban 71-75 category had better weight status than 65-70 age group. Urban males and females were better in height and weight than the rural citizens. Underweight was found more among rural citizens. Better anthropometric standards can be taken as an indication of nutritional adequacy as well as a reflection of acceptable dietary habits. This has been proven from the fact that those who had inadequate dietary

pattern had poor stature as well as has poor clinical scores and low scores for physical health.

The clinical status of the subjects when evaluated indicated the prevalence of locomotor, cardiovascular and endocrine system disorders more among urban citizens and problems related to respiratory, nervous, gastro-intestinal and urogenital more among rural citizens. Female citizens were more prone to problems of locomotor, nervous and urogenital systems while cardiovascular, respiratory and endocrine problems were more among males. It was observed that more of male citizens were affected by diseases than the female. It was also noted that as the result of health problems like cardiovascular and endocrine disorders more of the urban citizens have made changes in their dietary pattern.

Lack of proper diet may lead to deficiency disorders. Clinical examination of the elderly subjects for deficiency manifestations revealed the fact that more of rural respondents were anaemic than their urban counter parts. Incidence of cataract, angular stomatitis and cheilosis, were also more among rural citizens. Low scores obtained for physical health and high scores for the incidence of deficiency manifestations revealed that rural male subjects had poor health compared to urban and female subjects. This is further established by the anthropometric parameters where the rural men had poor body stature than their urban counterparts. This could all be due to poor dietary habits and negative personal habits. This fact is further established from the information that the rural citizens had poor diet lacking in milk, vegetables, egg and pulses. Moreover the habit of smoking, and drinking of alcohol were also common among rural male elderly which would have contributed to poor food intake and poor health.

Regarding physical health, it was found that more of rural subjects (39 per cent) reported that they have poor health compared to urban subjects (33 per cent). Sex based differentiation based on perception about physical health revealed that 49.4 per

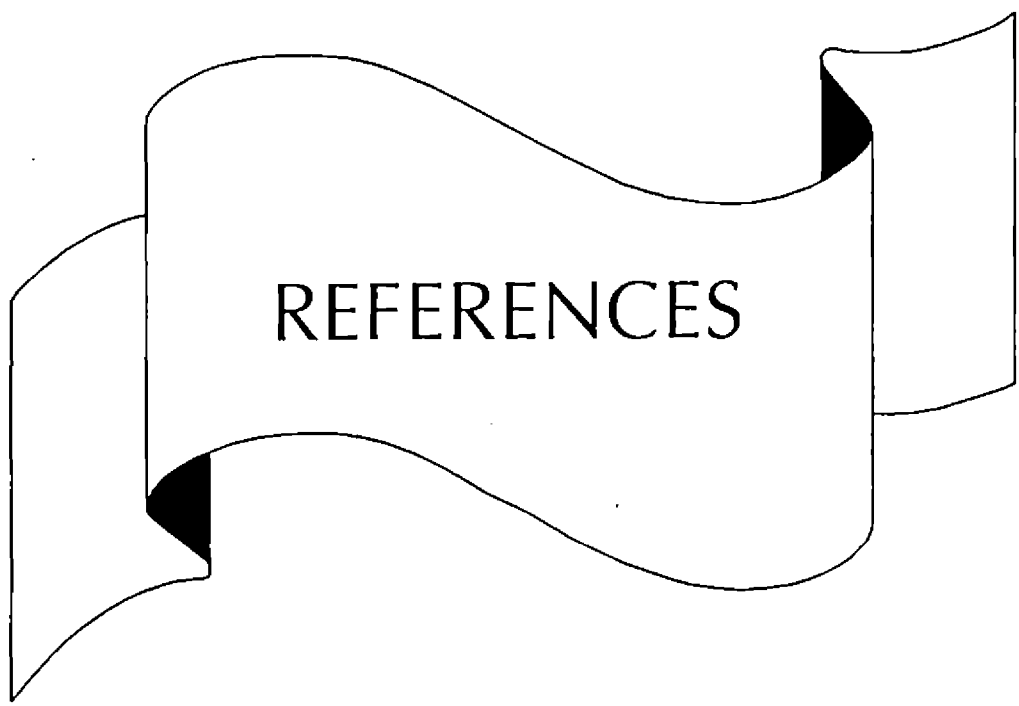
cent of females and 27 per cent of males reported that their health was poor. But the perception of health of the individual citizens when analysed revealed that 49.9 per cent of females reported that their health to be "poor" as against only 27 per cent of males. A significant association was observed between perception of health and current dietary pattern among urban and rural citizens. Those who had a better perception of health went out to eat more frequently.

Regarding the psychological status grouped into four domains (Physical, psychological, social and environmental) it was found, that urban subjects had higher scores for physical, social and environment domains; rural subjects had higher scores for psychological characteristics. A highly significant positive correlation was also observed between perception of respondents about their health and their Physical Activities of Daily Living (PADL). The environment in which the subjects were living (urban and rural) was found to have a significant positive influence on their perception about health. This means that the urban citizens had a better perception about their health, and they reported their health to be "good". A significant and positive association was also observed between psychological status of the elderly and their perception about health.

It was found that daily consumption of milk and commercial health preparations, egg and supplements significantly and positively influenced the health of urban respondents while less consumption of milk, commercial health preparations and supplements, meat and egg, have negatively influenced the health status of rural respondents.

Regarding the functional ability, the urban citizens had a slightly higher mean score than rural citizens, for IADL, but the capacity for performing various physical activities were same for urban and rural citizens. The use of supplements and the habit of dining out had no significant influence on PADL of urban citizens while the number of meals taken was found to have a significant influence on the IADL of rural citizens.

In a nut shell, the study revealed that the urban citizens were economically well off, their personal habits (like alcohol consumption, smoking and tobacco use) were better; their perception about their health was found to be better than rural citizens. Their physical health, social relationships, environment in which they are living were also found to be better. Their functional ability (such as IADL scores) were relatively higher than rural citizens. They had better anthropometric indicators too. All this could be due to good dietary habits practiced by them. Though they had made dietary modifications their diet the urban subjects had simple and adequate diet when compared to rural citizens. Female citizens in the present study had higher body weight than male citizens and had low levels of degenerative and deficiency diseases. But they found difficulty in performing strenuous activity, and their functional ability was less when compared to male citizens. This could be due to the prevalence of locomotor problems among them. The study ultimately reveals the fact that the diet consumed by the elderly subjects were moderately balanced, and their dietary habits were influenced primarily by their economic status and secondarily by their living arrangements. The support received from the family had significant influence on the dietary pattern of the subjects. The dietary habits of the urban subjects were profoundly influenced by their perception about their health as well as by the health problems that they have such as cardiovascular diseases or diabetes. However, psychological or functional factors were not found to significantly influence the dietary pattern of the elderly.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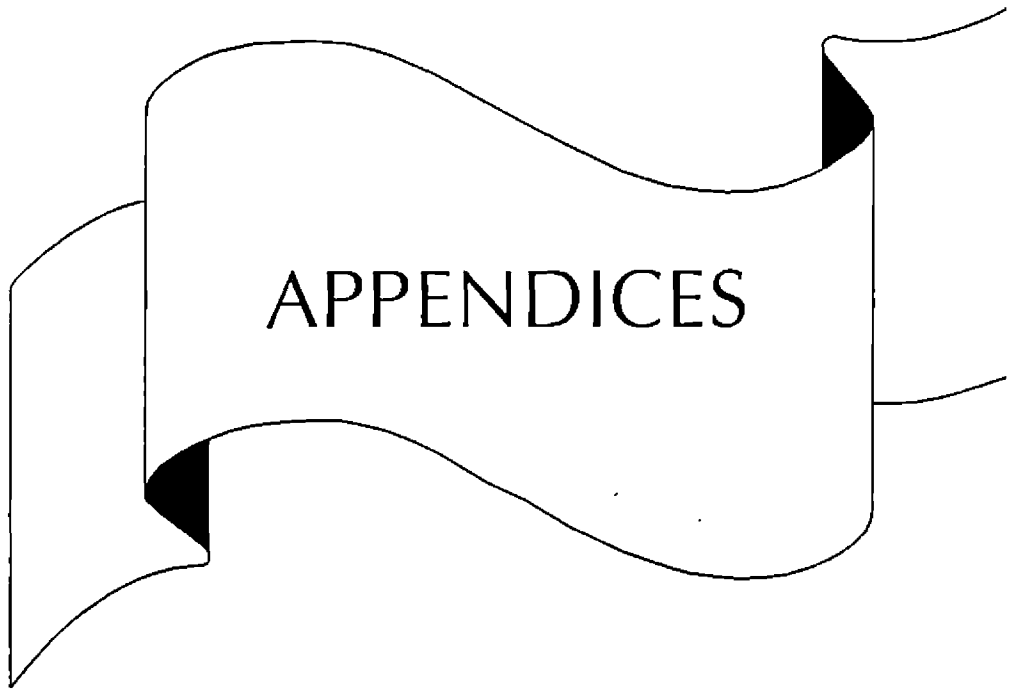
APPENDICES

APPENDIX - I

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE
DEPARTMENT OF HOMESCIENCE, VELLAYANI

QUESTIONNAIRE TO ELICIT INFORMATION ON THE SOCIO-ECONOMIC STATUS OF THE SENIOR CITIZENS

1. Name of the respondent :
2. Full Address :
3. Age (Actual) :
4. Date of Birth :
5. Sex :
6. Marital status :
7. Educational status :
8. Place of residence :
9. Religion :
10. Caste :
11. Employment status
    (a) The type of employment you were involved in the past :
    (b) Current employment status(if any) :
12. Financial status
    (a) Income per month from the current employment (Actual) :
    (b) Other sources of income :
    (c) Present personal income from all the sources (Rs./month) actual :
    (d) Do you have the freedom to spend money :
    (e) If you are financially dependent on other family members, then specify the degree of dependence :
    (f) Who decides on spending of your income :
13. Personal expenditure pattern

Items	Rs/month
Cigarettes	
Alcohol	
Travelling	
Cosmetics	
Medicine	
Contribution to household	

14. Savings

(a) Do you have the habit of saving :
  (i) If yes, mention the nature of saving :
  (ii) Frequency of saving :
  (iii) Amount saved (actual) :

15. Assets

(a) Do you possess any personal assets :
  (i) If yes, give details of assets :
  (ii) Who manages the property :

16. Liabilites

(a) Do you have any financial liabilities :
(b) If yes, give details

Type of liability	Amount Total	Amount Repaid	Amount to be repaid
(i) Debt			
(ii) Loan repayment			
(a) House loan			
(b) Vehicle loan			
(c) Land loan			
(d) Any other specify			

17. Housing

(a) With whom are you staying with :
(b) Is it your own house :
(c) If no, then whose house is it :
(d) Number of rooms in the house :
(e) Do you and your spouse have a room for sleeping and for personal use :
(f) Are you satisfied with the facilities in the house/room :

18. Social life style

(a) How many close friends do you have :
(b) What is the frequency of meeting with them :
(c) Mention the activities you participate with them :
(d) Mention the matters you discuss with them :
(e) Do you engage in any social/voluntary service in the community :
(f) How do you spend your leisure time in the house :

APPENDIX - II

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE
DEPARTMENT OF HOME SCIENCE, VELLAYANI

QUESTIONNAIRE TO ELICIT INFORMATION ON THE SOCIO-ECONOMIC BACKGROUND OF THE WHOLE FAMILY

1. Type of family :
2. Family size :

(a)

Member	Number (Actual)
a. Adults	
Male	
Female	
b. Children	
Male	
Female	
Total	

(b) Composition of the family (Actual Number)

Sl.No.	Relationship with respondent	Sex	Age	Educational status	Occupational status

3. Sources of Income :
4. Total family income (actual) :
5. Family expenditure pattern monthly (actual income)

Items	Rs/month
1. Food	
2. Clothing	
3. Housing	
4. Education	
5. Transport	
6. Medicine	
7. Doctor	
8. Fuel	
9. Electricity	
10. Savings	
11. Luxuries	
12. Entertainment	

6. Food expenditure pattern (Actual amount)

Items	Rs/month
1. Cereals	
2. Pulses	
3. Green leafy vegetable	
4. Other vegetables	
5. Roots and tubers	
6. Milk	
7. Meat	
8. Fish	
9. Fats and Oils	
10. Beverages	
11. Sugar and Jaggery	
12. Bakery products	
13. Health drinks	

7. Savings

(a) Does the family possess any savings :
(b) If yes, the nature of saving :
(c) The frequency of savings :

8. Assets

(a) Does the family possess any assets :
(b) If yes, give details :

9. Liabilities

(a) Does the family possess any financial liabilities :

10. Housing

(a) Nature of house :
(b) Source of lighting :
(c) Source of water :
(d) Availability of drainage system :
(e) Availability of latrine facility :
(f) If yes, give details :

11. Social life style

(a) Does the family members engage in any social activities or voluntary activities :

APPENDIX - III

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE
DEPARTMENT OF HOME SCIENCE, VELLAYANI

SCHEDULE TO ELICIT INFORMATION REGARDING THE PERSONAL HABITS OF RESPONDENTS

1. Are you in the habit of taking exercise ? Yes / No
2. If yes, occasionally / regularly.
3. What is the duration of exercise ?
   a. > 30 minutes
   b. 30 minutes
   c. one hour
   d. 1-2 hour
   e. 2-3 hour
   f. more than 3 hour
4. Do you take alcohol ? Yes / No
5. If Yes, occasionally / regularly.
6. The quantity of alcohol in ml?
   a. below 100
   b. 101-200
   c. above 200 ml
7. Do you smoke? Yes / No
8. If Yes occasionally / regularly
9. Do you use tobacco ? Yes/No
10. If yes, occasionally/regularly.

APPENDIX - IV

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE
DEPARTMENT OF HOME SCIENCE, VELLAYANI

DIETARY HABITS PROFORMA

MEAL PATTERN

1. What is your current dietary pattern?

   1. Vegetarian 2. Non-vegetarian 3. Lacto-vegetarian 4. Ova-vegetarian

2. Give details of your current dietary pattern, specify to which category do you belong now.

3. How long since you have been practicing this dietary pattern?

4. If you had a different dietary pattern earlier give the reason for changing the meal pattern?

   1. Due to disease
   2. Due to psychological / physical problems
   3. Due to changes in socio-economic status
   4. Self imposed control
   5. Due to the feeling that it is better to change the style as one is getting old.
   6. Due to religions considerations.

5. How many times do you take your meals?

   1. two times
   2. three times
   3. four times
   4. five times
   5. six times
   6. more than six times a day.

6a. Besides consuming major meals do you take any foods in between the major meals?
1) Yes 2. No.

6b. If yes, what are they?

7a. Just before consuming one of the major meals do you take any other items?

   1. Always
   2. Occasionally
   3. very often
   4. not at all.

7b. If you take them, what are they ?

8a. Just after consuming the major meals do you take nay other items ?

   1. Yes 2. No

8b. If yes, what are they ?

9a. Is there a variation in the heaviness of your meal in a day?

1. Yes 2. No

9b. If yes, which is the heaviest meal?

1. breakfast
2. lunch
3. snack
4. dinner

9c. Which is the lightest meal?

1. breakfast
2. lunch
3. snack
4. dinner

10. Are you in the habit of taking any of the following supplements?

1. vitamin/mineral tablets
2. ayurvedic medicine
3. health tonic
4. others specify

11a. Do you go out to eat? 1. Yes 2. No

11b. If yes, how frequency do you eat out?

12a. Do you have a specific time schedule for taking meals?

1. Yes 2. No

12b. If yes, state the timings

Meal	Timings
Early morning	
Breakfast	
Lunch	
Tea	
Dinner	
Other meals (specify)	

12c. How much time do you spend to eat your meals?(minutes)

Breakfast
Lunch
Dinner
Other meals

12d. Do you have special utensils for eating foods?

	Yes	No	If yes, what utensils(specify)
breakfast			
lunch			
dinner			

Food preferences, selection or choice

1. Do you strongly prefer some foods?

   1. Yes 2. No

   If yes what are they (tabulate) (food preparations)

2a. Do you consume the preferred foods or preparations frequently?

   1. Yes 2. No

2b. If yes how often?

Foods		Preparation	
Daily		Weekly	Monthly
1 2 3 4		1 2 3	1 2 3 4 5 6

2c. If no give reason?

3. Do you strongly dislike some preparations? 1. Yes 2. No

4a. Does the food price have only effect on the items included in your diet? Yes / No

4b. If no why?

5a. Are your allergic towards any of the foods ?

   1. Yes 2. No

5b. If yes, specify the foods?

6a. Do you restrict any foods in your diet?

   1. Yes 2. No

6b. If yes, select the foods/item that you restrict and give reasons?

7. Do you select your own food?

   1. Yes 2. No

8. If no, who selects or decides, your daily diet, and why?

9. Do you eat only the foods that are familiar?

   1. Yes 2. No

10. Who cook the food for you?

1. My wife	2. Myself	3. Daughter	4. Daughter-in-law
5. Relatives	6. Servants	7. Others specify.	

11. Where do you take your foods?

1. Living room	2. In one's room	3. Kitchen	4. Others specify

12. With whom do you take your food?

1. With my kins	2. With my spouse	3. daughter & sons	4. Relatives
5. alone (specify)	6. Others		

V. Food preparations used

1. What do you feel about the preparations included in your daily diet?

   1. Monotonous 2. Variable

2. What is the type of cooking method that you prefer for cooking different foods that you consume every day?

	Reason
1. Cereals	
2. Pulses	
3. Green leafy vegetables	
4. Other vegetables	
5. Roots & Tubers	
6. Fleshy foods	
7. Egg	
8. Milk	

1. Boiling	2. Steaming	3. Excess water & Boiling
4. Streaming	5. Pressure cooking	6. Deep frying
7. Baking	8. Shallow frying	9. Others (specify)

3. Which are the most common methods used in preparation of your meals?

   Breakfast, Lunch, Dinner

Give the food that you had consumed for the past three days.

	Breakfast	Lunch	Snack	Dinner
I st Day				
II nd Day				
III rd Day				

Dietary modifications as result of ageing

1a. Do you have any social/ cultural/ or economic problems?

   1. Yes 2. No

1b. Because of such problem have you made any changes in your dietary?

1. Yes 2. No

If yes

1c. Economic Problem	Change in dietary pattern & reason	How long change happened
1. Lack of income 2. Poverty. 3. Low purchasing power		

1d. Socio-cultural problem	Change in dietary pattern & reason	How long change happened
1. Inadequate cooking Facility 2. In adequate cooking Skills		

2. As a result of physical changes associated with ageing have you made any changes in your dietary pattern

1. Yes 2. No

If yes

Physical change	Change in dietary Problem	How long change has been made
Loss of teeth Difficulty in swallowing Tremor of hand Loss of vision Inability to prepare food Not able to eat independently Not able to move around Not able to get up from bed Any other (specify)		

3a. Do you have any psychological problems?

1. Yes 2. No

3b. If yes have you made any changes in dietary pattern because of the above problem

1. Yes 2. No

If Yes

Psychological change	Changes in dietary pattern	For how long change happened
Depression		
Loneliness		
Social isolation		
Change of place of residence		
Loss of interest in food or cooking		
Mental disorders		
Loss of spouse		
Any other (specify)		

4a. Have the religions practices that you follow has made any change in your dietary pattern during old age

1. Yes 2. No

4b. If Yes

Religious practices	Changes in food pattern habit

5a. Has any of the disease or illness altered your food pattern 1. Yes 2. No

5b. If Yes

Nature of disease	Changes in dietary pattern	For how long change happened

6. Due to aging what the changes that you have made in consistency of food stuffs in the major meals?

7. Do you have any other food related problems?

1. Yes 2. No

8. If yes, what are they?

Frequency of use of foods in daily diet of individual

Food Groups	Daily	Weekly	Monthly	Occasionally	Never
Cereals					
Rice					
Wheat					
Semolina					
Maida					
Ragi					
Pulses					
Bengal gram whole					
Black gram					
Green gram					
Green gram dhal					
Red gram dhal					
Green leafy vegetables					
Other vegetables					
Roots & Tubers					
Fruits					
Nuts					
Oil seeds					
Milk					
Milk products					
Fats & Oils					
Sugar & Jaggery					
Egg					
Meat					
Fish					
Beverages tea/ coffee					
Commercially					
Health preparations					
Bakery items					

APPENDIX - V

ANTHROPOMETRIC MEASUREMENTS OF URBAN RESPONDENTS (HEIGHT, WEIGHT AND BODY MASS INDEX)

Sl. No.	Weight (kgs)	Height (cm)	BMI	Sl. No.	Weight (kgs)	Height (cm)	BMI
1.	65	1.54	27.0	51.	51	1.60	24.9
2.	55	1.62	20.9	52.	50	1.50	22.7
3.	45	1.45	21.4	53.	60	1.53	26.0
4.	50	1.64	18.6	54.	55	1.50	25.0
5.	50	1.50	22.2	55.	42	1.45	27.0
6.	60	1.58	24.0	56.	58	1.80	28.1
7.	85	1.68	30.4	57.	44	1.49	19.8
8.	54	1.55	22.5	58.	45	1.42	22.5
9.	68	1.62	20.6	59.	50	1.65	18.5
10.	54	1.60	21.6	60.	51	1.60	24.9
11.	60	1.65	22.2	61.	58	1.65	24.2
12.	52	1.64	19.3	62.	55	1.60	26.6
13.	65	1.50	29.5	63.	42	1.46	25.0
14.	65	1.68	23.2	64.	48	1.55	20.0
15.	45	1.58	18.8	65.	55	1.47	26.1
16.	64	1.50	20.2	66.	55	1.50	25.0
17.	69	1.88	21.6	67.	52	1.60	24.1
18.	50	1.50	22.8	68.	64	1.78	24.1
19.	40	1.46	19.4	69.	45	1.58	27.8
20.	75	1.58	31.3	70.	55	1.47	26.1
21.	57	1.70	20.4	71.	55	1.50	25.0
22.	45	1.49	20.4	72.	40	1.46	26.0
23.	55	1.50	25.0	73.	49	1.48	25.2
24.	65	1.50	29.5	74.	45	1.42	28.1
25.	45	1.40	22.9	75.	50	1.53	25.0
26.	45	1.42	26.4	76.	58	1.50	26.3
27.	40	1.53	17.3	77.	52	1.62	27.0
28.	55	1.47	26.1	78.	40	1.58	16.6
29.	45	1.40	22.9	79.	42	1.62	16.2
30.	66	1.64	25.4	80.	45	1.68	16.0
31.	71	1.68	25.4	81.	49	1.48	23.3
32.	59	1.64	25.5	82.	45	1.58	18.8
33.	76	1.73	26.2	83.	40	1.46	19.1
34.	55	1.50	25.0	84.	55	1.50	25.0
35.	42	1.61	16.8	85.	55	1.50	25.0
36.	34	1.45	16.1	86.	50	1.60	19.5
37.	40	1.50	18.2	87.	50	1.61	19.3
38.	39	1.50	17.7	88.	70	1.50	31.8
39.	64	1.78	20.6	89.	40	1.46	26.0
40.	53	1.62	20.4	90.	47	1.55	19.5
41.	52	1.63	20.0	91.	73	1.56	30.4
42.	58	1.50	22.7	92.	40	1.51	18.2
43.	40	1.46	19.1	93.	60	1.72	20.6
44.	59	1.70	21.0	94.	50	1.46	23.4
45.	70	1.73	24.1	95.	52	1.63	20.0
46.	50	1.50	22.7	96.	51	1.50	24.9
47.	80	1.54	30.2	97.	50	1.50	22.8
48.	50	1.57	20.8	98.	54	1.50	24.5
49.	42	1.62	16.1	99.	59	1.64	25.5
50.	56	1.82	16.9	100.	66	1.64	25.4

APPENDIX - VI

MEASUREMENTS OF URBAN RESPONDENTS (MID UPPER ARM CIRCUMFERENCE, WAIST HIP RATIO (WHR), TRICEPS SKINFOLD THICKNESS) [N=100]

Sl. No.	MUAC (mm)	WHR	TSF (mm)	Sl. No.	MUAC (mm)	WHR	TSF (mm)
1.	27.0	0.83	12.0	51.	25.5	0.89	7.0
2.	26.0	0.80	10.0	52.	20.0	0.80	9.0
3.	26.0	0.84	9.0	53.	26.0	0.88	13.0
4.	26.4	0.90	10.2	54.	25.0	0.89	12.0
5.	26.0	0.85	12.0	55.	21.0	0.75	9.0
6.	27.0	0.85	13.0	56.	23.0	0.84	12.0
7.	34.0	0.93	15.0	57.	22.0	0.79	10.0
8.	26.0	0.92	12.0	58.	22.0	0.78	10.0
9.	31.0	0.73	13.0	59.	23.0	0.82	12.0
10.	26.0	0.93	11.0	60.	25.5	0.86	11.0
11.	27.0	0.85	13.0	61.	24.2	0.85	12.0
12.	26.5	0.87	14.0	62.	25.5	0.85	10.0
13.	29.0	0.90	13.0	63.	20.0	0.81	9.0
14.	29.0	0.89	14.0	64.	21.0	0.82	10.0
15.	24.3	0.84	9.0	65.	22.0	0.84	11.0
16.	29.0	0.90	11.0	66.	22.0	0.91	11.0
17.	26.0	0.91	16.0	67.	23.0	0.84	10.0
18.	26.0	0.82	10.0	68.	32.0	0.89	13.5
19.	22.5	0.83	10.0	69.	24.0	0.78	9.0
20.	30.0	0.79	15.0	70.	25.0	0.78	13.0
21.	23.0	0.78	10.0	71.	24.8	0.79	12.0
22.	22.0	0.71	8.0	72.	22.6	0.82	10.0
23.	25.5	0.78	11.0	73.	23.3	0.88	12.0
24.	28.0	0.90	12.0	74.	22.3	0.78	12.0
25.	21.2	0.74	8.0	75.	25.0	0.90	12.0
26.	24.0	0.85	9.5	76.	29.5	0.92	13.0
27.	23.0	0.72	7.0	77.	23.0	0.84	12.0
28.	27.0	0.83	11.0	78.	21.0	0.80	9.0
29.	23.0	0.87	9.0	79.	20.3	0.80	10.0
30.	24.0	0.86	13.0	80.	20.0	0.83	10.0
31.	28.0	0.88	15.0	81.	22.0	0.86	11.0
32.	25.5	0.80	13.0	82.	22.5	0.88	12.0
33.	24.0	0.89	16.0	83.	20.0	0.76	8.0
34.	25.0	0.86	13.0	84.	22.0	0.86	13.0
35.	20.0	0.72	9.0	85.	23.0	0.84	13.0
36.	20.5	0.73	7.0	86.	22.0	0.82	12.0
37.	22.0	0.83	10.0	87.	21.0	0.83	11.0
38.	22.0	0.90	8.0	88.	28.0	0.89	16.0
39.	29.5	0.88	12.0	89.	22.0	0.76	9.0
40.	25.0	0.86	11.0	90.	24.0	0.80	10.0
41.	25.0	0.85	13.0	91.	30.0	0.92	15.0
42.	28.0	0.85	14.0	92.	20.0	0.75	9.0
43.	23.0	0.77	9.0	93.	28.5	0.90	14.0
44.	27.0	0.72	12.0	94.	26.0	0.88	13.0
45.	30.0	0.84	14.0	95.	27.0	0.85	13.0
46.	26.0	0.86	11.0	96.	25.5	0.83	13.0
47.	34.0	0.90	15.0	97.	26.0	0.83	12.0
48.	24.0	0.87	11.0	98.	24.0	0.85	13.0
49.	21.0	0.84	8.0	99.	26.5	0.87	14.0
50.	25.0	0.86	9.0	100.	27.5	0.89	15.0

APPENDIX - VII

ANTHROPOMETRIC MEASUREMENTS OF RURAL RESPONDENTS (WEIGHT, HEIGHT AND BMI) [N=100]

Sl. No.	Weight (kgs)	Height (mts)	BMI	Sl. No.	Weight (kgs)	Height (mts)	BMI
1.	45	1.64	17.8	51.	60	1.60	24.0
2.	52	1.65	20.1	52.	55	1.52	24.0
3.	42	1.62	16.2	53.	45	1.49	20.4
4.	40	1.58	23.1	54.	39	1.52	16.9
5.	40	1.46	26.0	55.	59	1.43	29.5
6.	39	1.54	16.5	56.	51	1.60	24.9
7.	39	1.50	17.7	57.	45	1.62	17.3
8.	50	1.43	29.1	58.	42	1.64	16.1
9.	55	1.58	22.0	59.	58	1.55	24.1
10.	60	1.53	26.1	60.	69	1.65	25.5
11.	45	1.42	26.4	61.	58	1.57	24.1
12.	50	1.72	20.6	62.	47	1.61	18.8
13.	66	1.64	25.4	63.	42	1.50	19.0
14.	59	1.64	22.6	64.	58	1.55	24.1
15.	49	1.48	23.3	65.	41	1.50	18.6
16.	50	1.50	22.2	66.	58	1.51	26.3
17.	55	1.48	25.1	67.	50	1.50	22.7
18.	40	1.45	19.4	68.	40	1.50	18.1
19.	65	1.55	27.0	69.	50	1.54	21.7
20.	55	1.47	26.1	70.	46	1.57	19.1
21.	52	1.63	19.6	71.	50	1.43	25.0
22.	40	1.46	18.7	72.	45	1.55	18.7
23.	38	1.43	18.6	73.	47	1.60	18.8
24.	50	1.50	22.2	74.	58	1.55	24.1
25.	53	1.53	23.0	75.	62	1.60	24.8
26.	56	1.47	25.9	76.	60	1.60	24.0
27.	38	1.43	18.6	77.	58	1.58	24.1
28.	48	1.51	21.0	78.	40	1.66	14.8
29.	50	1.50	22.7	79.	70	1.50	31.8
30.	30	1.37	20.5	80.	68	1.58	28.3
31.	65	1.55	27.5	81.	56	1.48	26.6
32.	51	1.46	24.2	82.	41	1.61	16.4
33.	40	1.64	21.6	83.	42	1.55	17.5
34.	58	1.63	22.3	84.	53	1.51	18.9
35.	51	1.54	22.1	85.	49	1.50	22.2
36.	60	1.55	29.4	86.	45	1.43	22.5
37.	59	1.62	22.6	87.	50	1.50	22.7
38.	42	1.47	19.4	88.	40	1.55	16.6
39.	53	1.42	26.3	89.	47	1.60	18.8
40.	39	1.50	17.7	90.	58	1.50	26.3
41.	55	1.64	21.1	91.	38	1.50	17.2
42.	52	1.50	23.6	92.	40	1.55	17.4
43.	50	1.60	20.0	93.	68	1.53	29.5
44.	60	1.52	26.0	94.	43	1.69	15.3
45.	45	1.50	20.4	95.	70	1.61	27.0
46.	40	1.46	18.5	96.	58	1.48	27.6
47.	40	1.54	16.8	97.	50	1.35	20.8
48.	55	1.50	25.0	98.	42	1.43	21.0
49.	58	1.49	26.3	99.	41	1.50	18.6
50.	39	1.55	16.2	100.	47	1.43	23.5

APPENDIX - VIII

ANTHROPOMETRIC MEASUREMENTS OF RURAL RESPONDENTS (MID UPPER ARM CIRCUMFERENCE, WAIST HIP RATIO (WHR), TRICEPS SKINFOLD THICKNESS) [N=100]

Sl. No.				Sl. No.			
1.	24.0	0.82	9.0	51.	26.0	0.86	7.0
2.	27.0	0.83	10.0	52.	21.0	0.82	13.0
3.	24.0	0.84	8.0	53.	21.0	0.72	11.0
4.	23.0	0.83	7.0	54.	20.0	0.73	9.0
5.	22.0	0.83	10.0	55.	28.0	0.82	8.0
6.	20.0	0.82	8.0	56.	27.0	0.82	12.0
7.	23.0	0.82	9.0	57.	23.0	0.73	10.0
8.	26.0	0.82	7.0	58.	23.0	0.70	10.0
9.	24.0	0.82	10.0	59.	27.0	0.82	8.0
10.	28.0	0.93	11.0	60.	28.0	0.89	11.0
11.	25.0	0.72	12.0	61.	23.0	0.82	14.0
12.	26.0	0.82	9.0	62.	22.0	0.82	12.0
13.	29.0	0.92	10.0	63.	20.0	0.73	10.0
14.	27.0	0.86	14.0	64.	28.0	0.60	8.0
15.	25.0	0.72	10.0	65.	21.0	0.82	9.5
16.	26.0	0.83	8.0	66.	26.0	0.83	6.0
17.	27.0	0.88	9.5	67.	24.0	0.70	10.0
18.	23.0	0.73	9.0	68.	20.0	0.75	9.0
19.	30.0	0.93	7.0	69.	27.0	0.80	8.0
20.	27.0	0.84	12.0	70.	22.0	0.80	11.0
21.	26.0	0.86	11.0	71.	23.0	0.88	9.0
22.	24.0	0.73	10.5	72.	20.0	0.83	10.0
23.	20.0	0.70	9.5	73.	21.0	0.70	8.0
24.	26.0	0.82	6.0	74.	28.0	0.80	7.0
25.	28.0	0.85	10.0	75.	32.0	0.88	8.0
26.	30.0	0.85	9.0	76.	30.0	0.90	11.0
27.	21.0	0.70	19.5	77.	28.0	0.63	11.0
28.	27.0	0.74	9.0	78.	22.0	0.62	9.0
29.	26.0	0.82	10.0	79.	30.0	0.82	8.5
30.	19.0	0.72	11.0	80.	29.0	0.88	13.0
31.	26.5	0.95	6.0	81.	26.0	0.83	11.0
32.	20.0	0.82	13.0	82.	21.0	0.84	12.0
33.	23.0	0.83	11.0	83.	22.0	0.72	9.0
34.	25.5	0.85	9.0	84.	29.0	0.73	8.0
35.	22.0	0.84	11.0	85.	26.0	0.80	10.0
36.	27.0	0.82	9.0	86.	22.0	0.82	10.0
37.	20.0	0.82	13.0	87.	23.0	0.83	7.0
38.	24.0	0.72	11.0	88.	24.0	0.81	6.0
39.	24.0	0.85	8.0	89.	25.0	0.83	7.0
40.	27.0	0.72	10.0	90.	28.0	0.88	10.0
41.	26.0	0.85	8.0	91.	21.0	0.68	6.0
42.	22.0	0.83	12.0	92.	21.0	0.74	10.0
43.	23.0	0.88	9.0	93.	26.0	0.90	14.0
44.	31.0	0.88	11.0	94.	24.0	0.82	9.5
45.	22.0	0.75	12.0	95.	28.0	0.83	12.0
46.	22.0	0.80	9.5	96.	24.0	0.88	12.0
47.	26.0	0.74	8.0	97.	20.0	0.88	10.0
48.	28.0	0.82	9.0	98.	20.0	0.80	7.0
49.	28.0	0.74	10.0	99.	22.0	0.80	7.0
50.	23.0	0.72	12.0	100.	23.5	0.80	8.0

APPENDIX - IX

PERCEPTION ABOUT HEALTH SCORE (URBAN)

1.	23.0	26.	30.0	51.	15.0	76.	23.0
2.	23.0	27.	16.0	52.	25.0	77.	16.0
3.	20.0	28.	23.0	53.	16.0	78.	21.0
4.	18.0	29.	15.0	54.	25.0	79.	21.0
5.	25.0	30.	22.0	55.	25.0	80.	25.0
6.	17.0	31.	30.0	56.	19.0	81.	21.0
7.	22.0	32.	23.0	57.	24.0	82.	23.0
8.	25.0	33.	15.0	58.	17.0	83.	24.0
9.	29.0	34.	18.0	59.	15.0	84.	27.0
10.	20.0	35.	22.0	60.	21.0	85.	19.0
11.	27.0	36.	19.0	61.	17.0	86.	24.0
12.	12.0	37.	19.0	62.	29.0	87.	17.0
13.	18.0	38.	20.0	63.	24.0	88.	23.0
14.	27.0	39.	17.0	64.	19.0	89.	25.0
15.	27.0	40.	27.0	65.	27.0	90.	16.0
16.	27.0	41.	18.0	66.	25.0	91.	19.0
17.	17.0	42.	22.0	67.	17.0	92.	17.0
18.	17.0	43.	26.0	68.	22.0	93.	21.0
19.	13.0	44.	24.0	69.	20.0	94.	19.0
20.	13.0	45.	25.0	70.	24.0	95.	20.0
21.	13.0	46.	26.0	71.	26.0	96.	20.0
22.	14.0	47.	19.0	72.	21.0	97.	24.0
23.	22.0	48.	20.0	73.	20.0	98.	21.0
24.	21.0	49.	17.0	74.	21.0	99.	19.0
25.	17.0	50.	27.0	75.	20.0	100.	22.0

PERCEPTION ABOUT HEALTH SCORE (RURAL)

1.	6.0	26.	9.0	51.	22.0	76.	28.0
2.	21.0	27.	20.0	52.	21.0	77.	15.0
3.	25.0	28.	22.0	53.	28.0	78.	13.0
4.	15.0	29.	10.0	54.	29.0	79.	12.0
5.	16.0	30.	8.0	55.	12.0	80.	8.0
6.	10.0	31.	19.0	56.	13.0	81.	21.0
7.	10.0	32.	8.0	57.	8.0	82.	7.0
8.	21.0	33.	13.0	58.	8.0	83.	25.0
9.	11.0	34.	26.0	59.	15.0	84.	22.0
10.	22.0	35.	30.0	60.	16.0	85.	17.0
11.	5.0	36.	25.0	61.	18.0	86.	15.0
12.	22.0	37.	28.0	62.	19.0	87.	16.0
13.	14.0	38.	14.0	63.	20.0	88.	15.0
14.	13.0	39.	18.0	64.	21.0	89.	30.0
15.	18.0	40.	19.0	65.	28.0	90.	26.0
16.	25.0	41.	25.0	66.	27.0	91.	18.0
17.	18.0	42.	13.0	67.	10.0	92.	26.0
18.	26.0	43.	14.0	68.	12.0	93.	22.0
19.	14.0	44.	15.0	69.	8.0	94.	24.0
20.	12.0	45.	25.0	70.	7.0	95.	26.0
21.	10.0	46.	26.0	71.	20.0	96.	28.0
22.	18.0	47.	19.0	72.	8.0	97.	30.0
23.	13.0	48.	12.0	73.	30.0	98.	12.0
24.	8.0	49.	15.0	74.	21.0	99.	8.0
25.	16.0	50.	14.0	75.	22.0	100.	9.0

APPENDIX - X

SCORES FOR DEFICIENCY MANIFESTATIONS OF URBAN CITIZENS

1.	25.0	26.	32.0	51.	13.0	76.	3.0
2.	30.0	27.	33.0	52.	14.0	77.	18.0
3.	26.0	28.	34.0	53.	18.0	78.	2.0
4.	28.0	29.	42.0	54.	19.0	79.	6.0
5.	13.0	30.	14.0	55.	20.0	80.	13.0
6.	14.0	31.	28.0	56.	22.0	81.	14.0
7.	12.0	32.	33.0	57.	10.0	82.	15.0
8.	0	33.	28.0	58.	8.0	83.	0
9.	18.0	34.	26.0	59.	9.0	84.	9.0
10.	14.0	35.	0	60.	8.0	85.	10.0
11.	20.0	36.	12.0	61.	0	86.	11.0
12.	32.0	37.	0	62.	22.0	87.	5.0
13.	15.0	38.	32.0	63.	23.0	88.	0
14.	18.0	39.	31.0	64.	15.0	89.	0
15.	22.0	40.	34.0	65.	8.0	90.	0
16.	23.0	41.	28.0	66.	0	91.	13.0
17.	28.0	42.	19.0	67.	10.0	92.	12.0
18.	40.0	43.	18.0	68.	11.0	93.	14.0
19.	35.0	44.	16.0	69.	13.0	94.	15.0
20.	35.0	45.	30.0	70.	14.0	95.	16.0
21.	25.0	46.	28.0	71.	0	96.	17.0
22.	28.0	47.	21.0	72.	0	97.	18.0
23.	32.0	48.	24.0	73.	2.0	98.	13.0
24.	34.0	49.	0	74.	0	99.	0
25.	38.0	50.	28.0	75.	0	100.	0

SCORES FOR DEFICIENCY MANIFESTATIONS OF RURAL CITIZENS

1.	28.0	26.	18.0	51.	15.0	76.	34.0
2.	32.0	27.	22.0	52.	18.0	77.	38.0
3.	35.0	28.	32.0	53.	10.0	78.	36.0
4.	38.0	29.	34.0	54.	18.0	79.	33.0
5.	32.0	30.	38.0	55.	36.0	80.	10.0
6.	18.0	31.	39.0	56.	32.0	81.	19.0
7.	28.0	32.	6.0	57.	31.0	82.	23.0
8.	32.0	33.	19.0	58.	8.0	83.	6.0
9.	38.0	34.	27.0	59.	18.0	84.	27.0
10.	28.0	35.	37.0	60.	34.0	85.	28.0
11.	25.0	36.	35.0	61.	32.0	86.	28.0
12.	32.0	37.	38.0	62.	8.0	87.	30.0
13.	33.0	38.	33.0	63.	16.0	88.	32.0
14.	32.0	39.	34.0	64.	11.0	89.	34.0
15.	18.0	40.	39.0	65.	22.0	90.	35.0
16.	19.0	41.	28.0	66.	23.0	91.	38.0
17.	30.0	42.	25.0	67.	6.0	92.	8.0
18.	28.0	43.	22.0	68.	28.0	93.	4.0
19.	22.0	44.	23.0	69.	35.0	94.	12.0
20.	23.0	45.	28.0	70.	16.0	95.	14.0
21.	24.0	46.	25.0	71.	18.0	96.	18.0
22.	8.0	47.	21.0	72.	13.0	97.	26.0
23.	5.0	48.	24.0	73.	12.0	98.	27.0
24.	10.0	49.	18.0	74.	29.0	99.	22.0
25.	13.0	50.	10.0	75.	32.0	100.	21.0

APPENDIX - XI

SCORES FOR PRESENCE OF SYMPTOM OF ILL HEALTH (URI

1.	141.0	26.	99.0	51.	56.0	76.	75.0
2.	100.0	27.	52.0	52.	46.0	77.	89.0
3.	69.0	28.	68.0	53.	135.0	78.	115.0
4.	102.0	29.	74.0	54.	120.0	79.	108.0
5.	72.0	30.	78.0	55.	55.0	80.	20.0
6.	120.0	31.	133.0	56.	42.0	81.	39.0
7.	121.0	32.	100.0	57.	100.0	82.	74.0
8.	98.0	33.	115.0	58.	73.0	83.	75.0
9.	120.0	34.	109.0	59.	78.0	84.	120.0
10.	109.0	35.	48.0	60.	46.0	85.	76.0
11.	59.0	36.	35.0	61.	88.0	86.	112.0
12.	63.0	37.	62.0	62.	90.0	87.	130.0
13.	132.0	38.	99.0	63.	35.0	88.	115.0
14.	89.0	39.	130.0	64.	25.0	89.	55.0
15.	82.0	40.	96.0	65.	29.0	90.	78.0
16.	55.0	41.	92.0	66.	31.0	91.	100.0
17.	95.0	42.	75.0	67.	65.0	92.	59.0
18.	75.0	43.	135.0	68.	89.0	93.	62.0
19.	140.0	44.	125.0	69.	80.0	94.	106.0
20.	76.0	45.	100.0	70.	100.0	95.	85.0
21.	111.0	46.	138.0	71.	32.0	96.	100.0
22.	89.0	47.	120.0	72.	75.0	97.	45.0
23.	130.0	48.	48.0	73.	27.0	98.	58.0
24.	120.0	49.	48.0	74.	75.0	99.	65.0
25.	120.0	50.	43.0	75.	99.0	100.	75.0

SCORES FOR PRESENCE OF SYMPTOM OF ILL HEALTH (URBAN)

1.	100	26.	55	51.	110	76.	128
2.	89	27.	118	52.	56	77.	107
3.	100	28.	69	53.	126	78.	119
4.	120	29.	112	54.	130	79.	108
5.	125	30.	119	55.	107	80.	128
6.	126	31.	132	56.	115	81.	119
7.	68	32.	82	57.	29	82.	51
8.	90	33.	35	58.	130	83.	114
9.	75	34.	102	59.	89	84.	108
10.	121	35.	112	60.	65	85.	113
11.	123	36.	103	61.	98	86.	70
12.	115	37.	69	62.	119	87.	109
13.	122	38.	95	63.	112	88.	102
14.	140	39.	110	64.	96	89.	65
15.	142	40.	128	65.	103	90.	72
16.	75	41.	118	66.	78	91.	120
17.	110	42.	45	67.	132	92.	102
18.	132	43.	140	68.	110	93.	119
19.	139	44.	112	69.	68	94.	130
20.	110	45.	102	70.	86	95.	96
21.	140	46.	54	71.	122	96.	103
22.	132	47.	55	72.	112	97.	52
23.	50	48.	106	73.	108	98.	58
24.	48	49.	113	74.	75	99.	119
25.	121	50.	122	75.	82	100.	142

APPENDIX - XII

SCORES FOR IADL AND PADL OF URBAN AND RURAL CITIZENS

IADL (URBAN)

1.	12	26.	11	51.	11	76.	9
2.	9	27.	10	52.	8	77.	13
3.	11	28.	10	53.	10	78.	7
4.	8	29.	6	54.	4	79.	13
5.	8	30.	9	55.	8	80.	9
6.	10	31.	10	56.	5	81.	8
7.	8	32.	11	57.	4	82.	12
8.	11	33.	6	58.	5	83.	12
9.	12	34.	8	59.	11	84.	11
10.	12	35.	12	60.	5	85.	10
11.	10	36.	9	61	8	86.	9
12.	12	37.	3	62.	6	87.	6
13.	11	38.	9	63.	3	88.	12
14.	8	39.	10	64.	10	89.	11
15.	10	40.	6	65.	14	90.	7
16.	9	41.	11	66.	12	91.	9
17.	8	42.	3	67.	6	92.	11
18.	14	43.	10	68.	8	93.	8
19.	8	44.	10	69.	13	94.	5
20.	11	45.	11	70.	11	95.	11
21.	9	46.	8	71.	10	96.	6
22.	11	47.	10	72.	13	97.	13
23.	10	48.	11	73.	9	98.	10
24.	10	49.	11	74.	11	99.	5
25.	10	50.	11	75.	6	100.	5

IADL (RURAL)

1.	9	26.	10	51.	7	76.	10
2.	12	27.	11	52.	12	77.	9
3.	12	28.	5	53.	4	78.	12
4.	9	29.	10	54.	8	79.	9
5.	8	30.	8	55.	10	80.	10
6.	8	31.	13	56.	5	81.	14
7.	10	32.	12	57.	4	82.	8
8.	8	33.	13	58.	10	83.	10
9.	8	34.	12	59.	11	84.	9
10.	7	35.	10	60.	13	85.	4
11.	6	36.	9	61.	12	86.	5
12.	7	37.	3	62.	13	87.	6
13.	14	38.	10	63.	4	88.	8
14.	8	39.	11	64.	14	89.	12
15.	6	40.	12	65.	8	90.	12
16.	11	41.	13	66.	9	91.	10
17.	9	42.	14	67.	10	92.	3
18.	10	43.	14	68.	9	93.	8
19.	8	44.	3	69.	10	94.	13
20.	10	45.	5	70.	8	95.	6
21.	4	46.	4	71.	8	96.	3
22.	9	47.	12	72.	12	97.	14
23.	13	48.	13	73.	6	98.	10
24.	8	49.	8	74.	10	99.	4
25.	11	50.	9	75.	14	100.	5

APPENDIX - XII (Contd...)

PADL (URBAN)

1.	14	26.	13	51.	13	76.	10		
2.	14	27.	11	52.	12	77.	14		
3.	14	28.	13	53.	14	78.	9		
4.	13	29.	6	54.	6	79.	12		
5.	11	30.	13	55.	13	80.	9		
6.	13	31.	14	56.	12	81.	14		
7.	13	32.	14	57.	12	82.	13		
8.	14	33.	9	58.	13	83.	12		
9.	14	34.	3	59.	11	84.	12		
10	14	35.	13	60.	10	85.	8		
11.	14	36.	9	61.	8	86.	13		
12.	14	37.	7	62.	13	87.	8		
13.	14	38.	12	63.	6	88.	12		
14.	14	39.	13	64.	11	89.	7		
15.	14	40.	10	65.	12	90.	13		
16.	14	41.	13	66.	12	91.	10		
17.	11	42.	6	67.	6	92.	12		
18.	14	43.	11	68.	13	93.	14		
19.	12	44.	14	69.	12	94.	9		
20.	14	45.	13	70.	10	95.	11		
21.	14	46.	13	71.	14	96.	8		
22.	14	47.	14	72.	14	97.	14		
23.	14	48.	12	73.	11	98.	8		
24.	13	49.	13	74.	12	99.	5		
25.	14	50.	13	75.	9	100.	5		

PADL (RURAL)

1.	14	26.	12	51.	7	76.	13
2.	14	27.	13	52.	10	77.	10
3.	13	28.	11	53.	9	78.	13
4.	14	29.	13	54.	7	79.	11
5.	14	30.	10	55.	11	80.	14
6.	13	31.	14	56.	8	81.	13
7.	14	32.	10	57.	5	82.	8
8.	13	33.	13	58.	13	83.	12
9.	14	34.	13	59.	10	84.	13
10.	7	35.	14	60.	11	85.	8
11.	13	36.	12	61.	12	86.	8
12.	14	37.	9	62.	10	87.	7
13.	14	38.	10	63.	9	88.	13
14.	12	39.	14	64.	13	89.	14
15.	13	40.	11	65.	8	90.	14
16.	14	41.	10	66.	11	91.	11
17.	9	42.	14	67.	10	92.	10
18.	13	43.	14	68.	8	93.	11
19.	8	44.	7	69.	9	94.	12
20.	13	45.	10	70.	8	95.	13
21.	8	46.	3	71.	10	96.	9
22.	8	47.	10	72.	13	97.	14
23.	12	48.	10	73.	8	98.	7
24.	13	49.	9	74.	10	99.	10
25.	11	50.	9	75.	14	100.	10

DIETARY HABITS OF SENIOR CITIZENS

By

AJITHA. R

ABSTRACT OF THE THESIS

SUBMITTED IN PARTIAL FULFILMENT OF
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DEPARTMENT OF HOME SCIENCE
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THIRUVANANTHAPURAM

2000

ABSTRACT

The study entitled "Dietary habits of senior citizens", was conducted to assess the dietary pattern of senior citizens as influenced by physical, psychological, socio-economic factors. Two hundred elderly citizens in the age group of 65-75 years from urban (100) and rural (100) areas of Trivandrum were selected for the study. There was major variations between rural and urban elderly as well as male and female elderly as far as their economic, social and personal profile were examined, which could influence their dietary pattern directly or indirectly. The urban citizens had better educational status than rural citizens. Though there were no major variations in the number of citizens currently employed both among urban and rural citizens, there was significant variation in their dietary habits. The meal pattern of urban citizens were relatively adequate than rural citizens. The inclusion of nutritious foods were less among rural citizens. Both urban and rural citizens had made changes in their diet due to problems related to aging.

The personal habits like smoking, tobacco use, alcohol, consumption were less among urban citizens. They had also perceived their health to be good. They had better functional ability (mainly IADL), and also better physical and social environment. The female citizens had better body weight than men and the prevalence of deficiency diseases and other degenerative diseases were low among them. But male citizens were doing strenuous activity and they had better functional capacity than females.

The results of the study revealed a significant association between dietary habits of the elderly and their socio-economic and personal characteristics. It was observed

that the age had a significant influence on current dietary pattern and number of meals consumed. Age also was found to influence the consumption of milk, meat, egg and pulses.

Current employment was found to have a significance influence on the number of meals taken out. Among rural citizens the number of meals consumed per day and their habit of dining out had a significant bearing on the body mass index . Less consumption of pulses, milk, commercial health preparations and supplements were found to have a significant influence on the presence of deficiency diseases among rural elderly. Social relationships were also found to have a significant influence on the current dietary pattern. Frequency of taking alcohol was found to have a profound influence on number of meals consumed both among rural and urban citizens.

In general the study revealed that the urban elderly had better dietary habits, living arrangements and greater freedom to spend money. But the rural elderly were found to be performing strenuous activity even at the age of seventy though they had diets containing lesser amount of protective foods. It was also found that the dietary habits of the elderly were influenced significantly by their social and economic conditions, rather than by functional or psychological factors.