HEALTH AND NUTRITION PROFILE: A STUDY IN OLD AGE HOMES AT ERNAKULAM, KERALA

Thesis submitted to the Mahatma Gandhi University
for the award of the Degree of

DOCTOR OF PHILOSOPHY IN HOME SCIENCE
(SCIENCE)

by

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Certificate

This is to certify that the dissertation entitled **"HEALTH AND NUTRITION PROFILE: A STUDY IN OLD AGE HOMES AT ERNAKULAM, KERALA"** submitted to Mahatma Gandhi University, Kottayam, in fulfilment of the requirement for the award of the degree of **Doctor of Philosophy in Home Science (Science)** is a record of original research work, done by **MANU.G.V** during the period of her study in the Centre for research in Home Science, St. Teresa's College, Ernakulam, under my supervision and guidance. This dissertation has not formed the basis for the award of any Degree/Diploma/Associateship/Fellowship or similar title to any candidate of any other University and it represents entirely an independent work on the part of the candidate.

Signature of the Guide

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Signature of the
Head of the Institution

Declaration

I hereby declare that the dissertation entitled **"HEALTH AND NUTRITION PROFILE: A STUDY IN OLD AGE HOMES AT ERNAKULAM, KERALA"** submitted to Mahatma Gandhi University, Kottayam, in fulfilment of the requirement for the award of the degree of **Doctor of Philosophy in Home Science (Science)** is a record of original research work, done by me under the supervision and guidance of Dr. (Mrs.) K.S.Kumari, Head of the Department of Home Science (Rtd.), St. Teresa's College, Ernakulam, and it has not formed the basis for the award of any Degree/Diploma/Associateship/Fellowship or similar title to any candidate of any other University.

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1. INTRODUCTION

Ageing of the population has been one of the most important developments of this century all over the world and will be one of the major challenges for the next millennium. In 1950 there were approximately 200 million aged people of 60 years and above through out the world, according to United Nation estimates. By 1975 this number had increased to 350 million. Currently there are almost 580 million elderly people in the world representing around 20 percent of total population, of whom 355 million live in developing countries (Arlappa *et al*., 2004).

Population projection as per WHO (2002), Europe will retain its title as the World's oldest region. Japan and Switzerland will take the lead to have the highest proportion of older persons (35%) by 2025 followed by Italy, Germany, Greece and Spain (less than 30% each), Northern America (25%) and Eastern Asia (21%).

Among low income countries, the population projection shows that during the next 25 years many of them will be among the ten countries with the largest population of older persons in the world. For example, China (287 million), India (168 million), Indonesia (35 million), Brazil (33 million) and Pakistan (18 million). So the developed as well as developing countries are in the process of population ageing, with India becoming the second largest country with respect to elderly population.

According to 2001 census, in India, there are about 75 million (7.3%) elderly people. It is expected to be 179 million by 2031, 301 million by 2051 and 340 million (26%) in 2061 (Liebig *et al*., 2003). At present one in every 12 Indians is elderly and this ratio is likely to be one in every five in 2050. This means that while the total population over the period climbs to five times, the increase in the number of elderly would be 13 times.

The state wise population density as per the 2001 census further revealed that among the 28 states and 8 union territories in India, Kerala ranked first with the highest percentage of elderly people forming about 9.79 percent of the total population (Rajan, 2004).

An increase in longevity and decline in fertility have contributed to people living much longer today than ever before in the last 50 years. Mortality rates have declined virtually in all the countries due to progress in preventing infectious diseases and improving hygiene and sanitation and over all social development and living standards. As a result, average life expectancy at birth in low income countries rose from around 45 years in the early 1950s to 64 years in 1990. The average life expectancy through out the world is projected to reach 73 years in 2020. In India, life expectancy at the time of independence was 32 years and today it is 62 years.

This decline in mortality accompanied by an equally sharp fall in birth rates (more recently) contributed to the steady and fast increase in aged population, which has become a matter of great concern.

The children and older persons are often referred as the main dependent groups in a society with a relative weightage given to children. But with the present epidemiological transition and the fast growth rate of elderly population, there is a shifting of weightage from children to older persons.

Ageing, infact is not a disease, or a negative condition that develops all on a sudden. As stated by Venkaraman (1998) it is a gradual developmental process that effects biological, psychological, sociological and behavioural changes which begins at the moment an individual is born. Ageing process also signifies the progression of changes in the biochemical process which determine the structural and functional alteration with age in the cells and noncellular tissues.

As defined by Natarajan (1998) old age is the age of retirement, for it is at that time that the combined effect of ageing, social changes and diseases are likely to cause a break down in health. The World Health Organisation describes the persons who have attained the age of 60 years as old, for the purpose of identifying their specific health needs and medical attention (Tuli, 1996).

As people age there tend to be a concomitant increase in the presence and number of chronic conditions and complications of both physiological and psychological nature. There will be a great dependency on the caretakers. Infections and illnesses, which are common problems of elderly, add to the severity of the condition. The reasons include impaired defense system of the body, late diagnosis and malnutrition. Besides older people are prone to chronic diseases of heart, blood vessels, brain, kidney, liver etc. and also have complications of diseases like diabetes.

Elderly people are also seen to suffer from physical disabilities, financial insecurity and loneliness resulting from ostracism by the family and society. Owing to their economic dependency, social deprivation and change in behaviour towards diet and health care, they become more vulnerable to malnutrition and ill health.

Studies have shown that diet and nutrition play a crucial role in maintaining good health and functional status of elderly. But the data collected by National Nutrition Monitoring Bureau (NNMB) over a period of time on total population including elderly, found that under nutrition in India continues to be a public health problem (Brahmam, 2007).

Recent NNMB survey (1996-97) on diet and nutritional status of elderly population reported that the proportion of elderly who were meeting 100 percent of Recommended Dietary Allowances (RDA) for all the nutrients was as low as 2.8 percent, and only in 4 percent of the elderly, the intakes of macronutrients like energy, protein and the micronutrients, iron and calcium were equal to or more than the RDA. The survey also indicated that the prevalence of Chronic Energy Deficiency (CED) was significantly higher among the elderly than their adult counterparts (18-59 years) as reported by Arlappa *et al*. (2004).

So the extreme under nutrition along with poor income, social isolation, depression and decreased mobility are the factors known to affect the health and well being of the elderly in India (Khanna, 1997).

The utmost need of people in old age is often over looked, which includes proper care and support in terms of health and nutrition, social, economic and psychological needs. They are also not provided with the comfort and support at the time of anxiety, loneliness and helplessness, by listening and intervening appropriately and effectively.

Family is the most important institution which can provide succour to the elderly. There was a time when aged persons were looked upon with reverence. But recent upheavals in the structure of the society and family, have

considerably changed their status and living conditions. For example, urbanization and the resultant changes in family structure, women employment, high cost of living, increasing materialism and individual orientation, all these lead to problems with accommodation and care of the elderly in a family environment.

Old age homes were established in urban and rural areas under the initiative of both Governmental and Non-Governmental agencies, to provide shelter and support to the old destitutes. At present such institutional care is a source of relief to the aged in our society. As Sreevals and Nair (2001) pointed out, in the absence of joint family system, the old parents are sometimes left with no other alternative than joining the old age homes. Studies conducted by Rajan (1999) and Dandekar (1996) in Kerala and Maharashtra state respectively also found that most of the inmates ended up in old age homes because of no one to take care at home.

As far as number of old age homes are concerned, Kerala ranked first by having the highest number of institutions for aged although the state's population shares only 3.4 percent of the Indian population. (Sreevals and Nair, 2001). Further the two districts of central Kerala namely Kottayam and Ernakulam have the highest number of old age homes (Rajan, 1999).

Even though old age homes have been in existence for about 300 years, only recently have they caught the attention of researchers. The

problems of inquiry also have been exacerbated by the level of accurate information about the facilities (Liebeg *et al.,* 2003). People accommodated here require a wide range of preventive, curative and rehabilitative care.

Often institutionalization itself becomes the underlying cause of ill health and malnutrition among aged. The extent of impact depends on the specific environment in the old age homes, care and services offered and support provided to the inmates.

So with adequate nutrition and a well balanced diet during old age, coupled with appropriate health care and psychological support it is possible to prevent and control the common hazards of ageing and the process of ageing could be made healthy and enjoyable.

Comprehensive information on the diet and nutritional status of the elderly in general and institutionalized in particular with respect to Kerala state, is scanty. There is a need to develop a strong database on these lines so as to plan appropriate and timely intervention strategies to tackle the problems of elderly and to ensure a better quality of life.

Due to lack of published information in this regard, it was considered necessary to study the health and nutrition status of the elderly particularly those living in institutions.

Hence the present study entitled “Health and Nutrition profile of the Elderly: A study in Old Age Homes at Ernakulam, Kerala” was embarked with the following objectives.

1. To study the infrastructural facilities and quality of services rendered by the old age homes.
2. To find out the socio-economic and life style pattern of the institutionalized elderly.
3. To applaise the health status of the institutionalized elderly.
4. To study the nutritional status of the institutionalized elderly.
5. To examine the association between infrastructural facilities and quality of services in old age homes and Health/Nutrition profile of the inmates.

2. REVIEW OF LITERATURE

Literature on different aspects related to the present study entitled **'Health and Nutrition Profile: A study in old age homes at Ernakulam, Kerala**'is furnished under the following heads.

2.1 AGEING

2.1.1 Definition
2.1.2 Demography
2.1.3 Physical and physiological changes

2.2 PROBLEMS OF ELDERLY

2.2.1 Socioeconomic problems
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2.3 SPECIAL CARE AND SERVICES FOR ELDERLY

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2.1 AGEING

2.1.1 Definition

The definition of term elderly or aged varies from society to society. There is no fixed age at which a person begins to age. It varies widely from one

individual to another. Singh (2004) defined ageing as those changes in structure and function that occur, following the attainment of reproductive maturity, result in a decreased ability to do the work necessary to overcome environmental or internal challenges and result in an increased probability of death with time. Moody (2000) defines ageing as a time dependent series of cumulative, progressive, intrinsic and harmful changes that begin to manifest themselves at reproductive maturity and eventually end in death.

According to Pankajam (2004), ageing is natural, universal and inevitable with the passage of time. It is a developmental phase in the life process which begins at conception and ends with death and it is the last stage in the life journey and the closing period in the life span of a man with decreased capacity for adaptation. Barnabas (2001) said that ageing is a natural and irreversible process of human life. It is not a disease, nor a disintegrative force.

Ageing as given by Bagchi (2000) is a slow process through which an adult individual passes after a certain age and this process is always associated with some visible changes like graying hair and wrinkling of skin as well as internal changes in the physiological organs, collectively known as ageing process or biological ageing.

But according to Saraswathy (1999), ageing refers to the regular changes that occur in matured genetically representative organisms, living under representative environmental conditions, as they advance in chronological age. It

is more of a cultural process than a biological one. Jayakumar (1992) opined that ageing is a toilsome treadmill grinding to a tragic halt as the years pile up. Ageing is a life spanning process of growth and development running from birth to death.

National Institute of Nutrition (1992) rightly pointed out that ageing is basically a biophysical and neural phenomenon characterized by a slowing down of reflexes and a decrease in physical and mental abilities over time. Physical ageing is not a uniform process for all individuals in all societies, related only to the number of years a person has lived and that it is subject to modification depending on social, environmental, psychological and lifestyle factors.

The age of 60 years is taken as a cut off point, above which all individuals are known as elderly person. Anand (2004) and Pankajam (2004) were also of the opinion that in India the persons above sixty years of age are classified as aged persons. This age group is referred as 'Geriatric Age Group'. Due to dependence for personal requirements, old age is sometimes called the 'Second Childhood'. The aged may be regarded as those who are in the age group of 60 and above, have retired from employment or disengaged from business after having had their innings (Swaminadhan,1996*).*

2.1.2. Demography

The population of the world stood at 6.1 billion in 2000 and it is expected to reach 9.3 billion by 2050. Between 1950 and 2150, the world

population would have increased fourfold. Among the elderly the number of the oldest old, those aged 80 and above will increase more rapidly compared to other segments of the elderly (Rajan, 2004).

According to Reilly (2007) the number of persons 60 years or above in the world is expected almost to triple, increasing from 673 million in 2005 to 2 billion by 2050. Over the same period, the share of older persons living in developing countries is expected to rise from 64 percent to nearly 80 percent in 2050.

Ageing of the population, according to Rajagopalan (2000) is one of the most important development of the 20^{th} century all over the world and will be one of the major challenges for the next millennium. Population projection indicates that old age population will be over 1100 million by 2025. By 2020 there will be 700 million old people in the developing world.

In the developing countries, one in every 12 persons is now elderly; the ratio is expected to become one in five by 2050 equaling that in the developed countries. The two most populous countries in the world, China and India will share the major proportion of the world's elderly.

In India Projections on the basis of 2001 census showed that the population consisting of 28 states and 8 Union territories had a total elderly population of 71 million (Rajan, 2004). Singh (2004) also reported that India's

elderly population, which was 55 million in 1991, is expected to reach 76 million by the year 2001 and 124 million by the year 2020. It is likely to touch 177.4 million by the year 2025.

As per the World Bank Projection, old age population in India is likely to increase from 70 million in 1995 to 141 million by 2020 and 508 million by 2100 (Rajagopalan, 2000).

According to Liebeg *et al.* (2003) India is the second largest country in the world, with 72 million elderly persons above 60 years of age as of 2001. It is expected to increase from 72 million in 2001 to 179 million in 2031 and further to 301million in 2051. In the case of those 70 years and older, they are projected to increase from 27 million in 2001 to 132 million in 2051. Among the elderly persons 80 and above, they are likely to increase from 5.4 million in 2021 to 32 million in 2051. The increasing number and proportion of elderly will have a direct impact on the demand for health services and pension and social security payments.

The ageing of a population is defined in terms of the proportion of persons aged 60 and over in the total population. The two states that already have more than 7 percent of the population above the age of 60 years are Punjab and Kerala. The rate of growth of older women is even more pronounced for Kerala indicating a faster growth of women at older ages as compared to India (Luthra, 1991). Moli (2004) reported that among the Indian states, Kerala has the largest

proportion of elderly population and the growth rate among the aged is increasing higher and higher. Therefore one of the main challenges facing Kerala is its growing elderly population. It is growing much faster than the overall population itself.

An extensive work on Kerala commissioned by the Population and Development Section, United Nations, New York, carried out at the Centre for Development Studies, Trivandrum, indicated that one of the major disadvantages of Kerala's demographic transition is population ageing. The study noted that Kerala took 20 years to increase the share of the elderly in its population from 6 to 8 percent whereas the same increment is expected every 10 years in the immediate future (Rajan *et al*., 1999).

The available research on ageing suggests that fertility plays a predominant role in inducing the ageing process as compared to mortality. As far as India is concerned, there has been a substantial improvement in mortality compared to fertility since 1950. India is expected to have a faster decline in fertility in the immediate future compared to mortality because the latter is already at a low level. Hence the ageing process in India will be faster than certain other developing countries (Liebig *et al*., 2003) and Luthra (1991).

WHO (2002) also reported a virtual decline of mortality rates in all countries due to progress in preventing infectious diseases and improving

hygiene, sanitation and overall social development and living standards. As a result average life expectancy at birth in low income countries rose from around 45 years in the early 1950s to 64 years in the1990. The average life expectancy through out the world is projected to reach 73 years in 2020 which will also augment the elderly population in the world over.

Thus the demographic transition, which is popularly known as, 'graying population' with fewer babies born and more elderly surviving to later age were the result of advanced technology (Kumar,1995). While the recent emphasis on studies pertaining to the elderly in the developing world is attributed to demographic transition, the deteriorating conditions for the elderly are a result of the fast-eroding traditional family system in the wake of rapid modernization, migration and urbanization (Liebig *et al.*, 2003).

Some studies on the elderly in tribal communities showed that the aged were secure and enjoyed better status as these communities were perhaps free from the forces of modernization and industrialization (Jamuna, 1998).

2.1.3 Physical and physiological changes

As reported by Rosenburg (1996) some of the physical and physiological changes that occur during the ageing processes are visible. The changes in skin texture, hair colour and body posture and shape are the most obvious. Pankajam (2004) was also of the opinion that surface signs of ageing are obvious in their appearance. The skin wrinkles, hair loses colour, muscle strength

diminishes, the shoulders become stooped and a reduction in height characteries the elderly persons. The wrinkling of the skin as given by Rosenburg (1999), results due to the loss of fat and other changes.

Rosenburg (1999) also remarked that some of the physiologic differences that occur during ageing and that influence requirements for nutrients include changes in body composition which may result in changes in requirements for calories, changes in the skin that may influence requirements for Vitamin D and change in the intestinal tract that may influence requirements for some vitamins.

WHO (2002) reported that the most dramatic physiological transformation that occurs over the decades of aging is the change of the composition of the body. As lean or muscle mass decreases along with decreasing mass and mineralization of bone, fat increases as a percentage of body weight. These changes can result in weaker bodies, less mobility and some risks associated with excessive body fat including diabetes and heart disease. Lean body mass declines over the adult age span and accelerates beyond the age of 80 years.

Another physiological change that occur with ageing that influences nutritional requirements is changes in the stomach that result in decreased production of stomach acid which is important for certain digestive processes

including the normal absorption of dietary Vitamin B12, folic acid and iron (Rosenburg,1996).

The author further stated that much of the natural Vitamin D comes from synthesis in the skin in the presence of sunlight. Because, the efficiency of this process diminishes with age, the older person increasingly depends on diet for enough Vitamin D to maintain the absorption of sufficient calcium. Since these needs are not usually met by diet, the blood levels of Vitamin D decline with age. With this decline the efficiency of calcium absorption also decreases. This in turn leads to the loss of calcium from the skeleton and to osteoporosis.

As stated by Bagchi (2000), during ageing, a significant portion of the lungs is fibrosed and they are unable to offer oxygenation of blood in the lungs. The two kidneys get smaller in size and the power of the kidney to filter out the unwanted waste products from the body is diminished. With ageing, the water balance in the body is disturbed. Elderly person's body is already dehydrated and they are vulnerable to high temperature as in sunstroke and it is therefore extremely important for an older person to drink as much of fluids as possible, in the form of liquid foods like soup or plain water.

Stomach becomes smaller in size, foods take a long time to pass on to duodenum and thus causing a sense of heaviness and uncomfortable feeling, if the diet is not appropriately altered. The brain cells and its fibres which carry impulses from brain to the system and upwards get degenerated.

The most glaring manifestation of ageing affecting the brain is forgetfulness or the inability of the brain to recall past experience, which is common in all elderly persons (Bagchi, 2000). He further reported that the heart muscles get weaker and power to send blood to all parts of the body through the circulatory system gets progressively reduced. As a result, most organs in the body do not get sufficient amount of blood leading to undesirable consequences. Physical activity is therefore regarded as a very important step to ensure adequate supply of blood and delay the process of ageing. The small muscles, which are necessary for quick reflex action, get gradually atrophied with age. So quick movements, which need small muscles for quick reflex movements are impaired, causing accidents. The commonest is slipping on wet floor of the bathroom, unable to stop the slipping.

Inadequate dentition, diminished sensitivity to taste and smell, diminished secretion of hydrochloric acid in the stomach and digestive enzymes, biliary impairment, if any, which interfere with fat digestion, irregular bowel evacuation, general ill health, economic or emotional insecurity and feeling of unwantedness are some of the problems pointed out by Beegum (2001) as common among old people.

WHO (2002) reported that approximately 25 percent of adults over age 65 have a reduced ability to detect one or more of the four basic tastes (sweet,

sour, salty and bitter) due to a reduction in the number and function of the tongue's taste papillae. Bagchi (2000) also opined that with increasing age, the taste buds on the tongue responsible for sweet and sour taste get atrophied and as a result the preferences for food alters significantly with age. There is a craving for sweet foods in general.

As regard to physical health and mental activity, as Pankajam (2004) opined that persons over 60 may lose 50 percent of their power, which forces them to lose interest in personal life and family responsibility.

The ageing process is accelerated by many factors. Bagchi (1999) pointed out that a widely accepted theory of ageing is the 'free radical theory' which explains the various manifestations of the ageing process. The theory is based on the chemical nature of free radical reactions and their ubiquitous presence in the living system, and the ageing process greatly affected by these reactions. Oxygen is the main source of these damaging reactions. Free radicals generated the human body as a result of the routine enzymatic process or due to environmental influences have various damaging effects, the combination of which accelerates the ageing process.

2.2 PROBLEMS OF ELDERLY

The problems of elderly as remarked by Sarala and Kusuma (2003) begins with the fast changing Indian scenario which leads to the degeneration of the joint family system, dislocation of cultural and familial bonds. Failure on the part of the sons to look after the aged was considered as a serious demerit and

earned social opprobrium. Kumar (1995) also pointed that due to modernization, urbanization and industrialization the joint family system is witnessing a gradual breaking down. The present day younger generation is showing much interest towards nuclear family set up and the elderly in the existing joint family system are not enjoying either authority or security as they used to have earlier. This is mainly because of growing individualism among the younger generation.

Specifically the needs and problems of elderly vary according to their age, family background, health, economic status, living environment etc. as they are by no means a homogenous group (Swaminadhan, 1996). The problems of elderly as identified by Pankajam (2004) are physiological, personal, social, psychological and economic problems. Problems of inadequate food, lack of proper housing and care are very common among the aged. According to Moli (2004) the generally expressed primary needs of the elderly were reported to be food, clothing, housing, social and emotional security, attention and recognition. Need patterns vary among special populations viz., childless elderly, widowed, disabled and destitutes.

2.2.1 Socio economic problems

One of the major problems confronting the aged as reported by Mathew (1999) was withdrawal from control over economy and lack of income. This financial backwardness of elderly was also highlighted by Singh (2004). According to the author most of the older people have no personal income.

Unemployment adds to their financial backwardness. The main problem with the elderly in India is poverty and majority of the older people still live in or on the margins of poverty.

The Chronic Poverty Research Centre has identified the elderly as one of the groups that are likely to be vulnerable to chronic poverty (Rajan, 2004). According to Liebig *et al.* (2003), inadequate financial resources were the major problems of Indian elderly in general and this seems to be of a higher degree among female elderly compared to their male counterparts. A nationwide survey (National Sample Survey, 1986-87) found that 34.2 percent of the rural elderly were financially independent as against 28.94 percent of their urban counterparts. Only 23 percent of men and 4 percent of women received pension in Kerala. The highest number of women pensioners was found in TamilNadu. Jamuna (1998) also reported that more than half of the elderly live in poverty are dependent and have no independent income. More than 80 percent of the elderly who spent their early years in the bygone era were found to be poorly educated and unskilled. In rural areas most of the elderly depend on income from agricultural labour. The phenomenon of out migration is growing, leaving the elderly to lend for themselves.

The well being of the elderly is intimately linked to their education. Education, apart from providing economic stability also enables smooth adaptability towards the socio-economic transition in the society. Having a low

level of literacy in India on the whole, the literacy levels among elderly persons are pretty low and it is extremely low in rural areas and especially among women (Rajan *et al.*1999).

Elderly women form a sizeable portion of the aged population. As reported by Jamuna (1998) majority of the elderly are women and most of whom are widows. In Kerala also majority of the elderly females are widows (Moli, 2004). She further emphasized that as widowhood is the main factor that influences one's adjustment and mental health, elder widows must be considered as a special group to get priority in the National Policy for the elderly.

An examination of intra-family relations of urban elderly by Shah (1993) found that satisfactory intra-family relations are higher among the widows than the widowers and somewhat lower among those living in joint families compared to those living in nuclear families. Elderly having no substantial assets or a fairly good source of income and who are economically dependants, find the attitude and behaviour of their family members as unsatisfactory (Rajan *et al*., (1999).

Other related psychosocial problems of elderly such as loss of prestige and status, alienation and loneliness, neglect and lack of attention and care, alcoholism and disengagement among the aged also need special attention. Further disadvantaged sections of the aged such as disabled aged, aged women or

destitutes, aged landless labourers, chronically sick-aged, the homeless street aged particularly call for immediate attention of planners and policy makers (Sudhir, 1998).

2.2.2 Psychological Problems

Psychological well being is the basic requisite for the healthy life of elderly. They should be in a sound status both physically and mentally. But the actual state is different. Durairaj *et al.* (1999) specially highlighted on the mental problems of old people.

Mental health of the elderly, according to Sangeetha *et al.* (2005) is an area in which very little research has been done compared to that in the developed world. It is only in recent years that the prevalence of depression and dementias of various grades are being assessed in the elderly population (Bagchi, 1998).

The process of psychological ageing acquires importance in this context. As given by Shankar (1999) the individual worth, attitudes and his behaviour play significant roles in this ageing process. The old memories, major achievements in life and the respect bestowed on a person all these renew his faith in his own competence even in the old age.

At the same time a sense of loss of power, prestige and social status leads to insecurity. Loneliness, economic uncertainty, general unhappiness or distress, despair, meaninglessness and instability are symptoms which indicate anxiety conditions among the aged. All these are inevitable elements that aggravate the psychological depression (Shankar, 1999).

Khanna (1997) pointed out loss of authoritative status which the elderly had enjoyed during the prime years of their life coupled with intense loneliness makes the matter worse and hence a large percentage of the aged suffer from depression. Durairaj *et al.* (1999) were of the opinion that old people suffer from mental tension because of ill health of self or their life partners and feel their loneliness very strongly. They are disturbed by the feeling that they are helpless and not useful to their house and society. The sense of lack of usefulness and the resultant mental depression among elderly was also reported by Anand (2004). As given by Dube (1999) loss of earning power coupled with loss of social recognition leads to feeling of uselessness.

Thus depression is found to be one of the most common expressions of emotional distress among elderly and it is one of the major health problems faced by the old age population today (Anand, 2004 and Shankar, 1999). Community survey based studies are also there to support the high prevalence of depression in the later years of life (Durairaj *et al*. 1999). When the ability to exercise is impaired then the body and mind are affected and depression may result. Getting exposure to sunlight also can affect some people by changing their mood. For the homebound elderly this may be a problem (Anderson *et al*., 1999).

Women in general are more prone to develop major depression and depressive disorders (Jamuna, 1998). Bagchi (1999) also pointed out that a substantial segment of the elderly population especially elderly females are

victims of depression and various types of dementia leading to poor appetite and lack of interest in food.

According to the Epidemiologic Catchment Area Study, depressive symptoms occur in approximately 15 percent of the elderly population and rates are even higher for elderly in nursing homes. The common symptoms of depression as stated by Anand (2004) include loss of appetite, fitful sleep, early morning wakening, weight loss, lack of energy and motivation and sometimes even thoughts of suicide. Reduced appetite and inability to sleep are the indications of depression mentioned by Jamuna, 1998).

However, depression during old age not only affects the adjustment of the elderly to their living environment but also affects their food intake. In some cases depression may result in over eating as the food becomes a means to achieve emotional security. This may result in obesity and other related disturbances. In other cases, depression may lead to rejection of food and thus under nutrition.

But the effect of poor diet on the development of depression was highlighted by Anderson *et al*. (1999). Many older people have poor nutritional intake due to a variety of psychological and physical factors such as poor denture fit, cost of nutritious foods, changes in taste sensations and eating alone (Anderson *et al*., 1999).

So in depression both loss of appetite and malnutrition are often diagnostic and at the same time are a difficult therapeutic problem. Indeed, one of the most difficult situations in geriatric medicine is to decide if food refusal is due to curable depression or voluntary desire to give up in a mentally healthy individual (Steen, 1992).

Depressive illness in the elderly is responsible for more hospitalizations than any other disorder except cardiovascular disease. It leads to decreased functioning, increased morbidity and mortality, increased health care utilization and institutionalization (Steen, 1992).

Anderson *et al*. (1999) were also of the opinion that elderly individuals who are depressed are in a high risk category for institutionalization because they are less motivated to care for their personal hygiene and nutrition. This increases their vulnerability to disease. Depression is linked to the amount of the neurotransmitters serotonin and norepinephrine present in the nerve synapses. Lower serotonin and norepinephrine levels seem to be associated with depression.

Even though the institutions or old age home are called ‘home’ or ‘home away from home’ the elderly face problems of adjustment with the tight and rigid schedule, total or near total separation from the familial or social milieu, anxiety over entrusting oneself to an unknown and new environment, lack of mental stimulation, diminishing physical faculties and closer and more frequent

encounters with deaths and ailments in the institution. All these may create for the elderly the problems of depression, apathy and a process of resignation to fate (Mandal, 1998).

These problems which may lend itself to the psychological disturbances in elderly and in due course it affects their mental health. Prevalence of depression and dementia in the later age of life is mostly attributed to the emotional distress and mental tension of the individual.

2.2.3 Health problems

Health status is an important factor that decides the quality of life of any individual. Of the three implications of the demographic transition such as social, economic and health, health care is possibly an area which is most essential for every individual. The World Health Organization defined health as a state of physical, mental and social well being.

Health according to Vijayakumar (1996) is not only a biological or medical concern but it is also a significant personal or social concern. In general with declining health, individuals can lose their independence, lose social roles, become isolated, experience economic hardship, be labeled or stigmatized, change their perception and some of them may be institutionalized. Therefore the number one priority of the future should be the health care of the aged.

Even in Kerala the health care of the aged population is considered as one of the biggest challenges to be feed in the next millenium. (Shanmukhadas, 1999 and Bagchi, 1998).

Factors that are often used to define health, in more measurable terms, include physical signs, symptoms and functional disability. Physical signs are the directly observable or measurable changes in an individual's organs or systems. Symptoms are the more subjective reactions to the changes experienced by the individual (O'Sullivan *et al.*, 1994). With improving life expectancy and the resultant increase in the proportion of the aged population, there would be worldwide increase in the burden of chronic diseases and disabilities.

The health problems according to Subrahmanya (2002) and Mehta (2001) tend to increase with advancing age and very often the problems aggravate due to neglect, poor economic status, social deprivation and inappropriate dietary intake which often result in multiple nutritional deficiencies.

Khana (1997) was also of the opinion that many factors like poor income, decreased mobility, social isolation and depression are known to affect the health and well-being of the elderly.

Pasricha *et al.* (1992) presented a wide range of factors which have a negative influence on the health and nutrition of the elderly including lack of family support in terms of need, feeling of unwantedness, economic constraints, lack of value system among the members in the family, stressful conditions leading to tensions and loneliness leading to disinterestedness in living and eating, resulting in malnutrition.

The National Policy for older persons recognizes that with advancing age, old persons have to cope with health related problems, some of which may

be chronic, of a multiple nature, requiring constant attention and carry the risk of disability.

Thomas (2003), Prakash (2001) and Shah and Prabhakar (1997) ascertained this fact by stating that elderly in India showed considerable morbidity. As indicated by surveys 45 to 55 percent of older people had chronic illnesses. This coupled with the fact that geriatric medicine has not yet taken proper roots in the country and existing health system is not geared to the needs of a large group of elderly.

In a Delhi based study prevalence rate of morbidity was reputed to be 229 and 210 per 1000 in old men and women respectively (Shah and Prabhakar, 1997). In Kerala the morbidity levels in elderly population is higher than any of the major states in India. The average life expectancy in Kerala has reached 68.8 years for males and 74.4 years for females and this kind of longer life span is associated with worsening health condition. The life expectancy has increased to this level mainly because of progressive decline in death rate at all ages brought about by the control of communicable diseases (Dilip, 2001).He further added that the medical technology has seen more progress in the management of chronic diseases than cure. Therefore, the individuals who would have died during the previous mortality regime are still living with those conditions, resulting in a higher prevalence of these conditions in the population. As a result, more and more frail persons survive until old age and the aged population as such becomes frail and prone to diseases.

As far as the type of morbidity is concerned Liebig *et al.* (2003) reported that age-related disorders include life-threatening diseases such as heart disease, stroke, cancer, diabetes and infections as well as certain chronic disabling conditions affecting vision, mobility, hearing and cognition. Older persons also complain about various symptoms that may appear non-specific and unrelated to any classic disorder including general weakness, sleeplessness, constipation, flatulence, diminished appetite, decreased libido and so forth. Khanna (1997) also identified obesity, diabetes, cardiovascular diseases and osteoporosis as the most important and commonly prevalent nutrition related health problems among elderly.

According to Kasthuri (1999) the major diseases of old age are blood pressure, diabetes, heart diseases, arthritis etc. Coronary heart disease and stroke have become the major causes of death and disability among both ageing women and men. Sreeramulu *et al.* (1999) also stated that cardiovascular diseases like hypertension and coronary heart disease account for high morbidity in elderly.

The prevalence rate of Coronary Heart Disease (CHD) was nearly three times higher in the urban than in the rural population. In 1996, there were around 9 million CHD cases with males outnumbering females (Shah and Prabhakar, 1997).

Moody (2000) also opined that the leading cause of death for people over age 65 remains cardiovascular disease, which includes stroke and heart disease. Risk factors for cardiovascular disease in the elderly includes ageing, positive family history, cigarette smoking, hypertension, obesity, hyperlipidemia and diabetes mellitus.

Hypertension among the urban elderly however was reported to be twice as high as that among the rural elderly. Older subjects had nearly 20 times higher prevalence of hypertension compared to total population. Other health problems in elderly are degenerative disorders like diabetes and cancers.

In industrialized countries, about 75 percent of deaths in people over the age of 65 are now from heart disease, cancer and cerebrovascular disease (WHO, 2002).The population based cancer registries initiated in some large cities reported 35million detected cases among elderly in 1996 alone. Tobacco related cancer is common among males while in females cancers of uterine cervix and breast are more common (Shah *et al*., 1997).

With ageing, the walls of the intestines get atrophied and weak and the motility is markedly reduced. The enzymes needed for digestion and secreted by the intestine are also reduced. The partly digested food stays in the intestine for a longer period. As a result, gas formation or fluctulance and constipation occurs (Bagchi, 2000).

Constipation as stated by Dodd (1999) is one of the most common gastrointestinal complaints in the elderly. General symptoms caused by constipation are pain in abdomen, heaviness in stomach, gas formation ,coated tongue ,headache, loss of appetite, pain in lower legs, hypertension, drowsiness etc. Immobility, decreased exercise, and a lack of fibre and water in the diet are all common problems in the older population and these factors tend to exacerbate the tendency to become constipated (Anderson *et al*., 1999).

Natarajan (2001) suggested that a high fluid intake must be maintained and an older person should consume at least a minimum of two to 2.5 litres of fluids per day. Physical activity should be encouraged and the elderly should include in their diet 40gms of dietary fibre per day.

Moody (2000) stated that arthritis is the most familiar and most prevalent chronic disease of later life, it afflicts nearly half of all persons over age 65. Arthritis is basically an inflammation of the joints, also commonly known as rheumatism, and it is the most important cause of physical disability. Symptoms include pain and red, swollen joints and muscles. The cause of arthritis is not known and there is no cure, but treatment of the disease to reduce symptoms can be effective.

Osteoarthritis is yet another chronic degenerative disease of joints progressive in nature occurring mainly in the middle half of life affecting one or many joints and is the leading cause of disability in the older persons. Many people have mild aching and soreness in their joints, especially when they move. The risk factors to osteoarthritis are obesity, genetic factors, bone density and occupation (Anand, 2001).

The health problem often referred as a specific malady in old age is osteoporosis and fractures which can seriously interfere with movement and productivity (Sreeramulu *et al.*, 1999).

WHO (2002) also reported that osteoporosis and associated bone fractures are one of the major causes of disability and death that result in enormous medical expense the world over. It is estimated that the number of hip fractures worldwide will rise from 1.7 million in 1990 to around 6.3 million by 2050. As given by Moody (2000) osteoporosis is a condition involving deterioration or disappearance of bone tissue leading to loss of strength and often to fracture.

The bones get porous and fragile as the age advances, especially in elderly females which leads to osteoporosis (Bagchi, 2000). Women are more prone because their bone loss accelerates after menopause (WHO, 2002). Higher prevalence of osteoporosis among women (four times common than in men) especially beyond the age of menopause was also highlighted by Moody (2000).

Factors such as diet, physical activity and smoking are closely associated with osteoporosis. Lifestyle modifications, particularly increased calcium intake and physical activity have an important preventive impact on fracture rates (WHO, 2002). Improved blood circulation to bones through physical activity and proper diet with adequate calcium were also suggested by Bagchi (2000) as two best preventive measures of osteoporosis.

Bagchi (2000) further reported that with increase in age, the valve in the bladder, which controls the exit of urine from the bladder to urethra, gets atrophied and weak. Involuntary leakage of urine occurs in case the bladder is full or due to increased pressure on bladder as in sneezing or even in laughing, a condition known as urinary incontinence. Incontinence is a common complaint of elderly females.

The prevalence of blindness mainly due to cataracts, hearing problems and mental problems (70 percent due to depression) among the elderly was almost ten, eight and two times higher, respectively, than the prevalence in the total population (Liebig *et al*., 2003).

Compiling data from several studies initiated by the Indian Council of Medical Research, Shah *et al.* (1997) reported visual impairments in 11 million older population in India, while 38 million have hearing impairments.

Kasthuri (1999) also opined that in old people the occurrence of loss of memory, the difficulty for moving, impairment of hearing and seeing is also seen. In some older people forgetfulness is a serious problem and they may have difficulty in remembering things like where they are, their names, age, address etc. This is generally known as dementia and the most common forms of dementia are known as 'Alzheimer's diseases and vascular dementia'.

According to Moody (2000) dementia is an organic mental disorder involving progressive loss of the capacity to think and remember. Dementia is characterized by confusion and memory impairment and may manifest itself in a wide range of symptoms, such as wandering or losing things.

As stated by Sreeramalu *et al*. (1999) neurons get degenerated and are mostly not replaced resulting in dementia, Alzheimer's disease etc. There is a progressive decline in a person's ability to remember, learn, reason and think.

Muscle loss during old age leads to physical weakness. Immune

infections also get affected and results in increased risk of infections in old age (Sreeramalu *et al*., 1999). Thus elderly suffer from multiple health problems, apart from socioeconomic and other behavior problems which necessitates the need for giving special attention to their health care needs (Sreeramalu *et al*., 1999).The idea that health care of elderly is as essential as that of younger age group though theoretically accepted may not by translated readily into practice.

Functional disability

A functional limitation according to O'Sullivan *et al.* (1994) is the inability of an individual to perform a task or activity in the way it is done by most people, usually as the result of impairment. Three main categories of function have been delineated: physical function, psychological functional and social function. Physical function refers to those sensory motor skills necessary for the performance of usual daily activities. Getting out of bed, walking, climbing stairs and bathing are examples of physical functions. Tasks concerned with daily self care such as feeding, dressing, hygiene and physical mobility are called Basic Activities of Daily Living (BADL). Advanced skills that are considered vital to an individual's independent living in the community are termed Instrumental Activities of Daily Living (IADL). These include a wide range of high level skills such as managing personal affairs, cooking and shopping, home chores and driving (O'Sullivan *et al*., 1994).

Psychological function has two components-mental and affective. Mental function refers to the intellectual or cognitive abilities of an individual.

Factors such as initiative, attention, concentration, memory, problem solving or judgement are important components of normal mental function. Affective function refers to the affective skills and coping strategies needed to deal with the everyday hassles as well as the more traumatic and stressful events each person encounters over the course of a lifetime. Factors such as self esteem, attitude towards body image, anxiety, depression and the ability to cope with changes are examples of affective functions.

Social function refers to an individual's performance of social roles and obligations. Categories of roles and activities that are relevant to assessing and individual's social function include social activity, including participation in recreational activities, social interaction such as telephoning or visiting relatives or friends and social role created and sustained through interpersonal relationships specific to one's personal life and occupation (O'Sullivan *et al*., 1994).

People are regarded as dependent if they need help to perform basic daily tasks and their level of functioning is often assessed accordingly. As people age there tends to be a concominant increase in the presence and number of chronic conditions together with a greater dependence on caretakers (WHO, 2002).

Functional assessment measures how a person does certain tasks or fulfills certain roles in the various dimensions of living (O'Sullivan *et al*., 1994).

The physiological and pathological changes that inevitably accompany ageing result in degenerative processes and lower functional capacity. These in turn influence nutritional status of old people (Pasricha *et al*., 1992).

2.2.4 Nutritional Problems

Since a majority of the health problems among the aged are diet related and nutritionally dependent, appropriate and adequate nutrition is essential for health and well being of the elderly (Arlappa *et al.,* 2004). WHO (2002) also stressed that among the problems of old age, nutrition ranks as the major one.

The situation in 80's was also reported to be the same. As per Gambert (1987) nutritional problems are common in both healthy, community dwelling elderly and hospitalized and institutionalized elderly. This indicated the fact that nutritional problems of elderly continues to be in the same tempo. According to Antony (1999), nutritional assessment plays a significant role in identifying those persons who are at nutritional risk. Thus under nutrition remains a serious problem in high-risk populations, including the frail elderly.

According to WHO (2002) under nutrition is a global problem usually caused by a lack of food or a limited range of foods that provide inadequate amounts of specific nutrients or other food components, example, protein, dietary fibre and micronutrients. Among older persons malnutrition can occur in economically disadvantaged groups even within privileged societies and in pockets of poverty or social isolation.

Nutritional requirements of aged will be different from normal adult requirements. The lowered metabolic rate reduces the calorie requirement by about 25 percent compared with normal adults.

According to Bagchi (2000) the elderly require and consume fewer total calories per day than younger adults. Carbohydrate intake may increase slightly (40 % of total calories) whereas fat and protein intakes generally decline in older people. Lean body mass and total body protein decrease whereas the percentage of body fat increases with age. Reduced energy metabolism, lack of physical activity and lack of appetite leads to significantly reduced food intake and consequently energy deficiencies.

As reported by Steen (1992), many institutionalized elderly patients are physically inactive, which gives rise to low needs for energy and therefore difficulties in maintaining a sufficient intake of essential nutrients. Physical inactivity enhances bone mineral losses from the skeleton and several studies have shown that exercise can prevent or reverse some of the limiting change in cardiovascular function and work capacity and be able to improve glucose tolerance.

The sense of taste and smell diminishes with advancing age. The decline results in the lessening of appetite and reduction in the quantity of food consumed. Regular supplementation of vitamins and minerals is required for the vulnerable section of the elderly population (WHO, 2002).

According to Antony (1999), nutritional assessment plays a significant role in identifying those persons who are at nutritional risk. Many elderly persons experience a variety of physiological problems associated with the aging process. Nutrition assessment is of primary importance in helping to identify potential risks and solutions to many of these problems. Marginal or inadequate energy intake and vitamin status commonly occur among those who are homebound, disabled or institutionalized (Beck *et al*., 1999).

Since calcium and Vitamin D seem to play vital roles in the development of bone loss with ageing it is important to secure an adequate intake even in the old age- especially among those who are homebound and hence have an inadequate sunlight exposure (Beck *et al.*, 1999).

Bagchi (1999) stated that several sociopsychological factors also affect the dietary pattern and food intake of the elderly. Those living with their own families and have someone to take care of them have an invariably better food intake and nutritional status. Those in old age homes are usually undernourished with various types of nutritional deficiencies. Most elderly individuals are socially isolated. Loneliness and lack of companionship may depress appetite and hence food intake.

In majority of the elderly people it is very difficult to change some of the already established food habits carried over from childhood. Food habits get influenced by several factors such as family, education, occupation, economic

status, life style and cultural norms. Also change in diet may occur in the late years for physiological reasons such as denture problems, diminished senses of taste and smell and problems in digesting certain foods.

Social factors like widowhood and poor income may also intervene to change the diet of the elderly thereby leading to potential health problems (Vijayakumar, 1996). Loss of teeth is a common feature in ageing. Even with dentures, the eating habits are considerably altered as chewing is avoided and the elderly individuals prefer to eat soft, mashed or liquid foods, which quite often lead to nutritional deficiencies (Bagchi, 2000). Further these factors not only regulate the absorption of several components of food but also regulate gastro-intestinal function (Bagchi, 1999).

Absorption of nutrients is poor among old people due to changes in intestinal wall (Beegum, 2001). An appropriate diet composed of easily digestible food and with adequate amount of roughage or food fibres to stimulate the motility of the intestine will to a large extent overcome these complaints. Diet in ageing should receive high priority. Assimilation of minerals is poor in old people compared to a normal person.

Some of the common nutrition related problems among the elderly are diabetes, hypertension, other cardiovascular problems, gastrointestinal problems, kidney problems and arthritis (Pasricha *et al*., 1992).

Even fat digestion is difficult and delayed in old age. Cholesterol level could be high among old people and so it is better to avoid saturated fat from animal sources, coconut and palm oil. Vegetable oils reduce the blood cholesterol level and 40 to 50 grams of such fats or oils can be used (Beegum, 2001).

Poor absorption of minerals and hormonal imbalance, especially of androgen and oestrogen, produce osteoporosis in old people. Generally raw vegetables or fruits are consumed in fewer amounts by old people which produces signs and symptoms of various vitamin deficiencies. B complex vitamin deficiency is common (Beegum, 2001).

According to Gambert (1987), factors involved in the development of malnutrition in the elderly include physical impairments like poor vision, poor dentition/dentures, arthritis and immobility; physiological impairments like malabsorption and maldigestion, loss of taste and smell; pathological conditions like dementia, depression, disease states; social factors like poverty, alcoholism, poor dietary habits, isolation and latrogenic causes like drug interactions, prescribed diets.

Energy deficiency leading to emaciation, ascorbic acid and vitamin B complex deficiencies, anaemia and osteoporosis are frequently observed among older segment of the elderly individuals. Dietary anti-oxidants like vitamin C, E and beta-carotene are now being recognized as factors which might retard the process of ageing by scavenging ‘free radicals’. These anti-oxidants are

particularly useful in preventing the onset of pathological conditions which convert physiological ageing into pathological ageing. Vegetables and fruits are rich in these anti-oxidants and should be eaten liberally (Bagchi, 1999).

Sreeramulu *et al*. (1999) is also of the opinion that adequate micronutrient supplementation and calorie restriction may decrease free radical generation and may help in longevity. Studies conducted in various parts of the country have shown that most of the elderly people suffer from micronutrient deficiency diseases. They should therefore be encouraged to eat foods rich in micronutrients such as vitamins A, E and C and minerals such as calcium, zinc and selenium. Elderly people need more of Vitamin E compared to vitamin A as vitamin deficiency is more widespread among elderly.

Hasan (1998) opined that physiological changes associated with advancement in age have a potential impact on the diet and nutritional status of older persons. They are at risk of suffering from poor nutrition for a number of reasons, like poor dentition and ill-fitting dentures, economic pressures, depression, reduced mobility, loneliness, ageing tissues, inadequate food consumption, poor quality of diet and ignorance.

Malnutrition among older persons can occur in economically disadvantaged groups even within privileged societies and in pockets of poverty or social isolation. Reasons for under nutrition include decreased food availability and affordability, lack of interest or awareness affecting intake, malabsorption, or

increased nutrient requirements and traditional habits or beliefs whether of the elderly or their caretakers (WHO, 2002).

Increased intake of fruits and vegetables can dramatically reduce the risk of many degenerative diseases of ageing (Reddy *et al*., 1999). Studies from Kurichia, a tribal population of Kerala, India who enjoy longevity are relatively free from age associated chronic problems, reveal that consumption of leafy and root vegetables have beneficial influence on cardiac protection and retardation of ageing process.

WHO (2002) reported that there is substantial evidence that calcium and vitamin D protect against osteoporosis. During the later years, calcium together with vitamin D prevents negative calcium balance and reduces the rate of bone loss. Other minerals including boron, copper, magnesium, manganese and zinc appear to contribute to the maintenance of bone density with age. Sodium adversely affects calcium balance through the promotion of urinary calcium loss. Vitamin K and essential fatty acids also contribute to bone health. Dietary risk factors for osteoporosis include excess consumption of caffeine, protein and alcohol. An overall food pattern is likely to be more important for bone health among older persons than any single food factor taken alone.

Khanna (1997) pointed out that due to various physiological and socio-psychological changes, food intake of the elderly might decrease drastically resulting in under nutrition and malnutrition. Deficiencies of iron, folic acid and

vitamin C are common among the aged which manifest in the form of anaemias. Malnutrition may occur due to decreased intake, impaired absorption and poor utilization of various nutrients.

WHO (2002) reported that accumulating evidence suggests an important relationship between the incidence of age related cataract and nutritional status particularly where the antioxidant vitamins C and E are concerned. In two prospective randomized clinical trials conducted in China, supplementation with a multivitamin preparation or a riboflavin or niacin formula was found to significantly reduce the prevalence of nuclear cataract in older subjects. Significant correlations have also been reported between poor indices of thiamine, riboflavin and iron nutriture and impaired cognitive performance and electroencephalographic indices of neuropsychological function. High dose vitamin E supplementation appears to delay the progression of Alzheimer's disease.

2.3 SPECIAL CARE AND SERVICES FOR ELDERLY

2.3.1 Service Programmes

The year 1999 has been declared by the United Nations as the International Year of the Older Persons. The Government of India constituted a National Council for the Elderly Persons called 'AGEWELL', to develop and provide several practical solutions to the problems faced by old age people in the country (Ram, 1999).

Also during the International Year of Older Persons, the Government has approved a National Policy for Elderly Persons aimed at helping them live their lives with dignity and peace. The National Policy for Elderly Persons includes proposals for tax breaks for the elderly in the form of a higher standard education and a standard annual rebate for medical treatment (FPAI Bulletin, 1999). However the Geriatric health care has risen as the National Health agenda only recently.

For the first time, in 1983-84 the Government of India decided to give grants to voluntary organization for services to the aged, for health care, income generation, subsistence training and old age homes. In 1992, The Ministry of Welfare started a scheme called Welfare of the Aged which provides financial assistance to voluntary organizations for running programmes like running of old age homes, day care centres and provision of mobile medicare services for older persons above the age of 60 years (Mandal, 1998).

While the government continues its efforts to introduce programmes for the elderly, the non-governmental organizations (NGOs) have played a key role in bringing to the forefront of the socioeconomic and health problems of older people in the society at large. Presently there are many national and international NGOs working for the cause of India's elders. Most have concentrated their work among lower income groups and the disadvantage and unprivileged sections of the society (Liebig, 2003).

Thus both the Government and the Non-Governmental organizations are making efforts to promote the welfare of the elderly. Social security schemes have become very common among the developed as well as developing countries. Special concessions are being provided to people above 60 years of age. Old age pension to the destitute and to the poor has been introduced (Pankajam, 2004).

An Old Age Pension Scheme (OAP) which has been introduced to meet the needs of people who have no means to support themselves. But many states accord OAP a low priority and the monthly amount given is low. The Indian government formulated the long awaited National Policy on Older Persons in 1999. The national policy recognizes the need for affirmative action in favour of the elderly.

An Old Age Pension scheme (OAP) which has been introduced to meet the needs of people who have no means to support themselves was also reported by Liebig *et al*. (2003). According to them many states accord OAP a low priority and the monthly amount given is low. The Indian government formulated the long awaited National Policy on Older Persons in1999. The National Policy recognizes the need for affirmative action in favour of the elderly.

Until 1995, there was no social assistance programme managed by the Government of India for its poor citizens. The announcement of a National Social Assistance Scheme (NSAS) on 1995, was a significant step towards the

fulfillment of the Directive Principles enshrined in Article 42 of the Indian Constitution, which talks about public assistance in old age. But Liebig *et al.* (2003) commented that National Social Assistance Programme launched in 1995 has not covered the entire section of needy destitutes. On 1999, the Government of India also announced another social assistance scheme called 'Annapurna' for its elderly destitutes who have no one to take care of them. Under this scheme, an elderly will be provided with 10 kilograms of rice or wheat per month free of cost through the existing public distributing system (Rajan, 2004).

Recently on December 2006 Lida Jacob, IAS announces welfare programmes for aged. However, the Government supported health programmes targeted for the elderly, in general, are quite inadequate due to economic constraints (Liebig *et al.*, 2003).

It is in recent decades as stated by Mandal (1998) the NGOs or Voluntary organizations have intensified their activities for old age care. Eighty percent of the NGOs in the field of old age care emerged only after 1949. Many voluntary organizations are functioning in India for the care of the aged persons. Some of them registered at national levels, as given by Rajan *et al*.(1999) include the following:

- *Help Age India* initiated in the year 1948, with an aim to improve quality of life of the elderly in need of help. It is one of the premier NGOs that began to

work on the cause of India's older population and which is secular non profit organization too (Liebig, 2003). The main objectives of this organization are to foster the welfare of the aged in India especially the needy, to raise funds for projects which assists the elderly irrespective of caste or creed and to create a social awareness about the problems of the elderly among the younger generation. The main activity of this organization is to consult, train and provide financial support to the voluntary agencies which are engaged in the welfare of the aged. It also has research and development centres to train personnel engaged in the care of the aged.

- *Bharat Pensioner's Samaj* was established in 1960 which is an all-India pensioner's association. The main aims include direct senior citizens into various fields of economic and social activities in the development plans of the country, arrange medical facilities etc.
- *Caritas India* was established in 1962 for the education and animation of society at all levels and its aim is to promote care to the sick, crippled, handicapped, destitute and the aged.
- *Indian Association of Retired Persons* was established in 1973 to approach the government for socio-economic assistance for aged persons, render medical aid by opening dispensaries, hospitals etc. It organizes regular talks and discussions and projects the problems faced by retired persons to the authorities.

- *Age-Care India* was established in the year 1980. The main objectives are to help elderly through domiciliary, residential and institutional services and provide them with educational, recreational, social, cultural and spiritual services; arrange medical services; conduct research and studies on the problems of the aged etc. (Rajan *et al*., 1999).

2.3.2 Institutional care

The idea of institutionalization of the aged has been largely borrowed from the western societies, whose values and norms are quite different from that of India. Experts feel that the requirements of institutionalization cannot be denied for those aged people who are neither able to manage their own affairs nor do they have any person to look after them (Chopra *et al*., 2001).

The first old age home in India is supposed to have been started in early 18^{th} century, but information is available from 1782 onwards (Rajan *et al*., 1999). The Directory of the organizations engaged in the welfare of the aged in India published by the Centre for the Welfare of the Aged (CWEA) showed that the vast majority of homes were set up after the independence. But the oldest home was raised in 1782 in Chennai which functions even today under the name 'Monegar and Rajah of Venkatagiri Choultries' (Luthra, 1991).

A nationwide study of old age homes conducted by Rajan *et al.* (1999) reported that the growth of care homes for the elderly is seen to be high during the period 1951-75.

As of 1988, there were 71 old age homes in Tamil Nadu and 70 in Kerala. On the whole; the south Indian states (Tamil Nadu, Kerala, Karnataka and Andhra Pradesh) accommodate 57 percent of the old age homes. The survey also indicated that more than 60 percent of the institutions face heavy rush for getting accommodation. Specifically, the rush to acquire a seat in religious institutions is much higher (64.9 %) than any other institutions Rajan *et al*., (1999)

Voluntary organizations set up 212 old age homes, 31 mobile medicare units and many day care centers by the year 1995 under the scheme of welfare for the aged of the Ministry of welfare. During 1996-97 a scheme of assistance to Panchayatiraj institutions or voluntary organizations for the construction of old age homes was launched. This scheme aims at providing at least one old age home per district for at least 25 persons above the age of 65 years preferably destitute (Mandal, 1998). Thus despite the belief that children are the security of the aged, institutions for the aged started mushrooming since the late 1990's (Luthra, 1991).

The number of institutions for elderly care in Kerala and Tamil Nadu are higher than any other state in India (Rajan *et al.*1999). They further reported that among the major states in India, Kerala has the highest number of aged persons (21.89%) in old age homes. Tamil Nadu follows with 20.28 percent and the next is Karnataka (13.93%).

Liebig *et al.*(2003) also observed a very high rate of institutionalization of elderly in Kerala, followed by Maharashtra and Karnataka. While children are replacing their role as caregivers to their parents by working outside the home, a new challenge for elderly care will be posed. Day care centers, geriatric hospitals and old age homes are likely to play a major role in the living arrangements for the elderly. They further added that there are homes exclusively for elderly women in Kerala, Maharashtra, Tamil Nadu and one or two homes in other states.

The institutional care for the aged according to Rajan *et al.* (1999) is mainly provided by the non-government, private, voluntary, non-profit and particularly the religious charitable organizations. The central and state governments still play a very negligible role in providing care to this deprived sections of society.

But in recent years, some private agencies are participating to establish old age homes, especially with a profit motive. Majority of the institutions (57.4%) are run by the Christians and the role of Government institutions is very limited. There are very few old age homes run by other religious groups. Very recently, Hindus belonging to various castes and Muslims are taking part in the creation of old age homes (Rajan *et al.*, 1999).

In Kerala considering the rising need for old age homes in Kerala for the kinless and the abandoned, Social Welfare Department has established old age homes in the state. Many aged people even from well off families are waiting for admissions. The Department has initiated various steps by providing all basic

infrastructural facilities and necessary services in these institutions (Prabhakaran, 2004).

Regarding the type of services rendered by these institutions there observed variations. A country wide survey conducted by Help Age India (1995) reported that three types of facilities are available in old age homes. There are homes where the facilities are totally free of charge where the authorities take care of food, clothing and medical aid of their inmates free of charge. Shelter is given to the destitute aged till their death and these homes arrange for a decent funeral also. In purely pay and stay, where the payment for food, shelter and other facilities is on monthly basis. The amount varies depending upon the type of accommodation (more for single accommodation and less for double, more for bedridden and less for healthy) and the city status and there are homes with both free and pay and stay facility where payment is not compulsory. Payment depends upon the capacity and wish of the inmates.

Pankajam (2004) also made a mention about the paid services for the aged. As given by her, there are paid homes where senior citizens who are economically well off but have no relatives to take care of them, prefer to live till they leave the world. They have all the comforts but lack the affectionate care and touch of their children. There is also another category of the aged who prefer to live independently in a home for the aged away from their family whom they choose to visit with once in a while. Such ones feel that keeping a distance might

make the hearts grow fonder. But this is feasible only in the case of those who are financially independent and emotionally strong. Sons and daughters are ready to spend any amount on such elderly parents who live in old age homes without disturbing them by being away from them. This trend of leaving the responsibility of taking care of the aged to the government or to voluntary organizations is fast growing and the family bond is decreasing.

A survey conducted by Help Age India (1995) revealed that out of 258 homes 63 percent were destitute homes offering accommodation, food clothing and medical aid to their inmates free of charge. The others were 'pay and stay homes' run by NGOs or religious organizations. They admit the elderly regardless of their caste, gender and religion. There are also homes that provide care only for specific communities. The majority of these institutions are run by voluntary organizations with or without government assistance.

Ara (1995) classified the elderly approaching old age homes under four general categories:

- Some aged persons who are single, widow/widower or old couples are quite well to do and have regular income, but either they are childless or their children have settled down in distant countries. They feel lonely, frustrated and long for company. Due to failing health, they have to depend more upon servants. Some feel their life and money is not safe as long as they are in the clutches of the servants. Such aged persons are in immediate need of a place

where they can be safe, have persons to look after them with loving care and lead a peaceful life. Since these people are economically sound, they are quite in a position to pay for all the comforts that they enjoy.

- The second category of elderly comprises of single persons or couples without children who are no longer in a position to work and earn and their income through pension or some other source is too meagre to cover their needs. Such persons are in need of a place where they can get food, shelter and medical aid by paying whatever is possible from their side.
- There are some aged whose relationship with the family members is strained. They have either abandoned the family since they can no longer tolerate the humiliating behaviour from the family members or they have been discarded by the family members as an unmanageable burden. Such persons look around for a place where they will be in a position to spend the remaining years of life in peace and with dignity.
- The fourth category comprised of such aged persons who have no income and no relatives. They are very old and sick, mostly bedridden. They have neither children nor any relative to take care of them. People around them sometimes supply meals but nobody is prepared to attend upon them in bed.

Thus the needs and expectations of the elderly approaching old age homes are many and varied. For the destitutes old age homes are the only panacea. But for many others who were not destitutes the services available do not meet their expectations (Jamuna 1998).

A study of the existing institutions in India by Rajan *et al.* (1999) found that 88 percent provide residential care to the elderly, six percent offer day care services and the remaining institutions are engaged in health care and self-employment activities for the elderly. The existing institutions are admitting or providing care according to their objective with the available resources. Of the total old age homes in India 46 percent are for all types of old persons, 35 percent for the destitute elderly, 11 percent for poor elderly and 5 percent for sick and handicapped elderly.

However, the existing old age homes as per Ara (1995) are trying to serve the aged inmates to the best of their capacity. The inmates are treated with love and affection and efforts are being made to maintain a healthy and cordial atmosphere. The old age homes have already taken up the cause of the needy helpless aged and by providing love, shelter and care to them they are doing a great service to the society.

In the institution people live communally with a minimum of privacy and yet their relationships with each other are slender. Their mobility is restricted and they have little access to a general society. They are oriented toward a system in which they submit to orderly routine, non-creative occupation and cannot exercise much self determination. They have too little opportunity to develop the talents they possess and they atrophy through disuse. Occasionally they seem to withdraw into a private world of fantasy (Williams, 1984).

In this context as suggested by Mandal (1998) “Adopt A Granny Programme”, which is experimented successfully by several organizations, mainly inspired by Help Age India and Help Age International would to be a most viable solution for the problems of elderly.

3. METHODOLOGY

Research methodology is a way to solve the research problem systematically. Many different methods and procedures have to be developed for a study to aid in the acquisition for certain sources of data, yielding information of the kind and in the form that can be most efficiently used (Best and Khan, 2001). Methodology adopted for the present study '***Health and Nutrition Profile: A study in Old Age Homes at Ernakulam, Kerala***' comprised of the following:

3.1 LOCALE OF THE STUDY

Ernakulam is a thickly populated district in the central Kerala. Cochin, the second most important city on the western coast of India is also a part of Ernakulam district. This district has an area of 2407 sq.km and has got a population of 31,05,798 (census report, 2001). There are 88 panchayats, 8 municipalities and one corporation under the administrative purview of this district. The literacy rate in the district is 93.42 percent.

The number of old age homes in India comes around 1000 as per the available statistics (Subrahmanya, 2002). Kerala has the largest share of this, although the state's population constitutes only 3.4 percent of Indian population (Sreevals *et al*., 2001).

The two districts of Kerala, Kottayam and Ernakulam have the highest number of old age homes (Rajan, 1999). The rapid industrialization and urbanization and the resultant changes in the life style of the people, reflect essentially on the family structure, so also on the life of the elderly. Growing number of old age homes in Ernakulam is a clear indication of this transition. So Ernakulam district has been selected as the locale of the study.

3.2 PLAN OF ACTION

The plan of action of the present study comprised of two major phases.

3.2.1 Phase I

This phase dealt with the Infrastructural facilities and Service efficiency of the old age homes in Ernakulam district.

3.2.2 Phase II

In the second phase data regarding the Health /Nutrition Profile of the inmates of the old age homes was collected. This included a

documentation of systematic investigations on a macro sample of selected 300 inmates and a micro sample of 30 inmates of the old age homes in Ernakulam district.

The investigation on macro sample consisted of:

- **Socio economic background and lifestyle**
- **Health/Nutrition status**
  - **Health status**
  - **Nutrition status**

The investigation on micro sample consisted of:

- **Food consumption pattern**
- **Estimation of blood haemoglobin**

3.3 SELECTION OF SAMPLE

As an initial step, the list of Old Age Homes in Ernakulam district was obtained from the Department of Social Welfare, Ernakulam. All the 16 Old Age Homes in the list were included in the study.

The homes were then categorized into three groups based on their location such as Corporation, Municipality and Panchayat. The area wise classification of homes showed that, out of the total 16 homes, five were under Corporation area, two homes in Municipality and nine in Panchayat area.

Total number of inmates in all the homes put together was estimated as 779, based on the records kept by the authorities of the old age

homes. From these inmates, 300 subjects who were of sixty years and above and willing to co-operate with the study were selected by proportionate random sampling technique.

The importance of sampling technique in research has been emphasized by many authors. Kothari (1997) stated that the respondents selected should be as representative of the total population as possible inorder to produce a miniature cross-section and the selected respondents constitute what is technically called a ‘sample’ and the selection process is called ‘sampling technique’. According to Gupta (2003) sampling is simply the process of learning about population on the basis of a sample drawn from it. Under this, small group of the universe is taken as the representative of the whole mass and the results are drawn. It is a method to make social investigation, which is practically applicable.

Moreover use of simple random sampling as reported by Kothari (1997) ensures the law of Statistical Regularity, which states that if on an average the sample chosen is a random one, the sample will have the same composition and characteristics as the universe. Hence sampling unit for the study was selected using stratified random sampling, strata being corporation, municipality and panchayat.

As the homes exclusively for female elderly (9 nos.) were more in number than the homes where elderly males and females live together

(7 nos.), the female elderly population (643) was also more than four times in number than elderly males (136). Hence a proportionate sample was selected which included 240 females and 60 males. Care was taken to include sample from all the 16 homes. The sampling procedure is illustrated in Figure 1.

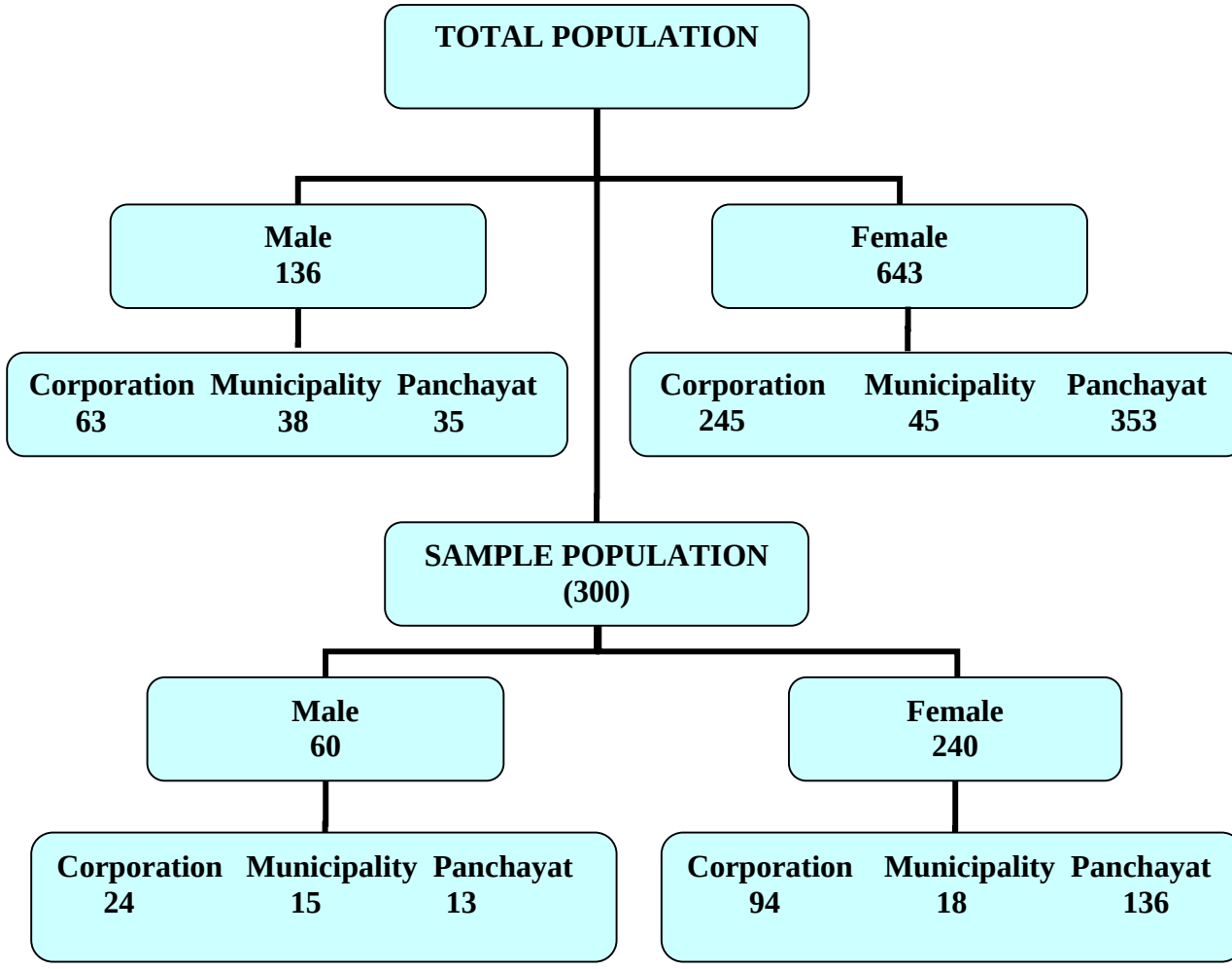

Figure 1 Sampling procedure

3.4 SELECTION OF TOOLS AND DATA COLLECTION

The tools selected for data collection should be appropriate and accurate for ensuring credibility and reliability of information. The present study targeted to procure data on the following lines:

3.4.1 The infrastructural facilities and service efficiency of the old age homes

3.4.2 Health/Nutrition profile of the inmates of the old age homes

3.4.1 The infrastructural facilities and service efficiency of the old age homes

Assessment of the environment is an essential step towards understanding the care and services provided to older adults. The assessment of the physical environment includes all aspects of the older adult's living situation that can be seen, heard, touched or smelled. Each of the physical items in the environment can either contribute to or detract from the optimal functioning of the older person (Anderson *et al.*, 1999).

Hence an interview schedule was developed to elicit information on the establishment details of the old age homes (16 nos.), infrastructural facilities available and quality of services rendered by these homes. The interview schedules as given by Thanulingam (2000) are a proforma containing a set of questions and are very useful in gathering information. Either the researchers or the ones who are specially appointed for the purpose generally fill it.

The schedule thus developed was pretested on a sample of three homes, one each from corporation, municipality and panchayat areas. The schedule was then finalized after making necessary modifications. The sample schedule (No. I) is given in Appendix 1.

Direct interview method was the technique adopted in the study for collecting the data. This method is reported to be a suitable way to proceed systematically and quickly to collect information. (Kothari, 2001 and Bass *et al*., 1979). In this method, there is a face-to-face interchange between interviewer and respondent before eliciting information (Kothari, 2003). Moreover this is found to b a systematic method by which a person can enter more or less imaginatively into the inner life of a comparative stranger (Rajammal and Kulandaivel, 1975).

The information received from an interview schedule was more reliable because the interviewer can clear up the doubts of informants and also accuracy of the statements could be checked by supplementary questions wherever necessary (Singh, 1997 and Gupta, 1987). So this technique can be used effectively to gather information regarding an individual's experience and knowledge, his or her opinions, beliefs and feelings and demographic data (Best and Khan, 2001).

The finalized interview schedules were therefore administered personally by the investigator on all the 16 old age homes. Initially the authorities of the homes were informed about the purpose of the study

through personal discussions by the investigator to ensure their support and co-operation. Then with the help of the authorities the inmates of the institutions were oriented about the purpose of the study to ensure their co-operation and participation during data collection.

The investigator stayed in the locale of the study during the period of data collection to develop rapport with the authorities of the homes and elderly subjects, to gain their co-operation and support and also for facilitating observation on physical facilities and services rendered by the homes.

3.4.2 Health/Nutrition profile of the inmates of the old age homes

Information on these lines has been obtained by studying the inmates on the following:

- **Socio-economic background and life style**
- **Health/Nutrition status**

Socio-economic background and life style

The socio-economic factors do play a major role in the nutritional well being of elderly. As Arlappa *et al*. (2004) rightly put in nutritional vulnerability of the elderly population is compounded further by their low socio-economic status. Social factors like widowhood and poor income, as stated by Vijayakumar (1996) may intervene to change the diet of the elderly, thereby leading to potential health problems. Bali (1997) was also

of the opinion that the elderly people face a multitude of problems ranging from lack of employment to economic insecurity, from health to psychosocial, to lack of familial support and social support. Several studies probing into the life of the aged in institutions reveal the satisfaction level of inmates (Shankar, 1999).

Taking into account of these factors another interview schedule was developed to assess the socio-economic background and life style of inmates. Pretesting of this schedule was also done by means of a pilot study on a comparable group of 30 inmates (15 male and 15 female) of old age homes under the purview of the study, but not included in the selected sample population. The schedule was then suitably modified and finalized. The sample schedule is given in Appendix II.

The interview schedule was administered on the selected sample of inmates (n=300) after giving an orientation on the purpose of the study so as to ensure their co-operation and participation during data collection. The authorities of the old age homes were also informed well in advance and prior permission was obtained for data collection.

Frequent visits to the homes and staying with the inmates during data collection helped the investigator a lot to develop rapport with the sample and elicit the relevant information in an effective and smooth manner.

Health/Nutrition status

The relevant data to arrive at the Health and Nutrition status of the elderly in old age homes was collected by pursuing investigation on the following lines.

- **Health status**
- **Nutrition status**
  - **MiniNutrition Assessment**
  - **Conventional Nutrition Assessment**

Health status

Health status is an important factor that decides the quality of life of an individual. Ageing is a time of multiple illnesses and poor health is repeatedly cited by the aged as one of their most serious problems (Kumar, 1996). The morbidity level of elderly population in Kerala is higher than any of the major state in India (Dilip, 2001). So there is a need to focus more on health and functional abilities rather than on vulnerability, risk and sickness, as a vast majority of elderly people in developed country enjoy good health and function as active members of the community (Prakash, 2000). Therefore the health problems of the sample population were studied in terms of:

- **General health problems**
- **Functional abilities**
- **Depression**

General health problems:

The elderly being the victims of multiple health problems apart from socio-economic and other behavioural problems was highlighted by Sreeramulu *et al.* (1999). They further emphasized the problems like osteoporosis and fractures, cardiovascular and other degenerative diseases like diabetes and cancers and also visual impairment due to cataract as specific problems of old age interfere with their health and well being.

Hence an interview schedule was developed to assess the health status of the elderly including the general health problems (problems in vision, hearing, movement), oral health problems (dental problems, difficulty in identifying taste etc) and degenerative disease conditions like diabetes, cancer etc. The schedule was reviewed by a team of physicians specialized in geriatric health care attached to hospitals. All the 300 elderly subjects were assessed by administering the schedule with the help of a qualified medical practitioner. The sample of schedule is given in Appendix IV.

Functional abilities:

Functional assessment of all the 300 samples was done using the Activities of Daily Living (ADL) scale developed by Katz *et al.* (1970). Functional assessment measures how a person does certain tasks or fulfills certain roles in the various dimensions of living. The Katz index of ADL focuses on the subject's performance and the degree of assistance required

in six categories of basic ADL: bathing, dressing, toileting, transferring, continence and feeding (Sullivan *et al.*, 1994). The sample schedule is given in Appendix IV.

Depression:

Mental depression is one of the major health problems faced by the aged population today (Nina, 1999). According to the Epidemiologic Catchment Area Study, depressive symptoms occur in approximately 15 percent of the elderly population and rates are even higher for elderly in nursing homes. It leads to decreased functioning, increased morbidity and mortality, increased health care utilization and institutionalization. Thus mental depression seriously affects the quality of life of elderly.

Taking into account of these factors an attempt was made to study the prevalence of depression among the elderly population under the purview of the present research. The tool was Geriatric Depression Scale (GDS-short version) developed by Yesavage *et al*. (1983).

The Geriatric Depression Scale (GDS) is a self-report scale designed to be simple to administer and not to require the skills of a trained interviewer. Each of the 30 questions has a yes/no answer, with the scoring dependent on the answer given. A 15-item short version of the GDS has been devised by Yesavage *et al.* (1983) and was used in the present study. The sample checklist is given in Appendix III. As stated by Burns *et al.*, (2002) it is probably the most common version currently used. Expertise

and assistance of a senior psychiatrist in the city was utilized for the administration of GDS on elderly. A total of 300 samples were assessed using Geriatric Depression Scale along with the assessment of their general health conditions. Here also, interview was the technique adopted for the data collection by the investigator.

Nutrition status

Nutrition could play an important role in retarding the ageing process and ensuring that the reduction in functional enzymes–a central attribute of ageing is minimized. Good nutrition can overcome sub optimal immunocompetence largely responsible for increased vulnerability to infection in old age and also in improving mental function (Bamji *et al.*, 1996).

The prevalence of malnutrition, which is relatively low in free-living elderly persons (5-10%), is considerably higher (30-60%) in hospitalized or institutionalized elderly persons. As a result, nutritional assessment should be part of routine clinical practice in elderly patients who are frail, sick or hospitalized. A comprehensive screening tool for assessment of nutritional status is needed that is clinically relevant and cost-effective to perform. A number of simple and rapid tests for detecting or diagnosing malnutrition in the elderly have recently been developed. If malnutrition is suggested by such screening tests, then they should be

supplemented by conventional nutritional assessment before treatment is planned (Vellas *et al*., 2001).

Hence an attempt was made to assess the nutritional status of all the elderly subjects using:

- **Mini Nutrition Assessment (MNA)**
- **Conventional Nutrition Assessment**

Mini Nutrition Assessment (MNA)

The Mini Nutritional Assessment (MNA) scale was developed by Guigoz *et al*., (1994) to grade the subjects as well nourished, at risk of malnutrition and malnourished. As stated by James *et al*., (2004), MNA is an assessment tool that can be used to identify older adults who are at risk of malnutrition. It is a clinician-completed instrument with two components: screening and assessment.

The purpose of MNA is to detect the presence of under nutrition and the risk of developing under nutrition among the elderly in home-care programmes, nursing homes and hospitals. The predictive validity of MNA has been evaluated by demonstrating its association with adverse health outcome, social functioning, mortality and a higher rate of visits to the general practitioner. The MNA takes only 10 minutes to complete and its practicability has been shown by its use in a large number of studies (Kondrup *et al.*, 2003).

The MNA has been validated in many research studies in older adults throughout the world in hospital, nursing home and ambulatory care

patients and in community screening. Internal consistency, inter-observer reliability and validity were shown to be acceptable (Bleda *et al.*, 2002 and Beck *et al*., 2001).

Sample MNA Scale is given in Appendix V. The MNA scale was also administered on all the 300 sample selected for the study, by adopting personal interview as the technique of data collection.

Conventional Nutrition Assessment

Nutritional status of a person is conventionally assessed by anthropometric measurements, biochemical measurements of nutrients or their by-products in blood and urine, clnical examination and by dietary analysis (Swaminathan 2003 and Bamji *et al*., 2003 and Robinson and Barasi, 2001).

Hence in the present study information regarding nutritional status of the sample was obtained by employing the following conventional assessment techniques.

- ***Anthropometry***
- ***Clinical examination***
- ***Food weighment survey***
- ***Estimation of blood haemoglobin***

Anthropometry

Chapman *et al.* (1996) suggested that anthropometry is an important method of assessing the nutritional status in elderly people. Physiologic changes in stature and body composition that accompany aging can be detected by means of nutritional anthropometry (Rahman *et al*.,

1998). It is widely accepted as a simple and useful practical index of nutritional status (Jelliffe, 1996 and Reddy *et al*., 1996). Anthropometric measurements of human body reflect changes in morphological variation due to inappropriate food intake or malnutrition (Srilakshmi, 2002 and Rao, 1996).

Importance of various anthropometric measurements in the assessment of nutritional status of an individual is stressed by several investigators like Balgir *et al.* (2001), Rao (1999), Park and Park (1997), Ramalingaswami *et al*., (1997), Onins *et al*. (1993) and Gopaldas and Seshadri (1987) which included Height and Weight, Body Mass Index, Mid arm circumference and Calf circumference.

Height and Weight*:*

Height and weight are two of the most easily obtained anthropometric measurements. In combination, they have been used to demonstrate the health risks associated with underweight as well as overweight and are used extensively in screening and monitoring programmes. However, much of what is known about these relationships relates to children, adolescents, and middle-aged adults; little is known about older people (Launer, 1996).

Height is the simplest and most widely used measure of skeletal size (Webb and Copeman, 1996). Height of the subjects (n=300) was measured using a non-stretchable fibre glass tape affixed on the wall. The

subject was made to stand barefoot with heels together and with buttocks, shoulders and back of head touching the wall. The head was held comfortably erect and arms left hanging by the sides in a natural manner. A metallic scale was gently lowered, compressing the hair and making contact with the top of the head and the reading measured to the nearest 0.1 cm.

Body weight according to Rao and Vijayaraghavan (1999) and Swaminathan (1995) is the most widely used and the simplest reproducible anthropometric measurement for the evaluation of nutritional status. Jelliffe (1991) indicated that body weight is one of the most important and useful indicators of nutritional status. The subject was asked to stand straight with bare foot, on a calibrated weighing scale. The scale was set to zero before each measurement of the subjects (n=300) and the weight was recorded to the nearest 0.5 kg.

Body Mass Index (BMI*):*

Body Mass Index provides a reasonable indication of the nutritional status of adults. It can be used as an indicator of health (Bamji, 1999). BMI is a good index for assessing the current form of malnutrition (Raman, 1991). From the recorded height and weight of the subjects, BMI values were calculated for all the 300 subjects using the formula, BMI=Weight (kg)/Height (m^2). The subjects were then categorized under various grades of nutrition suggested by James *et al*. (1988) and Luizz *et al*. (1992).

Mid –upper arm circumference (MUAC):

MUAC is the circumference of the left upper arm, measured at the mid point between the tip of the shoulder and the tip of the elbow (olecranon process and the acromium). The MUAC measurement requires little equipment and is easy to perform even on the most debilitated individuals. The use of MUAC in adults may be affected by the redistribution of subcutaneous fat towards central areas of the body during ageing. MUAC is an appropriate indicator useful for both screening acute adult undernutrition and for estimating prevalence of undernutrition at a population level (Collins *et al.*, 2000).

The mid-upper arm circumference of the sample (n=300) was measured using a flexible fibre glass tape, which was placed firmly around the left limb. The mid point between the tip of acromium of scapula and the tip of the olecranon of the forearm bone, ulna is located with the arm flexed at the elbow; and marked with the marker pen. The arm is left hanging freely and the tape is gently, but firmly placed embracing the arm without exerting too much pressure on the soft tissue. The reading is taken to the nearest 0.1cm, with the tape still in position (Bamji, 1999).

Calf circumference:

In a study to examine the efficacy of calf circumference (CC) measurement for assessing the nutritional state of the elderly, Bonney *et al.* (2002) reported that calf circumference is a pertinent marker of nutritional

state in the elderly. Considering its relevance, measurement of calf circumference was done on the entire sample (n=300). Calf circumference is taken on the widest part of the leg below the knee. The measurement is taken by using a fibre glass tape without too much pressure on the tissue. The reading is taken to the nearest 0.1 cm with the tape still in position. Additional measurements above and below this point was taken to ensure that the first measurement was the largest.

The Body Mass Index, Mid arm circumference and Calf circumference values were used to score the subjects on the Mini Nutritional Assessment (MNA) score sheet. The anthropometric measurements obtained were compared with the standard values reported by National Nutrition Monitoring Bureau (NNMB reports, 1996-97).

Clinical examination

Clinical examination is an important practical method of assessing nutritional status. This is based on examination of changes that can be seen or felt in superficial epithelial tissues especially in the skin, eyes, hair and buccal mucus or in organs near the surface of the body (Whiteheed,1965). Swaminathan (2003) and Kamath (1986) also opined that clinical examination is an important, practical, sound and simplest means of assessing nutritional status.

All the 300 inmates selected for the study were subjected to clinical examination. The prevalence of clinical signs, symptoms and

disease conditions among the elderly due to dietary deficiencies or excess were studied with the help of a qualified medical practitioner using the clinical assessment schedule developed by National Advisory Committee-Indian Council of Medical Research (NAC-ICMR) reported by Swaminathan (2003). The sample schedule is given in Appendix V.

According to Park (2002) and Swaminathan (1990) clinical examination is the most essential part of nutritional surveys, since the ultimate objective is to assess levels of health of individuals and population groups as influenced by the diets they consume. When two or more clinical signs characteristic of a deficiency disease are present simultaneously, their diagnostic significance is greatly enhanced (Sreelakshmi, 2002).

Food weighment survey

Diet is a vital determinant of health and nutritional status of people (Thimayamma and Rao, 1996). A diet survey provides information about dietary pattern and intake of specific foods and helps to estimate nutrient intake (Srilakshmi, 2002). Actual quantity of food consumed by an individual was ascertained by food weighment method. Rajammal and Eswaran (1986) emphasized that food weighment method was the most reliable method to assess the actual food intake of an individual.

So a food weighment survey for three consecutive days was conducted to determine the actual food and nutrient intake by a selected sub sample of 30 including 15 male and 15 female elderly people. For this a

kitchen balance having a capacity of weighing five kilogram was used. Weight of raw food ingredients before cooking, total cooked weight and also the cooked food consumed by the subjects were recorded. The raw equivalent of the individual food intake was calculated using the formula,

Raw equivalent of one food ingredient in a preparation = Total raw weight of the ingredient used in a preparation × cooked weight of the preparation consumed by the individual/Total cooked weight of the preparation.

The nutrient consumption was estimated by calculating the nutritive value of the food consumed by individual using the food consumption table (Gopalan *et al*., 2002). The mean food and nutrient intakes of subjects were computed and compared with the RDA for Indian elderly suggested by ICMR (2004).

Estimation of blood hemoglobin

According to Swaminathan (1995), variations in the intake of different nutrients present in the diet are reflected by changes in the ratio of the corresponding nutrients or metabolites influenced by the nutrients in blood, tissue and in urine. Biochemical changes occur prior to clinical manifestation. It helps to diagnose disease at the sub clinical stage (Srilakshmi, 2002). As stated by Swaminathan (2003) haemoglobin level of blood is a reliable index of the overall state of nutrition in addition to its diagnostic importance in anaemia.

Therefore an attempt was made to estimate the haemoglobin content of blood on a sub sample of 30 (n=15 male and 15 female). The haemoglobin values of the subjects were compared with the standard values recommended by WHO (1999) and categorized according to the severity of anaemia. Cyanmethaemoglobin method was used to estimate haemoglobin (NIN, 1993). The procedure is given in Appendix V.

3.5 ANALYSIS OF DATA

The data was analysed statistically using appropriate techniques such as percentages, chi-square, F ratio, and Rank correlation coefficient and Regression analysis.

Besides, Performance index of homes, was developed based on the scores secured for the specific features included under each head. Then the homes/inmates were rated as 'good', 'fair' and 'poor' based on their status. The formula used for developing the index is as follows.

Index = Si/3nX100

where S_i = total score obtained for the variable studied in the i^{th} home

n = number of variables considered

3n = the maximum score that can be achieved by a home for each of these variables.

Health index and Nutrition index of the inmates, who formed the subjects of the study, were also developed based on their overall health status and nutrition status.

4. RESULTS AND DISCUSSION

The present study entitled **'Health and Nutrition Profile: A study in old age homes at Ernakulam, Kerala'** was conducted to appraise the living facilities and quality of services rendered by the old age homes in Ernakulam, Kerala and also the health and nutrition status of the inmates of the institutions. The data collected on these lines was analyzed statistically and presented under the following heads:

Phase I

4.1 BACKGROUND INFORMATION ON THE OLD AGE HOMES

- **4.1.1 Origin**
- **4.1.2 General characteristics**

4.2 INFRASTRUCTURAL FACILITIES IN THE OLD AGE HOMES

- **4.2.1 Indoor space**
- **4.2.2 Lighting and Ventilation**
- **4.2.3 Safety aspects**
- **4.2.4 Other essential amenities**

4.3 SERVICE EFFICIENCY OF THE OLD AGE HOMES

- **4.3.1 Food service**
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Phase II

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- 4.9.2 Health problems
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  - Area wise distribution of overall health status
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4.10 NUTRITIONAL ASSESSMENT

4.10.1 Mini Nutritional Assessment (MNA)

- **Global assessment**
- **General assessment**
- **Dietary assessment**
- **Self assessment**

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4.11 PERFORMANCE INDEX OF HOMES Vs. HEALTH/NUTRITION INDEX

- **Performance index of Homes Vs. Health index**
- **Performance index of Homes Vs. Nutrition index**
- **Health index Vs. Nutrition index**

Phase I

4.1 BACKGROUND INFORMATION ON THE OLD AGE HOMES

The background information on the old age homes under the purview of the present study was collected in terms of their origin and general characteristics. The data was analyzed and presented below.

4.1.1 Origin

The details on the origin of old age homes with special reference to their inception, location and founders were studied and given in Table 1.

Table 1 Distribution of old age homes based on location, Year of establishment and founding agencies

Sl.No	Location	Year of Establishment	Founding agency
1	**Panchayat**		
	Home 1	1921	CM
	Home 2	1927	CM
	Home 3	1949	CM
	Home 4	1951	CM
	Home 5	1958	CM
	Home 6	1963	CM
	Home 7	1980	CM
	Home 8	1987	CM
	Home 9	1994	HCS
2	**Municipality**		
	Home 10	1936	CM
	Home 11	1975	CM
3	**Corporation**		
	Home 12	1937	CM
	Home 13	1938	CM
	Home 14	1947	CM
	Home 15	1978	CM
	Home 16	1997	Govt

CM-Christian Missionary

HCS-Hindu Charitable Society

Govt-Government.

Table 1 reveals that the first institution for the aged in Ernakulam district came into existence before independence (1921) and it was in panchayat area. Altogether there were five institutions established before independence (two each in corporation and panchayat and one in municipal area) and 11 institutions in the post independence period (seven in panchayat, three in corporation and one in

municipality). The latest addition to the list of old age homes was located in the corporation area of Ernakulam district during the year 1997. Thus the inception of old age homes in Ernakulam district was found to be at the rate of two homes in every decade. But after 1997, no home was reported to be established in the study area.

As far as the number of homes was concerned panchayat area ranked first with nine homes followed by corporation area (five homes) and municipality (two homes).

Earlier studies on old age homes by Rajan (1999) reported that there were only 19 homes in Kerala in 1950. As per the present findings, the number of homes in Ernakulam district alone in the corresponding year was seven; thereby contributing a major portion of the state's share of elderly homes. Rajan (1999) further reported an addition of 17 homes in the next two decades of 1950 to 1969, and 60 more homes between the years of 1970 to 1989. The contribution of Ernakulam district during these periods was found to be three and four homes respectively.

Yet another study by Rajan *et al*. (1999) revealed that as on 1998 there were 70 old age homes in Kerala. One fifth of this number, in other words 20.00 percent (14 homes) as per the present findings was the contribution of Ernakulam district.

Regarding the founding agencies of the homes, it was noted that majority of the institutions (87.50%) were initiated by the Christian missionaries. Hindu Charitable society and Government of Kerala were responsible for initiating one home each.

Rajan *et al.* (1999) reported that in India, majority of the institutions for aged (57.40%) are run by the Christian missionaries and the role of government institutions in this respect is very limited. There are very few old age homes run by other religious groups. But recently, Hindus and Muslims are also taking initiative in the creation of old age homes. (Shankar, 1999 and Muttagi, 1997).

The main intention for establishing the institutions for the aged, as given by the authorities was to render care, help and services to the aged who were poor and neglected.

4.1.2 General characteristics

The general characteristics of the old age homes were assessed in terms of:

- **Details on building**
- **Admission criteria**
- **Financial sources**
- **Total number of inmates**

Details on building

The appropriateness of a building to house the elderly people depends on a number of factors like site selection, building structure and ownership. The data on these lines was procured and analyzed. The results are given in Table 2.

Table 2 Distribution of old age homes based on the building site, structure and ownership

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Site**				
	Access to main road				
	Slightly away	2(40.00)	1(50.00)	5(55.60)	8(50.00)
	Far away	-	1(50.0)	3(33.30)	4(25.00)
	Very near	3(60.00)	-	1(11.10)	4(25.00)
2	**Surroundings**				
	Crowded and noisy	2(40.00)	1(50.00)	3(33.30)	6(37.50)
	Calm and peaceful	3(60.00)	1(50.00)	6(66.70)	10(62.50)
3	**Outdoor space**				
	Adequate well maintained	3(60.00)	2(100)	3(33.33)	8(50.00)
	Adequate not maintained	1(20.00)	-	5(55.56)	6(37.50)
	Inadequate	1(20.00)	-	1(11.10)	2(12.50)
4	**Type**				
	Pucca	5(100)	2(100)	9(100)	16(100)
5	**Structure**				
	Single storied	2(40.00)	2(100)	8(88.90)	12(75.00)
	Double storied	3(60.00)	-	1(11.10)	4(25.00)
6	**Ownership**				
	Own building	5(100)	2(100)	8(88.90)	15(93.75)
	Rented building	-	-	1(11.10)	1(6.25)

Figures in the parentheses indicate percentages

Site selection:

From the study it was observed that most of the homes (50.00%) were suitably located in sites slightly away from the main road especially the ones in panchayat area Dandekar (1996) also opined that the building for an urban home for

the aged should as far as possible be located on the outskirts of the city. At the same time 25.00 percent of the homes were located very near to the busy road. These were mainly the homes (60.00%) in the corporation area.

In short 89.00 percent of homes in panchayat area were either far away or slightly away from the main road and home sites in corporation area were mostly near the busy main road.

Surroundings:

The surroundings of most of the homes (62.50%) were calm and peaceful whereas it was crowded and noisy with respect to 37.50 percent of the homes.

Outdoor space:

The unbuilt space of the building according to Dandekar (1996) should be utilized for a small garden. Old age homes should have some open ground so that the old could move about freely and safely for exercise, relaxation or peace of mind. In the present study 50.00 percent of the homes had adequate outdoor space which was well maintained with garden and trees. All the homes in the municipality and 60.00 percent homes of the corporation area belonged to this category. Availability of adequate space which was not maintained properly was the case of 37.50 percent of the homes studied and most of the homes in this category were in panchayat area. Only 12.50 percent of the homes had inadequate outdoor space.

So majority of the homes in the panchayat area (88.90%) had adequate outdoor space, but only 33.33 percent utilized this space appropriately. The remaining 55.56 percent did not maintain the available outdoor space properly. As stated by Dandekar (1996) such vacant land could be used for the cultivation of fruits, vegetables or flowers if water is available. This creates a pleasant atmosphere around the old age home, and the old can occupy themselves with the upkeep of the garden in addition to enjoying the fruits of their labour. Kitchen gardening can also be done to generate some income.

Type and structure:

All the 16 homes under the purview of the present study had pucca buildings. Of which 75.00 percent were single storied and 25.00 percent were double storey building. All the homes in municipality (100%), 88.90 percent homes in panchayat and 40.00 percent homes in corporation had single storey buildings.

Ownership:

Majority of the homes (93.75%) had their own land and buildings, which included 100 percent of homes in corporation, 100 percent in municipality and 88.90 percent in panchayat area. Only 11.10 percent of homes in panchayat area were functioning in rented buildings.

Admission Criteria

The admission criteria generally followed in old age homes were studied and the results are presented in Table 3.

Table 3 Admission criteria followed in old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Age**				
	< 60 years	2 (40.00)	-	-	2(12.50)
	> 60 years	3(60.00)	2(100)	9(100)	14(87.50)
2	**Gender**				
	Females	1(20.00)	-	8(88.90)	9(56.25)
	Males and females	4(80.00)	2(100)	1(11.10)	7(43.75)
3	**Marital status**				
	Couples admitted	3(60.00)	1(50.00)	-	4(25.00)
	Couples not admitted	2 (40.00)	1(50.00)	9(100)	12(75.00)
4	**Religion**				
	All religion	4(80.00)	2(100)	6(66.70)	12(75.00)
	Only Christians	1(20.00)	-	3(33.30)	4(25.00)

Figures in the parentheses indicate percentages

Age:

Although the age of admission to old age homes, as recommended by the Government is above 60 years, destitutes below the age of 60 years were also given admission in the homes (40.00%) of corporation area. Rajan (1999) also observed that many old age homes run by charitable and religious organizations accommodate elderly, who were very poor including widows and beggars, mentally retarded and physically handicapped ones based on humanitarian grounds.

But infirms as revealed from the present study were admitted only in 67.00 percent of homes in panchayat and 60.00 percent of homes in corporation. The remaining homes did not admit the infirms due to lack of facilities and trained staff to look after them.

Gender:

As obtained from Table 3, majority of the homes (56.25%) were exclusively for female elderly. These homes were located mainly in panchayat area. In 43.75 percent of the homes studied, both males and females were admitted. This included all the homes (100%) in municipality, 80.00 percent homes in corporation and 11.00 percent in panchayat. There was no institution exclusively for elderly men.

Marital status:

All the homes in panchayat, 50.00 percent homes in municipality and 40.00 percent in corporation had no provision to admit both husband and wife together in the same home.

Religion:

Religion was not considered as a criterion for admission in 100 percent homes in municipality, 80.00 percent in corporation and 66.70 percent in panchayat whereas in the rest of the homes (20.00% in corporation and 33.30% in panchayat), only Christians were given admission.

One general norm followed by all the institutions at the time of admission of elderly to the homes, was a recommendation letter from Bishop, Parish priest, Village or panchayat officer.

Financial sources

The data on the source of finance for the establishment as well as the day to day functioning of the homes was collected and analysed. The results are given below.

Source of finance for establishment:

The details are presented in Table 4.

Table 4 Financial sources for the establishment of Homes

Sl.No	Sources	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Government aid**	1(20.00)	-	-	1(6.25)
2	**Own fund**	1(20.00)	-	4(44.40)	5(31.25)
3	**Own fund and public contribution**	3(60.00)	2(100)	5(55.60)	10(62.50)

Figures in the parentheses indicate percentages

Majority of the old age homes (62.50%) made use of their own fund and public contribution for their establishment. All the homes (100%) in the municipality, 60.00 percent in corporation and 55.60 percent in panchayat area came under this category. The rest of the homes were established either by government support (6.25%) or by own funds (31.25%).

Source of finance for day-to-day functioning:

The details are given in Table 5.

Table 5 Financial aid for the day-to-day expenditure of homes

Sl.No	Sources	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Government grant**	5(100)	2(100)	9(100)	16(100)
2	**Other sources:**				
	Own fund	-	-	3(33.30)	3(18.75)
	Own fund and public contribution	2(40.00)	2(100)	6(66.70)	10(62.50)
	Own fund, contribution from public and voluntary organization	3(60.00)	-	-	3(18.75)

Figures in the parentheses indicate percentages

All the homes received government grant, at the rate of Rupees 450 per inmate per month to meet the day to day expenses. This being obviously inadequate, the homes had to find their own funds for running the institutions. In majority of the cases (81.25%), public contribution as cash or kinds was the additional source. Serving sumptuous meals to the inmates during special occasions like death or birth anniversaries and distribution of clothes or medicines on special occasions were also reported. Where as 18.75 percent of the homes depended totally on own funds, other than government aid, to meet the day to day expenses.

Apart from these, contribution by voluntary agencies also formed a source of finance for 60.00 percent of homes located in corporation area. The main agency supporting like this was Help Age India, which provide help in the form of vehicle,

building, solar heater, mosquito proof nets etc. Yet another agency named 'Suhrit Samithi'in which District Collector also is a member, provided help in the form of tea powder and snacks to the government sponsored homes. However assistance from voluntary organization was found to be very meagre, may be due to the lack of awareness on the part of home authorities.

The practise of collecting donations for running the old age homes when the Government grant was totally inadequate has also been reported by Rajan (1999) and Dandekar (1996).

The mode of financial support to old age homes also varied with the supporting agencies. The details are shown in Table 6.

Table 6 Mode of financial support to old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Government aid**				
	• As per capita per month	5(100)	2(100)	9(100)	16(100)
	• As lump sum amount	1(20.00)	-	-	1(6.25)
2	**Contribution from other agencies**				
	Never	-	-	3(33.30)	3(18.75)
	Occasional	1(20.00)	2(100)	5(55.60)	8(50.00)
	Regular	4(80.00)	-	1(11.10)	5(31.25)

Figures in the parentheses indicate percentages

The Government grant of Rupees 450 per inmate per month was given on monthly basis to all the homes (100%) studied. But only one home (6.25%) in the corporation area, received the government aid as lump sum grant.

As far as the nature of help is concerned, it was observed that financial aid from public or voluntary agencies was received on a regular basis by 31.25 percent of the homes; of which 80.00 percent belonged to corporation area. But majority (50.00%) reported getting the aid only on occasional basis. At the same time 18.75 percent of the homes received no such help from public or voluntary agencies.

Total number of inmates

The strength of the inmates at the time of establishment, strength in the last two years, strength at present and the sanctioned strength were studied to get a picture on the rate of admission of elderly in the homes over the years. The details are given in Table 7.

Table 7 Distribution of homes based on number of inmates

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Strength at the time of establishment**				
	1 to 10 inmates	2(40.00)	2(100)	7(77.80)	11(68.75)
	11 to 20 inmates	2(40.00)	-	-	2(12.50)
	21 to 30 inmates	1(20.00)	-	-	1(6.25)
	31 to 40 inmates	-	-	2(22.20)	2(12.50)
2	**Strength in the last two years**				
	<50 inmates	3(60.00)	2(100)	7(77.80)	12(75.00)
	51 to 100 inmates	2(40.00)	-	1(11.10)	3(18.75)
	>100 inmates	-	-	1(11.10)	1(6.25)
3	**Strength at present**				
	<50 inmates	1(20.00)	-	7(77.80)	8(50.00)
	51 to 100 inmates	3(60.00)	2(100)	1(11.10)	6(37.50)
	>100 inmates	1(20.00)	-	1(11.10)	2(12.50)
4	**Sanctioned strength**				
	50 inmates	-	-	2(22.20)	2(12.50)
	100 inmates	4(80.00)	2(100)	6(66.70)	12(75.00)
	200 inmates	1(20.00)	-	1(11.10)	2(12.50)

Figures in the parentheses indicate percentages

As the table indicates the sanctioned strength of inmates in the homes studied varied from 50 to 200; with 75.00 percent of the homes having an allotted strength of 51 to 100 inmates.

But at the time of initiation the number of inmates in 68.75 percent of the homes were less than 10 which was far below the sanctioned strength. Only two homes in panchayat area (22.20%) had a maximum strength of 31 to 40 inmates at the

time of establishment. Later there obtained a gradual increase in number in the last two years. As a result 75.00 percent of the homes reported having a strength of 50 inmates and 18.75 percent had strength of 51 to 100 inmates.

The present strength at the time of study indicated a further increase, with 37.50 percent of the homes having strength of 51 to 100. This was in fact more than double the number (18.75%) reported in the last two years. Similar trend (50.00% increase) was observed in the homes having more than hundred inmates. This increase was exclusively due to the admission of inmates in the homes of corporation and municipality areas. Whereas homes in the panchayat area did not show any increase in the number of inmates over this period of two years.

4.2 INFRASTRUCTURAL FACILITIES IN THE OLD AGE HOMES

The infrastructural facilities in the old age homes do play an essential role in the wellbeing of inmates. The availability, adequacy and maintenance of these facilities were studied and presented under the following heads.

4.2.1 Indoor space

Availability:

The accommodation facilities provided in the indoor space of the institutions are given in the table below.

Table 8 Availability of accommodation facilities in old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Type of accommodation**				
	Dormitories	3(60.00)	2(100)	4(44.45)	9(56.25)
	Rooms	-	-	2(22.22)	2(12.50)
	Both	2(40.00)	-	3(33.33)	5(31.25)
2	**Storage of personal belongings**				
	Cupboards	3(60.00)	1(50.00)	5(55.60)	9(56.25)
	Boxes	2(40.00)	1(50.00)	-	3(18.75)
	No arrangements	-	-	4(44.40)	4(25.00)
3	**Indoor areas**				
	Living or recreation area	4(80.00)	1(50.00)	6(66.70)	11(68.75)
	Dining area	5(100)	2(100)	7(77.75)	14(87.50)
	Kitchen	5(100)	2(100)	9(100)	16(100)
	Store room	1(20.00)	1(50.00)	5(55.60)	7(43.75)
	Sick room	4(80.00)	2(100)	6(66.70)	12(75.00)
	Prayer room	4(80.00)	2(100)	9(100)	15(93.75)
	Bathroom / Toilet	5(100)	2(100)	9(100)	16(100)

Figures in the parentheses indicate percentages

As table 8 reveals majority of the homes (56.25%) provided only dormitory facilities to the inmates. All the homes in municipality, 60.00 percent homes in corporation and 44.50 percent in panchayat had dormitory facilities. Rooms for accommodating inmates were found only in 12.50 percent of homes, where the strength was only 10. The rest (31.25%) of the homes had the provision for both rooms and dormitories.

When the storage space for keeping personal belongings of the inmates like dresses, toiletries etc was considered, majority of the homes (56.25%) provided

individual cupboards to the inmates near the bedside. Most of the homes in corporation (60.00%), 55.60 percent homes in panchayat and 50.00 percent of the homes in municipality had this facility. Whereas in 18.75 percent of the homes, a common room was provided to keep the belongings of the inmates. In the remaining homes (25.00%) no such arrangements were given to the inmates. These homes belonged to the panchayat area.

Regarding the availability of indoor space for use in multipurpose activities of the homes, it was found that irrespective of their location all the homes had separate cooking area and bathroom/toilets. Separate dining area was observed in 87.50 percent of homes which included all the homes in corporation and municipality. Sick rooms and living/recreation room were found in 75.00 percent and 68.75 percent of the homes respectively. Mostly the bedridden inmates were accommodated in these sick rooms. The living/recreational area was used for watching television, listening music, reading newspaper and magazines and for informal chat. In homes (31.25%) where such an area was not available; bedroom or dormitories or even dining area was utilized for recreational activities. Storeroom facility was available only in 43.75 percent of the homes, that too in panchayat and municipality area.

A study conducted by Dandekar in Maharashtra, (1996) revealed that in most old age homes there was a kitchen, storeroom and administration wing. Besides, there was the dining hall, prayer rooms and recreation rooms. In some cases, one room was used for all these purposes.

As far as the present study is concerned, all the homes (100%) had separate area only for sleeping, food preparation and toileting.

Adequacy:

The adequacy of the accommodation facilities in old age homes was studied by the way it has been equipped for the comfortable living of elderly. For example, the sleeping area was evaluated based on the minimum requirements like a cot, individual cupboards or shelf, a chair and table. Similarly toilets/bathrooms were evaluated based on type of closet, raised platform for buckets, grab bar on walls, non slippery flooring etc. A score card was developed and used for the purpose. Sample score card is given in Appendix I. The results thus obtained are shown in Table 9.

Table 9 Adequacy of the accommodation facilities in old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Sleeping area**				
	Well adequate	-	-	1(11.10)	1(6.25)
	Adequate	5(100)	2(100)	6(66.70)	13(81.25)
	Not adequate	-	-	2(22.20)	2(12.50)
2	**Bathroom and toilet**				
	Well adequate	-	-	2(22.20)	2(12.50)
	Adequate	4(80.00)	2(100)	6(66.70)	12(75.0)
	Not adequate	1(20.00)	-	1(11.10)	2(12.50)
3	**Prayer room**				
	Well adequate	4(80.00)	2(100)	8(88.90)	14(87.50)
	No prayer room	1(20.00)	-	1(11.10)	2(12.50)
4	**Living or recreation area**				
	Well adequate	-	-	1(11.11)	1(6.25)
	Adequate	1(20.00)	-	2(22.23)	3(18.75)
	Not adequate	3(60.00)	1(50.00)	3(33.33)	7(43.75)
	No living room	1(20.00)	1(50.00)	3(33.33)	5(31.25)
5	**Dining area**				
	Well adequate	2(40.00)	-	1(11.12)	3(18.75)
	Adequate	2(40.00)	2(100)	4(44.44)	8(50.0)
	Not adequate	1(20.00)	-	2(22.22)	3(18.75)
	No dining room	-	-	2(22.22)	2(12.50)
6	**Kitchen**				
	Well adequate	2(40.00)	-	-	2(12.50)
	Adequate	2(40.00)	1(50.00)	5(55.60)	8(50.0)
	Not adequate	1(20.00)	1(50.00)	4(44.40)	6(37.50)
7	**Store room**				
	Adequate	1(20.00)	1(50.00)	5(55.60)	7(43.75)
	No store room	4(80.00)	1(50.00)	4(44.40)	9(56.25)

Figures in the parentheses indicate percentages

As the table indicates the majority (81.25%) of the homes studied had adequate facilities in the sleeping area, which included 100 percent of the homes in

corporation and municipality and 66.70 percent of the panchayat area. Total inadequacy in this respect was seen in 12.50 percent of the homes, particularly the homes (22.20%) in panchayat. Well equipped homes, although a very small in percentage was found in panchayat area only.

Bathrooms and toilets in majority (75.00%) of the homes had adequate facilities. This included 100 percent of homes in municipality and 80.00 percent and 66.70 percent respectively of corporation and panchayat areas. Prayer room was absent in 12.50 percent of homes and all the rest of the homes (87.50%), this room was sufficiently equipped with furniture and other provisions.

Living or recreation area was not adequate in majority of the homes (43.75%) and somewhat adequate in 18.75 percent of the homes. 31.25 percent of the homes did not have such an area at all.

In the case of dining area also, equipping with just adequate accessories was found in majority (50.00%) of homes. Lack of dining area (12.50%) and inadequacy in the existing dining area (18.75%) were observed mainly among the homes in panchayat.

As far as kitchen is concerned it was found that they were either equipped with just adequate arrangements (50.00%) or inadequate (37.50%). Only 12.50 percent of the homes studied had well equipped kitchen and this was found only in the corporation area.

A storeroom for keeping food items and kitchen accessories was not

available in majority of homes (56.25%). Eighty percent of homes in corporation and 50.00 percent homes in municipality and 44.40 percent in panchayat came under this category. Wherever a storeroom was available (43.75%), it had only minimum facilities.

Maintenance:

The maintenance of the indoor space used for different purposes was studied by means of personal observation for three consecutive days. A score card was used to record the observation. Sample scorecard is given in Appendix I.

The maintenance of the indoor space was rated as ‘good’, ‘fair’ and ‘poor’ based on the scores obtained for each area. The results are presented in Table 10.

Table 10 Maintenance of indoor space in old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Sleeping area**				
	Good	-	-	1(11.10)	1(6.30)
	Fair	4(80.00)	1(50.00)	3(33.30)	8(50.00)
	Poor	1(20.00)	1(50.00)	5(55.60)	7(43.80)
2	**Bathroom and toilet**				
	Good	-	-	2(22.20)	2(12.50)
	Fair	5(100)	1(50.00)	5(55.60)	11(68.80)
	Poor	-	1(50.00)	2(22.20)	3(18.80)
3	**Prayer room**				
	Good	4(80.00)	2(100)	8(88.90)	14(87.50)
	No room	1(20.00)	-	1(11.10)	2(12.50)
4	**Living or recreation area**				
	Good	2(40.00)	-	1(11.10)	3(18.80)
	Fair	2(40.00)	1(50.00)	5(55.60)	8(50.00)
	No room	1(20.00)	1(50.00)	3(33.30)	5(31.30)
5	**Dining area**				
	Good	2(40.00)	-	1(11.10)	3(18.80)
	Fair	3(60.00)	2(100)	6(66.70)	11(68.80)
	No room	-	-	2(22.20)	2(12.50)
6	**Kitchen**				
	Good	2(40.00)	-	1(11.10)	3(18.80)
	Fair	3(60.00)	1(50.00)	4(44.40)	8(50.00)
	Poor	-	1(50.00)	4(44.40)	5(31.30)
7	**Store room**				
	Fair	1(20.00)	1(50.00)	5(55.60)	7(43.80)
	No room	4(80.00)	1(50.00)	4(44.40)	9(56.30)

Figures in the parentheses indicate percentages

Good-score above 80%

Fair-score between 50% to 80%

Poor-sore less than 50%

The results revealed that only prayer room was well maintained by majority of the homes (87.50%). All the homes in municipality (100%), 88.90 percent homes in panchayat and 80.00 percent homes in corporation came under this category. All

the other areas were rated fair with respect to maintenance (score 50-80%) in majority of the homes.

4.2.2 Lighting and Ventilation

Proper lighting and ventilation are the essential requisites for a comfortable living in a home. Adequacy of lighting during the day and night was studied with the help of a scorecard. The sample score card is given in Appendix I. The adequacy of lighting (day light and artificial light) as given by the inmates was recorded. Ten inmates from each home were asked to give their opinion. The mean score was taken as the score obtained by each home. When the percentage score was below 50 it was considered as insufficient, 50 to 80 percent as moderately sufficient and more than 80 percent as well sufficient.

Adequacy of day lighting:

The ratings in terms of the adequacy of day lighting in the indoor space of the old age homes are presented in Table 11.

Table 11 Adequacy of day light in the indoor space of old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Sleeping area**				
	Well sufficient	2(40.00)	-	4(44.44)	6(37.50)
	Moderately sufficient	1(20.00)	2(100)	2(22.23)	5(31.25)
	Insufficient	2(40.00)	-	3(33.33)	5(31.25)
2	**Bathroom and toilet**				
	Well sufficient	-	-	1(11.10)	1(6.25)
	Moderately sufficient	4(80.00)	1(50.00)	5(55.60)	10(62.50)
	Insufficient	1(20.00)	1(50.00)	3(33.30)	5(31.25)
3	**Prayer room**				
	Well sufficient	4(80.00)	2(100)	3(33.30)	9(56.25)
	Moderately sufficient	-	-	5(55.60)	5(31.25)
	No prayer room	1(20.00)	-	1(11.10)	2(12.50)
4	**Living or recreation area**				
	Well sufficient	4(80.00)	1(50.00)	6(66.70)	11(68.75)
	No living area	1(20.00)	1(50.00)	3(33.30)	5(31.25)
5	**Dining area**				
	Well sufficient	1(20.00)	-	4(44.44)	5(31.25)
	Moderately sufficient	4(80.00)	1(50.00)	3(33.33)	8(50.00)
	Insufficient	-	1(50.00)	-	1(6.25)
	No dining area	-	-	2(22.23)	2(12.50)
6	**Kitchen**				
	Well sufficient	-	-	2(22.20)	2(12.50)
	Moderately sufficient	5(100)	1(50.00)	7(77.80)	13(81.25)
	Insufficient	-	1(50.00)	-	1(6.25)
7	**Store room**				
	Well sufficient	-	-	2(22.22)	2(12.50)
	Moderately sufficient	1(20.00)	1(50.00)	1(11.12)	3(18.75)
	Insufficient	-	-	2(22.22)	2(12.50)
	No store room	4(80.00)	1(50.00)	4(44.44)	9(56.25)

Figures in the parentheses indicate percentage

During the day, the sleeping area of the homes generally had insufficient (31.25%) or moderately sufficient (31.25%) lighting. The lighting was well sufficient only in 37.50 percent of the homes.

Only moderate lighting was there in bathrooms/toilets of majority of homes (62.50%). In 31.25 percent of the homes the lighting in this area was totally insufficient. In prayer rooms lighting during the day was quite sufficient in 56.25 percent of homes, whereas moderate lighting in the prayer room was reported by 31.25 percent of homes particularly the ones in panchayat area.

Living area in general (68.75%) had good lighting. Moderate lighting was reported in the dining rooms of majority (50.00%) of homes studied. Only 31.25 percent reported having sufficient light in their dining rooms during day time. Of which majority (44.44%) were the homes in panchayat area.

As far as kitchen is concerned, 81.25 percent of the homes had sufficient natural light. All the homes in corporation, 50 percent homes in municipality and majority of homes (77.80%) in panchayat area came under this category.

In majority of the homes (56.25%) store space was not available. Even among those who had a separate store room attached to kitchen there was not sufficient light.

Hence it can be said that in the old age homes studied, plenty of natural light was available during the day time in areas like living or recreation (68.75%) and prayer rooms (56.25%). Sleeping area (37.50%) of some homes also had good lighting. But in majority of homes, kitchen (81.25%), bathroom (62.50%) and dining area (50.00%) had only moderate lighting which needs to be addressed.

Type and adequacy of artificial lighting:

Adequacy of artificial lighting in different areas of the homes was rated using score card. The results are presented in Table 12.

Table 12 Type and adequacy of artificial lighting in the indoor space of old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Type of artificial lighting**				
	Dim light	-	-	1(11.10)	1(6.00)
	Incandescent bulbs	-	1(50.00)	1(11.10)	2(12.50)
	Fluorescent lamps	5(100)	1(50.00)	7(77.80)	13(81.00)
2	**Adequacy of artificial lighting**				
	Sleeping area				
	Well sufficient	2(40.00)	-	3(33.30)	5(31.20)
	Moderately sufficient	3(60.00)	2(100)	6(66.70)	11(68.80)
	Bathroom and toilet				
	Moderately sufficient	2(40.00)	2(100)	8(88.90)	12(75.00)
	Insufficient	3(60.00)	-	1(11.10)	4(25.00)
	Prayer room				
	Well sufficient	4(80.00)	1(50.00)	5(55.60)	10(62.50)
	Moderately sufficient	-	1(50.00)	3(33.30)	4(25.00)
	No prayer room	1(20.00)	-	1(11.10)	2(12.50)
	Living or recreation area				
	Well sufficient	1(20.00)	-	2(22.30)	3(18.80)
	Moderately sufficient	3(60.00)	1(50.00)	4(44.40)	8(50.00)
	No living area	1(20.00)	1(50.00)	3(33.30)	5(31.20)
	Dining area				
	Well sufficient	1(20.00)	-	3(33.30)	4(25.00)
	Moderately sufficient	4(80.00)	2(100)	4(44.40)	10(62.50)
	No dining area	-	-	2(22.30)	2(12.50)
	Kitchen				
	Well sufficient	1(20.00)	-	3(33.30)	4(25.00)
	Moderately sufficient	4(80.00)	2(100)	6(66.70)	12(75.00)
	Store room				
	Moderately sufficient	1(20.00)	1(50.00)	5(55.60)	7(43.80)
	No store room	4(80.00)	1(50.00)	4(44.40)	9(56.20)

Figures in the parentheses indicate percentages

Majority of the homes (81.00%) used fluorescent lamps for lighting the indoor space of homes at night. All homes in corporation area and 50.00 percent of the homes in municipality and 77.80 percent in panchayat area adopted this. Incandescent bulbs were used only by 12.50 percent of homes.

According to Sanford (1999), since many elderly lose some colour sensitivity, good colour rendering lamps may enhance the colour discrimination. Incandescent lamps, including halogen, render colours very well. Many types of fluorescent lamps render colours nearly as well as incandescent lamps, and have much longer lives.

Adequacy of artificial lighting showed that majority of indoor space areas had only moderate lighting including kitchen (75.00%), bathroom/toilet (75.00%), sleeping area (68.80%), dining (62.50%) and living rooms (50.00%). Homes in the municipality were mostly affected like this. This is also a matter of great concern as ill illumination can cause serious problems to elderly like falls, accidents etc.

Taylor (2005) also of the opinion that light plays a role in the quality of care and safety experienced by residents in nursing homes and assisted living facilities, especially during night time hours. As vision of the elderly deteriorates; it becomes harder for the eyes to adapt to both dark environment and rapid changes in brightness. Sanford (1999) added that lighting can make a critical difference to elderly people with deteriorating vision and an older person may see poorly in dim light and lose both acuity and contrast sensitivity.

Ventilation:

The provision for ventilation either natural by providing doors and windows and/or artificial like fans is an essential requisite adding to the quality of services provided to the inmates in the old age homes. Data on these aspects was collected and analyzed. The results are given in Table 13.

Table 13 Adequacy of ventilation in the indoor space of old age homes

Sl.No	Adequacy of ventilation	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Sleeping area**				
	Both natural and artificial	5(100)	2(100)	9(100)	16(100)
	Sufficient doors and windows	2(40.00)	-	3(33.30)	5(31.20)
	Insufficient doors and windows	3(60.00)	2(100)	6(66.70)	11(68.80)
2	**Prayer room**				
	Both natural and artificial	4(80.00)	2(100)	8(88.90)	14(68.80)
	Sufficient doors and windows	4(80.00)	2(100)	6(66.70)	12(75.0)
	Insufficient doors and windows	-	-	2(22.20)	2(12.50)
	No prayer room	1(20.00)	-	1(11.10)	2(12.50)
3	**Living or recreation area**				
	Both natural and artificial	2(40.00)	1(50.00)	2(22.30)	5(31.25)
	Only natural	2(40.00)	-	4(44.40)	6(37.50)
	Sufficient doors and windows	4(80.00)	-	6(66.70)	10(62.50)
	Insufficient doors and windows	-	1(50.00)	-	1(6.25)
	No living area	1(20.00)	1(50.00)	3(33.30)	5(31.25)
4	**Dining area**				
	Both natural and artificial	5(100)	1(50.00)	7(77.80)	13(81.30)
	Only natural	-	1(50.00)	-	1(6.25)
	Sufficient doors and windows	5(100)	-	4(44.40)	9(56.30)
	Insufficient doors and windows	-	2(100)	3(33.40)	5(31.20)
	No dining area	-	-	2(22.20)	2(12.50)
5	**Kitchen**				
	Only natural	5(100)	2(100)	9(100)	16(100)
	Sufficient doors and windows	2(40.00)	-	-	2(12.50)
	Insufficient doors and windows	3(60.00)	2(100)	9(100)	14(87.50)

Figures in the parentheses indicate percentages

As far as ventilation of the rooms was considered, all homes had natural ventilation with the help of doors and windows or artificial ventilation with fans provided in different indoor areas. Both natural and artificial ventilation were then only in the sleeping area and prayer room of all the homes. Insufficient doors and windows were observed in kitchen (87.50%), sleeping area (68.80%), dining area (31.20%), prayer room (12.50%) and living or recreation area (6.25%).

A study conducted by Dandekar (1996) in old age homes of Maharashtra reported that in all the homes natural ventilations like doors and windows and artificial ventilation like fans were provided. Dandekar emphasized that the rooms of the old age homes should have proper ventilation, fresh air, light etc.

4.2.3 Safety aspects

The safety measures, with special emphasis on the requirement of elderly, available in the old age homes were studied in terms of the following:

- **Flooring**
- **Staircase**
- **Special fixtures in bathrooms/toilets**

Flooring

The data on types of flooring in the interior of the old age homes was collected and presented in Table 14.

Table 14 Types of flooring in the interior of old age homes

Sl.No	Particulars	Old age homes			Total
		Corporation	Municipality	Panchayat	
1	**Sleeping area**				
	Cement	2(40.00)	2(100)	6(66.70)	10(62.50)
	Red oxide	3(60.00)	-	3(33.30)	6(37.50)
2	**Bathroom and toilet**				
	Cement	2(40.00)	-	4(44.40)	6(37.50)
	Red oxide	1(20.00)	-	2(22.30)	3(18.80)
	Mosaic	-	-	1(11.10)	1(6.10)
	Tiles	-	2(100)	1(11.10)	3(18.80)
	Tiles and cement	2(40.00)	-	1(11.10)	3(18.80)
3	**Prayer room**				
	No prayer room	1(20.00)	-	1(11.10)	2(12.50)
	Cement	-	2(100)	3(33.30)	5(31.20)
	Red oxide	2(40.00)	-	-	2(12.50)
	Tiles	2(40.00)	-	5(55.60)	7(43.80)
4	**Living or recreation area**				
	No living room	1(20.00)	-	4(44.40)	5(31.20)
	Cement	1(20.00)	2(100)	4(44.40)	7(43.80)
	Red oxide	3(60.00)	-	1(11.20)	4(25.00)
5	**Dining area**				
	No dining area	-	-	2(22.20)	2(12.50)
	Cement	1(20.00)	2(100)	5(55.60)	8(50.0)
	Red oxide	4(80.00)	-	2(22.20)	6(37.50)
6	**Kitchen**				
	Cement	2(40.00)	2(100)	6(66.70)	10(62.50)
	Red oxide	3(60.00)	-	3(33.30)	6(37.50)
7	**Store room**				
	No store room	4(80.00)	1(50.00)	4(44.40)	9(56.20)
	Cement	1(20.00)	1(50.00)	3(33.40)	5(31.30)
	Red oxide	-	-	2(22.20)	2(12.50)
8	**Staircase**				
	No staircase	2(40.00)	2(100)	8(88.90)	12(75.00)
	Cement	1(20.00)	-	1(11.10)	2(12.50)
	Red oxide	2(40.00)	-	-	2(12.50)

Figures in the parentheses indicate percentages

As the table denotes cements, red oxide, mosaic and tiles were the different types of flooring observed in the old age homes. But majority of the homes had cement flooring only in sleeping area (62.50%), kitchen (62.50%), dining area (50.00%), living area (43.80%), toilets (37.50%) and store rooms (31.30%). Next in the order was red oxide flooring. However in the case of prayer room, tile flooring was more common (43.80%) followed by cement flooring (31.20%).

Although the possibility of accident is there everywhere for elderly, the bathrooms are generally considered as the accident prone area. So flooring of this area requires special attention. In the present study nearly 43.90 percentage of home reported having tiles (18.80%), tiles and cements (18.80%) or mosaic (6.10%) which were slippery. May be the easy maintenance was the reason for opting these kinds of flooring although they were not very safe.

As Carter *et al*. (1997) reported the environment has been found to be a contributory factor in most falls. Uneven or slippery floor surfaces, tripping obstacles, inadequate lighting, poorly designed or maintained stairs without handrails and inappropriate furniture are cited as increasing the risk of falling, tripping or slipping for old people.

Stairways

Climbing stairways, often poses difficulty to the elderly. If it is unavoidable, certain safety measures are to be provided. According to Gambert

(1987) and Williams (1984) if there are stairs, it is important to determine whether there is a railing, number of steps and a non slip surface. Stair handrails should be secure and at proper height and nonskid treads are recommended for stairs. An attempt to study these aspects has been made and the results are shown in Table 15.

Table 15 Safety measures provided at the stairways of old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Homes with stairways**	3(60.00)	-	1(11.10)	4(25.00)
	Steps have adequate width	3(100)	-	-	3(75.00)
	Steps have comfortable height	3(100)	-	1(100)	4(100)
	Railing present at the stairs	3(100)	-	1(100)	4(100)
2	**Homes without stairways**	2(40.00)	2(100)	8(88.90)	12(75.00)

Figures in the parentheses indicate percentages

As most of the buildings are single storied, stairways were present only in 25.00 percent of the institutions. The condition of the stairs was found to be good and heights of the stairways were also suitable to the inmates in all homes. Breadth of the stair steps was also assessed, as narrow stair steps tend to cause falls. It was observed that the stairways in all the corporation homes (100%) had broad steps. All the stairways also had railings for the safety of the inmates.

Special fixtures in bathrooms and toilets

Special fixtures provided in the bathrooms and toilets of old age homes for safety and convenience of elderly were noted and the observations are given in Table 16.

Table 16 Special fixtures provided in bathrooms and toilets of old age homes

Sl.No	Particulars	Old age homes			
		Corporation	Municipality	Panchayat	Total
1	**Raised platform for buckets**	2(40.00)	1(50.00)	4(44.40)	7(43.80)
2	**Stool or chair to sit and bath**	3(60.00)	-	2(22.20)	5(31.30)
3	**Shower connection**	1(20.00)	-	-	1(6.30)
4	**Hot water facility**	4(80.00)	1(50.00)	4(44.40)	9(56.30)
5	**Grab bar on the walls**	2(40.00)	1(50.00)	2(22.20)	5(31.30)
6	**Toilet seat**				
	Indian	-	-	1(11.10)	1(6.30)
	European	5(100)	2(100)	8(88.90)	15(93.70)

Figures in the parentheses indicate percentages

Raised platform for keeping the buckets was there in 43.80 percent of the homes. Half of the homes (50.00%) in municipality and 44.40 percent in panchayat and 40.00 percent homes in corporation came under this category. A stool or chair was provided inside the bathroom for the convenience of inmates during bathing in 31.30 percent of the homes. This facility was offered in most of the homes (60.00%) in the corporation area.

Shower connection in bathroom was found only in 6.30 percent of the homes that too in corporation area. The need for shower connection was specially emphasized by Williams (1984). According to him, a handheld shower head connected to the regular shower outlet may be easier for some elderly persons to use, particularly if they must shower while sitting down.

More than half of the homes (56.30%) provided hot water facility for the inmates including majority of the homes in corporation (80.00%) and 50.00 percent of

the homes in municipality and 44.40 percent in panchayat. A grab bar fixed on the wall of the bathroom, as a safety measure, was there only in 31.30 percent of the homes studied. Williams (1984) reported that the place where the most serious falling accidents happen is in the bathroom. A grab bar installed on the wall should be mandatory in the homes of all elderly. There is also a guard rail designed for toilets which can be purchased from medical and surgical supply stores.

Dandekar (1996) was also of the opinion that bathrooms should be specially constructed with handles and handrails, be easily accessible and be kept clean. Older people with joint and muscular problems have difficulty using toilets. So toilets should be at a convenient height, easy to use with and grab bars installed next to the commode can help the older person sit and get up easily (Prakash, 2000). The need for a raised toilet seat was stressed by Williams (1984), especially for the elderly having limitations of hip and knee joints.

In the present study most of the homes (93.70%) provided European commode in the toilet and only 6.30 percent had Indian closets. Thus it is obtained that European closet (93.70%) and hot water facility (56.30%) were the main arrangements specially done in the homes for the elderly. Other requirements like grab bars, shower connections, provision to sit while bathing and raised platform for bucket were not given much importance in most of the homes.

4.2.4 Other Essential Amenities

The facilities for communication, recreation, transportation, shopping,

banking and health care were considered under this head. The availability of these essential amenities to the inmates was studied. The results are shown in Table 17.

Table 17 Availability of essential amenities in and around the old age homes

Sl.No	Particulars	Area			Total
		Corporation	Municipality	Panchayat	
1	**Communication**				
	Post office				
	Reachable distance	4(80.00)	-	-	4(25.00)
	Far away from the home	1(20.00)	2(100.00)	9(100)	12(75.00)
	Telephone booth				
	Inside the premises	1(20.00)	-	-	1(6.25)
	Reachable distance	3(60.00)	1(50.00)	4(44.40)	8(50.00)
	Far away from the home	1(20.00)	1(50.00)	5(55.60)	7(43.75)
2	**Transportation**				
	Reachable distance	5(100)	1(50.00)	6(66.70)	12(75.00)
	Far away from the home	-	1(50.00)	3(33.30)	4(25.00)
3	**Hospital**				
	Reachable distance	3(60.00)	-	4(44.40)	7(43.75)
	Far away from the home	2(40.00)	2(100.00)	5(55.60)	9(56.25)
4	**Bank**				
	Reachable distance	3(60.00)	1(50.00)	2(22.20)	6(37.50)
	Far away from the home	2(40.00)	1(50.00)	7(77.80)	10(62.50)
5	**Place of worship**				
	Inside the premises	4(80.00)	2(100)	6(66.70)	12(75.0)
	Reachable distance	-	-	2(22.20)	2(12.50)
	Far away from the home	1(20.00)	-	1(11.10)	2(12.50)
6	**Recreation**				
	Library/Reading room				
	Inside the premises	1(20.00)	-	-	1(6.25)
	Reachable distance	3(60.00)	-	-	3(18.75)
	Far away from home	1(20.00)	2(100)	9(100)	12(75.0)
	Park				
	Far away from home	5(100)	2(100)	9(100)	16(100)
7	**Shopping**				
	Reachable distance	5(100)	1(50.00)	4(44.40)	10(62.50)
	Far away from the home	-	1(50.00)	5(55.60)	6(37.50)

Figures in the parentheses indicate percentages

As the table depicts except transportation (75.00%), shopping centre (62.50%) and telephone booth (50.00%), the rest of the essential services such as park (100%), post office (75.00%), reading room (75.00%), bank (62.50%) and hospitals (56.25%) were located far away from home. This observation was irrespective of the location of homes.

The nearness to a hospital is a must in any homes for the aged. Muttagi (1997) opined that one way of ensuring smooth running of an old age home is that it must be established in quiet suburbs of cities where medical facilities are within the reach. But in the present study only 43.75 percent of the homes had health care facilities within a reachable distance from the homes.

As given by Dandekar (1996) the old age homes should certainly be located in a pleasant, quiet atmosphere. It should neither be too far away from a railway station or state transport bus stop, nor too close since heavy traffic and hubbub of the stations can put an unbearable strain on the old and infirm. Marketing facilities had to be in the vicinity. In the present study, bus stand or railway station and shopping facility was available within a reachable distance for majority of homes.

Many old age homes made separate arrangements for prayer. Generally the old were expected to visit these halls at specific time where they prayed or sang bhajans for an hour or so everyday. In all the homes the inmates were free to pray on their own, and there was no pressure at all on anybody to participate in the collective prayer session. This was supported by the study of Dandekar (1996).

In the present study, the place of worship especially church was found to be inside the premises for most of the homes (75.00%).

4.3 SERVICE EFFICIENCY OF OLD AGE HOMES

The quality of services rendered by old age homes in terms of the basic necessities like food, clothing, health care and recreation were studied individually as they play a significant role in the health and wellbeing of the inmates.

4.3.1 Food Service

Food is the prime necessity of man all through the life cycle. Nutrition and health profile of the elderly largely depend on the kind and quality of food served to them, whether it is in an institution or home situation. The data on the food service and related factors in old age homes was collected and presented in Table 18.

Table 18 Food service and related practices in old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Meal pattern**				
	Three meals a day	5(100)	2(100)	9(100)	16(100)
2	**Criteria for food selection:**				
	Preference of inmates	-	-	-	-
	Availability of food	3(60.00)	2(100)	7(77.80)	12(75.00)
	Cost of food	5(100)	2(100)	9(100)	16(100)
	Nutritive value of food	-	-	-	-
	Ease of preparation	2(40.00)	1(50.00)	7(77.80)	10(62.50)
3	**Involvement of inmates in:**				
	Meal planning				
	Inmates	-	-	2(22.22)	2(12.50)
	Authorities	4(80.00)	2(100)	5(55.56)	11(68.75)
	Both	1(20.00)	-	2(22.22)	3(18.75)
	Food purchase				
	Inmates	-	-	-	-

	Authorities	4(80.00)	1(50.00)	7(77.78)	12(75.00)
	Both	1(20.00)	1(50.00)	2(22.22)	4(25.00)
	Food preparation				
	Inmates	-	-	2(22.22)	2(12.50)
	Helpers	-	-	1(11.11)	1(6.25)
	Both	5(100)	2(100)	6(66.67)	13(81.25)
	Food serving				
	Inmates	-	-	2(22.22)	2(12.50)
	Helpers	-	2(100)	-	2(12.50)
	Both	5(100)	-	7(77.78)	12(75.00)
4	**Use of ready to eat foods**				
	Always	-	-	-	-
	Occasionally	5(100)	1(50.00)	5(55.56)	11(68.75)
	Not at all	-	1(50.00)	4(44.44)	5(31.25)
5	**Special foods**				
	Common ailments				
	Always	-	-	-	-
	Occasionally	-	-	-	-
	Not at all	5(100)	2(100)	9(100)	16(100)
	Degenerative diseases				
	Always	2(40.00)	-	2(22.22)	4(25.00)
	Occasionally	-	-	-	-
	Not at all	3(60.00)	2(100)	7(77.78)	12(75.00)
	Bedridden inmates				
	Always	3(60.00)	1(50.00)	3(33.33)	7(43.75)
	Occasionally	1(20.00)	-	1(11.11)	2(12.50)
	Not at all	1(20.00)	1(50.00)	5(55.56)	7(43.75)

Figures in the parentheses indicate percentages

According to Dandekar (1996), four meals (two principal and two minor a day) should be served to the inmates. He added that the daily ration should make a light and balanced diet, with an emphasis on protective foods. In the present study, only three meals were served by all the homes. This may be due to the poor financial status of the homes. Also, the government grant was very meagre to meet the daily expenses.

Regarding criteria for food selection none of the homes considered the likes and dislikes of inmates nor the nutritive value or nutritive value of foods. But all the homes were given preference to cost of food items (100%). Where as 75.00 percent of the homes considered the availability of food items and 62.50 percent on ease of preparation.

In majority of the homes, the inmates were not allowed to involve in the food purchase (75.00%) or meal planning (68.75%) activities. These were mainly under the control of home authorities. But in the case of food preparation (81.25%) and food serving (75.00%), most of the homes permitted inmates to participate along with the home maids.

Occasional use of ready to eat foods was observed among 68.75 percent of homes; that too in the form of snacks with evening tea. All the homes of corporation, 50.00 percent homes of municipality and 55.56 percent of homes in panchayat area came under this category.

None of the homes were provided any special foods to the inmates during common ailments. But therapeutic diets were served by 25.00 percent of the homes to

the inmates suffering from degenerative health problems like diabetes. This included 40.00 percent homes of corporation and 22.22 percent homes of panchayat area. The diet included wheat based foods, sugar free tea or coffee and bread. Nearly half of the homes (43.75%) always provided special foods to the bedridden inmates while 12.50 percent provided it occasionally.

Fuels used for cooking:

Fuels used for food preparation can influence the general cleanliness and sanitation in the kitchen and even the health of the inmates who involved in food preparation. So information on these aspects was procured and given in Table 19.

Table 19 Cooking fuels used in old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Fire wood**	-	1(50.00)	4(44.44)	5(31.25)
2	**Cooking gas**	1(20.00)	-	1(11.12)	2(12.50)
3	**Both**	2(40.00)	-	2(22.22)	4(25.00)
4	**A combination of fuels** (Fire wood, kerosene, cooking gas)	2(40.00)	1(50.00)	2(22.22)	5(31.25)

Figures in the parentheses indicate percentages

As the table depicts majority of the homes used either firewood (31.25%) or a combination of fuels (31.25%) like firewood, cooking gas and kerosene. Twenty five percent of the homes depended both on firewood and cooking gas for food preparation.

Use of firewood was more popular among municipal and panchayat areas, may be because of its availability and affordability. Whereas a combination of fuels like cooking gas and firewood was more common in corporation area.

But Dandekar (1996) in his study suggested that the kitchen in the old age homes should be equipped with gas stoves or smokeless chulhas.

4.3.2 Clothing related services

The supply, laundry and storage facilities with respect to the clothing of the inmates were studied and given in Table 20.

Table 20 Clothing related services offered by old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Supply of clothing**				
	Adequate in number	5(100)	2(100)	9(100)	16(100)
	Suitability to the requirement:				
	Climatic	-	-	-	-
	Cultural	5(100)	1(50.00)	6(66.70)	12(75.00)
	Frequency of supply:				
	As and when required	1(20.00)	-	1(11.10)	2(12.50)
	Twice a year	1(20.00)	1(50.00)	6(66.70)	8(50.00)
	Once a year	3(60.00)	1(50.00)	2(22.20)	6(37.50)
	Supplied by:				
	Homes	3(60.00)	2(100)	7(77.78)	12(75.00)
	Public contribution	-	-	-	-
	Both	2(40.00)	-	2(22.22)	4(25.00)
2	**Washing facilities**				
	Stone washing	-	2(100)	6(66.70)	8(50.00)
	Stone washing and washing machine	5(100)	-	3(33.30)	8(50.00)
	Washing assistance				
	Done by institution	-	-	2(22.20)	2(12.50)
	Helping one another	1(20.00)	2(100)	6(66.70)	9(56.30)
	Both	4(80.00)	-	1(11.10)	5(31.30)
	Done by self	5(100)	2(100)	9(100)	16(100)

Figures in the parentheses indicate percentages

Clothing is the second most important basic need of human being. In old age it acquires added significance, as it should be able to fulfill the special requirements of the elderly in general and individuals in particular and also during changing climatic conditions.

As obtained from the table, the supply of clothes was exclusively done by the homes in majority of cases (75.00%). Only in 25.00 percent, the homes received public contribution in this respect. Even this donation, as reported by the home authorities was over and above what was being supplied by the homes and not as substitute.

All the homes reported providing adequate clothing to the inmates. But their suitability to the clothing needs of elderly was assured by only 75.00 percent of the homes. The frequency of supply of clothing to the inmates, as given by majority (50.00%) was twice in a year and in 37.50 percent it was only once in a year. 12.50 percent of the homes supplied clothing as and when required.

Majority of the homes (75.00%) provided clothes as per the preference and taste of the inmates. This means that the inmates belonged to different religions, like to wear dresses according to their tradition. For example, Hindus usually wear sarees, Christians used to wear dhoti and blouse and Muslims also wore dhotis. But in 25.00 percent of the homes the inmates were forced to wear the type of clothes given by the institutions irrespective of the religion. These were the Christian organizations in panchayat area.

For washing clothes, two techniques were commonly used in homes, such as stone washing and machine washing. Stone washing was adopted by 50.00 percent of the homes and the remaining 50.00 percent used both the methods (stone as well as machine washing).

As far as the assistance for washing clothes is concerned, in majority (56.30%) of the homes, the inmates helped each other. That is, the healthy inmates helped the sick ones for this. In 31.30 percent of homes, institution also provided assistance in washing clothes of inmates. In a few cases (12.50%) that too homes of panchayat area, the laundry of clothes of inmates was done exclusively by the homes. In all the homes, the healthy inmates were washing their clothes by themselves without any assistance.

A study conducted by Dandekar (1996) in Maharashtra old age homes revealed that all the inmates from the old age homes were provided with individual clothing and as for laundry, the inmates had to make their own arrangements or to take paid help.

To sum up, method of stone washing of clothes was mainly used by the homes in municipality (100%) and panchayat (66.70%). A combination of stonewashing and machine washing was adopted in all homes (100%) of corporation area and 33.30 percent homes of panchayat area. As far as the assistance for washing clothes is concerned, the inmates helping one another was practised mainly in the homes of municipality (100%) and panchayat (66.70%), but 80.00 percent of homes in corporation followed a combination of institutional help together with inmates helping each other

.

4.3.3 Health service

Health care of elderly should be an integral component of the services of old age homes. This aspect was studied in terms of availability of a medical centre in the premises, services of trained nurses or medical practitioner, periodic health checkup and measures to tackle medical emergencies . The details are shown in Table 21.

Table 21 Health care facilities provided in old age homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Medical clinic**				
	Inside the premises	-	-	1(11.12)	1(6.25)
	Reachable distance	4(80.00)	1(50.00)	4(44.44)	9(56.25)
	Far away from home	1(20.00)	1(50.00)	-	6(37.50)
2	**Health care Personnel**				
	Medical practitioner	-	-	-	-
	Trained nurse	3(60.00)	1(50.00)	5(55.56)	9(56.25)
	Neither of the above	2(40.00)	1(50.00)	4(44.44)	7(43.75)
3	**Periodic medical checkup**				
	Yes	1(20.00)	-	1(11.12)	2(12.50)
	No	4(80.00)	2(100)	8(88.88)	14(87.50)
4	**Other arrangements for medical emergencies**				
	Ambulance	-	-	1(11.11)	1(6.25)
	Wheel chair	4(80.00)	1(50.00)	2(22.22)	7(43.75)
	Stretcher	-	-	1(11.11)	1(6.25)
	Pharmacy/First aid	3(60.00)	-	2(22.22)	5(31.25)

Figures in the parentheses indicate percentages

A medical clinic inside the premises of the old age home is highly essential

to provide minimum health care services to the inmates and also to tackle medical emergencies. Only 6.25 percent of the homes studied had this facility. Majority of the homes (56.25%) reported that such medical facility was available within their reach, that is, very close to the homes. Eighty percent of homes in corporation, 50.00 percent in municipality and 44.44 percent in panchayat area came under this category. Whereas a sizeable number of homes studied (37.50%) agreed that they did not have this facility anywhere near the homes. This was very unfortunate and pitiable too.

None of the homes had a medical practitioner available. But availability of a trained nurse (56.25%) in the homes helped to save the situation to certain extent. Still there were homes (43.75%) without having any health personnel to attend the medical needs of inmates. As Muttagi (1997) remarked when an inmate does not get medical aid in time, management is branded as inefficient and indifferent. Lack of medical facilities always creates fear and suspicion among residents. Further, in old age homes, some groups of elderly like oldest old (80+), extreme old (90+), centenarians, physically handicapped in old age (specially falls), bedridden elderly, mentally retarded, depressed elderly and dementia patients need special care such as one nurse for one elderly (Rajan, 1999).

The need to have a resident doctor or a doctor in the near vicinity of old age home was also stressed by Rajan *et al.* (1999). He also suggested that the organizations like Help Age India should come out with necessary assistance in this respect.

Periodic medical check up for the inmates were arranged only by 12.50 percent of the homes, especially the homes located in corporation and panchayat area. It was done by the homes themselves without any public support. Dandekar (1996) was also of the opinion that all inmates of the aged homes should be physically examined periodically at least once in six months.

Some of the arrangements in the homes to tackle medical emergencies included availability of wheel chair (43.75%), stretcher (6.25%) and ambulance (6.25%) to shift the sick ones to the nearest hospitals. Area wise distribution clearly indicated that ambulance was available only in one home of panchayat area. Wheel chair (80.00 percent of homes in corporation, 50.00 percent in municipality and 22.22 percent in panchayat). Rajan *et al*. (1999) in his study of old age homes found that only 27.96 percent of the institutions had vehicle facility, especially for emergency purposes. He suggested that charitable trusts should help the old age homes in India to have a vehicle for emergency purposes. Ambulance according to Muttagi (1997) is a necessity for homes, although many cannot afford it.

Availability of a pharmacy and first aid facilities in the homes (31.25%) under the purview of the present study was quite encouraging. In the rest of the homes (68.75%) a well maintained pharmacy or first aid facility was not available. But they stocked emergency medicines for common ailments. For other degenerative health problems the inmates had to make their own arrangements. Usually the inmates made use of their pocket money for this purpose. For major ailments involving long hospitalisation, the authorities either took the help of the relatives of the inmates, if available, or shouldered the responsibilities by themselves.

4.3.4 Recreational services

Recreation according to Rajan *et al*. (1999) is one of the means of spending time for enjoyment and these include newspaper reading, listening to radio, watching television or participating in sports activities. The data on these lines was collected and presented in Table 22.

Table 22 Recreational facilities provided by the homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Indoor Activities**				
	Watching Television:				
	Daily	5(100)	2(100)	2(22.20)	9(56.25)
	Weekly once	-	-	5(55.60)	5(31.25)
	No Television	-	-	2(22.20)	2(12.50)
2	**Radio**	-	-	-	-
3	**Reading:**				
	Newspaper	5(100)	-	4(44.40)	9(56.25)
	Spiritual magazine	3(60.00)	2(100)	5(55.60)	10(62.50)
	Others	2(40.00)	-	-	2(12.50)
4	**Tape recorder/Video player**	-	-	1(11.10)	1(6.25)
5	**Place of activity**				
	Recreation room	3(60.00)	2(100)	3(33.34)	8(50.00)
	Bed room	-	-	1(11.10)	1(6.25)
	Verandah	2(40.00)	-	5(55.55)	7(43.75)
6	**Outdoor Activities**				
	Outings/Picnics	2(40.00)	-	3(33.33)	5(31.25)
	Games and celebration	5(100)	2(100)	9(100)	16(100)

Figures in the parentheses indicate percentages

Majority of the homes (87.50%) had a television set. Watching television daily was the main entertainment of the inmates in 56.25 percent of homes. All the

homes in corporation (100%) and municipality (100%) and 22.20 percent of homes in panchayat offered this facility to inmates, whereas watching television was restricted to once in a week in 31.25 percent of the homes in the panchayat area.

It was surprising to note that none of the homes had radio. But tape recorder and video player was available in 11.10 percent of the homes in panchayat area. Reading of spiritual magazines (62.50%) and newspaper (56.25%) were also found to be part of indoor recreational activities of the inmates. Mostly (50.00%), recreation room was used for the purpose. In the rest of the cases, verandah (43.75%) and sleeping area (6.25%) were also used for recreational activities.

As far as outdoor activities are concerned picnics/outings were arranged by 31.25 percent of the homes. Mostly the homes of corporation (40.00%) and panchayat (33.33%) area did this. Sports events and other celebrations were arranged for the inmates in the home premises by almost all homes (100%) irrespective of their locations. 31.25 percent of the homes, including 80.00 percent homes in corporation and 11.11 percent in panchayat, had occasionally took the inmates to outside for participating in games and other celebrations. These activities not only provide the inmates an occasion for enjoyment but also help to bring them together and improve the interpersonal relations. Rajan *et al*. (1999) also found that 88.00 percent of the homes for the aged have at least one kind of recreational facility.

4.3.5 Other services

- **Hygiene and sanitation**
- **Electricity and water supply**
- **Provision for active involvement in:**

- **Home-related activities**
- **Stress alleviation activities**
- **Income generating activities**

Hygiene and sanitation

The measures adopted by the homes to ensure personal and environmental hygiene were studied and presented in Table 23.

Table 23 Measures adopted by homes to ensure hygiene

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Personal hygiene**				
	Awareness given to inmates	2(40.00)	-	5(55.60)	7(43.75)
	Special care for practising personal cleanliness:				
	Brushing teeth daily	4(80.00)	2(100)	6(66.70)	12(75.00)
	Taking bath daily	2(40.00)	-	4(44.40)	6(37.50)
	Changing dress daily	2(40.00)	-	4(44.40)	6(37.50)
	Combing hair	1(20.00)	-	2(22.20)	3(18.75)
	Toileting	1(20.00)	-	1(11.10)	2(12.50)
	Changing bed linens	2(40.00)	-	4(44.40)	6(37.50)
2	**Environmental hygiene**				
	Sweeping home/surroundings:				
	Daily	5(100)	2(100)	7(77.80)	14(87.50)
	Weekly	-	-	2(22.20)	2(12.50)
	Mopping rooms:				
	Daily	2(40.00)	1(50.00)	2(22.20)	5(31.25)
	Alternate days	3(60.00)	1(50.00)	1(11.10)	5(31.25)
	Weekly	-	-	6(66.70)	6(37.50)
	Cleaning bathrooms/toilets:				
	Daily	3(60.00)	1(50.00)	2(22.20)	6(37.50)
	Alternate days	2(40.00)	1(50.00)	2(22.20)	5(31.25)
	Weekly	-	-	5(55.60)	5(31.25)
	Control of pest and insect	5(100)	2(100)	9(100)	16(100)
	Methods:				
	Net	2(40.00)	-	3(33.40)	5(31.25)
	Repellents	-	2(50.00)	2(22.20)	4(25.00)
	Wire mesh	1(20.00)	-	3(33.30)	4(25.00)
	All the above	2(40.00)	-	1(11.10)	3(18.75)
3	**Waste disposal:**				
	Garbage				
	Compost pit	-	-	3(33.30)	3(18.75)
	Burning	1(20.0)	2(100)	6(66.70)	9(56.25)
	Incilinator	4(80.0)	-	-	4(25.00)
	Liquid waste				
	Open drain	1(20.00)	1(50.00)	3(33.30)	5(31.25)
	Closed drain	4(80.00)	-	3(33.30)	7(43.75)
	Soak pit	-	1(50.00)	2(22.20)	3(18.75)
	Closed drain and soak pit	-	-	1(11.20)	1(6.25)

Figures in the parentheses indicate percentages

As the table shows 43.75 percent of the homes took special effort to create awareness among the inmates about importance of personal hygiene. The homes were also made attempts to check whether the inmates practised some of the basic hygienic measures such as brushing teeth daily (75.00%), daily bathing (37.50%), changing dress (37.50%) and changing of bed linens regularly (37.50%). But only 12.50 percent

of homes used to check the toilet habits of the inmates. In general, the authorities of the homes felt that the inmates were not bothered about the personal cleanliness and pay little or no attention towards it. Their interest was mainly confined to praying and taking rest. The inmates who were sick or bedridden were well taken care off by the authorities.

Environmental hygiene was studied based on the maintenance of cleanliness in the living area and the surroundings. This included sweeping of the homes and its surroundings, mopping the rooms and cleaning the bathrooms and toilets. The frequency of cleaning was recorded as daily, alternate days and weekly.

As shown in the table, daily sweeping of the homes and surroundings was reported by 87.50 percent of the homes which included 100 percent each of homes in corporation and municipality and 77.80 percent of the homes in panchayat. But 22.20 percent of the homes in panchayat did this cleaning process only once in a week.

Mopping of rooms was done mostly on weekly basis (37.50%) followed by once in a day (31.25%) or on alternate days (31.25%). Bathroom cleaning was also done either on daily basis (37.50%) or on alternate days (31.25%).

Control of pests and insects like flies, mosquito, cockroach and mice also formed part of cleanliness and hygiene. Various controlling measures used by homes included mosquito nets (31.25%), repellents (25.00%) and wire mesh (25.00%). More than one method of pest or insect control was deployed by 18.75 percent of homes including homes in corporation (40.00%) and panchayat (11.10%) areas.

Garbage and waste water disposal also contribute a lot towards environmental cleanliness. Data procured on these aspects showed that burning the garbage was the mode of disposal adopted by majority (56.25%) of homes. Use of

incilinator (25.00%) and depositing the garbage in compost pit (18.75%) were also practised. Incilinator was found only in corporation homes (80.00%).

Liquid waste was mainly disposed through closed drain (43.75%). This method was adopted by 80.00 percent of homes in corporation and 33.30 percent homes in panchayat. Open drain disposal was followed by 31.25 percent of homes. Disposal of wastewater in soak pit was also reported by 18.75 percent of homes.

Electricity and water supply:

Adequate water supply and uninterrupted power supply are essential requisites for proper functioning of the old age homes. They are therefore playing a decisive role in appraising the quality of services rendered by the homes. The data collected on these lines are given in Table 24.

Table 24 Availability of water sources and power supply to old age homes

Sl.No	Particulars	Old age homes			Total
		Corporation	Municipality	Panchayat	
1	**Sources of water**				
	Drinking:				
	Tap water	3(60.00)	-	2(22.20)	5(31.25)
	Well water	2(40.00)	2(100)	5(55.60)	9(56.25)
	Bore well	-	-	1(11.10)	1(6.25)
	Rain water harvested	-	-	1(11.10)	1(6.25)
	Other purposes:				
	Tap water	1(20.00)	1(50.00)	-	2(12.50)
	Well water	4(80.00)	1(50.00)	8(88.90)	13(81.25)
	River water	-	-	1(11.10)	1(6.25)
2	**Electrification of homes**	5(100.00)	2(100.00)	9(100.00)	16(100.00)
	Provision for generator/invertor	-	-	-	-

Figures in the parentheses indicate percentages

Provision for adequate water supply was observed in all the homes studied although the sources of water varied with the location of homes and the purpose for which it was used.

Well water was found to be the major source (56.25%) of drinking water in the homes followed by tap water, that is, water supplied by concerned authorities of the government (31.25%). Hundred percent of homes in municipal area and 55.60 percent of homes in panchayat area used well water for drinking purposes whereas for majority of homes (60.0%) in corporation area, tap water was the source.

When the sources of water used for other purposes like washing, cleaning, bathing etc were considered, once again well water was found to be the most commonly (81.25%) used source, irrespective of location of homes.

Electrification was also there in all the homes (100%) studied. But provision for generator or other alternatives to be used at the time of power failure was not there in any of the homes.

Provision for active involvement in:

- **Home-related activities**
- **Stress alleviation activities**
- **Income generating activities**

Elderly population often gets dejected and depressed due to the sheer feeling that they are unproductive, unwanted and totally neglected. An opportunity to engage themselves in decision making and various other activities of productive and non-productive nature would be able to give them sort of rejuvenation or revitalization.

Hence an attempt has been made to study the opportunities available in the homes for the participation of inmates in activities as given below.

Home-related activities:

The details are given in Table 25.

Table 25 Participation of inmates in home related activities

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Food purchase and other shopping**				
	Some times	1(20.00)	1(50.00)	2(22.20)	4(25.00)
	Not at all involved	4(80.00)	1(50.00)	7(77.80)	12(75.00)
2	**Food Preparation**				
	Always	4(80.00)	2(100)	6(66.70)	12(75.00)
	Some times	1(20.00)	-	2(22.20)	3(18.75)
	Not at all involved	-	-	1(11.10)	1(6.25)
3	**Serving food**				
	Always	4(80.00)	-	9(100)	13(81.25)
	Sometimes	1(20.00)	-	-	1(6.25)
	Not at all involved	-	2(100)	-	2(12.50)
4	**Cleaning house**				
	Always	3(60.00)	2(100)	8(88.90)	13(81.25)
	Some times	2(40.00)	-	1(11.10)	3(18.75)
5	**Gardening**				
	Planting:				
	Always	1(20.00)	2(100.00)	5(55.60)	8(50.00)
	Some times	1(2000)	-	1(11.10)	2(12.50)
	Not at all	3(60.00)	-	3(33.30)	6(37.50)
	Watering:				
	Always	1(20.00)	-	3(33.33)	4(25.00)
	Some times	-	1(50.00)	1(11.11)	2(12.50)
	Not at all invited	4(80.00)	1(50.00)	5(55.56)	10(62.50)
6	**Care of very old inmates**				
	Always	3(60.00)	-	6(66.67)	9(56.25)
	Some times	2(40.00)	2(100.00)	1(11.11)	5(31.25)
	Not at all	-	-	2(22.22)	2(12.50)

Figures in the parentheses indicate percentages

The participation of inmates in various home related activities revealed that in majority of the homes (81.25%), the inmates were involved in the food serving and cleaning activities. The inmates of all the homes in panchayat and 80.00 percent homes of corporation were always involved in the food serving activity while in 100 percent of homes of municipality, 88.90 percent homes of panchayat and 60.00 percent homes of corporation, the inmates were always participated in the cleaning activities of home and the surroundings. Food preparation (75.00%), care of the old-old inmates (56.25%) and watering the plants (25.00%) also found to be the activities of interest to the inmates.

Stress alleviation activities

The programmes for the promotion of psychological well being of the inmates were also arranged by the homes. The data collected on this aspect is presented in Table 26.

Table 26 Participation of inmates in programmes for psychological well-being

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Meditation**	-	-	4(44.40)	4(25.00)
2	**Counselling**	2(40.00)	-	2(22.20)	4(25.00)
3	**Prayer meetings:**				
	By institution	3(60.00)	1(50.00)	4(44.40)	8(50.00)
	By outside organization	2(40.00)	-	1(11.10)	3(18.75)

Figures in the parentheses indicate percentages

Majority of the homes (68.75%) arranged prayer meetings for the inmates, either under the initiative of the institutions (50.00%) themselves or by the outsiders (18.75%). Corporation homes were the ones took initiative mainly (60.00%) to arrange the prayer meetings by themselves. Next in order were the homes in municipality (50.00%).

Meditation (25.00%) and counselling (25.00%) were also organized by the homes for the inmates, although the number was comparatively less. Meditation as a means of relaxation was practised only by the homes in panchayat area (44.40%) and counselling mainly by the homes in corporation area (40.00%).

As given by Agarwal (2003), if counselling facility is available to senior citizens it will help in better adjustments and in minimizing the generation gap and tensions in life. It will help in developing healthy mental attitude towards life and that will be a positive step towards happy ageing.

As yoga proved to be an effective remedy for most of the health problems of elderly, an attempt was made to study the provision for practising yoga in homes. But it was found that no homes provided such a facility.

Arya (2000) was of the opinion that yoga, meditation and relaxation exercises have been shown to reduce blood pressure in elderly people. Both developed and developing countries have learned several techniques and methods of taking care of the elderly from each other's experience. For example, the western countries use a number of yogic exercises and meditation to improve the quality of

life of the aged (Muttagi, 1997). Thomas (2003) also pointed out the importance of yoga as it envisages the proper functioning of body, mind and soul, and regular practice of yoga is the surest way to acquire a disease free and vigorous body.

Income generating activities:

The details are given in Table 27.

Table 27 Participation of inmates in income generating activities of homes

Sl.No	Particulars	Old Age Homes			Total
		Corporation	Municipality	Panchayat	
1	**Poultry**	2(40.00)	-	-	2(12.50)
2	**Agriculture (coconut, paddy, rubber, banana)**	5(100)	2(100)	6(66.70)	13(81.25)
3	**Cattle and other domestic animals**	1(20.00)	1(50.00)	1(11.10)	3(18.75)
4	**School for children in the premises**	-	-	2(22.20)	2(12.50)
5	**Cover making (with old newspapers)**	2(40.00)	-	2(22.20)	4(25.00)

Figures in the parentheses indicate percentages

As the table depicts the homes also had a variety of income generating activities. The income thus generated was used for day to day functioning of the homes. Most of the homes (81.25%) had agriculture as an income generating programme including the cultivation of paddy, coconut, rubber and banana. All the homes in corporation (100%) and municipality (100%) and 66.70 percent of the homes in panchayat area had this in a small way.

Rearing of cattle or animals like pig and rabbit and birds like duck also form the source of income in 18.75 percent of homes. Poultry keeping was an income generating activity for 12.50 percent of homes and this was found only in the homes

of corporation area. A school for children was functioning in the premises of 12.50 percent of the homes, especially in panchayat area.

In 25.00 percent of the homes, the inmates were engaged in cover making with old newspapers. They were paid for it by an outside agency although the amount is very meagre. This amount was utilized by the inmates for the purchase of medicines.

The inmates engaged themselves in such income generating activities of the homes according to their willingness and physical health conditions. Besides these, some homes also had some other income generating activities in which the inmates were not involved. These included a printing press, nursery school, tailoring unit and a food production unit. These were run by people from outside.

4.4 PERFORMANCE INDEX OF HOMES

As an effort to grade the institutions based on their performance, Performance Index of Homes was computed. This was based on the availability of infrastructural facilities in the institutions and the quality of services rendered by them. The homes were then graded as good, fair and poor. The technique of developing Performance Index of Homes is detailed in the methodology.

4.4.1 Infrastructural facility index

The composite index developed by considering the infrastructural facilities in the homes is termed as the 'Infrastructural Facility Index'. The homes were graded as good, fair and poor based on the mean score obtained for each item of infrastructural facilities. The homes which secured a score greater than or equal to the sum of mean and standard deviation (≥ Mean + SD), were categorized under 'good' and the variables which obtained a score less than or equal to the difference of mean and standard deviation (≤Mean – SD) were categorized under 'poor' and those which obtained medium scores, were categorized under 'fair'.

The results are presented in Table 28 and illustrated in Figure 2.

Table 28 Distribution of homes based on Infrastructural facility index

Sl.No	Infrastructural facilities	Number of homes		
		Good	Fair	Poor
1	**Location and building**	7(43.80)	4(25.00)	5(31.30)
2	**Essential amenities**	4(25.00)	8(50.00)	4(25.00)
3	**Accommodation facilities**	5(31.30)	6(37.50)	5(31.30)
4	**Indoor space-adequacy**	3(18.80)	10(62.50)	3(18.80)
5	**Indoor space-maintenance**	3(18.80)	9(56.30)	4(25.00)
6	**Day lighting**	2(12.50)	10(62.50)	4(25.00)
7	**Artificial lighting**	3(18.80)	10(62.50)	3(18.80)
8	**Ventillation**	3(18.80)	9(56.30)	4(25.00)
9	**Floors-safety**	7(43.80)	6(37.50)	3(18.80)
10	**Furniture-safety**	8(50.00)	4(25.00)	4(25.00)
11	**Toilet facilities**	4(25.00)	7(43.80)	5(31.30)
12	**Grouping of rooms**	5(31.30)	7(43.80)	4(25.00)
13	**Water and electricity facilities**	14(87.50)	-	2(12.50)
	All combined	4(25.00)	9(56.30)	3(18.80)

Figures in the parentheses indicate percentage

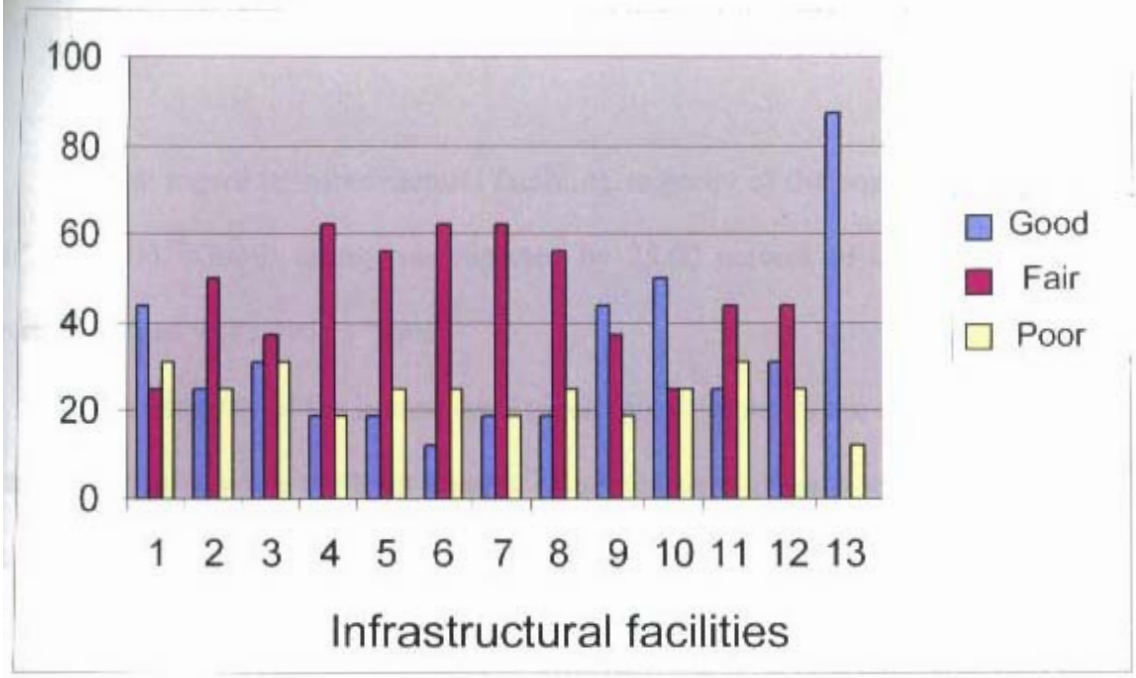
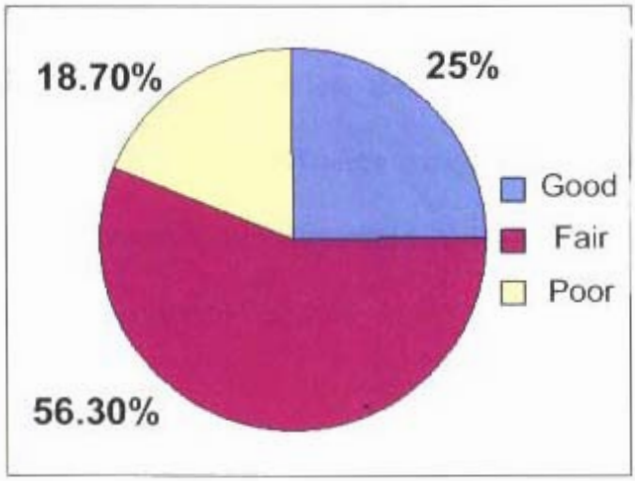


Fig. No. 2

Percentage distribution of homes based on Infrastructural facility index

1 Location and building
2 Essential amenities
3 Accommodation facilities
4 Indoor space-adequacy
5 Indoor space-maintenance
6 Day lighting
7 Artificial lighting
8 Ventillation
9 Floors-safety
10 Furniture-safety
11 Toilet facilities
12 Grouping of rooms
13 Water and electricity facilities



All combined

With regard to infrastructural facilities, majority of the homes were rated as 'fair' (56.30%). 'Good' rating was reported by 25.00 percent of homes and 18.80 percent of homes was rated as 'poor'.

The majority of the homes were given 'good' rating in the case of water and electricity facilities while the least number of homes were given 'good' rating for day lighting facility. Majority of the homes were rated as 'fair' with respect to adequacy of indoor space and day and artificial lighting. Poor infrastructural facility was observed mainly in the case of location and building, accommodation facilities and toilet facilities.

4.4.2 Service efficiency index

The composite index developed by taking the service efficiency variables into consideration is termed as the 'Service efficiency index'. The homes were graded as good, fair and poor based on the mean score obtained for each item of service efficiency. The homes which secured a score greater than or equal to the sum of mean and standard deviation (≥ Mean + SD), were categorized under 'good' and the variables which obtained a score less than or equal to the difference of mean and standard deviation (≤Mean – SD) were categorized under 'poor' and those which obtained medium scores, were categorized under 'fair'. The results are presented in Table 29. This is illustrated in Figure 3.

Table 29 Distribution of homes based on service efficiency index

Sl.No	Programmes and services	Number of homes		
		Good	Fair	Poor
1	**Food service**	1(6.30)	13(81.30)	2(12.50)
2	**Health care service**	4(25.00)	9(56.30)	3(18.80)
3	**Clothing related service**	4(25.00)	8(50.00)	4(25.00)
4	**Indoor recreational service**	4(25.00)	8(50.00)	4(25.00)
5	**Outdoor recreational service**	7(43.80)	-	9(56.30)
6	**Stress alleviation activities**	7(43.80)	2(12.50)	7(43.80)
7	**Provision for productive engagements**	3(18.80)	10(62.50)	3(18.80)
8	**Provision for personal hygiene**	3(18.80)	9(56.30)	4(25.00)
9	**Provision for environmental hygiene**	6(37.50)	8(50.00)	2(12.50)
	Involvement of inmates in home related activities	3(18.80)	10(62.50)	3(18.80)
10	**All combined**	2(12.50)	13(81.25)	1(18.75)

Figures in the parentheses indicate percentages

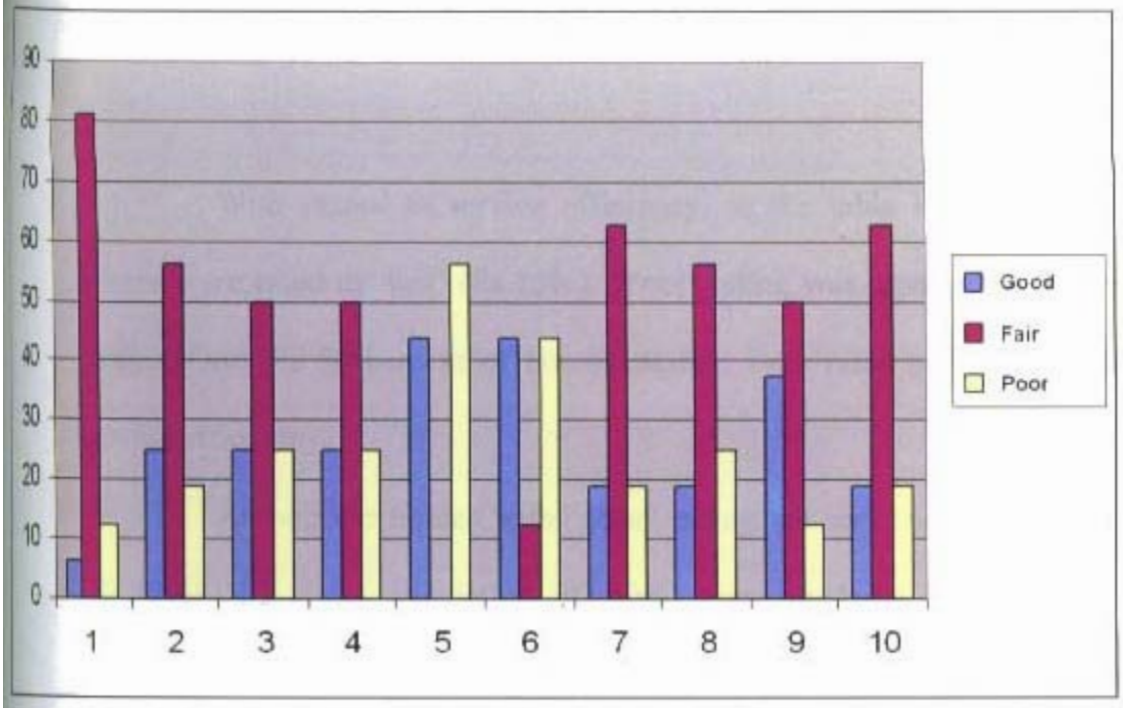
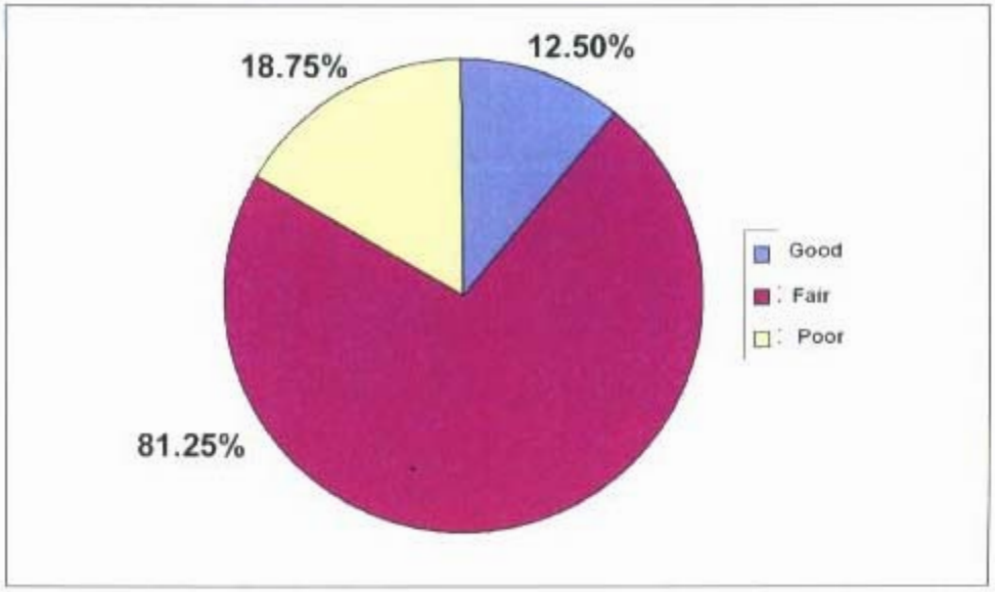


Fig. No. 3

Percentage distribution of homes based on service efficiency index

1 Food service
2 Health care service
3 Clothing related service
4 Indoor recreational service
5 Outdoor recreational service
6 Stress alleviation activities
7 Provision for productive engagements
8 Provision for personal hygiene
9 Provision for environmental hygiene
10 Involvement of inmates in home related activities



All combined

With regard to service efficiency, as the table indicates majority of the homes were rated as ‘fair’ (81.25%). ‘Poor’ rating was reported by 18.75 percent of homes. Only 12.50 percent of homes studied were rated as ‘good’ with respect to service efficiency.

Among the homes with ‘good’ rating the services like outdoor recreation (43.80%) and stress alleviation (43.80%) were rendered in an effective manner. Where as least number of homes (6.30%) were given ‘good’ rating for food service, which is the basic necessity of life. But except for stress alleviation (12.50%) and outdoor recreation, in all other services majority of the homes were rated as ‘fair’. In fact the highest percentage of homes rated ‘fair’ with respect to food service.

Poor service efficiency was observed mainly in the case of outdoor recreation (56.30%) and stress alleviation activities (43.80%). Services related to clothing (25.00%), indoor recreation (25.00%) and personal hygiene (25.00%) also need improvement in one quarter of the homes. An attempt to improve upon these aspects would go a long way for the betterment of the quality of life of elderly in the homes, which could be done easily and effectively without having much financial implications.

As an attempt to find out the differences if any in the infrastructural facilities and service efficiency of the old age homes in three different localities like corporation, panchayat and municipality, chi-square analysis was done. The results are given in Table 30.

Table 30 Chi-square analysis of the scores on infrastructural facilities and service efficiency of homes in three localities

Sl.No	Area	N	Infrastructural facilities χ^2	Service efficiency χ^2
1	**Corporation**	5		
2	**Municipality**	2	0.415	8.007*
3	**Panchayat**	9		

Figures in the parentheses indicate percentages *$p<0.05$

To test the significance of the difference between infrastructural facilities of homes located in corporation, municipality and panchayat, chi-square test was employed on average scores. The calculated chi-square was 0.415 with degree of freedom 2. There was no significant difference in the average scores of the three regions. This indicated that there was no significant difference in the infrastructural facilities of homes located in the corporation, municipality and panchayat area. The chi-square test employed on the average scores obtained for the service efficiency of the homes in three regions showed a significant difference at five percent level. This

indicated a significant difference in the service efficiency of homes located in the corporation, municipality and panchayat area.

4.4.3 Correlation between infrastructural facilities and service efficiency

The details are given in Table 31.

Table 31 Correlation between infrastructural facilities and service efficiency

Sl.No	Area	N	Infrastructure facilities and service efficiency (Correlation coefficient)	Significance
1	**Corporation**	5	0.982*	P<0.05
2	**Municipality**	2	-790	Not significant
3	**Panchayat**	9	0.512*	P<0.05

Figures in the parentheses indicate percentages

To find out whether there is any relation between infrastructure facilities and service efficiency, correlation test was employed. There observed a significant (at 5% level) positive correlation between infrastructure facilities and service efficiency of the old age homes in the corporation and panchayat areas, but not in the homes of municipality.

Phase II

4.5 SOCIO-ECONOMIC BACKGROUND OF THE SAMPLE

The socio-economic details of the sample were studied as they have a profound influence on health and nutrition status of the inmates. The results in this respect are discussed below.

4.5.1 Age and genderwise distribution

Table 32 presents the age and gender wise distribution of the inmates of old age homes.

Table 32 Percentage distribution of the sample based on age and gender

Sl.No	Age (Years)	Corporation			Municipality			Panchayat			Gender		
		M	F	Total	M	F	Total	M	F	Total	M	F	Total
1	**60-69**	40.0	40.0	40.0	30.0	46.7	37.1	20.0	38.5	36.6	19(31.7)	95(39.6)	114(38.0)
2	**70-79**	44.0	47.4	46.7	55.0	20.0	40.0	66.7	47.7	49.6	32(53.3)	110(45.8)	142(47.3)
3	**80-89**	16.0	12.6	13.3	15.0	33.3	22.9	13.3	13.8	113.8	9(15.0)	35(14.6)	44(14.7)

Figures in the parenthesis indicate percentages

M-Male
F-Female

As obtained from table 32, the inmates of old age homes under the purview of present investigation were mostly in the young-old category of 70 to 79 years (47.30%) and 60 to 69 years (38.0%). Old-old group (80 years and above) were only 14.7 percent. Area wise analysis also showed the same trend.

Gender wise classification of the sample also indicated that females out numbered males in most of the age groups when the homes in three different areas were considered separately.

The findings of the present study in terms of age and gender of the sample were in line with the findings of a number of researchers. Sreevals and Nair (2001) found that the highest percentage (37.00%) of inmates in old age homes belonged to the age group of 70 to 79 years and lowest (14.60%) belonged to above 80 years as in the present study. The studies of Dandekar (1996) in Maharashtra and Rani (1999) in Secunderabad also reported that majority of the institutionalized elderly, were between 70 to 74 years and above 75 years respectively. A sharp increase in the

number of elderly persons above70 years than those who are in their sixties (60s) has been predicted by Rajan (2004) .This is an indication of having more number of people above 70 years in the aged homes in the future.

Female domination in the old age homes as in the present study was also reported by Jose and Premakumari (2001). According to Rajan *et al*. (1999), 58.00 percent of the inmates in old age homes were females and only 42.00 percent were males. As stated by Hassan (1998) elderly females outnumber males due to their long life expectancy at birth as a product of the biological advantage for females.

Hence, as the years pass by, due to increase in the number of elderly population above 70 years (Rajan, 2004) and due to higher life expectancy for females (Bagpai, 2003) there will be an enormous increase in the strength of women in the old age home. Even in the present study the female to male ratio was found to be around 4:1.

4.5.2 Social background

The social background of the sample was studied in terms of type of family, religion, education and occupation prior to joining the old age homes. The details are given in the Table 33.

Table 33 Percentage distribution of the sample based on social background

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Type of family**							
	Nuclear	66.70	51.40	57.20	60.30(181)	66.70	58.80	60.30(181)
	Joint	33.30	48.60	42.80	39.70(119)	33.30	41.20	39.70(119)
2	**Religion**							
	Christian	69.20	82.90	82.10	77.00(231)	68.30	79.20	77.00(231)
	Hindu	30.80	11.40	13.80	20.30(61)	31.70	17.50	20.30(61)
	Muslim	-	5.70	4.10	2.70(8)	-	3.30	2.70(8)
3	**Education**							
	Primary	44.20	48.60	55.80	50.30(151)	60.00	47.90	50.40(151)
	Secondary	3.30	17.10	8.30	7.30(22)	8.30	7.10	7.30(22)
	Higher secondary	-	2.90	-	0.34(1)	1.70	-	0.30(1)
	Illiterate	52.50	31.40	35.90	42.00(126)	30.00	45.00	42.00(126)
4	**Previous occupation**							
	Maid servant	25.00	14.30	36.60	29.30(88)	3.30	35.80	29.30(88)
	Casual labour	27.50	45.70	24.80	28.30(85)	56.70	21.30	28.30(85)
	Agricultural labour	5.80	-	2.10	3.30(10)	6.70	2.50	3.30(10)
	Office work	3.30	5.70	1.40	2.70(8)	8.30	1.30	2.70(8)
	Self employment	1.50	5.70	0.70	1.70(5)	8.30	-	1.70(5)
	No job	36.70	28.60	34.50	34.70(104)	16.70	39.20	34.70(104)

Figures in the parenthesis indicate numbers

C – Corporation
M – Municipality
P – Panchayat

The nuclear family system which is getting popular in the modern days found to be the primary cause of institutionalization of elderly. In the present study also the inmates of old age homes were mainly from nuclear families (60.30%) than joint families (39.70%). Similar trend was observed in all the aged homes studied irrespective of their location. The trend of large number of elderly people from nuclear families being accommodated in old age homes was also reported by Rani

(1999). According to her about 96 percent of inmates in the old age homes of Secunderabad were from nuclear families.

Gender wise classification showed that more males (66.70%) than females (58.80%) seeked admission to old age homes from nuclear families.

The religion wise analysis of the sample clearly brought out the Christian predomination (77.00%) in old age homes than Hindus (20.30%) and Muslims (2.70%). This was true with the area as well as gender wise distribution of the sample. Rani (1999) also reported that majority of the inmates in her study were Christians. The reason may be the availability of more number of old age homes sponsored by Christian service agencies.

The well-being of the elderly is intimately linked to their education. Education, apart from providing economic stability also enables smoother adaptability towards the socio-economic transition in the society. According to the Indian census, a literate is defined as a person having the ability to read and write with an understanding in any language.

The educational background of the sample when studied it was observed that 50.30 percent of them had only primary education. Illiterate people (42.00%) ranked next in the order. The rest who had secondary (7.30%) and higher secondary (0.34%) were very few in number. Majority of the illiterates (52.50%) were there in the homes of corporation area. The number of elderly people with primary, secondary or higher education was also found to be the lowest in the homes of corporation area.

Gender wise analysis showed that illiteracy was more among females (45.00%) than males (30.00%) where as more males (60.00%) had primary education than females (47.90%). Higher education was uncommon among males as well as females. As given by Rajan *et al*. (1999) higher educational levels are most uncommon among the older people. The literacy levels among older persons are pretty low and it is extremely low in rural areas and especially among women. Older women are the least illiterate as there was a larger sex differential in the literacy level of the elderly compared to the general population (Rajan *et al*., 1999).

The data on occupational status of the elderly before joining the old age homes revealed that 34.70 percent of them were jobless. Inmates who were jobless were mostly found in the homes of corporation area (36.70%) followed by panchayat (34.50%) and municipality (28.60%). The rest of them were worked as maid servants (29.30%) and casual labourers (28.30%). Agricultural labour (3.30%), office work (2.70%) and self employment (1.70%) were also found to be the income generating activities of minorities.

Gender wise data indicated that most of the males (56.70%) were casual labourers. Women were mostly jobless (39.20%) or were maid servants (35.80%). 21.30 percent of females were casual labourers too.

Mehta (2001) in his study of elderly in Vadodara city also reported that most of the respondents were working in the informal sectors doing jobs like maid servants, daily wage labourers, gardeners etc. Similarly, John (1999) in a study of

institutionalized aged in Trivandrum found that 35.00 percent of the inmates were labourers.

Illiteracy and low level of education prominently seen among the sample of the present study may be the root cause of poor occupational status among them.

4.5.3 Availability and use of personal income

One of the major problems confronting the aged is withdrawal from control over economy and lack of income. Most of the older people have no personal income. Good income ensures good health care, nutrition, housing, opportunity for recreation, travel, entertainment etc (Mathew, 1999). Individuals with a secure and sufficient income during their old age are likely to face less economic and psychological problems because of their ability to meet their needs, the ability to afford supportive services and the sense of security this brings (Annual report of NIN, ICMR, 1992). The details on the availability and use of personal income by the inmates are given in Table 34.

Table 34 Percentage distribution of the sample based on the availability and use of personal income

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Availability of personal income**							
	Yes	25.80	8.60	15.20	18.70(56)	13.30	20.00	18.70(56)
	No	74.20	91.40	84.80	81.30(244)	86.70	80.00	81.30(244)
2	**Monthly income**							
	<500	80.74	66.66	81.81	80.30(45)	50.00	85.001	80.30(45)
	501-1000	6.56	-	9.09	9.00(5)	12.50	7.00	9.00(5)
	>1000	12.70	33.33	9.09	10.70(6)	37.50	7.00	10.70(6)
3	**Sources**							
	Pension	29.03	33.33	63.63	42.86(24)	37.50	43.75	42.86(24)
	Savings	9.67	66.66	13.63	14.28(8)	37.50	10.41	14.28(8)
	Given by institution	48.38	-	18.18	33.93(19)	-	39.58	33.93(19)
	Given by children	12.90	-	4.54	8.93(5)	25.00	6.25	8.93(5)
4	**Uses**							
	Medicine/eatables	62.29	66.66	68.18	69.64(39)	62.50	70.80	69.64(39)
	Toiletries	16.11	-	27.27	19.64(11)	-	20.20	19.64(11)
	Transport	19.35	33.33	13.64	10.72(6)	37.50	37.50	10.72(6)

Figures in the parenthesis indicate numbers

C – Corporation
M – Municipality
P – Panchayat

The above table revealed that only a small percentage (18.70%) of the sample had personal income and majority (81.30%) did not. The sources of personal income included their own pension (42.86%), money given by the institution (33.93%), own savings (14.28%) and pocket money given by children (8.93%).

Among the 18.70 percent of the sample who had personal income, 80.30 percent had a monthly income of less than Rupees 500 and only 10.70 percent had more than Rupees 1000 per month. This income was mostly spent for buying

medicine and eatables (69.64%), toiletries (19.64%) and also for transportation (10.72%).

Although the same trend as not having personal income by majority was seen among both the gender, females (20.00%) were slightly better than the males (13.30%) in this respect.

Number of studies are available to support the present findings. Shankar (1999) found that majority of the older persons belonging to lower and middle class groups has economic problems and they do not have enough savings to take care of their needs. A study conducted by Rajan *et al*. (2004) on the problems of the aged in Pondicherry reported that absence of savings and lack of pocket money are the most serious economic problem of the aged. Based on a study in Maharashtra, Dandekar (1996) reported that before coming to the old age home 40 percent of the inmates had a yearly income of less than Rs.500 and only 5.30 percent had an annual income of more than 15,000. Yet another study among urban poor elderly conducted by Merlin (1999) revealed that 31.67 percent earn only below Rs.500 per month. 21.67 percent earn between Rupees 501 to 1000 per month and only 15 percent earn more than 1000 Rupees per month.

Thus the financial and economic well-being of the elderly is often cited as a serious problem by many mini-surveys conducted on the elderly in the past. The economic situation of the elderly are closely associated with the socio-economic environment in which they reside. The economic status of a person is a function of his

or her past work status, level of education as well as the present activity status. Inadequate financial resources were indicated as one of the major problems of the Indian elderly. This also seemed to be of a higher degree among female elderly compared to their male counterparts (Rajan *et al*., 1999).

4.5.4 House and landownership

Land holdings and house ownerships are the possessions usually considered for determining the individual assets and economic status. The data in this respect was collected and presented in the table below.

Table 35 Percentage distribution of the sample based on house and land holdings

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Own house**							
	Yes	53.30	82.90	55.90	58.00(174)	66.70	55.80	58.00(174)
	No	46.70	17.10	44.10	42.00(126)	33.30	44.20	42.00(126)
2	**Type of house**							
	Pucca	57.90	48.20	59.20	56.90(99)	40.00	62.00	56.90(99)
	Kutcha	42.10	51.80	40.80	43.10(75)	60.00	38.00	43.10(75)
3	**Land holdings**							
	Yes	55.00	82.90	59.70	59.70(179)	66.70	58.00	59.70(179)
	No	45.00	17.10	42.00	40.30(121)	33.30	42.00	40.30(121)
4	**Area**							
	<5 cents	59.00	66.00	62.00	61.40(110)	53.00	64.00	61.40(110)
	5-10 cents	28.80	27.10	17.90	23.50(42)	32.00	21.00	23.50(42)
	>10 cents	12.20	6.90	20.10	15.10(27)	15.00	15.00	15.10(27)

Figures in the parenthesis indicate number

C – Corporation
M – Municipality
P – Panchayat

As the table indicated 58.00 percent of the sample possessed their own houses and 42.00 percent did not. Among the ones who had own houses, 56.90 percent reported having pucca type of houses and 43.10 percent had kutcha type.

Gender wise data also showed that 66.70 percent of males and 55.80 percent of female elderly had own house.

In the case of landholdings also majority (59.70%) reported that they had land in their own name. The land area in majority of cases (61.40%) were less than five cents. 23.50 percent of the sample possessed a land of five to 10 cents and 15.10 percent had more than 10 cents.

Areawise analysis showed that majority (82.90%) of inmates in the municipality had own house of either pucca (48.20%) or kutcha type (5180).

4.5.5 Marital status

The marital status of the elder persons is an aspect of family structure that deeply affects their living arrangements, support systems and individual well being (Moli, 2004). Widowhood, divorce or separation influence the family status of the elderly women and make them dependent on their children or other relatives (Mallick, 2003). The details on the marital status of the sample studied are given in Table 36.

Table 36 Percentage distribution of the sample based on marital status

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Marital status**							
	Married	56.66	45.70	50.30	52.33(157)	58.30	50.80	52.30 (157)
	Never married	43.34	54.30	49.70	47.70(143)	41.70	49.20	47.70(143)
2	**Present status**							
	Widow/widower	73.52	50.00	84.93	76.43(120)	48.57	84.42	76.43(120)
	Divorced/separated	19.11	25.00	15.06	17.83(28)	34.28	13.11	17.83(28)
	With spouse	7.37	25.00	-	5.73(9)	17.14	2.45	5.73(9)
3	**Reason for being never married**							
	Health problems	23.00	31.57	18.05	21.68(31)	28.00	20.36	21.68(31)
	Economic problems	55.76	57.89	65.27	60.84(87)	64.00	60.16	60.84(87)
	Fear of marriage	17.30	10.52	11.11	13.28(19)	8.00	14.40	13.29(19)
	No one took initiative	3.84	-	5.55	4.19(6)	-	5.08	5.08(6)
4	**Reason for divorce/separation**							
	Dowry problem	-	25.00	-	4.35(1)	-	6.25	4.35(1)
	Adjustment problem with spouse	76.92	50.00	90.90	95.65(22)	66.66	87.50	95.65(22)
	Economic problems	23.00	25.00	-	14.28(4)	33.33	-	14.28(4)
	Health problems	-	-	9.09	3.57(1)	-	6.25	3.57(1)

Figures in the parenthesis indicate numbers

C – Corporation
M – Municipality
P – Panchayat

As depicted by the table majority of the inmates (52.30%) were married. But only three percent had their spouse with them. In the rest of the cases spouses were either not alive (76.43%) or divorced/separated (17.83%).

It was surprising to note that a good number of inmates (47.70%) were not married at all. When enquired about the reason for being unmarried, majority (60.84%) said that it was due to economic problem. Health problem was the reason given by 21.68 percent of the sample followed by fear of married life (13.29%) and lack of initiative from the family (4.19).

It was also noted that divorce/separation from the spouse was mainly due to adjustment problems with the spouse (95.65%), although economic problems (14.28%), health problems and dowry problems (3.57%) each also contributed towards it. Gender wise data indicated that majority of the females (49.20%) were never married than males.

4.6 INFORMATION ON FAMILY MEMBERS OF THE SAMPLE

The more concept of old age homes is to accommodate the elderly people who have no one to look after in a family and to support them with necessary care and support in an institutional set up. Hence an attempt was made to study the details of family members of the sample especially their spouses and children. The table below presents the information on the spouses of inmates.

Table 37 Information on the spouses of the sample

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Spouse**							
	Alive	24.05	20.00	4.80	8.66(29)	40.85	11.47	18.47(29)
	Not alive	69.17	22.90	43.40	76.43(120)	48.57	84.42	76.43(120)
	Don't know	6.88	2.90	2.10	5.09(8)	11.42	3.27	5.09(8)
2	**Education**							
	Illiterate	58.33	85.71	42.85	65.51(19)	80.00	58.33	65.51(19)
	Primary education	41.66	14.28	57.14	34.48(10)	20.00	41.66	34.48(10)
3	**Occupation status**							
	House maids	8.33	-	-	44.00(1)	-	8.33	3.44(1)
	Casual labourers	41.66	-	57.14	41.37(12)	7.14	66.66	41.37(12)
	Agricultural labourers	8.33	14.28	-	6.70(2)	-	16.66	6.70(2)
	Office work	-	-	14.28	3.44(1)	-	8.33	3.44(1)
	Stationary shop	-	-	14.28	3.84(1)	7.14	-	3.84(1)
	No job	41.66	85.71	14.28	41.37(12)	85.71	-	41.37(12)
4	**Present place of stay**							
	With children	16.66	14.28	-	10.34(3)	14.28	8.33	10.34(3)
	With relatives	-	57.14	57.14	27.58(8)	50.00	8.33	27.58(8)
	Alone at home	41.66	28.57	14.28	27.58(8)	14.28	50.00	27.58(8)
	At work place	41.66	-	28.57	34.48(10)	21.42	33.33	34.48(10)

Figures in the parenthesis indicate numbers

C – Corporation
M – Municipality
P – Panchayat

As given in the table, majority of the inmates (76.43%) lost their spouses including 84.42 percent of females and 48.57 percent of males. Only 18.47 percent of the sample had them, but they were not staying with the inmates in old age homes. 5.09 percent of the inmates did not know the whereabouts of their spouses.

The spouses of the inmates were found to be mostly illiterates (65.51%) and some had primary education (34.48%). Due to low level of education 41.37 were jobless and did not have regular income to look after the family. Those who work were mostly casual labourers (41.37%).

Spouses of the inmates who were alive, found to stay either alone (30.76%) or with the relatives (30.76%). Some of them were staying at their work place (26.92%). Only 11.53 percent were staying with their children. Gender wise data showed that 40.00 percent of females and 9.83 percent of males list their partners.

Next to spouse children are the ones to take care of the elderly parents. So information about children were procured and presented separately for male and female children. The table 38 gives information pertaining to the male children of the sample.

Table 38 Details on the male children of the sample

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Number of sons**							
	One son	13.25	37.50	16.46	17.19(27)	20.00	16.39	17.19(27)
	Two sons	8.82	12.50	13.69	11.46(18)	25.72	7.37	11.46(18)
	Three sons	8.82	-	4.10	5.73(9)	8.57	4.91	5.73(9)
	More than three sons	2.94	6.25	-	1.91(3)	8.57	-	1.91(3)
	No sons	66.17	43.75	65.75	75.43(100)	37.14	71.33	75.43(100)
2	**Educational status**							
	All illiterate	-	-	20.00	8.77(5)	-	14.28	8.77(5)
	At least one primary	82.60	66.66	56.00	68.42(39)	68.18	68.57	68.42(39)
	At least one secondary	17.39	33.33	24.00	22.80(13)	31.81	17.14	22.80(13)
3	**Occupation status**							
	Casual labourers	65.21	55.55	72.00	66.66(38)	68.18	65.71	66.66(38)
	Office work	13.04	22.22	12.00	14.03(8)	22.72	8.57	14.03(8)
	No job	21.73	22.22	16.00	19.29(11)	9.09	25.71	19.29(11)

4	**Marital status**							
	Unmarried	21.73	11.11	8.00	14.03(8)	9.09	17.14	14.03(8)
	At least one married	78.26	88.88	92.00	85.96(49)	90.90	82.85	85.96(49)

Figures in the parenthesis indicate numbers

C – Corporation
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P – Panchayat

The data revealed that majority (75.43%) of the elderly subjects had no sons and 17.19 percent had only one son. A minority (1.91%) had more than three sons also. Educational status of the male children of the inmates indicated that majority of them (68.42%) had primary education followed by secondary education (22.80%). Illiterate children constituted 8.77 percent.

As a result, 66.66 percent of them were working as casual labourers and 19.29 percent were jobless. Majority of them (85.96) were married and had their own families. May be this poor economic position due to low educational and occupational status and family responsibilities compelled the male children to avoid taking the responsibility of their parents.

Gender wise analysis indicated that 71.31 percent of females and 37.14 percent of male elderly staying in old age homes have no son to look after them. Table 39 gives the details of the female children of the sample population.

Table 39 Details on the female children of the sample

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	M	F	Pooled
1	**Number of daughters**							
	One daughter	19.13	37.50	20.58	21.65(34)	16.66	10.00	21.65(34)
	Two daughters	17.64	12.50	5.74	11.49(18)	11.66	4.58	11.49(18)
	Three daughters	7.35	6.25	5.47	6.36(10)	6.66	2.50	6.36(10)
	More than three daughters	4.41	-	1.36	2.54(4)	-	1.66	2.54(4)
	No daughters	51.47	43.75	67.12	57.96(91)	23.33	32.08	57.96(91)
2	**Educational status**							
	All illiterate	15.15	11.11	8.33	12.12(8)	19.04	8.88	12.12(8)
	At least one primary	45.45	55.55	41.66	45.45(30)	47.61	44.46	45.45(30)
	At least one secondary	33.40	33.33	45.83	37.87(25)	33.33	40.00	37.87(25)
	At least one higher secondary	6.00	-	4.16	4.54(3)	-	6.66	4.54(3)
3	**Occupational status**							
	Casual labourers	36.36	11.11	16.66	25.75(17)	14.28	31.11	25.75(17)
	Office work	-	11.11	12.50	6.06(4)	9.52	4.44	6.06(4)
	No job	63.64	77.77	70.83	68.18(45)	76.19	64.44	68.18(45)
4	**Marital status**							
	Unmarried	9.09	11.11	8.33	9.09(6)	-	13.33	9.09(6)
	At least one married	90.90	88.88	91.66	90.90(60)	100	86.66	90.90(60)

Figures in the parenthesis indicate numbers

C – Corporation
M – Municipality
P – Panchayat

As revealed from the table, 57.96 percent of the sample had no daughters. 21.65 percent had one daughter and 5.09 percent had two. Most of these children had either primary education (45.45%) or secondary education (37.87%). Majority

(68.18%) were jobless. A small percentage (25.75%) of them worked as casual labourers. 90.90 percent were married and settled. May be these were the reasons which prevented them from taking care of their parents.

4.7 ADMISSION AND LIFE STYLE OF SAMPLE IN THE OLD AGE HOMES

This section deals with the entry of the sample in old age homes, the reason behind, their willingness in opting old age homes and duration of stay in the homes.

Admission to old age homes

The details are shown in the table below.

Table 40 Admission details and stay of the sample in the old age homes

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Willingness to get admitted:**							
	Willing	94.20	94.30	92.40	93.30(280)	96.70	92.50	93.30(280)
	Forced to come	5.80	5.70	7.60	6.70(20)	3.30	7.50	6.70(20)
2	**Accompanied by:**							
	Children	6.70	2.90	1.40	3.70(11)	3.30	3.80	3.70(11)
	Relatives	21.70	25.70	4.10	13.70(41)	10.00	14.60	13.70(41)
	Neighbours/friends	15.80	8.60	29.0	21.30(64)	16.70	22.50	21.30(64)
	Employer	9.20	8.60	6.20	7.70(23)	6.70	7.90	7.70(23)
	Religious agency	30.0	37.10	35.90	33.70(101)	26.70	35.40	33.70(101)
	On their own	16.70	17.10	23.40	20.00(60)	36.70	15.80	20.00(60)
3	**Reason for seeking admission:**							
	No means for living and no one to look after	56.70	57.10	64.80	60.70(182)	43.30	65.00	60.70(182)
	Adjustment problem with relatives	7.50	11.40	12.40	10.30(31)	10.00	10.40	10.30(31)
	Spouse/children	15.80	20.00	3.40	10.30(29)	31.70	5.00	10.30(31)
	Daughter-in-law/ son-in-law	8.30	8.60	11.00	9.70(31)	13.30	8.80	9.70(29)
	Health problems	11.70	2.90	8.30	9.00(27)	1.70	10.80	9.00(27)
4	**Prior dwelling place:**							

	With spouse/ children	42.50	54.30	22.80	34.30(103)	71.70	25.00	34.30(103)
	With relatives	12.50	28.60	17.20	16.70(50)	28.30	13.80	16.70(50)
	At work place	23.30	8.60	23.40	21.70(65)	-	27.10	21.70(65)
	Alone at home	21.70	8.60	36.60	27.30(82)	-	34.20	27.30(82)
5	**Duration of stay in home**							
	<1 year	19.20	28.60	11.00	16.30(49)	18.30	15.80	16.30(49)
	1-3 years	30.00	14.30	25.50	26.00(78)	31.70	24.60	26.00(78)
	3-5 years	26.70	14.30	9.70	17.00(51)	28.30	14.20	17.00(51)
	>5 years	24.20	42.90	53.80	40.70(122)	21.70	45.40	40.70(122)

Figures in the parenthesis indicate numbers

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The burgeoning of the nuclear family and the separation of the offspring from the parents creates a situation where the old parents have to stay on their own. Most of the primary surveys have investigated on the preference of the aged regarding their place of stay and it is found that a majority of them prefer to stay with their children or own family members in old age (Rajan *et al*., 1999).

But due to some reason or the other the older parents are left with no other alternatives than joining in the old age homes; although old age homes are generally the last resort for the aged. May be this situation encouraged the elder people of the present study to join for institutionalization. When enquired 93.30 percent of them were willing to join the old age homes, but 6.70 percent of the sample were actually forced to join the homes.

In most of the cases (33.70%) the inmates were brought to the old age homes by some religious agencies and 21.30 percent of them by neighbours and friends. Twenty percent of the samples come to the old age homes on their own. Relatives (13.70%) and children (3.70%) were also taken initiative to bring the elderly to the institution in a few cases.

Children playing the least role in putting their parents in old age homes was also reported by Rajan *et al*., (1999). Majority of the males (36.70%) come to the old age homes on their own while 35.40 percent of the females were brought to the old age homes by religious agencies. A study by Dandekar (1996) on institutionalized elderly of Maharashtra reported that a substantial 42.30 percent of the inmates came to the old age homes on their own. Sons or sons-in-law, daughters or daughters-in-law brothers or sisters had each brought the inmates to the institution in 6.00 percent of the cases. One-fourth of the inmates had been brought in by unrelated persons.

The reasons for seeking admission to the old age homes as given by the sample were many. The most prominent one was no means for living and no one to look after (60.70%). Adjustment problems with the relatives (10.30%) and children/spouse (10.30%) also formed the causes for seeking admission. Adjustment problems with son-in-law and daughter-in-law (9.70%) and health problems (9.00%) were also mentioned as reasons.

Sreevals and Nair (2001) and Dandekar (1996) also pointed out that no means for living and no one to take care of elderly in a family set up were the main reasons for the elderly to join the old age homes whereas no caregivers at home was the major reason highlighted by Rajan (2000) for institutionalization. Non adjustment with family members was also reported by Agarwal (2003) and Sreevals and Nair (2001). Quarrel with son-in-law and daughter-in-law (20.00%) and quarrel with sons and daughters (10.00%) were reported as adjustment problems of aged by Sreevals

and Nair (2001). The reasons for non adjustment as reported by Agarwal (2003) were the neglect and feeling of unwantedness of elderly at home. The basic reason for this attitude is economic dependency of the elderly.

As indicated by Vijayakumar (1995) in his study of elderly at Andra Pradesh, widows faced adjustment difficulties especially with their daughters-in-law when they live with their married sons. Absence of a living son or daughter made 46.00 percent of the elderly opt for old age home (Rajan *et al*., 1999).

As far as prior dwelling place of the inmates are concerned, 34.30 percent of them were staying with their spouse and children. 27.30 percent were living alone. Workplace was the dwelling place for 21.70 percent of the sample and 16.70 percent were with their relatives.

The duration of stay in old age homes revealed that majority of the inmates (40.70%) were institutionalized for more than five years. Twenty six percent of them (nearly one-fourth) reported staying in old age homes for one to three years. Latest addition for the last one year was 49 inmates (16.30%). Areawise distribution also showed that majority of the inmates in the old age homes of municipality and panchayat had been there for more than five years. It was also observed that every year more and more aged people were added to this stream of population. Genderwise data showed that majority of the males (31.70%) were institutionalized for one to three years whereas most of the females had been there for more than five years.

4.7.2 Communication with relatives and children

Strengthening interpersonal relationships is very important for the elderly. Visiting relatives, friends and the sick, writing letters to dear ones, dropping cards on their birthdays and anniversaries, making phone calls etc are the channels to reinforce interpersonal relationships (Korula, 1999). Maintaining active mental and physical activities and social contacts is conducive to good health in older people (The health of the UK's elderly people, 1994).

The information gathered on these lines was analysed and the details are given in the table below.

Table 41 Mode of communication with relatives and children

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Visiting children/relatives**							
	Often	3.30	14.30	2.10	4.00(12)	10.00	2.50	4.00(12)
	Sometime	13.30	11.40	13.10	13.00(39)	18.30	11.70	13.00(39)
	Never	83.30	74.30	84.80	83.00(249)	71.70	85.80	83.00(249)
2	**Visit by children/relatives**							
	Often	4.20	8.60	2.10	3.70(11)	5.00	3.30	3.70(11)
	Some times	7.50	20.00	11.00	10.70	16.70	9.20	10.70(32)
	Never	88.30	71.40	86.90	85.70(257)	78.30	88.50	85.70(257)
3	**Writing letters**							
	Often	-	-	0.70	0.30(1)	-	0.40	0.30(1)
	Some times	4.20	8.60	6.20	5.70(17)	10.00	4.60	5.70(17)
	Never	95.80	91.40	93.10	94.00(282)	90.00	95.00	94.00(282)
4	**Sending gift**							
	Some times	3.30	5.70	3.40	3.70(11)	-	95.40	3.70(11)
	Never	96.70	94.30	96.60	96.30(289)	100	4.60	96.30(289)

Figures in the parenthesis indicate numbers

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As the table revealed majority of the inmates (83.00%) never visited their children or relatives after joining the old age homes. Poor health condition, lack of money and neglect of children were the reasons given by them. 18.30 percent of males and 11.70 percent of the females visited their children or relatives once in a while. Only very few (4.00%) of them were privileged to make visits to their near and dear ones often. Similarly 85.70 percent of the children never visited their parents accommodated in old age homes. Only 3.70 percent of them did visit their parents. Receiving letters was found to be uncommon. Receiving gifts from children or

relatives was also not common. Only rarely (3.70%) the inmates received gifts from their children or relatives.

Similar findings were reported by Chopra *et al*. (2001). According to them most of the respondents had not communicated even through telephone with their children for six months. The visits paid by the family members to old age homes were also minimal. Such circumstances have a profound effect on the psychological state of respondents, which made them feel isolated and lonely.

Rajan *et al.* (1999) also reported that three-fourth of the elderly in old age homes complains of never receiving letters from their children and very few reports to sometimes having received letters. They added that to understand the quality of family relations completely not only the children's visits to parents but also the parent's visit to them is of relevance. With regard to the parent's visit to children 20 percent of the elderly never visit their children and more than 70 percent report to be visiting their children sometimes. It reflects the extent of contact between the elderly

parents and their displaced children. 37.30 percent of the inmates had no visitors at all and only 11 percent had their relatives visiting them regularly.

As per reports of Rajan *et al*. (1999) 15 percent of the males and 16 percent of the females revealed that their children never visit them.

4.7.3 Engagement in day-to-day activities

The inmates, who were healthy, were engaged in day-to-day activities of the old age homes. The details are shown in Table 42.

Table 42 Engagement of the sample in the activities of old age homes

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Routine home activities**	46.70	48.60	50.30	48.70(146)	23.30	55.00	48.70(146)
2	**Care of disabled**	5.00	5.70	5.50	5.30(16)	11.70	3.80	5.30(16)
3	**Care of animals/gardening**	11.70	2.90	7.60	8.70(11)	13.30	7.50	8.70(26)
4	**Marketing**	3.30	17.10	0.70	3.70(11)	15.00	0.80	3.70(11)
5	**No engagements**	33.30	25.70	35.90	33.70(101)	36.70	32.90	33.70(101)

Figures in the parenthesis indicate numbers

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The table revealed that nearly half of the sample (48.70%) did the routine home activities like food preparation, serving, washing clothes and utensils, cleaning the home etc. Quite a good number (33.70%) did none of the tasks. The remaining sample were engaged in a variety of activities like caring animals or pets and engaged in gardening or agriculture (8.70%), caring of the bedridden elderly (5.30%) and

doing marketing duties for the institution (3.70%). Genderwise distribution showed that majority of the females (55.00%) were engaged in routine home activities while majority of the males (36.70%) had no engagements.

Regarding the engagement in household chores, Kohli *et al*. (1997) in their study on institutionalized elderly of Chandigarh reported that 36.60 percent did no work. This finding was in line with the results of the present study. According to Dandekar (1996) most of the inmates in his study were mobile and capable of doing some work. But 64.00 percent of them did none of the chores needed to run the old age home. The rest worked in a variety of ways. Rani (1999) also reported that only a minority in the homes helped in watering plants, dusting, cleaning vessels, cutting vegetables etc.

The elderly accommodated in old age home have many adjustment problems, anxiety, feeling of abandoned and neglected by their dear ones etc, which create sort of psychological depression. This may prevent them from involving actively in any physical work.

4.7.4 Recreational activities

Involvement in some kind of leisure activity is essential for a good quality life whether it is contact with neighbors or friends or it is some information seeking or entertainment within home by way of watching television (Mohanty, 2001). So the leisure time activities of the inmates were studied and presented in Table 43.

Table 43 Recreational activities of the sample

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Watching Television/listening radio**	24.20	20.00	21.40	22.30(67)	26.70	21.30	22.30(67)
2	**Reading newspaper/ magazines/books**	7.50	11.40	11.70	10.00(30)	13.30	9.20	10.00(30)
3	**Chatting with friends**	9.20	20.00	11.70	11.70(35)	11.70	11.70	11.70(35)
4	**Praying**	34.20	22.90	40.70	36.00(108)	20.00	40.0	36.00(108)
5	**Making paper cover**	12.50	-	2.80	6.30(19)	10.00	5.40	6.30(19)
6	**Caring guests**	0.80	-	0.30(1)	0.30(1)	-	0.40	0.30(1)

Figures in the parenthesis indicate numbers

C – Corporation
M – Municipality
P – Panchayat

Praying (36.00%) and watching Television or listening to radio (22.30%) were the major recreational activities of the sample studied. 11.70 spent their time in chatting with friends and 10.00 percent used to read newspaper, magazines or books during leisure time. Cover making for outside organizations was the recreational activity of 6.30 percent of the sample lived in corporation and panchayat homes. They were paid an amount of 25 paise per cover by the organizations. 40.00 percent of the females spent their time in praying while watching television or listening radio was the recreational activity of most of the males (26.70%).

As in the present study, Television is the medium most frequently selected by the elderly for entertainment and information (Prakash, 2001 and Kohli *et al.* 1997). Based on a study by Dandekar (1996) on institutionalized elderly, 22.30

percent reported watching Television, listening to radio and also reading. A large percentage of them spent time in prayers or Japa and meditation.

Television being a potent media that could be used to bring about desired social changes. The media also seems to have become sensitive to ageing issues.

Prayers and meditation, attending bhajans, religious devotional discourses and visiting places of worship give elderly solace and provide peace and joy. According to Korula (1999) kitchen gardening, pisciculture, rearing of cattle, birds, pets etc were some of the activities which made elderly persons fully engaged and active.

4.7.5 Other productive activities of interest

When enquired about the productive engagements they would like to have in the old age homes, the sample suggested a number of such activities. The details are given in Table 44 and illustrated in Figure 4.

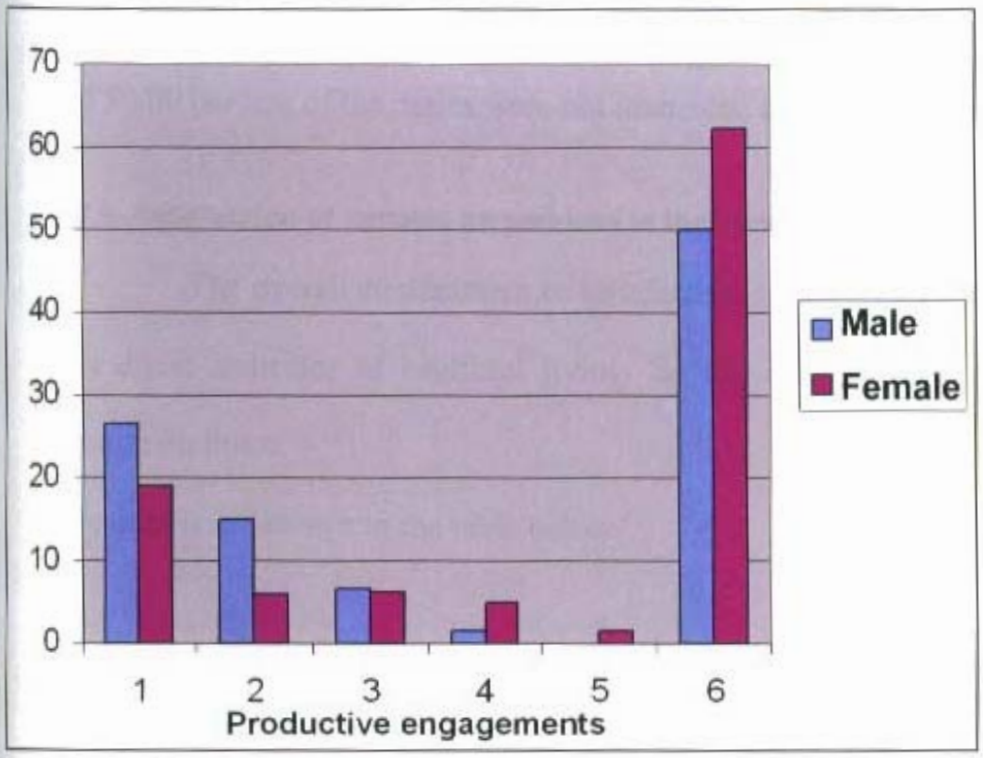
Table 44 Productive engagements of interest of the sample

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Day care for elderly**	20.80	22.90	20.0	20.70(62)	26.70	19.20	20.70(62)
2	**Pre school centre**	6.70	17.10	6.20	7.70(23)	15.00	5.80	7.70(23)
3	**Music class**	5.00	5.70	7.60	6.30(19)	6.70	6.30	6.30(19)
4	**Tailoring unit/crafts or arts**	5.80	-	4.10	4.30(13)	1.70	5.00	4.30(13)
5	**Yoga /meditation**	2.50	-	0.70	1.30(4)	-	1.70	1.30(4)
6	**No interest**	59.20	54.30	61.40	59.70(179)	50.00	62.10	59.70(179)

Figures in the parenthesis indicate numbers

C – Corporation
M – Municipality
P – Panchayat

It was surprising to note that more than half (59.70%) of the respondents were not interested in any of the activities. Of the remaining 20.70 percent were



1 Day care for elderly
2 Pre school centre
3 Music class
4 Tailoring unit
5 Yoga /meditation
6 No interest

Fig. No. 4

Productive engagements of interest of the sample

interested in having day care centres for elderly and 7.70 percent were interested to have preschool centers in the premises of old age homes. Other activities of interest included music classes (6.30%), tailoring unit/crafts or arts (4.30%) and yoga or meditation (1.30%). Genderwise distribution showed that 62.10 percent of the females and 50.00 percent of the males were not interested in any of the activities.

4.7.6 Satisfaction of inmates on services in the homes

The overall contentment or satisfaction on the style of life in old age homes is a direct indicator of healthful living. So the inmates were asked to give their opinion on this.

The details are shown in the table below.

Table 45 Satisfaction of inmates on services provided by old age homes

Sl.No	Particulars	Area				Gender		
		C	M	P	Pooled	Male	Female	Pooled
1	**Food and related services**							
	Fully satisfied	56.70	91.40	60.7	62.70(188)	50.00	65.80	62.70(188)
	Partially satisfied	10.00	-	6.20	7.00(21)	8.30	6.70	7.00(21)
	Not at all satisfied	33.30	8.60	33.10	30.30(91)	41.70	27.50	30.30
2	**Medicine and related services**							
	Fully satisfied	47.50	65.70	40.70	46.30(139)	48.30	45.80	46.30(139)
	Partially satisfied	10.80	14.30	5.50	8.70(135)	13.30	7.50	8.70(26)
	Not at all satisfied	41.70	20.00	53.80	45.00(135)	38.30	46.70	45.00(135)
3	**Clothing facilities provided**							
	Fully satisfied	55.00	82.90	52.40	57.00(171)	45.00	60.00	57.00(171)
	Partially satisfied	7.50	2.90	7.60	7.00(21)	5.00	7.50	7.00(21)
	Not at all satisfied	37.50	14.30	40.00	36.00(108)	50.00	32.50	36.00(08)
4	**Indoor recreation facilities**							
	Fully satisfied	46.70	82.90	57.90	56.30(169)	48.30	58.30	56.30(169)
	Partially satisfied	3.30	-	4.10	3.30(10)	1.70	3.80	3.30(10)
	Not at all satisfied	50.00	17.10	37.90	40.30(121)	50.00	37.90	40.30(121)
5	**Outdoor recreation facilities**							

	Fully satisfied	34.20	88.60	46.90	46.70(140)	41.70	47.90	46.70(140)
	Partially satisfied	4.20	5.70	1.40	3.00(9)	5.00	2.50	3.00(9)
	Not at all satisfied	61.70	5.70	51.70	50.30(151)	53.30	49.60	50.30(151)

Figures in the parenthesis indicate numbers

C – Corporation
M – Municipality
P – Panchayat

Majority of the sample were fully satisfied with the services related to food (62.70%) and clothing (57.00%). Total dissatisfaction was reported by majority of the sample in medical (45.00%) and recreational services including both indoor (40.30%) as well as outdoor (50.30%) recreation. Also a reasonably good number of them were fully satisfied with food and related services (62.70%), clothing facilities (57.00%), indoor (56.30%) and medical (46.30%) services.

Thus the different services offered in the institutions, in general, were rated as either fully satisfied or not at all satisfied by the majority of the sample. Individual differences in the expectations of the sample and individual variations in the services offered by the old age homes may have contributed towards it.

Overall contentment or satisfaction on the style of life in old age homes is a direct indicator of healthful living. Based on a study conducted in the old age homes of Maharashtra by Dandekar (1996) majority of (81%) of the inmates were fully satisfied with the living conditions of the old age homes, about 12 percent were only partially satisfied and another 4.6 percent were thoroughly dissatisfied with the home. Rajan (2000) also found that only one percent reported that the environment in the old age homes of Kerala was bad. A study conducted by Sreevals *et al.* (2001) in selected old age homes of Thiruvananthapuram district, Kerala reported that only 63 percent of the inmates were found to be satisfied with their life in the old age homes.

According to Kerala Old Age Home Survey conducted by Rajan (1999), sixteen percent of the inmates reported that they like very much the old age home

environment, 82 percent stated the conditions are alright and another one percent reported as bad.

The quality of food served in the old age homes found to be a consistently strong and significant predictor of the satisfaction of the inmates. Rani (1999) reported that majority were happy with the food they were served. A survey conducted by Rajan *et al*. (1999) reported that 77 percent of them are satisfied with the quality as well as quantity of the food served in the old age homes.

4.8 DEPRESSION PROFILE OF THE SAMPLE

As reported by (Anand, 2004), depression is a common condition among the elderly. Its symptoms include loss of appetite, fitful sleep, early morning wakening, weight loss, lack of energy and motivation. According to the Epidemiologic Catchment Area Study, the depressive symptoms occur in approximately 15 percent of the elderly population and rates are even higher for elderly in nursing homes (George, 1999).

So a Geriatric Depression Scale (Yesavage *et al*.1983) was used to assess the psychological status of the subjects. The responses to the 15 questions included in the scale were analysed and depression status of the sample population was arrived.

4.8.1 Gender and Area wise distribution

The area wise distribution of depression profile of inmates is given in Table 46 and illustrated in Figure 5.

Table 46 Areawise distribution of depression profile of the sample

Sl.No	Particulars	Old Age Homes			Total	χ^2
		Corporation	Municipality	Panchayat		
1	Normal	61(50.80)	15(42.90)	66(45.50)	142(47.30)	1.063
2	Depressed	59(49.20)	20(57.10)	79(54.50)	158(52.70)	

Figures in the parenthesis indicate numbers

As given by the table majority (52.70%) of the sample were depressed. Areawise analysis of the data also revealed that the sample with depression outnumbered the normal (without depression) ones in all the areas except the homes in corporation. Since the difference in percentage between normal and depressed was only marginal it was not statistically significant. Kapur (1997) also found that in general, people living in old age homes are not happy. They are very unhappy and lonely because they feel that they have come there due to their own children having abandoned and neglected them which give them a feeling of low self worth. As reported by Shankar (1999) several studies probing into the life of the aged in institutions found that the inmates are not very happy to reside in it. It affects their emotional and psychological level.

Chopra *et al*. (2001) tried to identify the causes of depression among inmates in old age homes. They remarked that even though the severity was not so high, the inmates felt depressed and were anxious because of the fact that they had limited social activities and lack the support and love of the families. As brought out by Mandal (1998) the elderly face problems of adjustment with the tight and rigid schedule, total or near total separation from the familial or social milieu, anxiety over

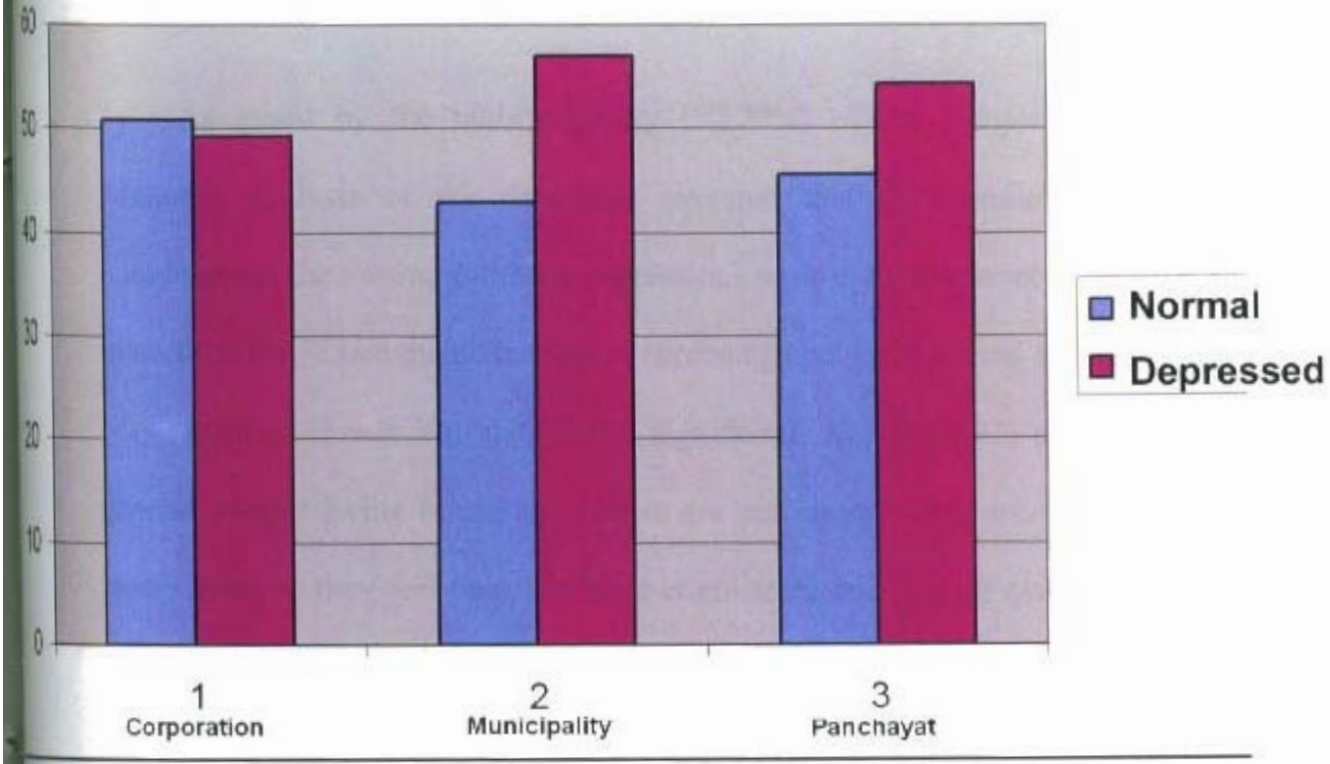
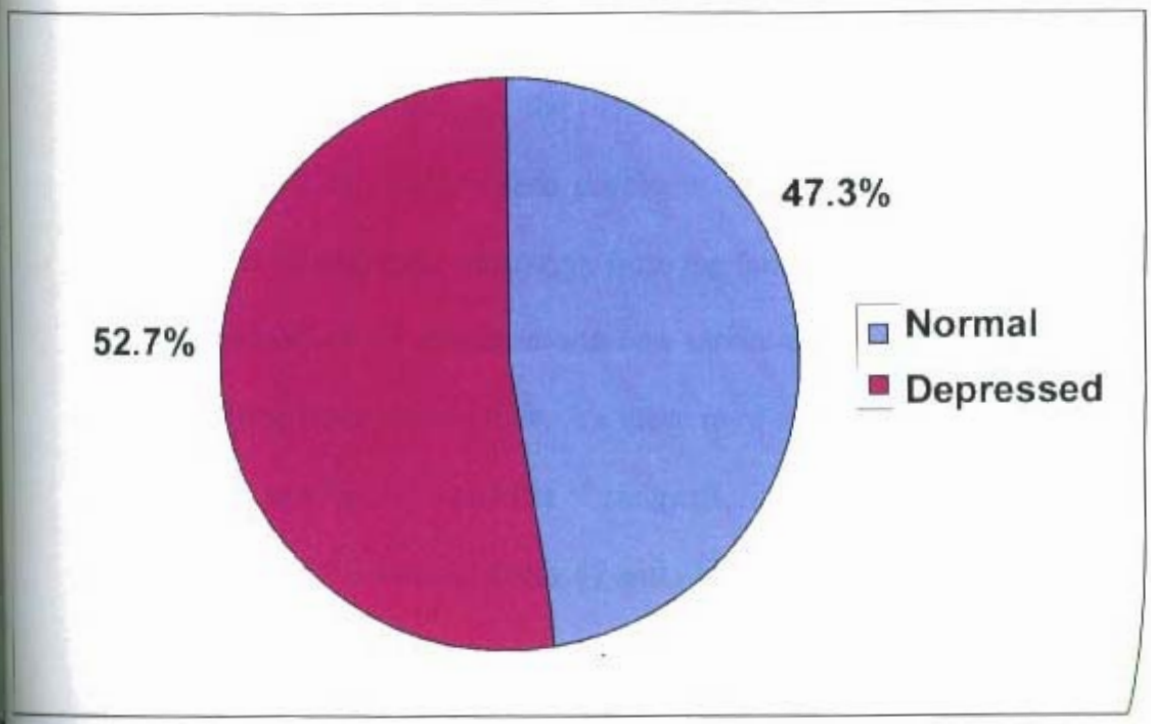


Fig. No. 5

Percentage Areawise distribution of depression profile of the sample



entrusting oneself to an unknown and new environment, lack of mental stimulation and diminishing physical faculties. All these may create for the elderly the problems of depression, apathy and a process of resignation to fate. The gender wise analysis of depression profile is shown in Table 47 and illustrated in Figure 6.

Table 47 Distribution of the sample based on sex and depression profile

Sl.No	Particulars	Gender		Pooled	χ^2
		Male	Female		
1	Normal	27(45.00)	115(47.90)	142(47.30)	0.164
2	Depressed	33(55.00)	125(52.10)	158(52.70)	

Figures in the parenthesis indicate percentage

Sexwise analysis indicated that elderly of both the sexes were equally vulnerable to depression, although the percentage of depressed men (55.00%) were comparatively more than that of women (52.10%). Similarly more females (47.90%) were found to be normal than the males (45.00%). But chi-square analysis failed to show any significant difference between male and female elderly with respective depression profile.

4.8.2 Socio economic variables Vs. depression profile

Depression is a product of so many factors; which may be physical, psychological or environmental. Hence an attempt was made to find out whether the socio-economic variables had any influence on the depression status of the sample studied. The details are given in the Table 48.

Table 48 Socio - economic variables Vs. Depression profile

Sl.No	Socio-economic variables	N	Psychological status		χ^2
			Depressed	Normal	
1	Age (years)				

	60-69	114	57(36.00)	57(40.10)	
	70-79	142	78(49.40)	64(45.10)	0.620
	80-89	44	23(14.60)	21(14.80)	
2	**Gender**				
	Male	60	33(20.90)	27(19.00)	
	Female	240	125(79.10)	115(81)	0.164
3	**Marital status**				
	Unmarried	143	68(48.00)	75(52.80)	
	Married	9	8(5.10)	1(0.70)	7.799
	Widowed	120	69(43.70)	51(35.90)	
	Divorced/separated	28	13(8.20)	15(10.60)	
4	**Educational status**				
	Illiterate	126	70(44.30)	56(39.40)	
	Primary	151	74(46.80)	77(54.20)	3.408
	Secondary	22	14(8.90)	8(5.60)	
	Higher secondary	1	-	1(0.70)	
5	**Economic status**				
	Having income	56	31(19.60)	25(17.60)	
	No income	244	127(80.40)	117(82.40)	0.200
6	**Visit by children/relatives**				
	Never	249	129(81.60)	120(84.50)	
	Some times	39	20(12.70)	19(13.40)	2.505
	Often	12	9(5.70)	3(2.10)	
7	**Reason for seeking accommodation in the institution**				
	No means for living and no one to look after	182	90(57.00)	92(64.80)	
	Adjustment problem with: Children or spouse	31	20(12.70)	11(7.70)	
	Daughter-in-law/son-in-law	29	21(13.30)	8(5.60)	8.592
	Relatives	31	16(10.00)	15(10.60)	
	Health problems	27	11(7.00)	16(11.30)	
8	**Duration of stay in the institution**				
	<1year	49	30(19.00)	19(13.40)	
	1-3 years	78	40(25.30)	38(26.80)	
	3-5 years	51	33(20.90)	18(12.70)	7.280
	>5 years	122	55(34.80)	67(47.10)	

Figures in the parenthesis indicate numbers

The data revealed that elderly in the 70 to79 age category (49.40%) were more depressed compared to other age groups. Similarly female elderly (79.10%) were more depressed than their male counterparts (20.90%). The prevalence of depression was more in the unmarried population (48.00%). Primary educated (46.80%) and illiterate (44.30%) sample were almost equally depressed. Economic status indicates that a majority of incomeless elderly (80.40%) were more depressed

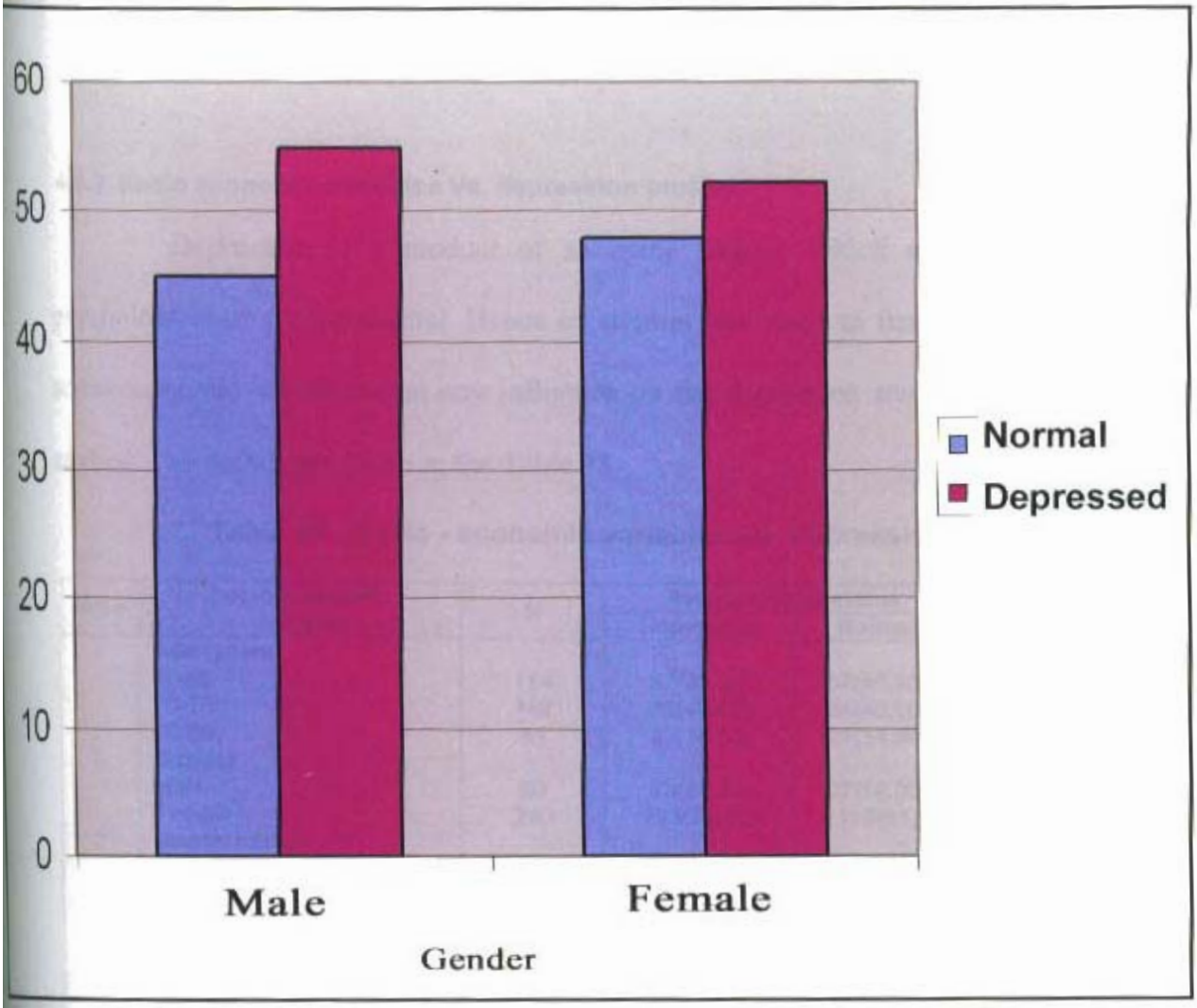
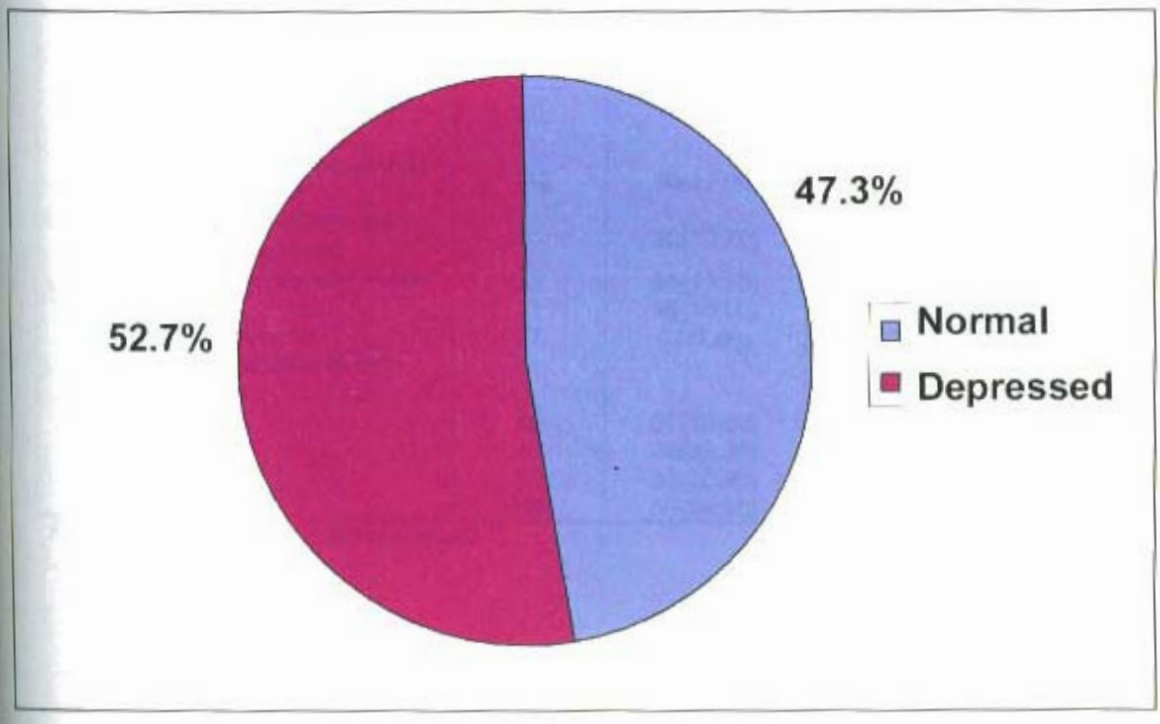


Fig. No. 6

Percentage distribution of the sample based on gender and depression profile



than the ones with having income (19.60%).The extent of prevalence of depression was high among those who were not visited by their children or relatives (81.60%).

High depression (57.00%) was exhibited by those who joined the old age homes due to lack of any one to take care and due to economic problems than those who had other problems. Duration of stay in the institution was also a factor of depression for the elderly as the majority had been living in the institutions for more than five years were more depressed (34.80%) than who had been living for less than five years. But chi-square analysis did not show any significant relation between depression status and socio-economic variables.

4.8.3 Health and nutrition status Vs. depression profile

An attempt was made to find out whether the independent variables had any influence on the depression status of the sample studied. The details are given in the Table 49.

Table 49 Health and Nutrition status Vs. Depression profile

Sl.No	Independent variables	N	Psychological status		χ^2
			Depressed	Normal	
1	**Functional status**				
	Good	263	138(87.30)	125(88.00)	
	Average	31	14(8.90)	17(12.00)	6.097*
	Poor	6	6(3.80)	-	
2	**Oral health status**				
	Good	25	14(8.90)	11(7.70)	
	Average	131	67(42.40)	64(45.10)	0.271
	Poor	144	77(48.70)	67(47.20)	

3	**General health status**				
	Good	5	2(1.30)	3(2.10)	
	Average	109	59(37.30)	50(35.20)	0.435
	Poor	186	97(61.40)	89(62.70)	
4	**Disease condition**				
	Good	9	6(3.80)	3(2.10)	
	Average	83	51(32.30)	32(22.50)	
	Poor	153	73(46.20)	80(56.30)	4.848
	Very poor	15	28(17.70)	27(19.00)	
5	Over health status				
	Normal	77	42(26.60)	35(24.60)	
	Mild	97	53(33.50)	44(31.00)	
	Moderate	96	42(26.60)	54(38.00)	6.938
	Severe	30	21(13.30)	9(6.30)	
6	**Nutritional status**				
	Well nourished	6	1(0.60)	5(3.50)	
	At risk of malnutrition	146	65(41.10)	81(57.00)	12.359**
	Malnourished	148	92(58.20)	56(39.40)	

Figures in the parentheses indicate percentages *$p<0.05$ **$p<0.01$

Chi-square analysis applied to test the association between independent variables and depression status of the elderly showed that nutritional status showed a highly significant association ($P<0.01$) with the psychological status. The prevalence of depression was high in the malnourished elderly (58.20%) than the 'at risk' group (41.10%) and well nourished (0.60%) category. Functional status also found to have a significant relation with psychological status ($p<0.05$). But the prevalence of depression was found to be more in the functionally 'good' categorized elderly (87.30%) than average (8.90%) or poor group (3.80%). This may due to the fact that majority of the elderly in the present study were functionally independent (87.70%)or

only minor assistance required(10.30%) to perform basic activities of daily living compared to the dependent (2.00%).

Other independent variables like BMI, oral health status, disease condition and overall health status found no significant relation with psychological status. The prevalence of depression was more in the elderly who had poor oral health and general health and had poor disease condition status. The elderly with mild category of overall health status had more depression compared to others.

Chi-square analysis was also done to find association between depression status of the elderly and Performance Index of Homes (the grade was given to the homes after assessing infrastructural facilities and service efficiency of the homes) and the results are presented in Table 50 and illustrated in Figure 7.

Table 50 Depression status of the elderly Vs. Performance Index of Homes

Sl.No	Depression status	N	Grade obtained by homes			$\chi 2$
			Good	Fair	Poor	
1	**Normal**	142	64(55.20)	73(45.60)	5(20.80)	9.808**
2	**Depressed**	158	52(44.80)	87(54.40)	19(79.20)	

Figures in the parentheses indicate percentages ***p<0.01*

The chi-square analysis showed a highly significant relation (at 1% level) between depression status of the elderly and Performance Index of Homes. The analysis clearly indicated that the prevalence of depression was highest among the inmates (79.20%) who lived in homes with 'poor' Performance Index than the homes rated as 'fair' (54.40%) or 'good' (44.80%) in their performance. The data also

showed that most of the inmates (55.20%) residing in homes with 'good' Performance Index were normal.

4.9 HEALTH ASSESSMENT

4.9.1 Personal habits

The personal habits of the elderly subjects were studied and presented in the table below.

Table 51 Distribution of the sample based on personal habits

Sl.No	Particulars	Gender		Pooled
		Male	Female	
1	**Smoking**			
	Regularly	14(23.30)	-	14(4.60)
	Occasionally	19(31.60)	-	19(6.30)
	Never	27(45.00)	-	27(9.00)
2	**Alcohol consumption**			
	Regularly	9(15.00)	-	9(3.07)
	Occasionally	6(10.00)	-	6(2.00)
	Never	45(75.00)	-	45(15.00)
3	**Pan chewing**			
	Regularly	6(10.00)	-	6(2.00)
	Occasionally	-	-	-
	Never	54(90.00)	-	54(18.00)
4	**Snuff**			
	Regularly	11(18.30)	-	11(3.60)
	Occasionally	8(13.30)	-	8(2.60)
	Never	41(68.30)	-	41(13.60)

Figures in the parenthesis indicate percentages

As the table shows none of the female elderly subjects had any unhealthy habits like smoking, drinking, chewing or snuffing. When enquired about it, very few women agreed that they were interested in chewing pan. But they were prevented from this due to lack of money to buy chewing pan and also due to strict prohibition insisted by the home authorities.

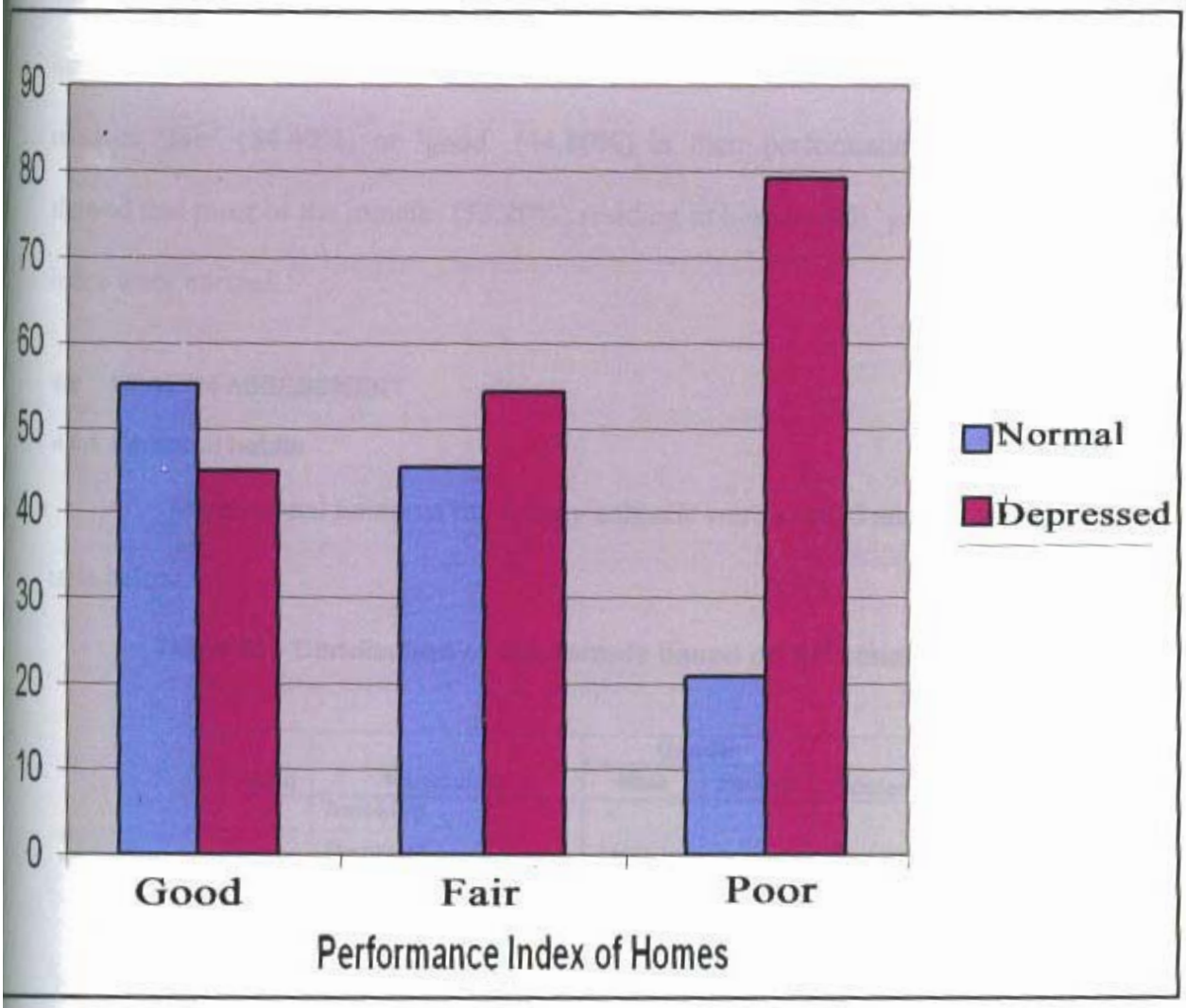


Fig. No. 7

Depression status of the elderly Vs. Performance Index of Homes

But some of the male elderly reported that they regularly smoke (23.30%) and snuff (18.30%). Regular consumption of alcohol (15.00%) and pan chewing (10.00%) were also observed among them. Although most of the males were interested in smoking and drinking, lack of money and health problems prevented them from using these. When the male and female sample put together only a small minority was observed practising regular smoking (4.60%), drinking alcohol (3.00%), chewing (2.00%) and snuff (3.00%).

Natarajan *et al*. (1991) also found that chewing tobacco and betel leaves and smoking were the prevalent habits among elderly in a rural population in Tamil Nadu. But in the present study the habitual usage was found to be very low. A study by Rajan et al. (1999) on household elderly also reported that among the personal habits enquired into, smoking seems to be the most prominent.

4.9.2 Health problems

Age related inabilities

The age related inabilities of the elderly people are the problems with sense organs, dental and oral health problems, locomotor etc. Information on these aspects was procured and analysed. The details are given in Table 52.

Table 52 Distribution of sample based on age related inabilities

Sl.No	Particulars	Male				Female			
		60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	Problem with vision	7(36.80)	18(56.30)	6(66.70)	31(51.70)	64(67.40)	83(75.50)	27(77.10)	174(72.50)
2	Problem with hearing	6(31.60)	14(43.80)	4(44.40)	24(40.00)	46(48.40)	53(48.20)	21(60.00)	120(50.00)

3	**Problem with walking**	8(42.10)	14(43.80)	5(55.60)	27(45.00)	40(42.10)	52(47.30)	25(71.40)	117(48.80)
4	**Dental problems**	11(57.90)	18(56.30)	6(66.70)	35(58.30)	60(63.20)	76(69.10)	27(77.10)	163(67.90)
5	**Difficulty in swallowing**	10(52.60)	16(50.00)	3(33.30)	29(48.30)	53(55.80)	65(59.10)	24(68.60)	142(59.20)
6	**Difficulty in chewing**	10(52.60)	20(62.50)	6(66.70)	36(60.00)	58(61.10)	72(65.50)	21(60.00)	151(62.90)
7	**Difficulty in identifying taste**	12(63.20)	14(43.80)	5(55.60)	31(51.70)	77(81.10)	91(82.70)	30(85.70)	198(82.50)

Figures in the parenthesis indicate percentages

Oral health problems like loss of taste, dental problems, and problems with chewing and swallowing were most obvious among the elderly studied irrespective of gender.

Loss of taste was the acute problem faced by the female (82.50%) and male (51.70%) elderly. Next was dental problems, which involved 67.90 percent of women and 58.30 percent of men. Difficulty in chewing (female 62.90% and male 60.0%) and swallowing (female 59.20% and male 48.30%) were also some of the oral health problems need to be addressed.

Visual disability was reported as the second highest problem in magnitude among elderly women (72.50%) and men (51.70%). So also hearing defects (50.00% women and 40.00% men). Locomotive problem was diagnosed among 48.80 percent of female and 45.00 percent of male elderly.

The percentage occurrence of these problems were comparatively very high among females than males, that too among old-old category (80+) of women than young-old category.

Thus it is obtained that elderly population, under the purview of the present study, were seriously affected by age related inabilities with women more involved than men. This situation would adversely affect their quality of life.

Many evidences support the present findings. Regarding age related inabilities Mehta and Thakore (1995) also observed the decreased taste sensitivity, loss of teeth and decreased digestion among elderly, which according to them will lead to reduced food intake which inversely affect the nutritional status of elderly.

As in the present study, visual disability has been reported as the most prominent problem among elderly followed by locomotor, hearing, amnesia and speech disability (Dilip, 2001).

Sweet and salt taste recognition thresholds as per Kim *et al*. (2003) were significantly higher in the elderly. Jayakumar (2004) stated that as age increases, there is a decrease in the number of taste buds and less saliva is produced and thus older adults may need more spices to make up for this change in diminishing taste. Hasan (1998) reported that the sense of taste and smell diminishes with advancing age and the decline results in the lessening of appetite and reduction in the quantity of food consumed.

Loss of teeth and difficulty in chewing is a common problem invariably faced by all elderly population. Since dentures play an important role in improving the quality and quantity of food consumed, artificial dentures should be provided for edentulous elderly.

A person is considered as 'visually disabled' if he did not have the perception of light or if he was having perception about light but could not count fingers of a hand with or without glasses from a distance of three meters (Dilip, 2001). Visual disability according to him was widely prevalent in Kerala. At least one out of every five persons was visually disabled and the visual disability rate was 181 and 319 per thousand persons among young old and old-old category respectively. Visual disability was comparatively higher among females than males.

Hasan (1998) also reported that 13 percent of elderly in India have visual problems. The commonest causes are cataract, glaucoma and diabetes. The disability can be reduced to a great degree by early detection and prompt treatment.

The prevalence of hearing disability was 107 per thousand persons (Dilip, 2001). Hasan (1998) reported that 25 to 30 percent of the elderly have hearing problems. It is vital to provide hearing aids, which have shown to improve the quality of life and reduce disability.

Health status based on age related inabilities

The subjects were graded as good, average and poor based on the number of age related inabilities present in each elderly sample. The grading was done after

computing the mean values and standard deviations of the total number of oral health problems each elderly person had. The subjects who obtained a score greater than or equal to the sum of mean and standard deviation (≥Mean+SD) were categorized under

'poor' and the subjects who obtained a score less than or equal to the difference of mean and standard deviation (≤Mean-SD) were categorized under 'good' and those who obtained medium scores were categorized under 'average'. The results are presented in Table 53.

Table 53 Health status based on occurrence of age related inabilities

Sl.No	Health status		Male				Female			
	Grade	Score	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	**Good**	≤3	7(36.8)	4(12.5)	1(11.1)	12(20.0)	6(6.3)	7(6.4)	-	13(5.4)
2	**Average**	4-5	5(26.3)	21(65.6)	4(44.4)	30(50.0)	48(50.5)	44(40.0)	9(25.7)	101(42.1)
3	**Poor**	> 5	7(36.8)	7(21.4)	4(44.4)	18(30.0)	41(43.2)	59(53.6)	26(74.3)	126(52.5)

Figures in the parenthesis indicate percentages

As the table indicates majority (52.50%) of the female elderly were rated as 'poor' with respect to health status and male (50.00%) as average; while considering the occurrence of age related inabilities. This clearly indicated the magnitude of the problem among female subjects. Although, the normal status was reported by the lowest percentage of sample in both males (20.00%) and female (5.40%), the gender influence was obvious here also. More men were having 'good' health status than women.

Age wise analysis clearly brought out a progressive decline in percentage of sample with normal status with the advancement of age in the case of males and progressive increase in percentage of sample with poor status with age among

females. In general old-old category (80+) was more affected by the problem of age related disabilities than young-old groups.

Age and gender wise comparison of health status based on age related inabilities

Chi-square analysis was done to find out association of health status computed from age related inabilities with age and sex of the sample. The results are shown in Table 54.

Table 54 Age and gender wise comparison of health status based on age related inabilities

Sl.No	Health status		Age (years)			Gender		
	Grade	Score	60-69	70-79	80-89	Male	Female	Pooled
1	**Good**	≤3	13(11.40)	11(7.70)	1(2.30)	25(8.30)	13(5.40)	25(8.30)
2	**Average**	4-5	53(46.50)	65(45.80)	13(29.50)	31(43.70)	101(42.10)	131(43.70)
3	**Poor**	> 5	48(42.10)	66(46.5)	30(68.20)	144(48.00)	126(52.50)	144(48.00)

Figures in the parenthesis indicate percentages

Chi-square analysis of the data showed that gender was highly associated (significant at 1% level) with the age related inabilities of the elderly, with female elderly more affected than their male counterparts. Elderly men were mostly rated either as 'Average' (50.0%) or 'Normal' (20.0%) with their health status whereas women rated as Poor (52.50%) or Average (43.70%).

A significant association (at 5 % level) was also observed between age of the elderly and age related inabilities, where old-old category (80-89 yrs) found to be more affected than young-old groups.

Minor ailments

Occurrence of minor ailments

The minor ailments generally seen among the elderly subjects were studied and presented in Table 55.

Table 55 Distribution of sample based on occurrence of minor ailments

Sl.No	Particulars	Male				Female			
		60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	**Insomnia**	9(47.3)	21(65.6)	6(66.7)	36(60)	71(74.7)	90(81.8)	29(82.9)	190(79.2)
2	**Fatigue**	12(63.2)	24(75)	7(77.8)	43(71.7)	62(65.2)	74(67.3)	30(85.7)	166(69.1)
3	**Indigestion**	9(47.3)	15(46.8)	7(77.8)	31(51.6)	66(69.5)	76(69.1)	31(88.6)	173(72.1)
4	**Constipation**	14(73.6)	23(71.9)	5(55.6)	42(70)	72(75.8)	88(80)	29(82.9)	189(78.8)
5	**Allergies**	12(63.2)	19(59.4)	3(33.3)	34(56.7)	69(72.6)	75(68.2)	25(71.4)	169(70.4)

Figures in the parenthesis indicate percentages

Among the minor ailments fatigue (71.70%) and constipation (70.0%) were more prominent than others among elderly men. Among women insomnia (79.20%) and constipation (78.80%) were so conspicuous. A steady increase in the problem with age was reported in all the ailments occurred in males and a majority of ailments except allergy in females.

The problem of insomnia among elderly has also been highlighted by Jayakumar (2004). He observed that deep sleep decrease with age, so the older adults tend to wake up more during the night.

In general a number of reasons may be attributed to the occurrence of minor ailments among elderly. But the physiological changes during ageing is the root cause of such problems.

Heath status based on minor ailments

The samples were categorized as good, average, and poor based on the number of minor ailments each one had. The grading was done by computing the mean values and standard deviations of the total number of minor ailments each elderly had. The subjects who obtained a score greater than or equal to the sum of mean and standard deviation (≥Mean+SD) were categorized under 'poor' and the subjects who obtained a score less than or equal to the difference of mean and deviation (≤Mean-SD) were categorized under 'good' and those who obtained medium scores were categorized under 'average'. The results are presented in Table 56.

Table 56 Health status based on occurrence of minor ailments

Sl.No	Health status		Male				Female			
	Grade	Score	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	**Good**	≤2	1(5.3)	-	-	1(1.7)	1(1.1)	3(2.7)	-	4(1.7)
2	**Average**	3-4	10(52.6)	12(37.5)	6(66.7)	28(46.7)	37(38.9)	39(35.5)	5(14.3)	81(33.8)
3	**Poor**	>4	8(42.1)	20(62.5)	3(33.3)	31(51.7)	57(60)	68(61.8)	30(85.7)	155(64.6)

Figures in the parenthesis indicate percentages

As per the table, majority of the sample, 51.7 percent of males and 64.6 percent of females, were rated as 'poor' in their health status as they had the highest number of minor health problems. Of the remaining, majority were rated as 'average'. This included 46.7 percent of male and 33.8 percent of female elderly. The

least number of sample (1.7% each of male and female elderly) were grouped under the grade of 'good' health status.

Age and gender wise comparison of health status based on minor ailments

Chi-square analysis was done to find association if any between the health status and age and sex of the sample. The results are presented in Table 57.

Table 57 Age and gender wise comparison of health status based on minor ailments

Sl.No	Health status	Age (years)				Gender		
		60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	Male	Female	Pooled
1	**Good**	2(1.8)	3(2.1)	-	5(1.7)	1(1.7)	4(1.7)	5(1.7)
2	**Average**	47(41.2)	51(35.9)	11(25)	109(36.)	28(46.7)	81(33.8)	109(36.3)
3	**Poor**	65(57)	88(62)	33(75)	186(62)	31(51.7)	155(64.6)	186(62)
		$\chi 2$ 4.878				$\chi 2$ 3.496		

Figures in the parenthesis indicate percentages

Genderwise analysis of health status failed to show any significant association, although more number of females were graded as 'poor' in this respect than males and more number of males were graded as 'average' than females.

Age wise analysis clearly indicated an increase in the percentage of sample with 'poor' health status with the advancement of age, and a progressive reduction with age in the percentage of sample under 'average' category. Here also Chi-square analysis did not show any significant association.

Degenerative diseases

The degenerative diseases commonly occurred in the elderly subjects were studied and the details are presented in Table 58.

Table 58 Distribution of sample based on occurrence of degenerative diseases

Sl.No	Particulars	Male				Female			
		60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	**Diabetes**	16(84.2)	18(56.3)	6(66.7)	40(66.7)	59(62.1)	78(70.9)	24(68.6)	161(67.1)
2	**Hypertension**	12(63.2)	27(84.4)	9(100)	48(80.0)	76(80.0)	83(75.5)	28(80.0)	187(77.9)
3	**Chronic obstructive pulmonary bronchitis**	18(94.7)	24(75.0)	8(88.9)	50(83.3)	70(73.7)	89(80.9)	29(82.9)	188(78.3)
4	**Osteoporosis**	8(42.1)	15(46.9)	6(66.7)	29(48.3)	67(70.5)	80(72.7)	25(71.4)	172(71.7)
5	**Dementia**	4(21.1)	6(18.8)	3(33.3)	13(21.7)	19(20.0)	29(26.4)	9(25.7)	57(23.8)
6	**Cardiovascular problems**	7(36.8)	16(50.0)	5(55.6)	28(46.7)	42(44.2)	43(39.1)	18(51.4)	103(42.9)
7	**Cancer**	1(5.3)	2(6.3)	-	3(5.0)	-	3(2.7)	5(14.3)	8(3.3)
8	**Cataract**	11(57.9)	21(65.6)	8(88.9)	40(66.7)	64(67.4)	85(77.3)	20(57.1)	169(70.4)
9	**Osteoarthritis**	11(57.9)	12(37.5)	6(66.7)	29(48.3)	56(58.9)	80(72.7)	26(74.3)	162(67.5)
10	**Urinary problems**	8(42.1)	12(37.5)	5(55.6)	25(41.7)	52(54.7)	60(54.5)	23(65.7)	135(56.3)
11	**Piles**	7(36.8)	15(46.9)	5(55.6)	27(45.0)	36(37.9)	46(41.8)	16(45.7)	98(40.8)
12	**Cervical spontilitis**	10(52.6)	25(78.1)	6(66.7)	41(68.3)	56(58.9)	67(60.9)	25(71.4)	148(61.7)
13	**Thyroid**	1(5.3)	1(3.30)	-	2(3.30)	2(2.1)	8(7.3)	2(5.7)	12(5.0)

Figures in the parenthesis indicate percentages

As per the table chronic obstructive pulmonary bronchitis was the disease prevalent in majority of the males (83.30%) as well as female elderly (78.30%) subjects. This was mostly seen among the age group of 60 to 69 years in men (94.70%) and 80 to 89 years in women (82.90%). Hypertension was next in order

affecting 80.0% of male and 77.90 percent of female elderly. All male subjects in the age group 80 to 89 years were affected by hypertension (100%). For females the susceptibility was almost equal in all age groups studied. According to Sivashanmugam (1990) hypertension was one of the commonest ailments among the elderly.

The men were also suffering from cervical spontilitis (68.30%), diabetes (66.70%) and cataract (66.70%). A progressive increase in the incidence of cataract was noticed with age. Whereas the diabetes was mostly found in the 60 to 69 age group than the older age group.

Women, at the same time, were affected mostly by osteoporosis (71.70%), cataract (70.40%), osteoarthritis (67.50%), diabetes (67.10%) and cervical spontilitis (61.70%). Elderly women of all age groups were equally affected by osteoporosis, whereas osteoarthritis showed a progressive increase with age. Osteoporosis was reported as a very common problem of women in the menopausal phase of life(Khanna, 1997).

Osteoporosis is the condition characterized by a significant decrease in bone mass occurs when bone demineralization takes place at a faster rate than the bone mineralization. As a result the bones become porous, lighter and fragile leading to easy and frequent fractures, with prolonged healing time. Prentice (1999) also reported that osteoporosis affects the majority of older persons including an estimated 33 percent of post-menopausal women. It is called ‘the silent disease’ because by the

time symptoms like pain and fractures appear, the disease is already in an advanced stage.

As the same time, arthritis is a common and often chronic condition among the aged and osteoarthritis is due to ageing changes in cartilage of the joints. This results in pain and restriction of joint movement. Osteoarthritis commonly affects knee joint, shoulder joint, hip and spines (Natarajan, 1997). Dalus (2004) also opined that osteoarthritis is the most common joint disease extremely common in elderly. Knee osteoarthritis is a leading cause of chronic disability and osteoporosis, characterized by decreased bone strength is a common problem among postmenopausal women and elderly men.

A study conducted by Dandekar (1996) on elderly in Maharashtra, reported that 11.80 percent did not have a single complaint regarding their health. Diabetes was reported by 6.70 percent. Asthma troubled 8.50 percent and heart disease 7.40 percent of the inmates while blood pressure, anaemia and eye defects were complained by 16 percent each. Diabetes mellitus, a common metabolic disorder is common in geriatric population. Diabetes is one of the leading causes of end stage renal disease, non-traumatic lower extremity amputations and blindness in elderly (Dalus, 2004).

As given by Chopra (2001) osteoarthritis is a chronic degenerative disease of joints, progressive in nature occurring mainly in the middle half of life affecting one or many joints and is the leading cause of disability in the older persons .According to Moody (2000) arthritis is the most familiar and most prevalent chronic

disease of later life; it afflicts nearly half of all persons over age 60. Arthritis is also commonly known as rheumatism and it is the most important cause of physical disability in the United States.

Cardiovascular problems were slightly higher in males (46.70%) compared to females (42.90%). Only a very small number of sample including males and females were affected by cancer and thyroid problems. Prevalence of cataract was slightly higher among women (70.40%) compared to men (66.70%). Urinary problems were also high in females (56.30%) especially in the old-old group of 80 to 89 (65.70%). Piles and cervical spontilitis were more prevalent in males.

Osteoporosis, cardiovascular diseases, diabetes and cancer have been identified as the most important and commonly occurring nutrition related problems among the aged by Khanna (1997). He further reported that cardiovascular diseases like atherosclerosis, acute myocardial infarction and congestive cardiac failure are also very high among the elderly. The use of drugs especially diuretics drugs may affect the dietary intake, nutrition and health of the individuals. The incidence of diabetes mellitus increases with age, both among males and females. The impaired ability of the elderly to utilize carbohydrates is perhaps due to decreased sensitivity of the cells to insulin which commonly results in hyperglycemia.

Cataract was identified as a common problem affecting both male (66.70%)

and female (70.40%) elderly in the present study. The studies carried out by ICMR on blindness on elderly have shown that the major cause of blindness was cataract. By surgery, many elderly may be able to regain their vision (Shah *et al*., 1997). Dalus (2004) also opined that a large number of elderly have unrecognized visual impairment and most common cause of visual impairment in elderly is due to senile cataract. Bamji (1999) reported that nearly eighty percent of the 9to12 million blind people in India have cataract. Age related cataract is characterized by multiplicity in the underlying mechanisms and risk factors like diabetes, excessive exposure to sunlight, nutritional deficiencies, environmental toxicants and heavy smoking (Rao, 1999).

The risk of cancer as given by Khanna (1997) increases with age. As many forms of cancer have long latent periods the occurrence is most frequent between 60-65 years. Cancer of lungs and prostate are more common in men, while that of breast and cervix are the most common forms in ageing women. A good nutritional status helps in the effective treatment of cancer.

Health status based on number of episodes of degenerative diseases

As most of the sample were found to have multiple health problems, the data was further analyzed on the basis of number of episodes of degenerative diseases. The sample were categorized on this basis (the elderly with less number of diseases secured better grades). The results are shown in Table 59.

Table 59 Health status based on number of episodes of degenerative diseases

Sl.No	Number of diseases	Grade	Male				Female			
			60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled

1	**No diseases**	Very good	-	-	-	-	-	-	-	-
2	**1 to 2 diseases**	Good	-	3(9.4)	-	3(5.0)	3(3.2)	3(2.7)	-	6(2.5)
3	**3 to 5diseases**	Average	7(36.8)	8(25.0)	2(22.2)	17(28.3)	32(33.7)	24(21.8)	10(28.6)	66(27.5)
4	**6 to 8diseases**	Poor	11(57.9)	16(50.0)	3(33.3)	30(50.0)	48(50.5)	61(55.5)	14(40.0)	123(51.3)
5	**Above 8diseases**	Very poor	1(5.3)	5(15.6)	4(44.4)	10(16.7)	12(12.6)	22(20.0)	11(31.4)	45(18.8)

Figures in the parentheses indicate percentages

As the table presents, not even a single elderly was seen without any health problems. Nearly one half of the male (50.0%) and female (51.30%) subjects were categorized as 'poor' with respect to the episodes of disease ranged between six to eight in number. More than a quarter of men (28.30%) and women (27.50%) were rated as having an average status with the number of episodes of diseases ranging between three to five per person. 16.70 percent and 18.80 percent respectively of men and women were suffering from more than eight diseases. So their disease status was rated as 'very poor'.

A 'good' status in this respect was reported only by five percent of elderly men and 2.5 percent of women. Among the elderly males percentage of sample in the 'very poor' disease status found to increase with age; and in the 'average' and 'poor' status there was a declining trend with age.

The similar trend in percentage of sample with age was observed among 'very poor' rated females. Studies of National Sample Survey Organization (NSSO),

reported that 45 percent of the elderly population in the rural and urban areas suffers from chronic ailments and about 5.40 percent of the elderly sample was found to be physically immobile Renganathan (2002). Chronic illness as per Moody (2000) are much more common among the old. Rates of chronic illness are 46.00 percent for those over age 60 compared with only 12.00 percent for those younger than that age.

Age and gender wise comparison of health status based on episodes of degenerative diseases

Chi-square test was applied to find out the association of health status (computed from the number of episodes of degenerative diseases) with age and gender. The results are presented in Table below.

Table 60 Age and gender wise comparison of health status based on episodes of degenerative diseases

Sl.No	Health status	Gender			Age(Years)			
		Male	Female	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	Good	3(5.0)	6(2.50)	9(3.0)	3(2.60)	6(4.20)	-	9(3.0)
2	Average	17(28.30)	66(27.50)	83(27.70)	39(34.20)	32(22.50)	12(27.30)	83(27.70)
3	Poor	30(50.0)	123(51.30)	153(51.0)	59(51.80)	77(54.20)	17(38.60)	153(51.0)
4	Very poor	10(16.70)	45(18.80)	55(18.30)	13(11.40)	27(19.0)	15(34.10)	55(18.30)
		χ^2 1.140			χ^2 15.803*			

Figures in the parentheses indicate percentages **p<0.05*

Nearly half of the sample (51.00%) were rated as having 'poor' heath status. Of which majority were from the age group of 60 to 69 (51.80%) and 70 to 79 (54.20%) years. 'Very poor' health status was reported by 18.30 percent of the sample and majority of them were in the old-old group of 80 to 89 years. Chi-square

analysis showed that there existed a significant association (5% level) between age and health status in terms of number of episodes of degenerative diseases.

The genderwise comparison exhibited a higher susceptibility of females to multiple episodes of degenerative diseases than their male counterparts. So the percentage of women categorized under the 'poor' and 'very poor' health status were marginally higher than men. However this difference was found to be statistically insignificant and no significant association could be established between gender and health status in terms of number of episodes of degenerative diseases.

4.9.3 Functional status

Activities of daily living (ADL)

Functional assessment of all the samples was done using the Activities of Daily Living (ADL) scale developed by Katz *et al.* (1970) which is given in Appendix IV. The results are presented in Table 61.

Table 61 Distribution of sample based on the performance of Activities of Daily Living (ADL)

Table 61 Distribution of sample based on the performance of Activities of Daily Living (ADL)

Sl.No	Particulars	Independent			Assistance Required			Dependent		
		Male	Female	Pooled	Male	Female	Pooled	Male	Female	Pooled
1	Bathing	55(91.7)	227(94.6)	282(94.0)	5(8.3)	12(5.0)	17(5.7)	-	1(0.4)	1(0.3)
2	Dressing/ Undressing	58(96.7)	233(97.1)	291(97.0)	1(1.7)	6(2.5)	7(2.3)	1(1.7)	1(0.4)	2(0.7)
3	Personal grooming	58(96.7)	233(97.1)	291(97.0)	2(3.3)	7(2.9)	9(3.0)	-	-	-
4	Toileting	58(96.7)	235(97.9)	293(97.7)	2(3.3)	5(2.1)	7(2.3)	-	-	-
5	Continence	58(96.7)	234(97.5)	292(97.3)	2(3.3)	6(2.5)	8(2.7)	-	-	-
6	Transferring	58(96.7)	230(95.8)	288(96.0)	2(3.3)	10(4.2)	12(4.0)	-	-	-
7	Walking	53(88.3)	228(95.0)	281(93.7)	7(11.7)	12(5.0)	19(6.3)	-	-	-
8	Eating	59(98.3)	236(98.3)	295(98.3)	1(1.7)	4(1.7)	5(1.7)	-	-	-

Figures in the parentheses indicate percentages

As the table reveals 93 to 98 percent of the sample in the present study could perform ADL independently and less than seven percent needed external assistance in this regard. A meagre number (less than one percent) found to depend on others for ADL, which included one male and two females. Eating (98.30%) dressing (97.00%) personal grooming (97.0%), toileting (97.70%) were some of the common activities which could be performed by the inmates.

Even those who required assistants for all the ADL activities considered, seeked helped for walking (6.30%) bathing (5.70%) and outing (4.00%). It was also noticed from the table that, there was absolutely no gender difference between the independent and partially dependent inmates.

Moody (2000) also reported that the vast majority of people over age 60 are healthy enough to engage in most activities of daily living such as bathing, dressing or preparing meals. More than four out of five reported no limitations as such in the everyday activities of life. Dwyer (1994) indicated that eating ability, oral health and mobility are important factors related to functional status of elderly.

Functional status based on percentage score of ADL

The subjects were categorized into three groups, such as 'good', 'average' and 'poor' based on the ADL score secured by the individual subjects. The score allotment for independent, partially dependent and dependent categories were three, two and one respectively and the maximum possible score was 24.Table 62 presents the details:

Table 62 Functional status based on percentage score of ADL

Sl.No	Functional status		Male				Female			
	Grade	Score	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	**Good**	**>90**	18(94.70)	28(87.50)	7(77.80)	53(88.30)	82(86.30)	98(89.10)	30(85.70)	210(87.50)
2	**Average**	**80-90**	-	4(12.50)	1(11.10)	5(8.30)	12(12.60)	9(8.20)	5(10.30)	26(10.80)
3	**Poor**	**<80**	1(5.30)	-	1(11.10)	2(3.30)	1(11.10)	3(2.70)	-	4(1.70)

Figures in the parentheses indicate percentages

The rating on functional status based on the performance of ADL was above 90 for majority of the subjects. 88.30 percent of males and 87.50 percent of females were rated having good functional status indicating that they were independent to perform the activities of daily living like bathing, dressing, personal grooming, toileting, continence, transferring, walking and eating.

Average functional status was reported by 8.30 percent of males and 10.80 of females, and poor status by 3.30 percent males and 1.70 percent females. Thus, as far as functional status is concerned women were found to be in a slightly better position than men.

Age also showed some association with functional status of males. Men in the age group of 60 to 69 years were better placed with functional status than old-old category. Such a trend was absent in the case of females.

Functional assessment measures as stated by Sullivan *et al*. (1994) explain how a person does certain tasks or fulfills certain roles in the various dimensions of living. Based on a study of institutionalized elderly in Maharashtra, Dandekar (1996) reported that 85 percent of the inmates of the institutions did not need any help. Males

were more independent in terms of mobility than women. 3.70 percent needed help for everything while 4.6 percent needed help only for going outside.

Another study conducted by Herman *et al*. (1998) among Guatemalan elderly, United States reported that almost one-third of the males and over two-thirds of females reported that they could function completely independently. A decline in functional capacity was noted for both sexes with advancing age. This confirms other reports that ADL can be used to predict morbidity and mortality in elder subjects. A study carried out by Vijayakumar (1996) on rural elderly of Andhra Pradesh state, India, pointed out that 17.4 percent of the elderly were in need of constant help for walking and 2.2 percent need help in taking food.

Age and gender wise comparison of functional status

Chi-square analysis was done to find out the association of functional status with age and gender. The details are presented in Table 63. This is illustrated in Figure 8 and Figure 9.

Table 63 Age and gender wise comparison of functional status

Sl.No	Functional status	Age(Years)				Gender		
		60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	Male	Female	Pooled
1	Independent	100(87.0)	126(88.70)	37(84.40)	263(87.70)	53(88.30)	210(87.50)	263(8.70)
2	Partially dependent	12(10.50)	13(9.20)	6(13.60)	31(10.30)	5(8.30)	26(10.80)	31(10.30)
3	Dependent	2(1.80)	3(2.10)	1(2.30)	6(2.0)	2(3.30)	4(1.70)	6(2.0)
		$\chi 2$ 0.802				$\chi 2$ 0.961		

Figures in the parentheses indicate percentages

Chi-square analysis indicated absence of any significant association between functional status and age of the elderly. The results indicated that majority of

the sample (87.70%) were in the good functional status, and only a minority of two percent were in the poor grade. The performance of Activities of Daily Living (ADL) was found to decrease with age although not to a very large extent. Age wise analysis further showed that majority of the inmates (2.30%) with poor functional status were in the 80 to 89 age group.

Sex wise comparison also illustrated that, irrespective of gender, most of them (87.70%) were in 'good' functional status; only a small minority (2.0%) rated as 'poor'. There observed a marginal difference between men (88.30%) and women (87.50%) with respect to the percentage of sample graded under 'good' functional status, with more were men enjoying this privilege than women. The same trend was noticed in 'poor' functional status too; with more men (3.30%) affected than women (1.70%). Women, in general secured an 'average' position with majority rated under either 'good' (87.50%) or 'average' (10.80%) functional status. However chi-square analysis could not establish any significant association between gender and functional status of institutionalized elderly.

Functional status Vs. performance index of homes

Chi-square analysis was employed to find out the association between functional status and performance index of homes and the results are presented in Table 64 and illustrated in Figure 10.

Table 64 Functional status Vs Performance Index of homes

Sl.No	Functional status	N	Performance index			$\chi 2$
			Good	Fair	Poor	

1	**Independent**	263	102(87.90)	138(86.30)	23(95.80)	
2	**Partially dependent**	31	13(11.20)	17(10.60)	1(4.20)	3.446
3	**Dependent**	6	1(0.9)	5(3.10)	-	

Figures in the parentheses indicate percentages

As obtained from the table the elderly with 'independent' functional status were found in all homes irrespective of the performance index. Even the inmates rated as 'dependent' with regard to functional status, although few in number, were there in the homes with either 'independent' or 'partially dependent' performance index. So chi-square analysis did not show any significant association between functional status and performance index of homes.

4.9.4 Overall health status

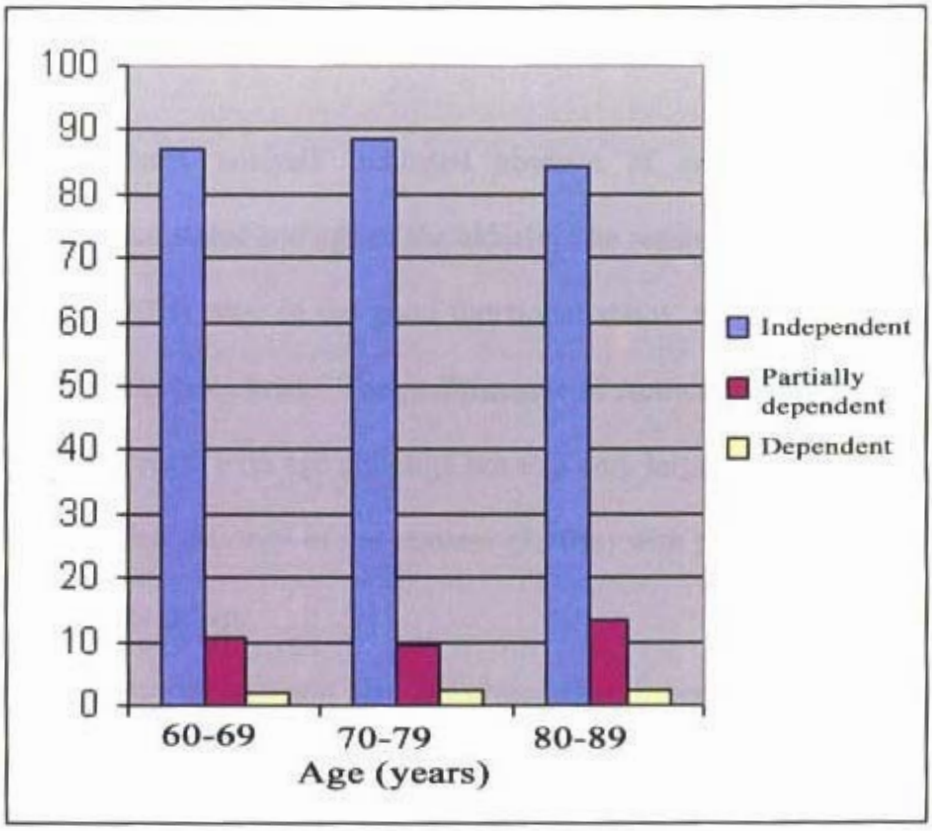


Fig. No. 8

Age wise comparison of functional status

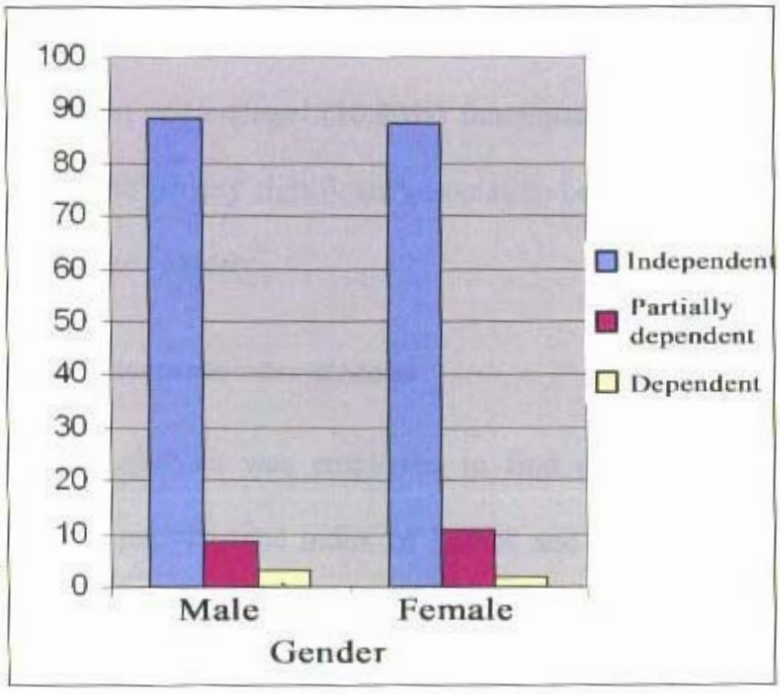


Fig. No. 9

Gender wise comparison of functional status

Over all health status of the sample was computed based on total number of health problems each subject had. (such as occurrence of age related inabilities, minor ailments, degenerative diseases and functional disabilities). The subjects were then categorized as normal health status (good), mild morbidities (fair), moderate morbidities (poor) and severe morbidities (very poor).

The grading was done after computing the mean values and standard deviations of the total number of health problems each elderly sample had. The subjects who obtained a score greater than or equal to the sum of mean and standard deviation (≥Mean+SD) were categorized under 'severe' and the subjects who obtained a score less than or equal to the difference of mean and standard deviation (≤Mean-SD) were categorized under 'normal' and those who obtained medium scores were categorized under 'mild' and 'moderate'.

The results are discussed as follows:

- Distribution of the sample based on over all health status
- Age and gender wise distribution of over all health status
- Chi square analysis of over all health status vs. age and gender of sample
- Chi square analysis of over all health status vs. performance index of homes

Distribution of the sample based on over all health status

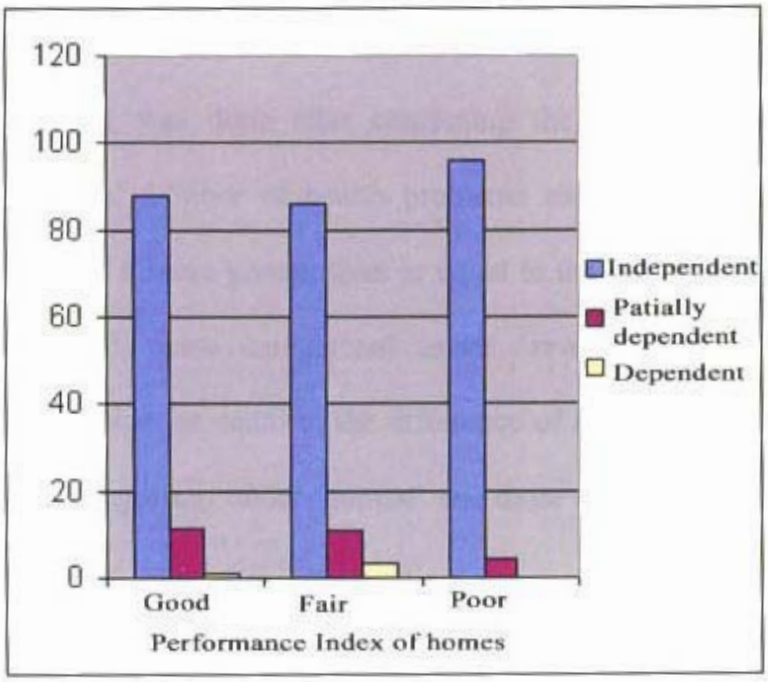


Fig. No. 10

Functional status Vs Performance Index of homes

The overall health status of the sample was analyzed in terms of area under the purview of the study. The results are presented in Table 65.

Table 65 Distribution of the sample based on overall health status

Sl.No	Overall health status		Area			
	Health score	Grade	Corporation	Municipality	Panchayat	Pooled
1	≤12	Good (normal)	23(19.20)	13(37.10)	41(28.30)	77(25.70)
2	13-15	Fair (mild morbidity)	39(32.50)	11(31.40)	47(32.240)	97(32.30)
3	16-18	Poor (moderate morbidity)	46(38.30)	5(14.30)	45(31.00)	96(32.00)
4	> 18	Very poor (severe morbidity)	12(10.00)	6(17.10)	12(8.30)	30(10.00)

Figures in the parentheses indicate percentages

As the table denotes, majority of the sample were grouped either under mild morbidity (32.30%) or moderate morbidity (32.00%). Area wise analysis showed that subjects with 'good' health status were mostly seen in homes of municipal area (37.10%) rather than in panchayat (28.30%) and corporation (10.00%). Where as the homes of corporation and panchayat had more inmates with mild to moderate morbidities. Inmates with severe morbidity or 'very poor' health status, although small in number, were mostly found in municipal and corporation area.

Overall health status Vs. age and gender of the sample

The details are shown in Table 66.

Table 66 Overall health status of the sample distributed in terms of their age and gender

Sl.No	Overall health status		Male				Female			
	Health score	Grade	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	≤12	Good (normal)	9(47.40)	11(34.40)	3(33.30)	23(38.30)	29(30.50)	21(19.10)	4(11.40)	54(22.50)
2	13-15	Fair (mild morbidity	6(31.60)	13(40.60)	2(22.20)	21(35.00)	33(34.70)	33(30.00)	10(28.60)	76(31.70)
3	16-18	Poor (moderate morbidity)	3(15.80)	6(18.80)	4(44.40)	13(21.70)	28(29.50)	44(40.00)	11(31.40)	83(34.60)
4	> 18	Very poor (severe morbidity)	1(5.30)	2(6.30)	-	3(5.00)	5(5.30)	12(10.90)	10(28.60)	27(11.30)

Figures in the parentheses indicate percentages

Gender wise analysis of the data indicated that male elderly were better placed than females with over all health profile. A majority of 38.30 percent of males were rated as 'normal', where as only 22.50 percent of females were found to be in the normal range of health status. Among females 'poor' health status (with moderate morbidity) was reported by a majority of 34.60 percent. Next was mild morbidity (31.70%). Severe morbidity condition (very poor health status) was also reported to be higher among females (11.30%) than male elderly (5.0%).

As far as age is concerned the highest percentage of elderly men with normal health status was in the age group of 60 to 69 years ; where as only 30.50 percent of women in this age group had normal health status. Majority of the women

(40.0%) at the same time were rated as 'poor' health status especially in the age group of 70 to 79 years. Sample with 'very poor' health profile was also more among the females than males in 80 to 89 years of age group.

As Rao (1999) pointed out the morbidity in the elderly depends upon the state of health with which they enter the geriatric stage. On an average an elderly person has three or four complaints and carries two to three clinical diagnoses.

As observed in the present study, females from to more physical disabilities than male has already been reported by Dilip (2001). The very high prevalence of health problems among the old-old category of females than the males of same age group was also highlighted by Dilip (2001). In this context the Manton's (1998) hypothesis seems to be most relevant, where he explains that the greater prevalence of disability among females is due to greater longevity and not due to greater risk of being functionally disabled.

Vijayakumar (1995) also supported this fact. According to the author in terms of health status, differences between the male and female are clearly explicit in that females have higher rate of morbidity though infact it has long been observed that 'women are sicker but men die sooner'.

The health of the UK's elderly people (1994) further reported that the incidence of disability in women and men are similar in older age but the prevalence is higher in women due to the longer survival of women after the onset of dependence.

Chi square analysis of over all health status Vs. age and gender of the sample

The details are given in the table below and illustrated in Figure 11 and Figure 12.

Table 67 Chi-square analysis of overall health status Vs. age and gender of sample

Sl.No	Overall health status	Gender			Age(Years)			
		Male	Female	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	Good (Normal)	23(38.3)	54(22.5)	77(25.7)	38(33.3)	32(22.5)	7(15.9)	77(25.7)
2	Fair (Mild morbidity)	21(35.0)	76(31.7)	97(32.3)	39(34.2)	46(32.4)	12(27.3)	97(32.3)
3	Poor (Moderate morbidity)	13(21.7)	83(34.6)	96(32.0)	31(27.2)	50(35.2)	15(34.1)	96(32.0)
4	Very poor (Severe morbidity)	3(5.0)	27(11.3)	30(10.0)	6(5.3)	14(9.9)	10(22.7)	30(10.0)
		$\chi 2$ 9.231*			$\chi 2$ 16.287			

Figures in the parentheses indicate percentages **p<0.05*

As per the table majority of the elderly were grouped under the mild or moderate morbidity indicating a 'fair' or 'poor' health status respectively. Age specific data revealed that majority (34.20%) of the young-old (60-69 years) had mild morbidity and majority of old-old category (80-89 years) had moderate (34.10%) and 'severe' form of morbidity. But chi-square analysis could not establish any significant association between overall health status and morbidity pattern.

Where as gender wise analysis clearly brought out a significant association between gender and overall health status with elderly males enjoying a comparatively better health status than their female counterparts. As table showed majority of the males (38.30%) found to have a 'normal' health status than females (22.50%). The second highest number of 35.0% of male had only mild morbidity. At the same time highest number of females (34.60%) were rated as having 'poor' health status followed by mild morbidity (31.70%). So gender is found to be an important differentiating factor in the general health condition of the elderly and also in the specific types of problems faced by the elderly in role change and role performances (Annual Report, NIN, ICMR, 1992).

Chi-square analysis of overall health status Vs. performance index of homes

Considering the role of living environment on the health profile of the elderly an attempt was made to analysis the data in this respect. Chi-square analysis was employed to bring out the relation if any between overall health status and performance index of homes. The results are presented in Table 68.

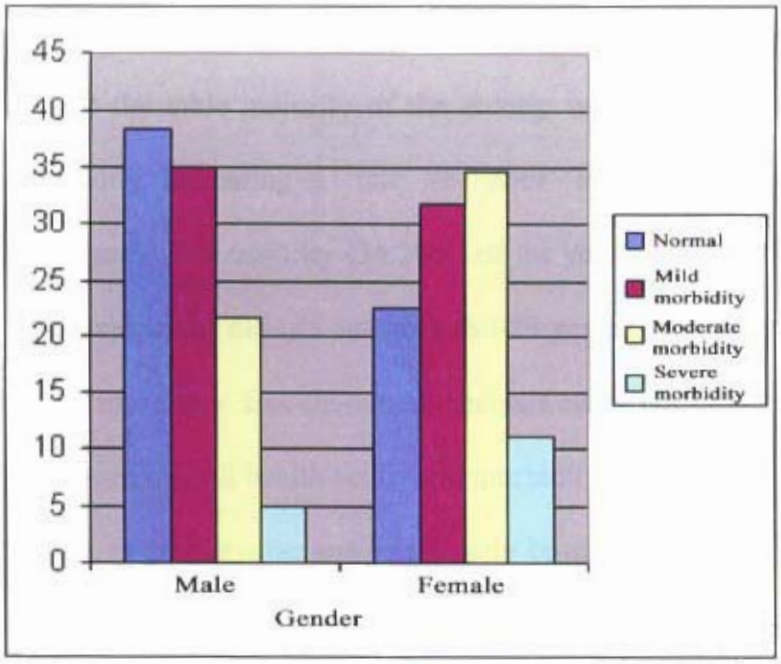


Fig. No. 11

Overall health status Vs gender of sample

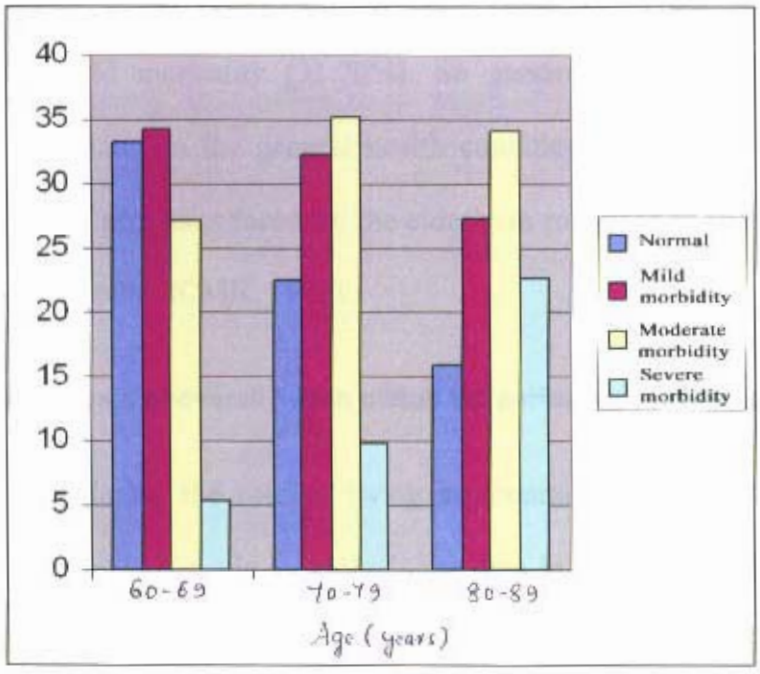


Fig. No. 12

Overall health status Vs age of sample

Table 68 Chi-square analysis of overall health status Vs. performance index of homes

Sl.No	Overall health status	N	Performance index of homes			$\chi 2$
			Good	Fair	Poor	
1	Good (Normal)	77	43(37.1)	30(18.8)	4(16.7)	15.829*
2	Fair (Mild morbidity)	97	35(30.2)	54(33.8)	8(33.3)	
3	Poor (Moderate morbidity)	96	32(27.6)	56(35)	8(33.3)	
4	Very poor (Severe morbidity)	30	6(5.2)	20(12.5)	4(16.7)	

Figures in the parentheses indicate percentages **p<0.05*

As the table shows, most of the elderly (37.10%) having normal health status, were found to be residing in homes with 'good' rating for their performance. And this number (elderly with 'normal' health status) reported to reduce in the homes with low ratings for their performance index.

Similarly the percentage of cases with severe morbidity indicating 'very poor' health status, were reported to be increasing progressively with the reduction in the performance index of homes. This relation, that is the good performance of index homes having a positive impact on the overall health status of the inmates and the vice versa, was found to be statistically significant at five percent level.

4.10 NUTRITIONAL ASSESSMENT

The nutritional status of the elderly was assessed using Mini Nutritional Assessment (MNA) scale, which was supplemented further with a Food weighment survey and a detailed study on Clinical picture and Blood haemoglobin status.

This section included the qualitative factors in dietary assessment and consumption pattern of selected food as suggested in the MNA scale.

Qualitative factors in dietary assessment

The qualitative factors in dietary assessment included food habits, food consistency and taste preferences. The details are given in Table 69.

Table 69 Distribution of sample based on qualitative factors of dietary assessment

Sl.No	Particulars	Gender		Pooled
		Male	Female	
1	**Type of meal**			
	Vegetarian	5(8.3)	12(5.0)	17(5.7)
	Non-vegetarian	46(76.7)	207(86.3)	253(84.3)
	Ovo-vegetarian	9(15.0)	21(8.8)	30(10.0)
2	**Food consistency preferred**			
	Liquid	23(38.3)	86(35.8)	109(36.3)
	Soft	26(43.3)	115(47.9)	141(47.0)
	Solid	11(18.3)	39(16.3)	50(16.7)
3	**Taste preferred**			
	Sour	5(8.3)	14(5.8)	19(6.3)
	Spicy	4(6.7)	26(10.8)	30(10.0)
	Sweet	19(31.7)	86(35.8)	109(36.3)
	Bland	9(15.0)	88(36.7)	111(37.0)

Figures in the parentheses indicate percentages

The majority of the inmates (84.30%) were non-vegetarians followed by 10.0 percent of ovo-vegetarian and 5.70 percent of vegetarian groups. Non vegetarianism was slightly more popular among females (86.30%) than males (76.70%). Foods having a soft texture was preferred by 47.0 percent of the inmates followed by liquid foods (36.30%). When taste preference of the inmates was considered, majority (37.0%) liked bland foods followed by spicy foods (33 .30%).

The choice of form and taste of food for both sexes were almost equal. The least preferred was salty foods (6.30%).

Preference for bland diet by the elderly including men and women was also reported by Natarajan *et al*. (1991).

4.10.1 Mini Nutritional Assessment (MNA)

Mini Nutritional Assessment (MNA) scale developed by Guigoz *et al*. (1994) was used for assessing nutritional status. The results are discussed under the various heads specified in the scale such as:

- **Global assessment**
- **General assessment**
- **Dietary assessment**
- **Self assessment**

Global assessment

Anthropometric data:

Global assessment forms the first section of the MNA scale, which comprised of anthropometric data. The results are presented in Table 70.

Table 70 Age and genderwise distribution of anthropometric data of the sample

Sl.No	Particulars	Male				Female			
		60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	**Body Mass Index (BMI)**								
	BMI<19	7(36.8)	9(28.1)	4(44.4)	20(33.3)	32(33.7)	29(26.4)	11(31.4)	72(30.0)
	BMI 19 to<21	10(52.6)	12(37.5)	4(44.4)	26(43.3)	37(38.9)	44(40.0)	7(20.0)	88(36.7)
	BMI 21 to <23	2(10.5)	9(28.1)	-	11(18.3)	20(21.1)	25(22.7)	11(31.4)	56(23.3)
	BMI≥23	-	2(6.3)	1(11.1)	3(5.0)	6(6.3)	12(10.9)	6(17.1)	24(10.0)
2	**Mid Arm Circumference (MAC)**								
	MAC<21cm	14(73.7)	20(62.5)	8(88.9)	42(70.0)	60(63.2)	72(65.5)	23(65.7)	155(64.6)
	MAC21-22cm	-	2(6.3)	-	2(3.3)	10(10.5)	13(11.8)	3(8.6)	26(10.8)
	MAC >22cm	5(26.3)	10(31.3)	1(11.1)	16(26.7)	25(26.3)	25(22.7)	9(25.7)	59(24.6)
3	**Calf Circumference (CC)**								
	CC<31cm	14(73.7)	30(93.8)	6(66.7)	50(83.3)	79(83.2)	95(86.4)	30(85.7)	204(85.0)
	CC>31cm	5(26.3)	2(6.3)	3(33.3)	10(16.7)	16(16.8)	15(13.6)	5(14.3)	36(15.0)
4	**Weight loss during last 3 months**								
	Weight loss>3 kg	3(15.8)	8(25.0)	-	11(18.3)	13(13.7)	23(20.9)	5(14.3)	41(17.1)
	Does not know	7(36.8)	13(40.6)	4(44.4)	24(40.0)	36(37.9)	43(39.1)	17(48.6)	96(40.0)
	Weight loss 1 to 3kg	3(15.8)	5(15.6)	1(11.1)	9(15.0)	20(21.1)	23(20.9)	5(14.3)	48(20.0)
	No weight loss	6(31.6)	6(18.8)	4(44.4)	16(26.7)	26(27.4)	21(19.1)	8(22.9)	55(22.9)

Figures in the parentheses indicate percentages *Standard values given by MNA scale

According to Natarajan *et al.* (1991) anthropometry using height, weight and BMI is a good indice to assess the nutritional status.

As table 70 depicts, quite a large percentage of the sample reported having a BMI either less than 19 (male-33.30% and female-30.00%) or between 19 to 21 (male-43.30% and female-36.70%). This clearly brought out the fact that around three-fourth of the sample population studied were severely malnourished indicating chronic energy deficiency. BMI above 23 was observed only among five percent of males and 10.00 percent of females.

As far as mid arm circumference, majority of the sample, both males (70.00%) and females (64.60%) had a measurement of below 21 cm indicating extensive muscle wasting. Around one fourth of the sample reported to have an MAC of above 22 cm. The remaining minority had MAC measurement between 21 to 22 cm.

In the case of calf circumference also irrespective of gender majority (male-83.30% and female-85.0%) of the sample had a measurement of less than 31 cm. Weight loss during the last three months, when enquired majority (40.0% each) of them expressed their ignorance about it. A loss of body weight of more than three kilogram was reported by 18.30 percent and 17.10 percent of the males and females respectively. The rest of them had a weigt loss of one to three kilograms in three months time. At the same time 26.70 percent of men and 22.90 percent of women said that they did not lose body weight for the last three months.

An attempt was made further to grade the elderly subjects based on Body Mass Index classification suggested by James *et al*. (1988) and Luizz *et al*. (1992). The results are presented in Table 71.

Table 71 Distribution of the sample based on BMI classification

		Presumptiv	Male	Female

Sl.No	BMI range	e diagnosis	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	**<16**	CED III	-	3(9.4)	-	3(5.0)	3(3.2)	5(4.5)	1(2.9)	9(3.8)
2	**16-17**	CED II	5(26.3)	2(6.3)	3(33.3)	10(16.7)	14(14.7)	6(5.5)	2(5.7)	22(9.20)
3	**17-18.5**	CED I	2(10.5)	4(12.5)	1(11.1)	7(11.7)	16(16.8)	18(16.4)	8(22.9)	42(17.50)
4	**18.5-20**	Low weight - normal	10(52.6)	12(37.5)	4(44.4)	26(43.3)	36(37.9)	44(40.0)	7(20.0)	87(36.30)
5	**20-25**	Normal	2(10.5)	11(34.4)	1(11.1)	14(23.30)	23(24.20)	36(23.70)	17(48.60)	76(31.70)
6	**>25**	Obese	-	-	-	-	3(3.20)	1(0.90)	-	4(1.70)

Figures in the parentheses indicate percentages *CED- Chronic Energy Deficiency*

As obtained from the table, majority of the male (43.30%) and female elderly (36.30%) were in the low weight but normal category. This was followed by CED II (16.70%) among males and normal BMI (31.70%) among females. Chronic Energy Deficiency of third degree was seen only among 5.00 percent of the males and 3.80 percent of the females. Energy deficiency as reported by Bagchi *et al*. (1999) leads to emaciation, ascorbic and Vitamin B complex deficiencies, anaemia and osteoporosis are frequently observed among elderly individuals especially among the older segment of the elderly individuals.

Obese subjects were totally absent among men and among women, it was 1.70 percent. BMI classification, in general, indicated that irrespective of gender most of the sample were grouped under normal or near normal categories.

James *et al*. (1998) also reported the prevalence of obesity among elderly females. This may be because of the fact that very often the elderly fall to make adjustments in the energy intake for their decreased needs associated with a sedentary

lifestyle and lowered basal metabolic rate. As a result the adipose tissue accumulates leading to obesity over a period of time. But as Bagchi *et al*. (1999) pointed out obesity in human being is conducive for healthy ageing process and invariably the obese subject will not have a longer life expectancy.

Energy deficiency as reported by Bagchi *et al*. (1999) leads to emaciation, ascorbic and Vitamin B complex deficiencies, anaemia and osteoporosis are frequently observed among elderly individuals especially among the older segment of the elderly individuals.

Mean height, weight and BMI of the sample

The mean height, weight and BMI of the sample were computed and presented in Table 72 along with the NNMB survey report (1996-97) on elderly.

Table 72 Height, weight and BMI of the sample

Sex	Age (yrs)	Present study			BMI ±SD	NNMB study (1996-97)			BMI ±SD
		N	Mean height ± SD	Mean weight ±SD		N	Mean height ± SD	Mean weight ±SD	
Male	60-69	19	158.2± 6.29	47.2± 2.78	18.9±1.73	1325	160.7±6.60	48.4±8.94	18.7±3.0
	70-79	32	156.1±6.15	46.6±5.844	19.1±2.30	444	160.1±6.64	47.6±8.91	18.6±3.16
	80-89	9	155.2±3.19	44.1±4.04	18.3±2.13	104	158.2±7.21	46.3±8.64	18.4±3.08
	F value		1.034	1.329	0.499				
Female	60-69	95	152.4±6.76	44.9±4.63	19.4±2.29	1295	148.3±6.13	42.8±8.61	19.4±3.65
	70-79	110	150.5±7.50	44.7±4.58	19.8±2.26	390	147.3±6.12	41.5±8.44	19.0±3.65
	80-89	35	145.1±6.76	42.8±4.32	20.4±2.45	88	146.1±6.99	41.7±8.12	19.5±3.69
	F vaue		13.398**	2.973	2.400				

***P<0.01*

As the table presents, irrespective of gender, the mean height and weight of the sample showed a declining trend with age. This reduction in the mean height of the female elderly with age was also found to be statistically significant at one percent level. The NNMB report (1996-97) on elderly also presents the same trend.

Chi-square analysis was employed to find association between selected social variables and BMI status of elderly. The results are presented in Table 73.

Table 73 Selected social variables Vs. BMI status of the sample

Sl.No	Social variables	N	Body Mass Index (BMI)			χ^2
			<18.5	18.5-25	25	
1	**Age (yrs)**					
	60-69	114	39(34.21)	72(63.15)	3(2.63)	
	70-79	142	38(26.80)	103(72.60)	1(0.70)	4.642
	80-89	44	15(34.00)	29(66.00)	-	
2	**Gender**					
	Male	60	20(33.30)	40(66.70)	-	1.194
	Female	240	72(30.10)	164(68.30)	4(1.70)	
3	**Marital status**					
	Never married	143	51(35.70)	89(62.20)	3(2.10)	
	Married	9	3(33.30)	6(66.70)	-	5.248**
	Widowed	120	30(25.00)	89(74.20)	1(0.80)	
	Divorced/separated	28	8(28.60)	20(71.4)	-	
4	**Educational status**					
	Illiterate	126	40(31.70)	85(67.50)	1(0.80)	
	Primary	151	46(30.50)	103(68.20)	2(1.30)	2.587
	Secondary	22	6(27.30)	15(68.20)	1(4.50)	
	Higher secondary	1	-	1(100)	-	
5	**Duration of stay in the institution**					
	<1year	49	12(24.5)	37(75.5)	-	
	1 to 3 years	78	20(25.60)	57(73.10)	1(1.30)	4.490
	3 to 5 years	51	19(37.30)	31(60.80)	1(2.00)	
	More than 5 years	122	41(33.60)	79(64.80)	2(1.60)	

Figures in the parentheses indicate percentages ***p<0.01*
Ref : ICMR (2004)

For classifying individuals according to their nutritional status using cut-off levels of BMI have already been proposed. Adults with a BMI less than18.5kg/m are considered to suffer from chronic energy deficiency and a BMI of over 25 indicates overweight (Nutrition Country Profile, 1998). Brahmam (1999) also stated that those having the BMI values of less than 18.5 are identified as suffering from CED while those with more than 25 belong to the obese categories.

Analysis based on the above criterion revealed that the Chronic Energy Deficiency (CED) <18.50 was highest in 60 to 69 years age group compared to others. Majority of normal BMI was in 70 to 79 year group. Obesity was not common. Only a small number in the young old category observed to have obesity but it was not seen among the old -old group.

Gender wise analysis showed that prevalence of CED was higher in males (33.30%) than females (30.00%). Similarly the prevalence of CED was higher among the never married (55.40%). The elderly who had been living in the old age homes for more than five years also had higher prevalence of CED (44.60) than who joined the institutions recently.

Health related variables of elderly Vs. BMI status

Chi-square analysis was done to find the relation between health related variables and BMI status of elderly and the results are presented in Table 74.

Table 74 Health related variables Vs. BMI Status of the sample

Sl.No	Health related variables	N	Body Mass Index (BMI)			$\chi 2$
			<18.5	18.5-25	>25	
1	**Age related inabilities**					
	Good	25	7(28.00)	18(72.00)	-	
	Average	131	41(31.30)	87(66.40)	3(2.30)	1.868
	Poor	144	44(30.60)	99(68.80)	1(0.70)	
2	**Minor ailments**					
	Good	5	1(20.00)	3(60.00)	1(20.00)	
	Average	109	36(33.00)	72(66.10)	1(0.90)	13.915**
	Poor	186	55(29.60)	129(69.40)	2(1.00)	
3	**Degenerative diseases**					
	Good	9	2(22.20)	7(77.80)	-	
	Average	83	23(27.70)	60(72.30)	-	
	Poor	153	52(34.00)	98(64.00)	3(2.00)	3.748
	Very poor	55	15(27.20)	39(70.90)	1(1.90)	
4	**Overall health status**					
	Normal	77	25(32.50)	52(67.50)	-	
	Mild	97	28(28.90)	68(70.10)	1(1.00)	4.166
	Moderate	96	30(31.20)	63(65.70)	3(3.10)	
	Severe	30	9(30.60)	21(70.50)	-	
5	**Nutritional status**					
	Well nourished	6	1(16.70)	5(83.30)	-	
	At risk of malnutrition	146	39(26.70)	105(72.00)	2(1.30)	3.148
	Malnourished	148	52(35.10)	94(63.50)	2(1.40)	
6	**Depression**					
	Normal	142	48(33.80)	93(65.50)	1(0.70)	1.914
	Depressed	158	44(27.80)	111(70.30)	3(1.90)	

Figures in the parentheses indicate percentages ***P<0.01*

`Table 74 revealed that the prevalence of CED was higher among the elderly having average age related inabilities (31.30%), average minor ailments (31.30%), those who were 'malnourished' (35.10%) and those having more number of degenerative health problems (35.10%) and depressed elderly (27.80%). However Chi-square analysis showed a significant association between occurrence of minor ailments and BMI.

General assessment

General assessment (questions related to life style, medication and mobility of the subjects) forms one of the sections in the Mini Nutrition Assessment scale. The assessment details are presented in Table 75.

Table 75 General assessment details of the sample

Sl.No	Particulars	Gender		Pooled
		Male	Female	
1	**Mobility:**			
	Able to get out of bed/chair but does not go out	22(36.70)	34(14.20)	56(18.70)
	Can go out	38(63.0)	206(85.80)	244(81.30)
2	**Takes more than three prescribed drugs per day**	10(16.70)	55(22.90)	65(21.70)
3	**Has psychological stress or acute diseases in the past three months**	21(35.0)	53(22.0)	74(24.7)
4	**Neuropsychological problems:**			
	Severe dementia or depression	33(55.0)	125(52.10)	158(52.70)
	Mild dementia	-	-	-
	Absence of psychological problems	27(45.0)	115(47.90)	142(47.30)
	Pressure sores or skin ulcers	3(5.0)	48(20.0)	51(17.0)

Figures in the parentheses indicate percentages

As the table reveals 81.30 percent of the sample had mobility. They were able to go out independently. But 18.70 percent were able to get out of bed/chair by themselves but their mobility outside the home was curtailed. Regarding medication 21.70 percent of the sample reported taking more than three drugs prescribed by physician. More females (22.90%) than males (16.70%) took medicine like this. Psychological stress or feeling of sadness was reported by 24.70 percent of the sample. Here males (35.00%) outnumbered females (22.00%) in this respect.

As given by the sample, 52.70 percent of them had depression or dementia, where men (55.00%) were more affected than women (52.10%). Skin ulcers were present in 17.0 percent of the subjects.

Regarding neuropsychological problems pressure sores and skin infections were very common in very frail, disabled and dependent elderly subjects. Approximately 10.0 percent of the elderly develop pressure sores by the end of one year of institutionalization. Impaired mobility is the single most important predisposing factor for development of pressure sores (Dey *et al.*, 1997). Natarajan (1997) reported that pressure sores are one of the special hazards facing patients who are old, ill and immobile.

Dietary assessment

Dietary assessment (questions related to number of meals, food and fluid intake and autonomy and mode of feeding) forms yet another section of Mini Nutrition Assessment scale. The food consumption factors included in the dietary assessment part of the MNA scale were analysed and presented in Table 76.

Table 76 Distribution of sample based on food consumption factors

Sl.No	Particulars	Gender		Pooled
		Male	Female	
1	**Meal pattern**			
	Two meals/day	6(10.00)	47(19.60)	53(17.70)
	Three meals/day	54(90.00)	193(80.40)	247(82.30)
2	**Selected consumption markers for protein intake**			
	One serving of dairy products /day	-	-	-
	Two or more servings of legumes or eggs per week	36(60.00)	112(46.70)	148(49.30)
	Meat, fish or poultry everyday	41(68.30)	132(55.00)	187(62.30)
3	**Two or more servings of fruits or vegetables per day**			
4	**Appetite**			
	Severe loss of appetite	13(21.70)	57(23.80)	70(23.30)
	Moderate loss of appetite	27(45.00)	91(37.90)	118(39.40)
	Normal appetite	20(33.30)	92(38.30)	112(37.30)
5	**Fluid intake per day**			
	Less than three cups	31(51.70)	105(43.90)	136(45.50)
	Three to five cups	16(26.60)	94(39.10)	110(36.60)
	More than five cups	13(21.70)	41(17.20)	84(18.10)
6	**Mode of feeding**			
	Unable to eat without assistance	-	-	-
	Self -fed with some difficulty	1(1.70)	4(1.70)	5(1.70)
	Self-fed without any difficulty	59(98.30)	236(98.30)	295(98.30)

Figures in the parentheses indicate percentages

The table revealed that 82.30 percent of the subjects were taking three meals a day compared to 17.70 percent of the elderly consuming only two meals. Most of the males (90.00%) and females (80.40%) were following three meal pattern. The meal pattern of the elderly sample depended on the food served by the old age homes where they were accommodated.

As regards the frequency of eating, Rajan *et al*. (1999) also observed that eating on an average three times a day which is more or less the same for both the sexes.

As shown by the table none of the sample consumed dairy products. Only half of them had two servings of legumes per week. Egg was not included in the menu at all. None of the elderly were consuming meat, fish or poultry everyday as no homes provide these food items regularly. On further enquiry it was obtained that fish and meat were the items given occasionally in the homes. Fruit consumption was also very rare. Banana and papaya were the fruits rarely included in the diet. Whereas at least two servings of vegetables per day as vegetable pugath or other side dishes were consumed by 62.10 percent of the inmates. Preference for vegetable was slightly more among men (68.30%) than women (55.00%).

There is an overwhelming body of evidence indicating that increased intake of fruits and vegetables can dramatically reduce the risk of many degenerative diseases of ageing. Eating 600 gram per day of fruits, vegetables and legumes in conjunction with oils especially mustard oil or soya bean oil may provide adequate antioxidant reserve which may be protective against CHD's. Studies from Kurichia, a tribal population of Kerala, India, who enjoy longevity are relatively free from age associated chronic problems reveal that consumption of leafy and root vegetables have beneficial influence on cardiac protection and retardation of ageing process (Reddy *et al*.,1999).

Adequate intake of food items by the elderly in terms of wheat, ragi, pulses, cereals, jaggery, egg, fish, rice flakes, green leafy vegetables, fruits and dairy products was emphasized by Natarajan (1997). He said if possible, two cups of milk should be consumed per day.

Considerable loss of appetite may reduce their food intake which in turn may lead to nutritional problems. Healthy ageing process itself may be affected this way. Loss of appetite and reduction in intake, as the age advances was reported by Young (2003).

Regarding the extent of appetite, Rajan *et al*. (1999) reported that 40 percent of the respondents do not have proper appetite. A study conducted on elderly by Mehta *et al*. (2001) in slums of Vadodara city also reported that majority of the respondents suffered from health problems like general weaknesss followed by lack of appetite, aches and pains in the joints and cataracts.

Natarajan (1997) rightly pointed out as age advances appetite is reduced and so the amount of food consumed is also reduced. More than the quantity, the quality of the diet is very important. Over four fifth of older adults have chronic diseases that are affected by diet, one fifth have confusion or memory loss and one eighth feel depressed much of the time. These factors affect significantly the appetite, digestion, body weight and the feeling of wellbeing (Dwyer, 1994).

Moderate loss of appetite was reported by majority (39.40%) including 45 percent of the males and 37.90 percent of the females. Almost equal number (37.30%) had normal appetite too. Severe loss of appetite was reported by 23.30 percent of the sample.

Fluid intake by majority (45.50%) of the sample was found to be less than three cups per day. This fluid intake was in the form of tea or coffee provided by the

homes twice in a day. Compared 43.9 percent of females reported inadequate fluid intake. This was followed by an intake of three to five cups per day. Only 18.1 percent of the sample took the required amount of more than five cups of fluid per day.

Adequate fluid intake during old age especially in summer was also stressed by Natarajan (1997). Chernoff (1994) pointed out that fluid requirement for older adults are usually calculated as 30ml/kilogram body weight with a minimum requirement of 1500 ml per day. Rolls (1990) indicated that for many elderly achieving this goal is sometimes difficult because with advancing age, thirst sensitivity decreases and voluntary fluid intake is impaired.

Almost all the sample (98.30%) were able to take food without any assistance. Only 1.70 percent each of the male and female elderly who had some difficulty in feeding.

Self assessment

Self assessment (questions related to self-perception on health and nutrition) forms one of the sections of the Mini Nutrition Assessment Scale. The assessment details are presented in the Table below.

Table 77 Distribution of sample based on self assessment

Sl.No	Self perception	Gender		Pooled
		Male	Female	
1	**On Nutritional problems**			
	Major malnutrition	39(65.0)	119(49.50)	159(53.0)
	Does not know/moderate malnutrition	19(31.60)	95(39.60)	113(37.60)
	No nutritional problem	2(3.30)	26(10.90)	28(9.30)
2	**On health In comparison with others**			
	Not as good	41(68.40)	146(60.80)	185(61.70)
	Does not know	8(13.30)	35(14.60)	43(14.30)
	As good	9(15.0)	33(13.70)	44(14.70)
	Better	2(3.30)	26(10.90)	28(9.30)

Figures in the parentheses indicate percentages

Self-view of elderly sample on their nutritional status indicated that more than half of them (53.00%) considered themselves as poorly nourished. Whereas 9.30 percent of the sample viewed themselves as having no nutritional problems, and 37.60 percent was uncertain about their nutritional state.

The uncertainty was expressed more by women (39.60%) than men (31.60%). The positive attitude to say no nutritional problem was also seen more among the females (10.90%) than males (3.30%). The personal view of having major nutritional problems was more prominent among male (65.0%) than female (49.50%) subjects.

Regarding the views on their health condition, 61.70 percent of the elderly subjects felt that their health status was as not as good as the others of the same age. But 14.70 and 9.30 percent of the sample rated their health status as good as that of

others or even better than others respectively. Female subjects were more positive in this way than their male counterparts. At the same time 14.30 percent of the samples were not sure about their health status.

Thus it can be obtained that men in general had the feeling that they had major nutritional problems and their health status was not as good as their counterparts. A reasonably good number of women, at the same time, seemed to be more optimistic. They would like to believe that their health condition was as good as others or even better, or else they would like to take a neutral stand by saying "does not know".

A Commonwealth study conducted in America reported that health problems increase in people above 75 years but even among the old-old more than half reported being in 'excellent or good health' (Moody, 2000) whereas a study conducted by Herman *et al.* (1998) on elderly in Guatemala, USA reported that majority of the elderly subjects rated their overall health as 'fair'.

4.10.2 Nutritional status based on MNA scores

Based on the scores obtained for global assessment, general assessment, dietary assessment and self assessment, total score for each individual was calculated and this formed the Mini Nutrition Assessment score. The maximum possible score was 30. The subjects were then categorized as 'well nourished' (score >24), 'at risk of malnutrition' (score 17 to 23.5) and 'malnourished' (score <17). The Nutritional status of the elderly thus arrived at from the Mini Nutritional Assessment score is presented in Table 78.

Table 78 Nutritional status of the sample by MNA score

Sl.No	Nutritional Status		Area			Pooled	χ^2
	MNA Score	Grade	Corporation	Municipality	Panchayat		
1	> 24	Well nourished	2(1.70)	2(5.70)	2(1.40)	6(2.0)	4.221
2	17 - 23.5	At risk of malnutrition	62(51.70)	18(51.40)	66(45.50)	146(48.70)	
3	<17	Malnourished	56(46.70)	15(42.90)	77(53.10)	148(49.30)	

Figures in the parentheses indicate percentages

As per the Mini Nutritional Assessment 49.30 percent of the sample was found to be 'malnourished' and almost equal number (48.70%) was 'at risk of malnutrition'. Only two percent was reported as well nourished. Areawise analysis did not show any significant difference in the nutritional status of the sample, although the percentage prevalence of malnutrition was more in the panchayat area followed by corporation and municipal areas.

The genderwise classification of nutritional status of the elderly is presented in the table below and illustrated in Figure 13.

Table 79 Gender wise distribution of nutritional status by MNA score

Sl.No	Nutritional Status		Gender			χ^2
	MNA Score	Grade	Male	Female	Pooled	
1	**> 24**	**Well nourished**	3(5.0)	3(1.30)	6(2.0)	
2	**17 -23.5**	**At risk of malnutrition**	19(31.70)	127(52.90)	146(48.70)	10.808**
3	**<17**	**Malnourished**	38(63.30)	110(45.80)	148(49.30)	

Figures in the parentheses indicate percentages **$p<0.01$

As the table depicts, malnutrition (49.30%) and at risk of malnutrition (48.70%) were comparatively very high among the sample. Only six percent was noted as 'well nourished'. Sexwise comparison showed that clear case of malnutrition was more among males (63.30%) than females (45.80%). Whereas at risk cases were predominant in females (52.90%) than their male counterparts. The gender differences observed in the nutrition status of the sample was statistically significant at one percent level.

Similar observations were reported in a number of studies. According to Beck *et al*. (1999) under nutrition remains a serious problem in high -risk populations, including the frail elderly and marginal or inadequate energy intake and vitamin status commonly occur among those who are homebound, disabled or institutionalized. Brahmam (1999) also observed that a sizeable number of elderly population is malnourished due to chronic energy deficiency.

Another study on older adults by Ismail (1999) reported that there is a high prevalence of malnutrition in older adults and it is highest among the very old. Ramakrishna et al. (1997) reported that approximately 10 percent of acute geriatric patients are malnourished. These observations were fairly consistent with the reports by Guigoz et al. (2003), Christensson et al. (2002) and Premakumari et al. (2001) that on using MNA scores a majority of the elderly were found to be at risk of malnutrition.

The most common risk factors for poor nutrition among elderly as observed by Cook *et al*. (2002) were polypharmacy, eating alone, not having enough money for food, having illness or conditions affecting eating and eating few meals per day.

Social variables vs. nutritional status of elderly

Chi-square test was employed to find out the relationship if any between nutritional status and different social factors and the results are presented in Table 80.

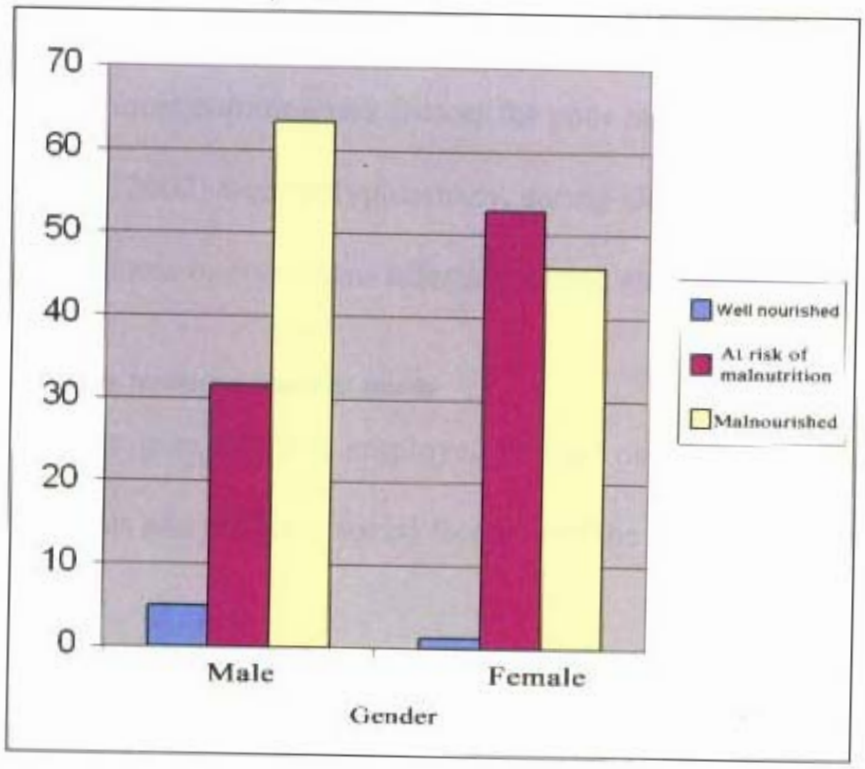


Fig. No. 13

Gender wise distribution of nutritional status by MNA score

Table 80 Social variables Vs. nutritional status by MNA scores

Sl.No	Social factors	N	Nutritional status			χ^2
			Well nourished	At risk of malnutrition	Malnourished	
1	**Age (yrs)**					
	60-69	114	3(50)	59(40.4)	52(35.10)	2.527
	70-79	142	3(50)	64(43.8)	75(50.70)	
	80-89	44	-	23(15.8)	21(14.20)	
2	**Gender**					
	Male	60	3(50)	19(13.0)	38(25.70)	
	Female	240	3(50)	127(57.0)	110(74.30)	10.808**
3	**Marital status**					
	Unmarried	143	3(50)	68(46.60)	72(48.60)	
	Married	9	-	3(2.10)	6(4.10)	
	Widowed	120	2(33.30)	61(41.80)	57(38.50)	
	Divorced/separated	28	1(16.70)	14(9.60)	13(8.80)	1.904
4	**Educational status**					
	Illiterate	126	-	65(44.50)	61(41.20)	
	Primary	151	4(66.70)	72(49.30)	75(50.70)	
	Secondary	22	2(33.30)	8(5.50)	12(8.10)	
	Higher secondary	1	-	1(0.70)	-	10.505
5	**Duration of stay in the institution**					
	<1year	49	1(16.70)	32(21.90)	16(10.80)	
	1 to 3 years	78	-	39(26.70)	39(26.40)	15.965*
	3 to 5 years	51	1(16.70)	15(10.30)	35(26.30)	
	More than 5 years	122	4(66.70)	60(41.10)	58(39.20)	

Figures in the parentheses indicate percentages

**p<0.01
*p<0.05

When the age factor of the elderly was compared with their nutritional status it was found that the age group of 70 to 79 years was most vulnerable to malnutrition, having 50.70 percent and 43.80 percent of the sample respectively under the category of 'malnourished' and 'at risk of malnutrition'. Next was 60 to 69 year age group. But this difference observed in the prevalence of malnutrition was not statistically significant. The severity of nutritional problems among elderly of above 75 years was also reported by Moody (2000).

Gender wise comparison indicated high prevalence of malnutrition and 'at risk of malnutrition' among females than their male counterparts. This gender influence on nutritional status was found to be significant statistically at one percent level. A significant association with sex and nutritional status of elderly was also established by Sarojini *et al*. (1990).

Marital status showed that unmarried people were mostly either in the risk of malnutrition (48.60%) or 'at risk of malnutrition' (46.60%) followed by the widows. Among married people and divorced or separated there were least percentage of sample with malnutrition or 'at risk of malnutrition'.

However statistical analysis failed to show any significant difference in the nutritional status of the sample. As far as the educational status is concerned illiterate and sample with primary education were mostly affected by malnutrition than sample with secondary and higher secondary education. But the difference observed among the sample with varying educational level was not significant statistically.

The duration of stay in the institution however showed to have a significant influence (at 5% level) on the nutritional status of the inmates. The sample who stayed in the homes for more than five years were found to be more vulnerable to malnutrition (39.20%) or 'at risk of malnutrition' (41.10%) than others.

According to Singh (2004), age, sex, marital status and educational status influence significantly the nutritional status of the elderly. Schulers *et al*. (2003) also reported that socio-economic characteristics significantly affect the nutritional status of the elderly. Deficiencies that occur in the elderly are either the result of reduced intake, impaired absorption or excessive utilization. Apart from these, socioeconomic and environmental factors also play an important part in aggravating the dietary deficiency and precipitating nutritional deficiency diseases. These precipitating factors are the widespread chronic infection among the poor living under conditions of poor environmental sanitation and personal hygiene (Natarajan, 1997).

Health factors vs. nutritional status of elderly by MNA scores

The association between health factors and nutritional status of elderly was worked out and the results are presented in Table 81.

Table 81 Health factors Vs. nutritional status of elderly by MNA scores

Sl.No	Health factors	N	Nutritional status			χ^2
			Well nourished	At risk of malnutrition	Malnourished	
1	**Status with respect to oral and age related health problems**					
	Good	10	1(16.70)	5(3.40)	4(2.70)	
	Average	65	1(16.70)	31(21.20)	33(22.3)	3.547
	Poor	225	4(66.70)	110(75.30)	111(75.0)	
2	**Status with respect to minor ailments**					
	Good	3	-	1(0.70)	2(1.40)	
	Average	139	1(16.70)	66(45.20)	72(48.60)	3.068
	Poor	158	5(83.30)	79(54.10)	74(50.0)	
3	**Status with respect to degenerative health problems**					
	Good	1	-	-	1(0.70)	
	Average	62	2(33.30)	29(19.90)	31(20.90)	
	Poor	198	4(66.70)	94(64.40)	100(67.60)	3.834
	Very poor	39	-	23(15.80)	16(10.80)	
4	**Over all health status**					
	Normal	77	2(33.30)	37(25.30)	38(25.70)	
	Mild health problems	97	1(16.70)	48(32.90)	48(32.40)	1.983
	Moderate health problems	96	3(50.0)	47(32.20)	46(31.10)	
	Severe health problems	30	-	14(9.60)	16(10.80)	
5	**Depression status**					
	Normal	142	5(83.30)	81(55.50)	56(37.80)	12.359**
	Depressed	158	1(16.70)	65(44.50)	92(62.20)	

Figures in the parentheses indicate percentages **p<0.01

As obtained from the table, the age related health factors are associated with the nutritional status of elderly. Malnutrition (75.0%) and 'at risk of malnutrition'

(75.30%) were more prevalent among the sample having more number of oral and age related health problems. Severity of malnutrition found to reduce with improvement in health status in this respect. But statistical analysis failed to show any significant relationship between nutritional status and age related health problems. The association between nutritional status and oral and age related health problems has been established by Arulmani *et al*. (1999) and Pla (1994).

Minor ailments of the sample also showed a positive relation with nutritional status. Sample suffering from minor ailments was more affected by malnutrition (50.0%) and at risk of malnutrition (54.0%). A reasonably good number of sample (83.30%) with minor ailments were rated as well nourished too. The statistical analysis therefore did not show any significant relationship between nutritional status and status of minor ailments in subjects.

Degenerative health problems during old age gave way to poor nutritional status among the sample. Subjects with malnutrition (67.60%) and 'at risk of malnutrition' (64.40%) were more in number among the ones rated as poor with respect to degenerative health problems such as the ones having more number of degenerative problems. It was surprising to note that 'well nourished' people (66.70%) were also there in one with degenerative problems.

Overall health status had a direct relation with nutritional status. The sample with health problems had more number of subjects who are malnourished (32.40%) or 'at risk of malnutrition' (32.90%). The majority of the sample (33.3%) who were 'well nourished' also had a normal health status.

Depression status found to play a role on the nutritional status of the sample. As given by the table, majority (83.30%) of the sample who were not depressed came under the 'well nourished' category and there was a progressive reduction in the prevalence with increasing severity of malnutrition. Whereas incidence of malnutrition was highest (62.20%) among the sample who had depression. Only 16.70 percent of them were rated as well nourished. So psychological depression had a negative impact on the nutritional status of the aged. This association was also found to be statistically significant (at 1% level).

Performance index of homes Vs. nutritional status of elderly by MNA Scores

An attempt was made to study the association between nutrition status and performance index of homes and the results are presented in Table 82.

Table 82 Performance index of homes Vs. nutritional status of the elderly

Sl.No	Nutritional status	N	Performance index of homes			χ^2
			Good	Fair	Poor	
1	**Well nourished**	**6**	2(1.70)	4(2.50)	-	
2	**At risk of malnutrition**	**146**	64(55.20)	78(48.80)	4(16.70)	**13.330****
3	**Malnourished**	**148**	50(43.10)	78(48.80)	20(83.30)	

Figures in the parentheses indicate percentages **p<0.01

Chi-square analysis showed that there is a highly significant association (at 1% level) between nutritional status and performance index of homes. The data showed that the prevalence of malnutrition was found to be highest (83.3%) among the inmates residing in homes with 'poor' performance index. Not even a single well nourished elderly was found in the homes rated 'poor' for their performance.

4.10.3 Food consumption pattern

With a view to generate data on actual food and nutrient intake of the elderly subjects, a food weighment survey for three consecutive days was conducted on a sub sample of 30 (15 males and 15 females). The mean food and nutrient intake of the sample was calculated and compared with the recommended allowances given by Pasricha and Thimayamma (2005) and ICMR (2004). The results are discussed as follows:

Comparison of mean food intake of the sample with RDA

The daily mean food intake of the sample compared with RDA given by Pasricha and Thimayamma (2005) is given in Table 83.

Table 83 Comparison of mean food intake of the sample with RDA

Sl.No	Food items	Male			Female		
		RDA* (gm)	Mean intake ±SD	t value	RDA* (gm)	Mean intake ± SD	t value
1	**Cereals**	350	317±96.3	1.32	225	333±33.7	11.08**
2	**Pulses and legumes**	50	24±14.8	6.79**	40	17±8.7	10.23**
3	**Green leafy vegetables**	50	3±3.09	58.86**	50	4±3.9	45.65**
4	**Other vegetables**	200	27±21.2	31.58**	150	28±12.3	38.08**
5	**Roots and tubers**	100	26±14.6	19.61**	100	19±4.1	74.64**
6	**Milk and Milk Products**	300	58±24.9	37.61**	300	61±22.6	40.43**
7	**Fish and fleshy foods**	150	18±6.4	79.81**	150	20±17.3	28.91**
8	**Fruits**	30	20±22.2	31.23**	30	18±23.5	29.84**
9	**Sugar and jaggery**	20	18±9.8	0.78	20	22±11.5	0.67
10	**Fats and oils**	25	2±0.75	111.26**	20	2±0.41	174.2**

**Ref: RDA by Pasricha and Thimayamma (2005)*

When the mean food intake of the elderly sample was compared with the RDA suggested by Pasricha and Thimayamma (2005), there observed a significantly ($p<0.01$) low intake of all the food groups by the male subjects except cereals and sugar and jaggery. For females the intake was significantly ($p<0.01$) low in all the food groups except sugar and jaggery. These item was consumed in excess and cereals reported a significantly higher intake than RDA.

The mean food intake of the sample was also compared with RDA given by ICMR (2004) and presented in Table 84.

Table 84 Comparison of mean food intake of the sample with RDA

Sl.No	Food items	Male			Female		
		RDA* (gm)	Mean intake ±SD	t value	RDA* (gm)	Mean intake ± SD	t value
1	**Cereals**	420	317±	4.13*	300	333±	3.38*
2	**Pulses and legumes**	60	24±	9.41**	60	17±	19.13**
3	**Green leafy vegetables**	100	3±	121.48**	100	4±	95.26**
4	**Other vegetables**	100	27±	13.32**	100	28±	22.47**
5	**Roots and tubers**	200	26±	46.12**	100	19±	74.64**
6	**Milk and Milk Products**	300	58±	37.61**	300	61±	40.93**
7	**Fish and fleshy foods**	150	18±	79.81**	150	20±	28.91**
8	**Fruits**	100	20±	13.88**	100	18±	13.45**
9	**Sugar and jaggery**	25	18±	2.76*	20	22±	0.67
10	**Fats and oils**	20	2±	87.07**	20	2±	174.20**

**Ref: RDA by ICMR (2004)*

The results indicated that the mean intake of all the food items in the case of males and sugar and jaggery in females, were significantly lower than the RDA for the respective gender. The intake of cereals was infact significantly higher than the RDA for females. So the results on food intake of the sample were more or less same, when compared with RDA given by ICMR (2004).

Similar findings were reported by Arlappa *et al*. (2003). They found that the mean consumption of all the foods except roots and tubers and sugar and jaggery were below the recommended dietary intakes. They further reported that the mean consumption of cereals that form the bulk of the Indian diet was also below the RDI. Also there was a reduction in the consumption of cereals, pulses and legumes with the advancement of age in both the sexes which may be attributed to dental problems and digestive problems commonly associated with ageing.

Sumathi *et al*. (1999) and Chandrasekhar *et al*. (1999) also observed a deficient intake of all food groups among elderly living in old age homes. Based on a study on diet and nutritional status of the elderly in rural India Arlappa *et al*. (2003) reported that the energy intake tended to decrease with an increase in age in both the sexes. The decrease was statistically significant only in females. In 65 percent of the population, the consumption of energy was more than the RDA.

Comparison of mean nutrient intake of the sample with RDA

The daily mean nutrient intake of the sample was compared with RDA given by Pasricha and Thimayamma (2005) and presented in the table below.

Table 85 Comparison of mean nutrient intake of the sample with RDA

Sl.No	Nutrients	Male			Female		
		RDA* (gm)	Mean Intake ± SD	t value	RDA* (gm)	Mean Intake ± SD	t value
1	**Energy(kcal)**	2200	1526±294.9	8.84**	1700	1587±161.7	1.48
2	**Protein(g)**	65	36±9.04	12.41**	50	37±4.42	5.56**
3	**Fat(g)**	50	12±2.39	61.53**	40	11±3.14	46.95**
4	**Fibre(g)**	30	3±0.83	125.89**	30	2±0.58	130.55**
5	**Calcium(mg)**	1000	234±39.2	75.62**	900	217±42.5	67.42**
6	**Iron(mg)**	38	7±2.8	42.54**	30	7±2.4	31.56**
7	**Thiamine(mg)**	11.96	0.5±0.16	277.18**	1.45	0.5±1.1	22.97**
8	**Riboflavin(Φg)**	1.78	0.5±0.16	38.10**	1.51	0.5±0.13	30.00**
9	**Vitamin A( )**	1030	310±70.12	39.73**	930	274±66.90	37.94**
10	**Ascorbic acid(mg)**	40	19±8.6	9.45**	40	16±9.01	10.80**

**Ref:RDA by Pasricha and Thimayamma (2005)*

The data revealed that the mean intake of all the nutrients were lower than the RDA irrespective of gender. Also, the mean intake of energy, fat, fibre, calcium, iron and Vitamin A were significantly ($p<0.01$) lower than the RDA in both male and female elderly.

The mean nutrient intake was also compared with RDA given by ICMR (2004) and presented in Table 86.

Table 86 Comparison of mean nutrient intake of the sample with RDA

Sl.No	Nutrients	Male			Female		
		RDA* (gm)	Mean Intake ± SD	t value	RDA* (gm)	Mean Intake ± SD	t value
1	**Energy(kcal)**	2425	1526±294	11.79**	1875	1587±161	3.77*
2	**Protein(g)**	60	36±9.04	10.27**	50	37±7.4	5.56**
3	**Fat(g)**	20	12±2.3	12.95**	20	11±3.1	14.57**
4	**Fibre(g)**	30	3±0.8	125.89**	30	2±0.5	130.55**
5	**Calcium(mg)**	400	234±39.2	16.38**	400	217±42	180.06**
6	**Iron(mg)**	28	7±2.8	28.81**	30	7±2.4	31.56**
7	**Thiamine(mg)**	1.2	0.5±0.16	16.93**	0.9	0.5±0.1	9.67**
8	**Riboflavin(Φg)**	1.4	0.5±0.13	26.79**	1.1	0.5±0.1	17.86**
9	**Vitamin A( )**	600	310±70.12	16.00**	600	274±66.90	18.85**
10	**Ascorbic acid(mg)**	40	19±8.6	9.45**	40	16±9.0	10.80**

**Ref:RDA by ICMR (2004)*

When the mean nutrient intake of the sample was compared with RDA suggested by ICMR (2004), it was found that the intake of all the nutrients was significantly lower than the RDA irrespective of gender. This finding is in line with the results of comparison with RDA by ICMR (2005).

Natarajan (1997) indicated that the intake of calories, proteins, vitamins and minerals in the aged is generally lower than the recommended allowance. Multiple vitamin deficiencies are common, particularly B complex, Vitamin C and minerals like iron and calcium. Marginal and preclinical vitamin deficiency may result in non-specific symptoms such as malaise, irritability, frequent colds, insomnia, loss of appetite and weight.

Riboflavin intake in the elderly have been linked to at least one chronic non-communicable disease. Deficiency of Vitamin B6 in older person might result in immune dysfunction and an increase in infectious diseases or other chronic immune related disorders (Russell, 1999). As Beck et al. (1999) pointed out calcium and vitamin D seem to play vital roles in the development of bone loss with ageing, it is important to secure an adequate intake even in the old age- especially among those who are homebound and hence have an inadequate sunlight exposure. Consumption of foods rich in Vitamin C is important in the elderly population. The problem of osteomalacia and osteoporosis as a result of calcium deficiency in old age has been highlighted by Brahmam (1999). So he further recommended that regular supplementation of vitamins, iron and calcium is essential for the elders.

So the significantly lowered intake of food and nutrients by the aged sample of the present study was in line with the findings of the nation wide study conducted on different states of India by NNMB, to assess the nutritional status of elderly. According to NNMB survey, the mean intake of all food groups and nutrients were consistently lower than the Recommended Dietary Allowances (Brahmam, 1999).

Adequacy of food intake

Inorder to find out the adequacy of food intake by the sample, the percent of RDA was computed using the food allowances given by Pasricha and Thimayamma (2005) and ICMR (2004) are shown below and illustrated in Figure 14 and Figure 15.

Table 87 Percentage adequacy of food intake by the sample

Sl.No	Food items	Male		Female	
		%RDA of Pasricha and Thimayamma*	% RDA of ICMR♦	%RDA of Pasricha and Thimayamma*	% RDA of ICMR♦
1	**Cereals**	90.57	75.47	148.00	111.00
2	**Pulses and legumes**	48.00	90.00	42.50	28.33
3	**Green leafy vegetables**	6.00	3.0	8.0	4.00
4	**Other vegetables**	13.50	27.00	18.66	28.00
5	**Roots and tubers**	26.00	13.00	19.00	19.00
6	**Milk and milk products**	19.33	19.33	20.33	20.33
7	**Fish and fleshy foods**	4.00	12.00	13.33	13.33
8	**Fruits**	10.0	20.00	9.00	18.00
9	**Sugar and jaggery**	90.00	72.00	110.00	110.00
10	**Fats and oils**	8.00	10.00	10.00	10.00

*Ref: *RDA by Pasricha and Thimayamma (2005)*
♦ *RDA by ICMR (2004)*

The data indicated that the percentage adequacy of all the food items of males and adequacy of all the food items except cereals and sugar and jaggery in females were lower than the RDA suggested by Pasricha & Thimayamma (2005) and ICMR (2004).

Similarly, percentage of RDA was calculated using the nutrient allowances recommended by Pasricha and Thimayamma (2005) and ICMR (2004). The details are presented in Table 88. This is illustrated in Figure 16 and Figure 17.

Table 88 Percentage adequacy of nutrient intake by the sample

Sl.No	Nutrients	Male		Female	
		%RDA of Pasricha and Thimayamma*	% RDA of ICMR♦	%RDA of Pasricha and Thimayamma*	% RDA of ICMR♦
1	**Energy(kcal)**	69.36	62.92	93.35	84.64
2	**Protein(g)**	55.38	60.00	74.00	74.00
3	**Fat(g)**	24.00	60.00	27.50	55.00
4	**Fibre(g)**	10.00	10.00	6.16	6.66
5	**Calcium(mg)**	23.40	58.50	24.11	54.25
6	**Iron(mg)**	18.42	25.00	23.33	23.33
7	**Thiamine(mg)**	4.18	41.66	34.48	55.55
8	**Riboflavin(Φg)**	28.09	35.71	33.11	45.45
9	**Vitamin A( )**	29.8	51.2	29.1	45.2
10	**Ascorbic acid(mg)**	47.5	47.50	40.00	40.00

*Ref: *RDA by Pasricha and Thimayamma (2005)*
♦ RDA by ICMR (2004)

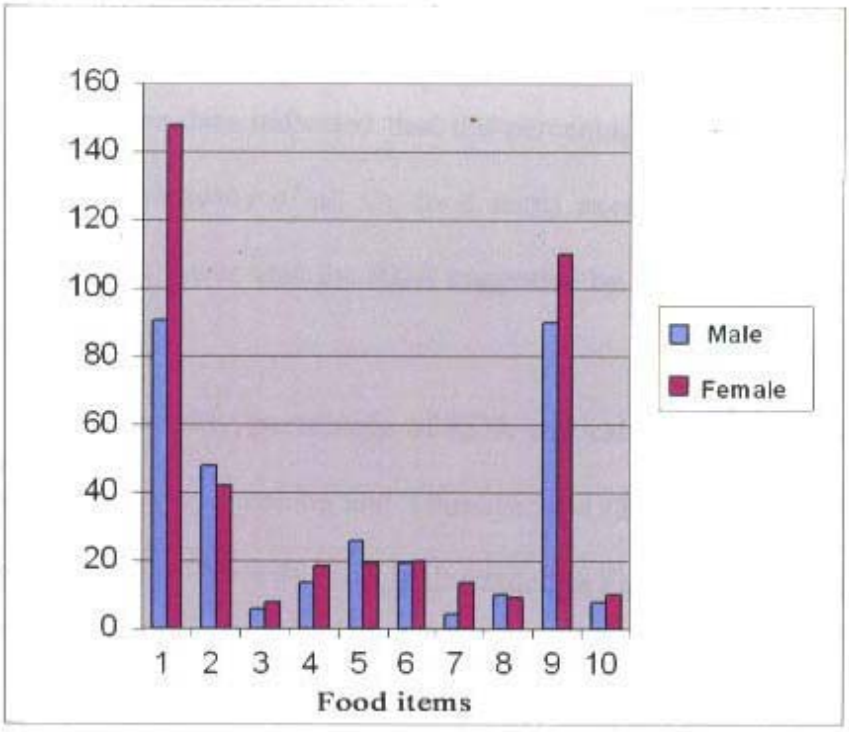


Fig. No. 14

Percentage adequacy of food intake by the sample

[%RDA of Pasricha and Thimayamma (2005)]

1. Cereals
2. Pulses and legumes
3. Green leafy vegetables
4. Other vegetables
5. Roots and tubers
6. Milk and Milk Products
7. Fish and fleshy foods
8. Fruits
9. Sugar and jaggery
10. Fats and oils

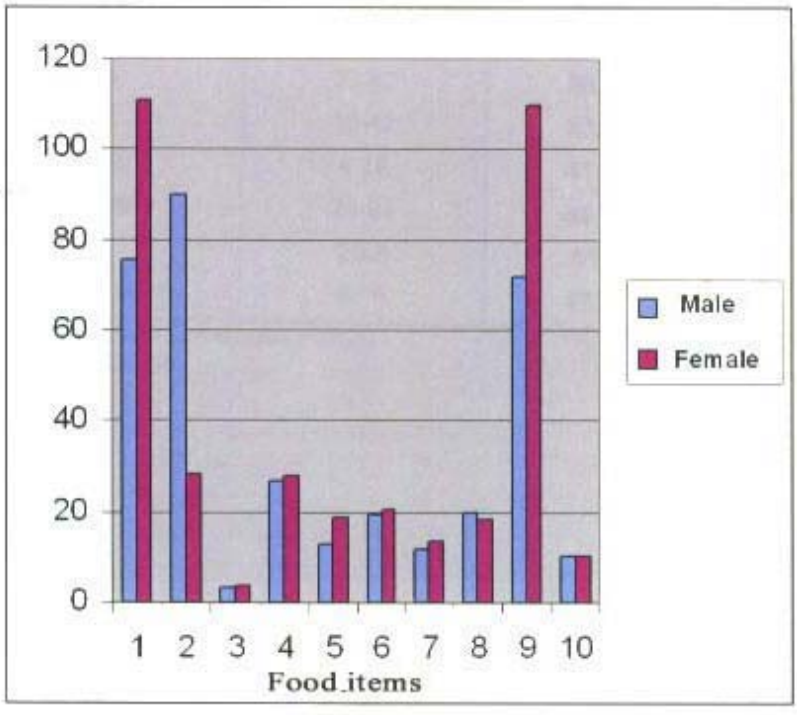


Fig. No. 15

Percentage adequacy of food intake by the sample

[% RDA of ICMR (2004)]

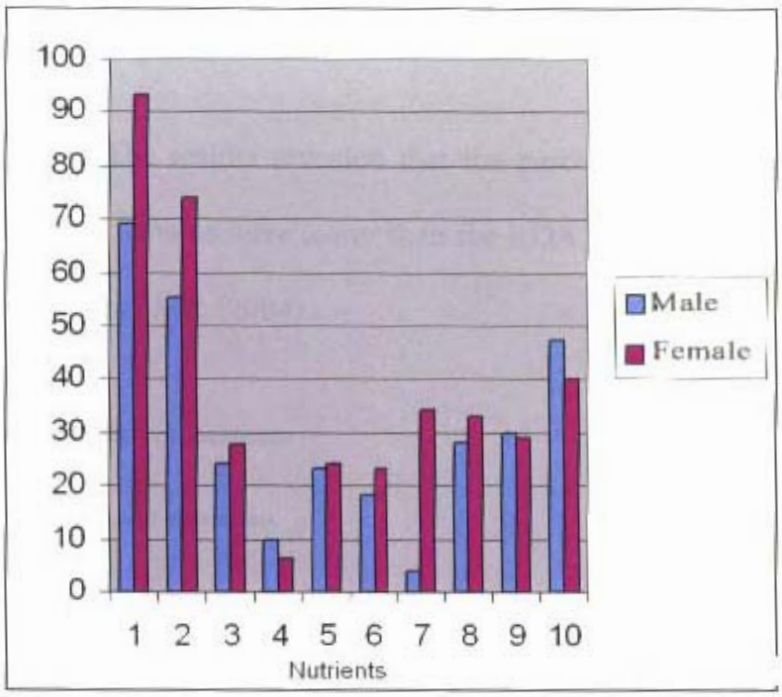
The results revealed that the percentage adequacy of all the nutrients of males and females were lower than the RDA suggested by Pasricha & Thimayamma (2005) and ICMR (2004).

4.10.4 Clinical assessment

Clinical signs and symptoms

The most practical and direct method of assessing the nutritional status of individual is the clinical examination (Copemann *et al.* 1996).

Clinical examination of the elderly subjects was carried out with the help of a qualified physician and the results are presented in Table 89.



1 Energy
2 Protein
3 Fat
4 Fibre
5 Calcium
6 Iron
7 Thiamine
8 Riboflavin
9 Vitamin A
10 Ascorbic acid

Fig. No. 16

Percentage adequacy of nutrient intake by the sample

[%RDA of Pasricha and Thimayamma (2005)]

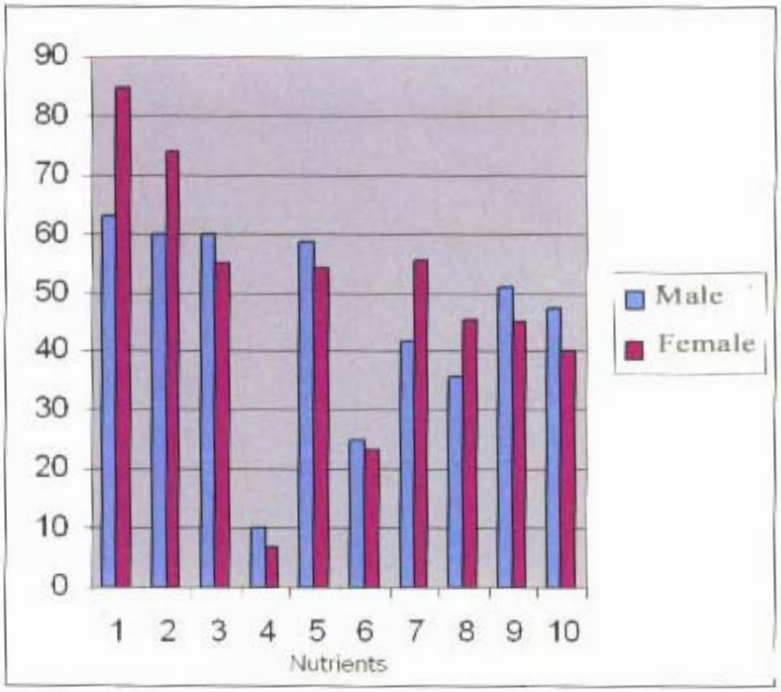


Fig. No. 17

Percentage adequacy of nutrient intake by the sample

[% RDA of ICMR (2004)]

Table 89 Distribution of the sample based on clinical symptoms

Sl.No	Particulars	Male				Female			
		60-69 (yrs)	70-70 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	Good appearance	14(73.70)	27(84.40)	6(66.70)	47(78.30)	51(53.70)	47(42.70)	15(42.9)	113(47.10)
2	Xerosis of conjuctiva	3(15.80)	4(12.50)	4(44.40)	11(18.30)	18(18.90)	25(22.70)	8(22.90)	51(21.30)
3	Pigmentation of conjuctiva	5(26.30)	13(40.60)	4(44.40)	22(36.70)	34(35.80)	38(34.50)	15(42.90)	87(36.30)
4	Xerosis of cornea	-	2(6.30)	2(22.20)	4(6.70)	5(5.30)	14(12.70)	6(17.10)	25(10.41)
5	Excoriation of lids	2(10.50)	6(18.80)	2(22.20)	10(16.70)	10(10.50)	15(13.6)	3(8.60)	28(11.70)
6	Folliculosis of lids	1(5.30)	4(12.50)	3(33.30)	8(13.30)	9(9.50)	13(11.8)	5(14.30)	27(11.30)
7	Angular conjuctivity of lids	1(5.30)	5(15.60)	2(22.20)	8(13.30)	11(11.60)	17(15.40)	7(20.00)	35(14.60)
8	Angular stomatitis of lips	2(10.50)	5(15.60)	2(22.20)	9(15)	5(5.30)	18(16.40)	6(17.10)	29(12.10)
9	Pale tongue	3(15.8)	9(28.10)	3(33.30)	15(25.00)	20(21.10)	28(25.50)	8(22.85)	56(23.30)
10	Gum conditions	-	3(9.40)	1(11.10)	4(6.7)	6(6.30)	15(13.60)	10(28.5)	31(12.90)
11	Fluorosis of teeth	3(15.80)	6(18.80)	2(22.20)	11(18.3)	17(17.90)	23(20.90)	6(17.1)	46(19.20)
12	Dental caries	6(31.60)	10(31.30)	5(55.60)	21(35)	24(25.30)	31(28.20)	11(31.4)	66(27.50)
13	Changes in hair	2(10.50)	4(12.50)	2(22.20)	8(13.3)	7(7.40)	15(13.60)	6(17.1)	28(11.70)
14	Elasticity of skin	7(36.80)	15(46.90)	7(77.70)	29(48.30)	43(45.30)	49(44.50)	18(51.4)	110(45.80)
15	Dermatitis around trunk	-	3(9.40)	4(44.40)	7(11.70)	6(6.30)	14(12.70)	7(20)	27(11.25)
16	Deficient adipose tissue	4(21.10)	9(28.10)	4(44.40)	17(28.30)	11(11.60)	14(12.70)	6(17.10)	31(12.90)
17	Anorexia	1(5.30)	5(15.60)	2(22.20)	8(13.30)	10(10.50)	14(12.70)	5(14.30)	29(12.10)
18	Palpable liver	1(5.30)	2(6.30)	1(11.10)	4(6.70)	5(5.30)	8(7.20)	3(8.60)	16(6.60)
19	Calf tenderness	-	1(3.10)	1(11.10)	2(3.30)	1(1.10)	11(10.0)	5(14.30)	17(7.10)
20	Parasthesia	-	1(3.10)	3(33.30)	4(6.70)	9(9.50)	11(10.0)	4(11.40)	24(10.0)

Figures in the parentheses indicate percentages

As the table depicts 78.30 percent of elderly males and 47.10 percent of females were devoid of any clinical symptoms. The rest of them were observed to have multiple clinical symptoms. The most prominent clinical symptoms seen among both male and female elderly were loss of elasticity of skin (male-48.30% and female-45.8%). Pigmentation of conjuctiva (male-36.70% and female-36.30%) and dental caries (male-35% and female-27.5%).

Depletion of adipose tissue was more obvious among men (28.3%) than women (12.9%). Whereas parasthesia (24.0%) and calf tenderness (17.1%) were more prevalent among women. Pale tongue was a clinical symptom, almost equally seen among both mal (25.0%) and female (23.3%) elderly. Conjuctival xerosis, dental flourosis, angular stomatitis and anorexia were also observed among quite a good number of the male and female sample population.

The age wise analysis of the data revealed that almost all the symptoms were more prevalent in the old- old category (80-89) of the male and female elderly. There was also a clear indication of the fact that among males the percentage of sample with clinical symptoms increased progressively with the advancement of age. That is, the percentage of sample with the same clinical signs was more among the higher age groups than the lower (60-69 years). This tendency was found to exist with all the symptoms observed among the subjects.

Among women also the same trend was noticed with the majority of the clinical symptoms except a few ones like pigmentation of conjuctiva, excoriation of lids, pale tongue, dental fluorosis and loss of skin elasticity.

Chatterjee *et al*. (1999) reported the appearance of the eye changes as an individual grows older. These changes are mild at first, become more marked and characteristic as age advances to the seventh and eighth decades and beyond. A few of these changes may cause visual impairment and other problems. In the present study also nearly one fourth of the symptoms observed were related to eyes and vision. Regarding the skin changes, Jayakumar (2004) stated that the number of sweat glands decreases with age and this can lead to dry skin. The skin becomes less elastic with less supporting tissues causing wrinkles. Skin colour tends to lighten and hair gets thinner. Loss of skin elasticity was the major clinical symptom observed in the present study.

Clinical symptoms corresponding to specific nutrient deficiency

The clinical signs and symptoms were grouped based on the specific nutritional deficiencies. The results are presented in Table 90.

Table 90 Distribution of sample based on clinical manifestations corresponding to specific nutrients

Sl.No	Nutritional problems	Symptoms	Male				Female			
			60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled
1	Vitamin A	Xerosis of conjunctiva	3(15.8)	4(12.5)	4(44.4)	11(18.3)	18(18.9)	25(22.7)	8(22.9)	51(21.3)
2	Anaemia	Pale tongue	3(15.8)	9(28.1)	3(33.3)	15(25)	20(21.1)	28(25.5)	8(22.8)	56(23.3)
3	Bcomplex	Angular stomatitis	2(10.5)	5(15.6)	2(22.2)	9(15.0)	5(5.3)	18(16.4)	6(17.1)	29(12.1)
4	Vitamin C	Retracted and bleeding gum	-	3(9.4)	1(11.1)	4(6.7)	6(6.3)	15(13.6)	10(28.5)	31(12.9)
5	Zinc deficiency	Sparse and brittle hair	2(10.5)	4(12.5)	2(22.2)	8(13.3)	7(7.4)	15(13.6)	6(17.1)	28(11.7)
6	Flourosis	Mottled teeth	6(31.6)	10(31.3)	5(55.6)	21(35.0)	24(25.3)	31(28.2)	11(31.4)	66(27.5)

Figures in the parentheses indicate percentages

Mottled teeth due to dental flourosis was the major nutritional problems observed among both male (35.0%) and female (27.50%) elderly. The intensity of the problem found to increase with age in both men and women.

The next in order was anaemia. 25 percent of males and 23.30 percent of females were affected by this. An increase in the incidence of anaemia was noticed with age only in the case of males.

Conjuctival xerosis, an indicative of vitamin A deficiency was prevalent among 18.3 percent of male and 21.3 percent of female elderly studied. The older age groups such as men of 80 to 89 years and women of 70 to 89 years were more affected than the age group of 60-69 years. B complex deficiency as angular stomatitis and zinc deficiency as sparse and brittle hair were also seen among 11 to 15 percent of the sample. Here again the incidence was found to increase with age in both elderly men and women.

Premkumari *et al*. (2001) also observed the nutritional problems like anaemia, angular stomatitis, cheilosis, spongy and bleeding gums, xerophthalmia and glossitis among the elderly population studied. As noted by Natarajan (1997), Clinical-Nutritional disease commonly encountered in the elderly is B Complex deficiency especially riboflavin deficiency leading to angular stomatitis, glossitis and cheilosis. Vitamin A deficiency leading to xerophthalmia, bitot's spots and softening of cornea are common problems affecting the elderly.

Clinical nutritional status based on clinical scores

Inorder to grade the subjects based on clinical signs and symptoms, clinical scores were computed and the subjects were classified as normal, mild, moderate and severely malnourished based on the number of clinical symptoms each elderly sample had. The grading was done after computing the mean values and standard deviations of the total number of clinical symptoms each elderly had. The subjects who obtained a score greater than or equal to the sum of mean and standard deviation (≥Mean+SD) were categorized under 'severe malnutrition' and the subjects who obtained a score less than or equal to the difference of mean and standard deviation (≤Mean-SD) were categorized under 'normal' and those who obtained medium scores were categorized under 'mild' and 'moderate malnutrition'. The results are presented in Table 91.

Table 91 Clinical nutritional status of the sample based on clinical scores

Sl.No	Nutritional status	Male				Female			
		60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Total	60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Total
1	Normal ≤5	7(36.80)	7(21.90)	3(33.30)	17(28.30)	38(40.0)	33(30.0)	7(20.0)	78(32.5)
2	Mild malnutrition 6-9	6(31.60)	14(43.80)	2(22.20)	22(36.70)	30(31.60)	31(28.20)	11(31.40)	72(30.0)
3	Moderate malnutrition 10-13	4(21.10)	10(31.30)	3(33.30)	17(28.30)	15(15.80)	22(20.0)	11(31.40)	48(20.0)
4	Severe malnutrition > 13	2(10.50)	1(3.10)	1(11.10)	4(6.70)	12(12.60)	24(21.80)	6(17.10)	42(17.5)

Figures in the parentheses indicate percentages

Based on the clinical scores majority (36.70%) of the elderly males were categorized under mild malnutrition. Whereas majority (32.50%) of the female sample were found to be normal. Comparatively less percentage of the sample, 6.70 percent male and 17.50 percent of females, were found to be severely malnourished.

Agewise analysis indicated that percentage of females with normal nutritional status found to decrease with age. Moderate malnutrition, at the same time, found to increase with ageing in both males as well as females.

Age and gender wise comparison of clinical nutritional status

Chi-square analysis was done to find out the association of clinical status with age and sex. The results are presented in Table 88.

Table 92 Age and gender wise comparison of clinical nutritional status

Sl.No	Clinical status	Age (yrs)				Gender		
		60-69 (yrs)	70-79 (yrs)	80-89 (yrs)	Pooled	Male	Female	Pooled
1	**Normal**	45(39.50)	40(28.20)	10(22.70)	95(31.70)	17(28.30)	78(32.50)	95(31.70)
2	**Mild**	36(31.60)	45(31.70)	13(29.50)	94(31.3)	22(36.70)	72(30.0)	94(31.30)
3	**Moderate**	19(16.70)	32(22.50)	14(31.50)	65(21.7)	17(28.30)	48(20.0)	65(21.70)
4	**Severe**	14(12.30)	25(17.60)	7(15.90)	46(15.30)	4(6.70)	42(17.50)	46(15.30)
		$\chi 2$ 8.544				$\chi 2$6.156*		

Figures in the parentheses indicate percentages *$P<0.05$

Both the age and genderwise classification showed a common feature. That is a progressive reduction in the percentage of sample with increasing severity of malnutrition.

As far as the gender is concerned, more number of females were rated as normal than their male counterparts. Severe malnutrition was also reported to be more in the elderly females. Whereas males outnumbered females in the case of mild and moderate type of malnutrition. Chi-square analysis of genderwise data showed that there existed a significant association (at 5% level) between gender and nutritional status.

Age wise analysis indicated that more number of sample with normal nutritional status were there in the age group of 60 to 69 years. As age advanced there observed a progressive decline in normally nourished individuals. At the same time elderly with moderate malnutrition found to increase with age. But agewise comparison of nutritional status failed to show any statistical significance in their association.

Clinical Nutritional status Vs. Performance index of homes

An attempt was made to find the association between clinical nutritional status and performance index of homes. The results are presented in the Table below and illustrated in Figure 18.

Table 93 Clinical Nutritional status vs. Performance index of homes

Sl.No	Clinical Nutritional status	N	Performance index of homes			χ^2
			Good	Fair	Poor	
1	**Normal**	**95**	43(37.10)	45(28.10)	7(29.20)	
2	**Mild**	**94**	33(28.40)	57(35.60)	4(16.70)	11.241
3	**Moderate**	**65**	27(23.30)	33(20.60)	5(20.80)	
4	**Severe**	**46**	13(11.20)	25(15.60)	8(33.30)	

Figures in the parentheses indicate percentages

As the table depicts the highest percentage of sample (37.1%) with normal nutritional status were the ones accommodated in homes having a good performance index. Similarly the highest percentage of severely malnourished subjects were found to be in those homes with poor performance index. It was also seen that percentage of severely malnourished elderly was progressively reducing with improvement in the performance index of homes. However chi-square analysis did not show any statistical significance in the association observed between the clinical nutritional status and the performance index of homes.

Blood Haemoglobin

Iron deficiency anaemia is another important nutritional problem of elderly (Natarajan, 1997) and blood haemoglobin level is an useful index of the overall nutritional status irrespective of its significant role in anaemia (Foster, 1992).

Blood haemoglobin assessment was carried out on a subsample of elderly subjects selected randomly from the old age homes. The subjects were then classified based on the haemoglobin status as recommended by WHO (1999). The results are given in Table 94 and illustrated in Figure 19.

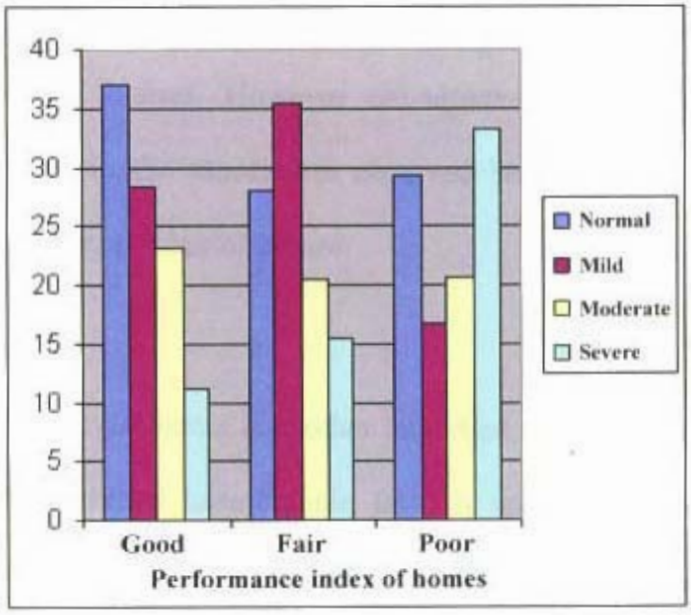


Fig. No. 18

Clinical Nutritional status vs. Performance index of homes

Table 94 Distribution of the sample based on blood haemoglobin status

Sl.No	Haemoglobin status (g/dl)			
	Male		Female	
	Haemoglobin level	Number	Haemoglobin level	Number
1	**Normal (>13)**	4(26.70)	**Normal (>12)**	3(20.0)
2	**Mild anaemia (11-13)**	6(40.0)	**Mild anaemia (10-12)**	8(53.30)
3	**Moderate anaemia (9-11)**	5(33.30)	**Moderate anaemia (8-10)**	4(26.70)
4	**Severe anaemia (<9)**	Nil	**Severe anaemia (<8)**	Nil

Figures in the parentheses indicate percentages *WHO (1999)*

As obtained from the table only 26.70 percent of males and 20.0 percent of female elderly were reported to have a normal blood haemoglobin level. The rest were found to be anaemic; which involved 73.30 percent of the males and 80 percent of females. Among them, majority had only mild anaemia including 40 percent men and 53.3 percent women. Severe anaemia was not at all present in the sample.

Higher prevalence of anaemia among elderly was reported by Natarajan (1997). When the WHO criteria was used; 38 percent of men (<13g/dl) and 52 percent of women (<12g/dl). He further added that more than 70 percent of elderly women were affected by anaemia.

Mean blood haemoglobin level

The blood haemoglobin level of male and female elderly in different age groups are presented in Table 95.

Table 95 Mean blood haemoglobin levels of the sample

Sl.No	Age (yrs)	Male (Mean value±SD)	Female (Mean value±SD)
1	**60-69**	14.26±0.85	13.2±1.16
2	**70-79**	12.78±1.14	11.6±0.91
3	**80-89**	10.98±0.67	10.48±0.67

Figures in the parentheses indicate percentages

The highest mean haemoglobin level was observed among the males (14.26±0.85) and females (13.2±1.16) of 60 to 69 years, followed by 70 to 79 years

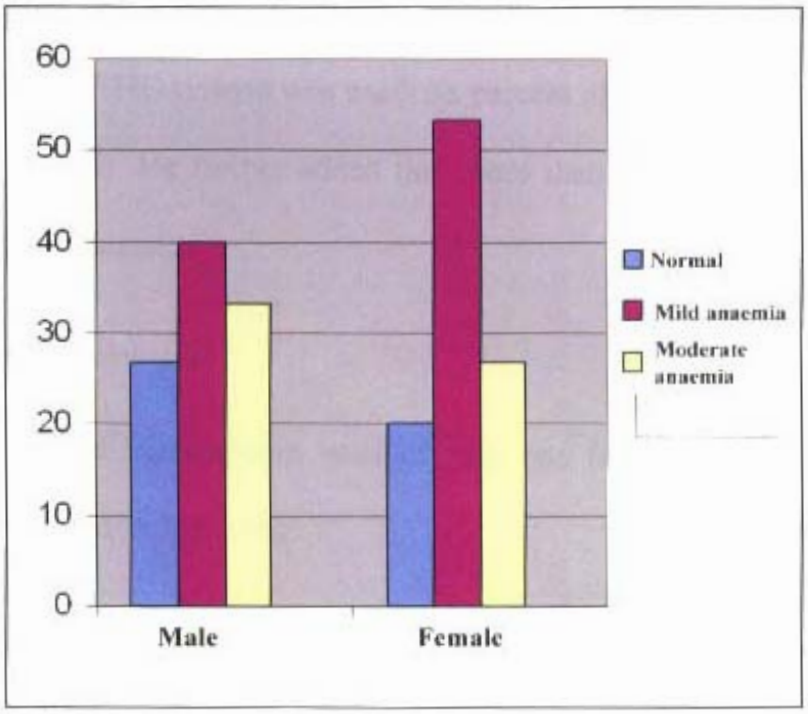


Fig. No. 19

Distribution of the sample based on blood haemoglobin status

and 80 to 89 years. As the age advanced irrespective of gender the haemoglobin level found to decline progressively in both male as well as female elderly. This clearly indicated the possibility of increased susceptibility to severe anaemia among old-old category. Similar observation of declining trend in haemoglobin level with the age of elderly was reported by Maulik *et al*. (2003).

4.11 PERFORMANCE INDEX OF HOMES VS. HEALTH INDEX OF INMATES

Rank correlation coefficient was worked out to find out the association if any between Institutional Performance index and health index of inmates. Institutional Performance index was developed based on the variables considered for assessing the infrastructure facilities and service efficiency of the old age homes (which was presented in Phase I of this section). The scores obtained for the overall health status was considered for the health index of the inmates. [The elderly subjects were graded as normal, mild moderate and severe based on the total number of health problems (such as occurrence of age related inabilities, minor health problems, degenerative diseases and functional disabilities) faced by each elderly sample]. Percentage score was calculated for each home.

Health index of the inmates (r1) was developed using the formula,

$$r1 = \frac{\sum Si\ xi}{\sum Si} \times 100$$

where Si = Scores for normal (4), mild (3), moderate (2) and severe health problems (1).

xi = Number of inmates in each class (normal, mild, moderate and severe classes)

The correlation results are presented in Table below and illustrated in Figure 20.

Table 96 Rank correlation coefficient of Performance index of homes and Health index of inmates

Homes Id	Health index of inmates (r1)	Performance index of homes (r2)	Rank(r1)	Rank(r2)
1	73.61	58.00	4.00	13.00
2	82.00	88.00	1.00	1.00
3	72.22	68.00	5.00	10.00
4	35.00	47.00	16.00	14.00
5	61.11	46.00	12.00	15.00
6	80.00	82.00	3.00	4.00
7	67.50	76.00	7.00	6.00
8	62.50	79.00	9.50	5.00
9	61.90	69.00	11.00	8.50
10	70.00	83.00	6.00	2.50
11	60.29	75.00	13.00	7.00
12	62.50	44.00	9.50	16.00
13	81.25	83.00	2.00	2.50
14	63.33	64.00	8.00	11.00
15	58.06	69.00	14.00	8.50
16	55.00	61.00	15.00	12.00
Correlation coefficient 0.58051				*$^{**}p<0.01$*

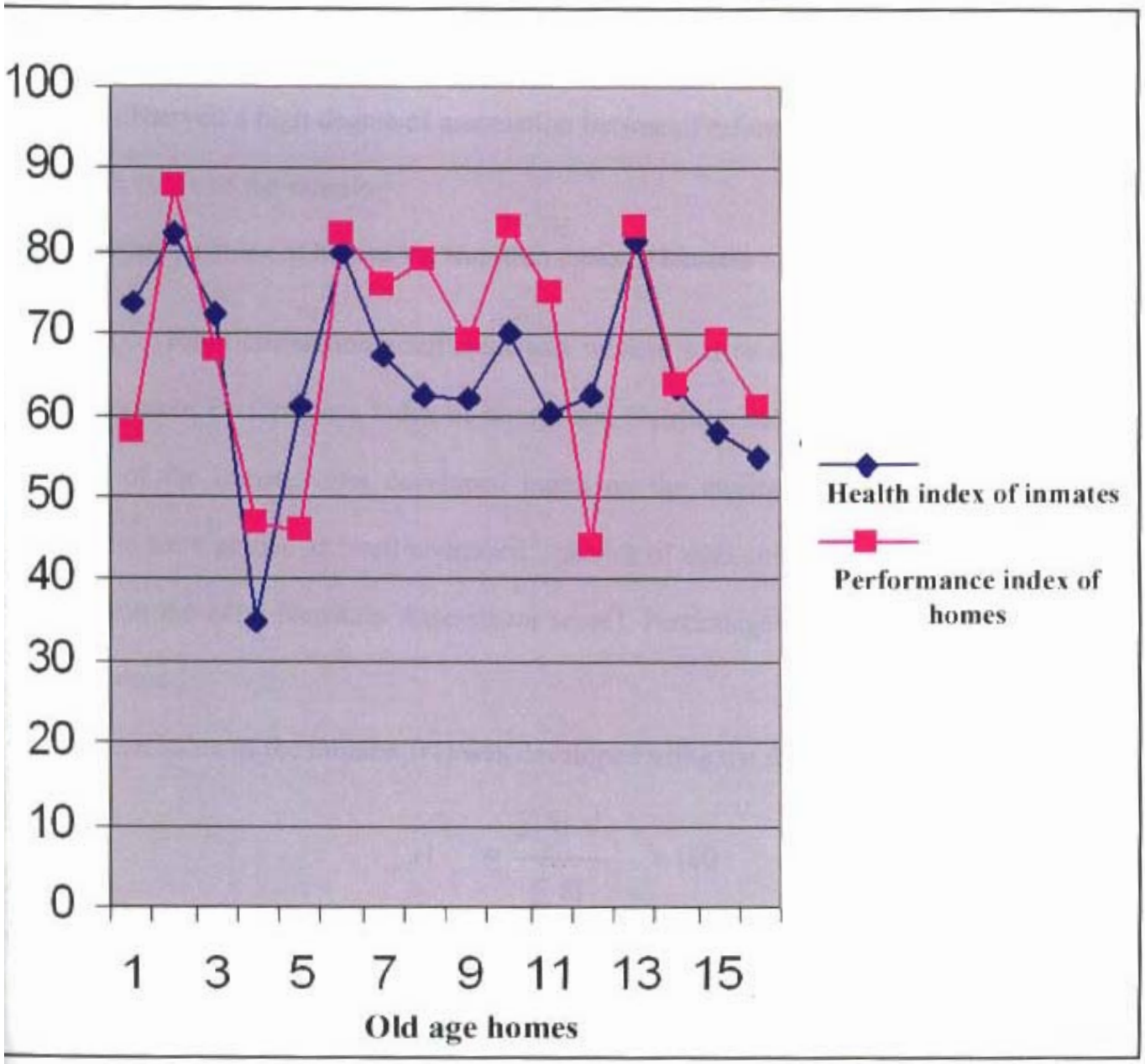


Fig. No. 8.0

Performance index of homes and Health index of inmates

Rank correlation coefficient of tied ranks between Performance index of homes and Health index of inmates were worked out to be 0.58, which was highly significant at one percent level. This indicates that the increase in Performance index of the homes brought about a resultant increase in Health index of the sample. That is, there observed a high degree of association between Performance index of homes and Health index of the sample.

Performance index of homes Vs. Nutrition index of inmates

Rank correlation coefficient was worked out to find out the association if any between Performance index of homes and Nutrition index of inmates. Nutrition index of the inmates was developed based on the nutritional status. [The elderly subjects were graded as 'well nourished', 'at risk of malnutrition' and 'malnourished' based on the Mini Nutrition Assessment score]. Percentage score was calculated for each home.

Nutrition index of the inmates (r1) was developed using the formula,

$$r1 = \frac{\sum Si\ xi}{\sum Si} \times 100$$

where Si =Scores for well nourished (3), at risk of malnutrition (2) and malnourished (1)

xi = Number of inmates in each class (well nourished, at risk of malnutrition and malnourished classes)

The correlation results are presented in Table below and illustrated in Figure 21.

Table 97 Rank correlation coefficient of Performance index of Homes and Nutrition index of inmates

Home id	Nutrition index of inmates (r1)	Performance index of homes (r2)	Rank (r1)	Rank (r2)
1	55.60	58.00	6.50	13.00
2	57.82	88.00	3.00	1.00
3	50.00	68.00	10.00	10.00
4	46.67	47.00	11.50	14.00
5	33.33	46.00	16.00	15.00
6	60.00	82.00	2.00	4.00
7	43.33	76.00	14.00	6.00
8	45.00	79.00	13.00	5.00
9	50.79	69.00	9.00	8.50
10	55.56	83.00	6.50	2.50
11	52.94	75.00	8.00	7.00
12	40.00	44.00	15.00	16.00
13	62.50	83.00	1.00	2.50
14	46.67	64.00	11.50	11.00
15	55.91	69.00	5.00	8.50
16	56.67	61.00	4.00	12.00
Correlation coefficient 0.5846**				** P<0.01

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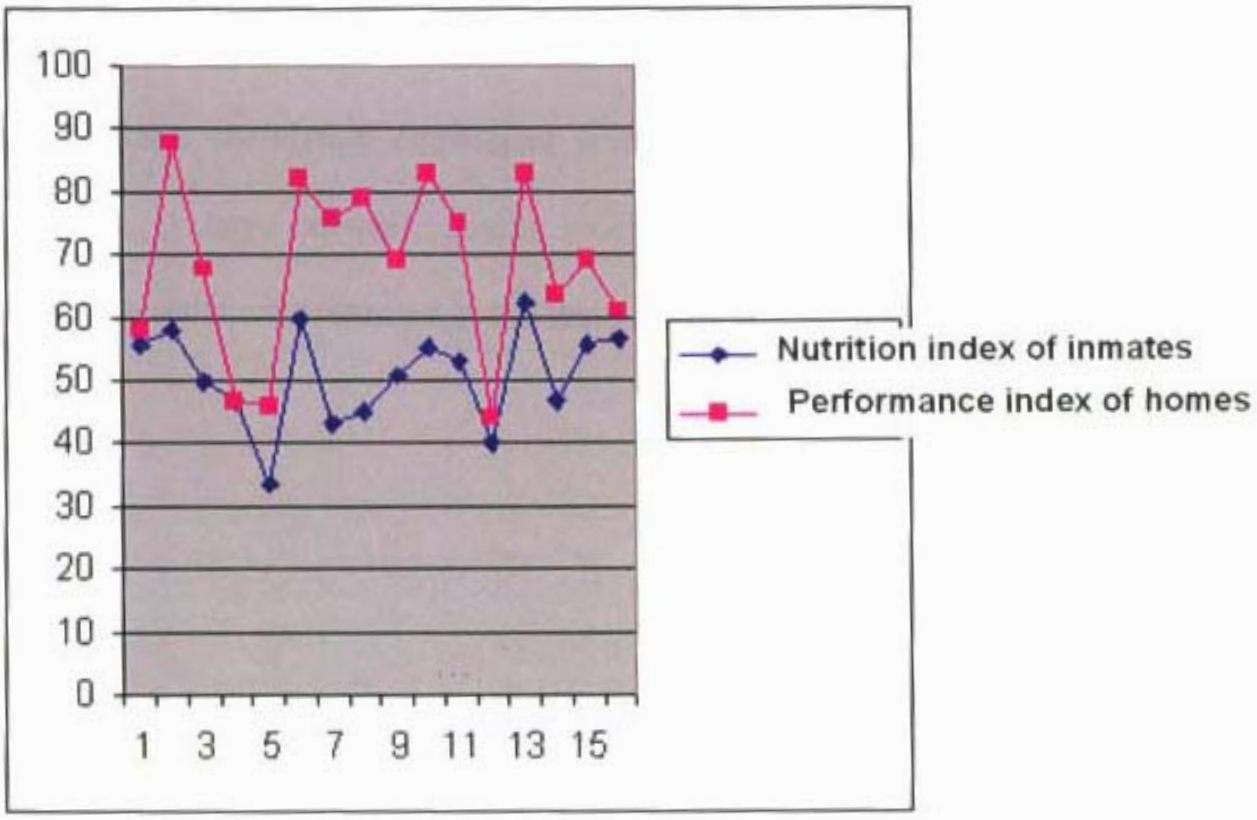

Fig. No. 21

Performance index of Homes and Nutrition index of inmates

Rank correlation coefficient of tied ranks between Performance index of homes and Nutrition index of inmates were worked out to be 0.58, which was highly significant at one percent level. This indicates that the increase in Performance index of the homes brought about a resultant increase in Nutrition index of the sample. That is, there observed a high degree of association between Performance index of homes and Nutrition index of the sample.

Health index Vs. Nutrition index of inmates

Rank correlation coefficient was calculated to find out the existence of association, if any, between health index and nutrition index of inmates. The correlation results are presented in the table below and illustrated in Figure 22.

Table 98 Rank correlation coefficient of Health index and Nutrition index of inmates

Homes Id	Health index of inmates (r1)	Nutrition index of inmates (r2)	Rank (r1)	Rank (r2)
1	73.61	55.60	14.00	13.00
2	82.00	57.82	1.00	1.00
3	72.22	50.00	4.50	10.00
4	35.00	46.67	12.00	14.00
5	61.11	33.33	15.50	15.00
6	80.00	60.00	2.00	4.00
7	67.50	43.33	7.00	6.00
8	62.50	45.00	11.00	5.00
9	61.90	50.79	9.00	8.50
10	70.00	55.56	3.00	2.50
11	60.29	52.94	8.00	7.00
12	62.50	40.00	15.50	16.00
13	81.25	62.50	4.50	2.50
14	63.33	46.67	10.00	11.00
15	58.06	55.91	6.00	8.50
16	55.00	56.67	13.00	12.00
Correlation coefficient 0.4125*				*P<0.0 5

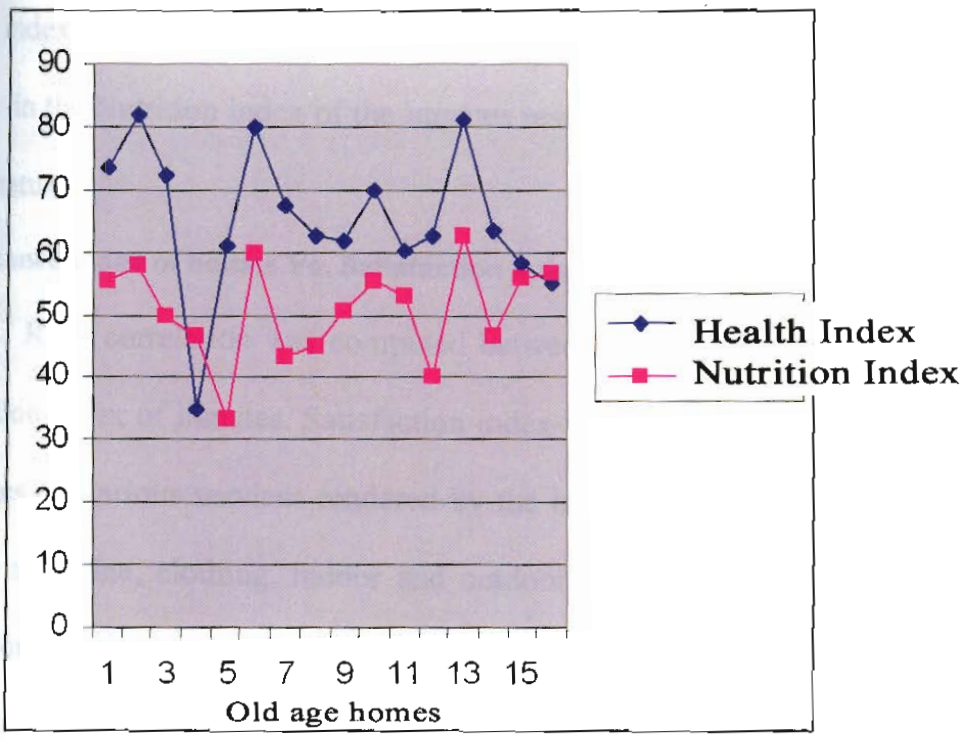

Fig. No. 22

Health index and Nutrition index of inmates

There is significant positive correlation between Nutrition index and Health index of the inmates ($P<0.05$) at five percent level, which indicated that increase in the Nutrition index of the inmates resulted in a significant increase in their health status.

Performance index of homes Vs. Satisfaction index of inmates

Rank correlation was computed between Performance index of homes and Satisfaction index of inmates. Satisfaction index was developed based on the opinion of inmates on various services rendered by the institutions, such as food and related services, medicine, clothing, indoor and outdoor recreation facilities. The extent of satisfaction was measured on a three-point scale namely 'fully satisfied', 'partially satisfied' and 'not at all satisfied'.

Satisfaction index of the inmates (r1) was developed using the formula,

$$r1 = \frac{\sum Si\ xi}{\sum Si} \times 100$$

where Si = Scores for fully satisfied (3), partially satisfied (2) and not at all satisfied (1).

xi = Number of inmates in each class (fully satisfied, partially satisfied and not at all satisfied classes).

The results are presented in Table 99 and illustrated in Figure 23.

Table 99 Rank correlation coefficient of Performance index of Homes and Satisfaction index of inmates

Home id	Satisfaction index of inmates (r1)	Performance index of homes (r2)	Rank (r1)	Rank (r2)
1	37.04	58.00	14.00	13.00
2	95.33	88.00	1.00	1.00
3	66.67	68.00	4.50	10.00
4	46.67	47.00	12.00	14.00
5	33.33	46.00	15.50	15.00
6	76.67	82.00	2.00	4.00
7	63.33	76.00	7.00	6.00
8	56.67	79.00	11.00	5.00
9	60.32	69.00	9.00	8.50
10	70.00	83.00	3.00	2.50
11	60.78	75.00	8.00	7.00
12	33.33	44.00	15.50	16.00
13	66.67	83.00	4.50	2.50
14	57.78	64.00	10.00	11.00
15	63.44	69.00	6.00	8.50
16	40.00	61.00	13.00	12.00
Correlation coefficient 0.86691**				**P<0.01

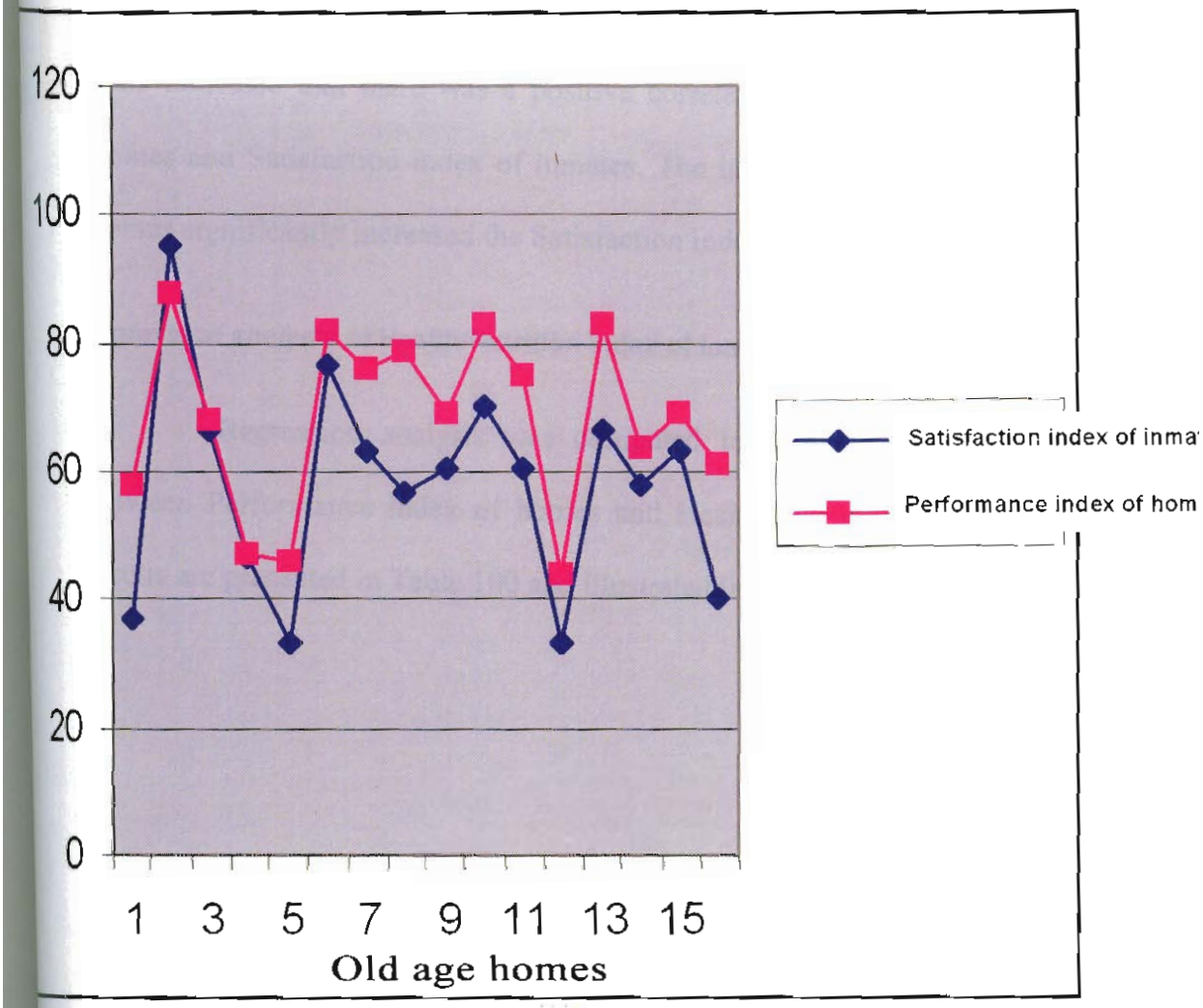

Fig. No. 23

Performance index of Homes and Satisfaction index of inmates

Rank correlation between Performance index of homes and Satisfaction index of inmates worked out to be 0.87 which was highly significant (at 1% level). This indicated that there was a positive correlation between Performance index of homes and Satisfaction index of inmates. The increase in the Performance index of homes significantly increased the Satisfaction index of the inmates.

Regression analysis of Health/Nutrition index of inmates on Performance index of homes

Regression analysis was computed to find out the correlation if any, between Performance index of homes and Health/Nutrition index of inmates. The results are presented in Table 100 and illustrated in Figure 24.

Table 100 Regression analysis of Health/Nutrition index of inmates on Performance index of homes

Homes Id	Performance index of homes	Health index of inmates	Nutrition index of inmates
1	58.00	73.61	55.60
2	88.00	82.00	57.82
3	68.00	72.22	50.00
4	47.00	35.00	46.67
5	46.00	61.11	33.33
6	82.00	80.00	60.00
7	76.00	67.50	43.33
8	79.00	62.50	45.00
9	69.00	61.90	50.79
10	83.00	70.00	55.56
11	75.00	60.29	52.94
12	44.00	62.50	40.00
13	83.00	81.25	62.50
14	64.00	63.33	46.67
15	69.00	58.06	55.91
16	61.00	55.00	56.67
		R square 0.416**	0.419**

**$p<0.01$

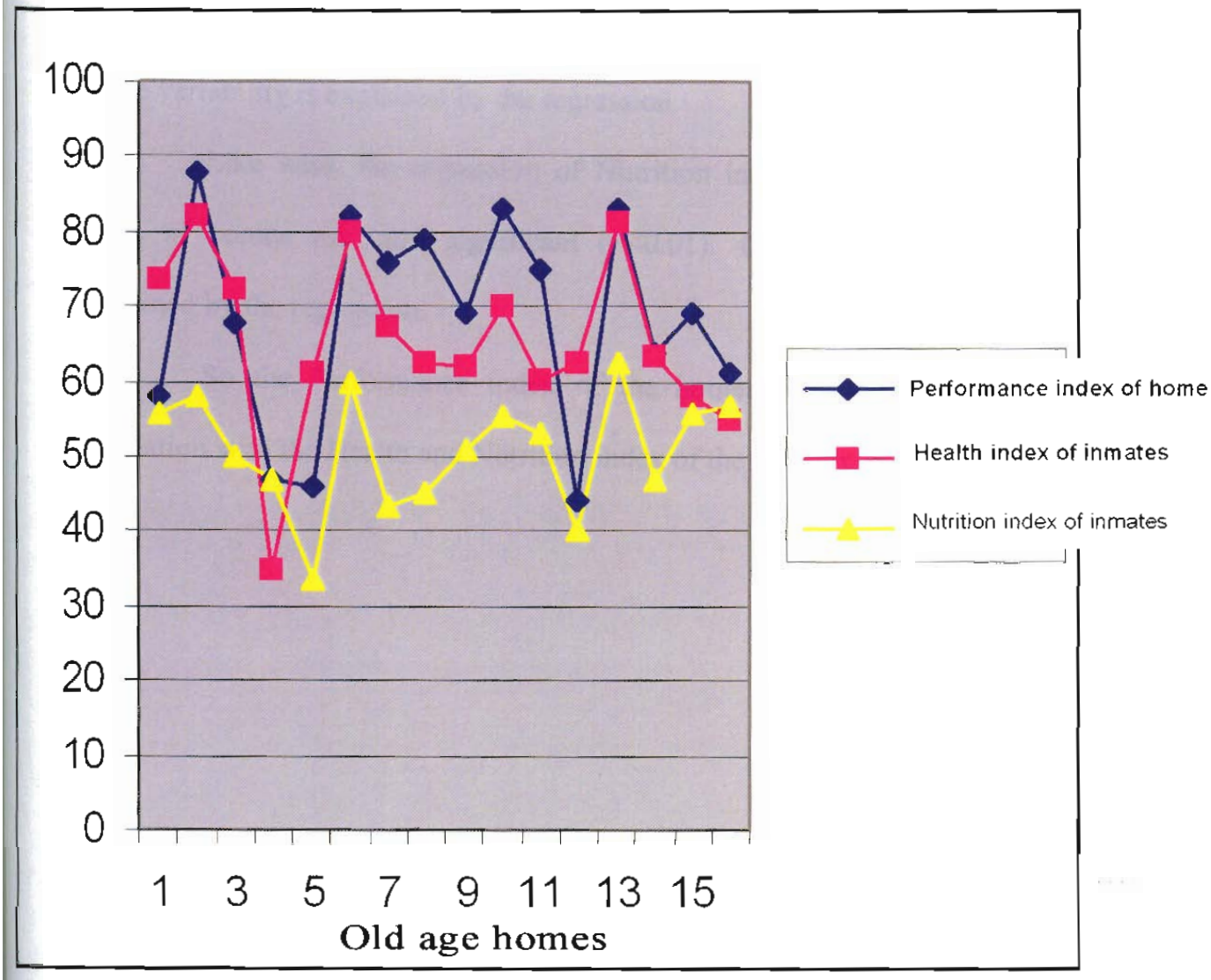

Fig. No. 2A

Health/Nutrition index of inmates on Performance index of homes

Regression analysis has been studied and the following relationship was established as y=0.363369x+25.99691. Prediction equation of Health index of inmates and Performance index of homes showed significant regression (P<0.01). 41.6 percent of the variability is explained by the regression.

Like wise, the regression of Nutrition index of inmates on Performance index of homes was also significant (P<0.01). 42 percent of the variability is explained by the regression.

So the Performance index of the homes proved to have a significant correlation with the Health and Nutrition index of the inmates.

5. SUMMARY AND CONCLUSION

The present study entitled "Health and Nutrition Profile: A study in old age homes at Ernakulam, Kerala" comprised of two major phases. Phase I dealt with the infrastructural facilities and service efficiency of the old age homes in Ernakulam district. Phase II dealt with the health and nutrition profile of the inmates of these old age homes.

The two districts of central Kerala such as Kottayam and Ernakulam have the highest number of old age homes than others, of which Ernakulam a cosmopolitan city is refered as the industrial capital of Kerala. The rapid urbanization and industrialization and the resultant changes in the life style of people, may have its own impact on the society and family and so on the life of the aged people. Ernakulam district has been identified as the potential area for the present study.

As an initial step, the list of old age homes in Ernakulam district was obtained from the Department of Social Welfare, Ernakulam. All the 16 old age homes were included in the study. The homes were then categorized into three groups based on their location such as Corporation, Municipality and Panchayat. 300 inmates who were of sixty years and above, and willing to cooperate with the study were selected randomly.

The direct interview method, the most popular method in modern research was the technique used to obtain information from the authorities of the institutions as well as from the inmates residing in these institutions.

Anthropometrical assessment and clinical examination was done on all sample (60 males and 240 females). Food weighment survey and estimation of blood haemoglobin was done on selected sub sample (15 male and 15 female).

The data was tabulated and analysed statistically using appropriate techniques such as percentages, $\chi 2$ analysis, Rank correlation coefficient and regression analysis.

The results of the present study can be summarised as:

PHASE I

The first institution for the aged in Ernakulam district came into existence in 1921 and it was in Panchayat area. The latest addition to the list of old age homes was in the corporation area of Ernakulam district during the year 1997. As far as the number of homes was concerned Panchayat area ranked first with nine homes followed by Corporation area (5 homes) and Municipality (2 homes).

Regarding the founding agencies of the homes, it was noted that majority (87.50%) was initiated by the Christian Missionaries. Hindu Charitable society and Government of Kerala were responsible for initiating one home each.

The surroundings of most of the homes (62.50%) were calm and peaceful whereas it was crowded and noisy with respect to 37.50 percent of the homes. 50 percent of the homes had adequate outdoor space which was well maintained with garden and trees. All the homes in the municipality and 60 percent homes in the corporation area also had this privilege.

Majority of the homes (93.80%) had their own land and buildings, which included 100 percent of homes in Corporation, 100 percent in Municipality and 88.90 percent in Panchayat area. 11.10 percent of homes in Panchayat area were functioning in rented buildings.

Majority of the homes (56.30%) were exclusively for female elderly only. But in 43.80 percent of the homes, both males and females were admitted. There was no institution exclusively for elderly men. Religion was not considered as a criterion for admission in all the homes of municipality, 80.00 percent in corporation and 67.00 percent in panchayat whereas in the rest of the homes (20.00% corporation and 33.00% panchayat), only Christians were given admission.

Majority of the old age homes (62.50%) made use of their own fund and public contribution for their establishment. All the homes received government grant, at the rate of rupees 125 per inmate per month to meet the day to day expenses. In majority of the homes (81.20%), public contribution was the additional source of income.

The sanctioned strength of inmates in the homes studied varied from 50 to 200; with 75 percent of the home having an allotted strength of 51 to 100 inmates. But at the time of initiation the number of inmates in 68.80 percent of the homes were less than 10 which were far below the sanctioned strength. The present strength, at the time of study indicated that 37.50 percent of the homes had an intimate strength of 51 to 100. All the homes in municipality, 60.00 percent homes in corporation and 44.40 percent in panchayat had dormitory facilities. When the storage space for keeping

personal belongings of the inmates like dresses, toiletries etc was considered, 56.30% of the homes provided individual cupboards to the inmates near the bedside.

Regarding the availability of indoor space, it was found that irrespective of locations, all the homes had separate cooking area and bathroom/toilets. Separate dining area was observed in 87.50 percent of homes including all the homes in corporation and municipality. Sick rooms and living/recreation rooms were found in 75.00 percent and 68.80 percent of the homes respectively.

The appropriateness of the accommodation facilities in the old age homes was studied by the way it has been equipped for the comfortable living of elderly. Majority (81.30%) of the homes studied had adequate facilities in the sleeping area which included 100 percent of the homes in corporation and municipality and 66.70 percent of the panchayat area. Bathrooms and toilets in majority (75.00%) of the homes were also had adequate facilities.

Living or recreation area was not adequate in majority of the homes (43.80%) and somewhat adequate in 18.80 percent of the homes. In the case of dining area also, equipping with just adequate provision was found in majority (50.00%) of homes. Lack of dining area (12.50%) and inadequacy in dining area (18.80%) were observed mainly among the homes in panchayat. As far as kitchen is concerned it was found that they were either equipped with just adequate arrangements (50.00%) or totally inadequate (37.50%).

The maintenance of the indoor space was studied by means of personal observation of the investigator for three consecutive days. A score card was used to

record the observation. The results revealed that only prayer room was well maintained by majority (87.50%). Other areas secured a score ranging between 50 to 80 percent indicating average cleanliness.

Adequacy of lighting during the day and night was also studied. Opinion of the inmates with respect to the adequacy of day and artificial lighting was also recorded. The mean score was taken as the score obtained by each home. Natural light was adequately available during the day time in areas like living or recreation (68.80%) and prayer rooms (56.25%) where as only in 37.50 percent of homes the sleeping area had sufficient lighting. In majority of homes, kitchen (81.25%), bathroom (62.50%) and dining area (50.00%) had only moderate lighting which needs to be addressed. Majority of the homes (81.00%) used fluorescent lamps for lighting the indoor space of homes at night. Adequacy of artificial lighting showed that majority of indoor space areas got only moderate lighting including kitchen (75.00%), bathroom/toilet (75.00%), sleeping area (68.80%), dining (62.50%) and living rooms (50.00%).

Cements, red oxide, mosaic and ceramic tiles were the different types of flooring observed in the old age homes. But majority of the homes had cement flooring only in sleeping area (62.50%), kitchen (62.50%), dining area (50%), living area (43.80%), toilets (37.50%) and store rooms (31.30%). As most of the buildings were single storied, stairways were present only in 25.00 percent of the institutions. It was observed that the stairways in all the corporation homes (100%) had broad steps

and the stairways in the panchayat home (100%) had narrow steps. But all the stairways had railings as a safety measure.

European closet (93.70%) and hot water facility (56.30%) were the main arrangements specially done in the homes for the elderly. Other requirements like grab bars, shower connections, provision to sit while bathing and raised platform for bucket were not given any importance in most of the homes.

Except transportation (75.00%), shopping centre (62.50%) and telephone booth (50.00%), the rest of the essential services such as park (100%), post office (75.00%), reading room (75.00%), bank (62.50%) and hospitals (56.30%) were located far away from home. This observation was irrespective of the location of homes.

For food service, none of the homes were considering the preference of inmates or the nutritive value of foods with food selection. Cost of food was the criterion given preference by all the homes. In majority of the homes, the inmates were not involved in the food purchase (75.00%) and meal planning (68.75%) activities. 68.75 percent of the homes occasionally provided the ready to eat foods to the inmates in the form of snacks with evening tea. 25.00 percent of the homes, that is, 40.00 percent homes of corporation and 22.22 percent homes of panchayat area took special care to provide therapeutic diet to the inmates with degenerative diseases, particularly diabetes.

All the homes reported providing adequate clothing to the inmates. The frequency of supply of clothing to the inmates, was twice in a year (50.0%) or only

once in a year (37.50%). 12.50 percent of the homes supplied clothing as and when required. Stone washing (50.0%) and machine washing (50.00%) were method of washing clothes. As far as the assistance for washing clothes, the inmates helping one another was practised mainly in the homes of municipality (100%) and panchayat (66.70%), but 80.00 percent of homes in corporation institutional help was also available to the inmates.

Only 6.30 percent of the homes studied had a medical clinic inside the premises. None of the homes had any medical practitioner. But availability of a trained nurse (56.25%) in the homes helped to handle the situation to certain extent. Still there were (43.75%) of homes without having any health personnels to attend the medical needs of inmates. At the same time availability of a pharmacy and first aid facilities in the homes (31.25%) was quite encouraging.

Recreational activities has been given some priority in the old age homes. Majority of the homes (87.50%) had a Television set and watching Television daily was the main entertainment of the inmates in 56.25 percent of homes. Spiritual magazines (62.50%) and reading newspaper (56.25%) were also found to be part of indoor recreational activities of the inmates. As far as outdoor activities were concerned, picnics/outings were arranged by 31.25 percent of the homes. Mostly the homes of corporation (40.0%) and panchayat (33.33%) area had this arrangement.

For personal cleanliness, 43.75 percent of the homes took special effort to create awareness among the inmates about its importance. The homes were also made attempts to check whether the inmates practised the basic hygienic measures such as

brushing teeth daily (75.0%), daily bathing (37.50%), changing dress (37.50%) and changing of bed linens regularly (37.50%).

Daily sweeping of the homes and surroundings was reported by 87.50 percent of the homes which included 100 percent each of homes in corporation and municipality and 77.80 percent of the homes in panchayat. Mopping of rooms was done mostly on weekly basis (37.50%) followed by once in a day (31.25%) or on alternate days (31.25%). Bathroom cleaning was also done either on daily basis (37.50%) or on alternate days (31.25%).

Control of pests and insects like flies, mosquito, cockroach and mice was also found to be a matter of concern for all the homes. Various measures were used such as mosquito nets (31.25%), repellents (25.0%) and wire mesh (25.0%). Burning the garbage was the mode of disposal adopted by majority (56.25%) of homes. Use of incilinator (25.0%) and depositing the garbage in compost pit (18.75%) were also practised. Incilinator was found only in 80 percent of corporation homes. Liquid waste was mainly disposed through closed drain (43.75%).

Well water was found to be the major source (56.25%) of drinking water in the homes followed by tap water (31.25%) supplied by Government water supply department. Electrification was also there in all the homes (100%) studied. But the provision of generator or other alternative to be used at the time of power failure was not there in any of the homes.

Majority of the homes (68.75%) arranged prayer meetings for the inmates, either under the initiative of the institutions (50.0%) themselves or by the outsiders

(18.75%). Corporation homes were the ones took initiative mainly (60.0%) to arrange the prayer meetings by themselves. Meditation (25.0%) and counselling (25.0%) were also arranged by the homes, although the number was comparatively less.

For testing the significance of the difference between infrastructural facilities of homes located in corporation, municipality and panchayat, chi-square analysis was employed on average scores. No significant difference was obtained in the infrastructural facilities of homes, based on their locations.

Similarly the chi square test was employed on average scores with respect to service efficiency individual homes. There observed a significant difference ($p<0.05$) in the service efficiency of homes located in three regions, indicating the fact that homes in the corporation area render a significantly better service than the homes in panchayat and municipality.

When the infrastructural facilities of the homes were correlated with their service efficiency, it was found that there was significant correlation between these two aspects.

Phase II

Majority (47.30%) of the inmates in the present study, belonged to the age group of 70 to 79 years in which 49.70 percent inmates were in panchayat homes. 38.0 percent of the inmates fell under the age group of 60 to 69 years in which a majority (40.0%) were in corporation homes. Only a minority (14.70%) was found in the age group of 80 to 89 years. Majority of this old-old category (22.90%) were

accommodated in municipality homes. Gender wise distribution showed that 80 percent of the inmates were females and the rest (20.00 %) were males.

More than three fourth of the sample (77.00%) were Christians. While Hindus constituted 20.30 percent and Muslims formed only a minority (2.70%). Regarding the type of family, it was observed that majority of the inmates came from nuclear family (60.30%) set up and the rest from joint family (39.70%). The educational background of the elderly subjects brought out the fact that a majority (50.33%) had only primary education followed by illiterates (42.0%). 34.70 percent of the sample were jobless. 29.30 percent and 28.30 percent respectively were working as house maids and casual labourers, prior to joining the old age homes. Only a small percentage (18.70%) of the sample had personal income and majority (81.30%) did not. 58.0 percent of the sample had their own houses before joining the old age homes and 42.0 percent did not.

Majority of the inmates (76.40%) lost their spouses. Only 16.60 percent of the sample had them, but they were not staying with the inmates in old age homes. Majority (63.70%) of the elderly subjects had no sons and 17.20 percent had only one son. A minority (1.90%) had more than three sons. 66.70 percent of them were working as casual labourers and 19.30 percent were jobless. 30.30 percent of the sample had no daughters. 11.30 percent had only one daughter and six percent had two.

In most of the cases (33.70%) the inmates were brought to the old age homes by some religious agencies and 21.30 percent of them by neighbours and friends. The most prominent reason for seeking admission to the old age homes was no means for living and no one to look after (60.70%). Most of them (34.30 %) were staying with their spouse and children before joining the institutions. But they (85.70%) never visited their children or relatives after joining the old age homes.

Age related disabilities were most common among the subjects irrespective of gender. Problems with vision and hearing, difficulties in swallowing and taste recognition were reported by majority. Minor ailments like insomnia (76.30%), fatigue (72.70%), indigestion (73.0%) and constipation (76.30%) were also present among the sample. When classified based on the number of episodes of degenerative health problems, no one was found to have a 'very good' health status. Instead majority was rated under 'poor' health status.

Chronic obstructive pulmonary disease was the one prevalent in majority of the elderly (79.30%). 78.30 percent had hypertension and 69.70 percent had cataract. 67.0 percent suffered from diabetes. Osteoporosis was found in majority of female elderly (71.70%). Cardiovascular problems were prevalent in 43.70 percent. Osteoarthritis, urinary problems, cervical spontilitis, piles and thyroid were also reported by the elderly.

Functional status as revealed by the Activities of Daily Living (ADL) scale indicated that the majority of the sample were able to perform the daily activities of

living like bathing, dressing, personal grooming, toileting, continence, transferring, walking and eating independently.

Overall health status of the sample was computed based on total number of health problems each subjects had (such as occurrence of age related inabilities, minor ailments, degenerative diseases and functional disabilities). It was observed (32.30%) or that the elderly were mainly suffering from either mild morbidity (32.30%) or moderate morbidity (32.00%).

The psychological status of the sample when studied by the Geriatric Depression Scale revealed that both male as well as female elderly were equally vulnerable to depression, although the percentage of depressed men (55.00%) was comparatively more than that of women. Though chi-square analysis failed to show any significant association between depression status and socio-economic variables there observed a significant association at five percent level between depression profile and functional status, and a highly significant association (at 1% level) with nutritional status.

Nutritional status of the elderly when assessed by Mini Nutrition Assessment scale (MNA). It was observed that nearly half of the subjects (49.30%) were severely malnourished and 48.70 percent were at the risk of malnutrition. Genderwise analysis showed that males (63.30%) were more malnourished than female elderly (45.80%).

Body Mass Index of the elderly showed a higher prevalence of chronic energy deficiency (CED) among females (78.30%) compared to males and the extent of prevalence was higher in 70 to 79 age group. Majority of the male and female

elderly in all the three age categories (60-69 years, 70-79 years and 80-89 years) had Mid Arm Circumference less than 21cm (MAC<21) and Calf Circumference less than 31cm (CC<31) which are indicative of malnutrition.

Food weighment survey conducted for three consecutive days among a sub sample of 30 elderly (15 males and 15 females) showed that the mean intake of all the food items by males and the mean intake except cereals and sugar by females were much lower than the allowance recommended by Pasricha and Thimayamma (2005). Similarly extreme inadequacy was reported in almost all nutrients in both males as well as female subjects. The results on food and nutrient intake of the sample were more or less same, when compared with RDA given by ICMR (2004).

Clinical examination of the sample brought out very clearly the presence of Vitamin A deficiency in the form of xerosis of conjunctiva (18.30 % in males and 21.30% in females), anaemia as pale tongue (25.00% in males and 23.30 % in females), Vitamin B complex deficiency as Angular stomatitis (15.00 % in males and 12.10% in females), Zinc deficiency and flourosis in the form of mottled teeth were also observed. The prevalence of anaemia as indicated by blood haemoglobin level indicated that majority of the inmates had mild (40.00% of males and 53.30 % of females) or moderate anaemia (33.30 % of males and 26.70 % of females)

Also a 'Performance Index' was computed for each home based on the scores secured for the availability of infrastructural facilities and the quality of services rendered by the individual homes. The old age homes were then graded as 'good', 'fair' and 'poor' based on the mean scores.

Similarly Health index and Nutritional index of the inmates, who formed the subjects of the study, were also developed based on their overall health status and Nutritional status.

Rank correlation between Institutional Performance index and Health index/Nutritional index of inmates was worked out. There obtained a significant ($P<0.01$) positive relation indicating the fact that the increase of Institutional Performance index brought about a simultaneous increase in the Health/Nutritionindex of the inmates.

Also there observed a significant ($P<0.05$) positive correlation between nutrition index and health index of inmates indicating that as nutrition index of inmates increased, health index also increased and vice versa.

CONCLUSION

Majority of the institutions for aged were initiated by the Christian missionaries. All the homes had to find their own funds for day to day expenditure as the government grant of Rupees 450 per inmate per month was totally inadequate.

As far as for infrastructural facilities most of the homes (56.25%) rated as 'fair' and for service qualities also, the rating was 'fair' for majority (81.25%). In total the Performance index of the homes was found to be 'fair' in majority (56.25%) of cases.

The overall health status indicated that male elderly were better placed than females. Poor health status was reported by females (34.60%) and males (21.70%). Most of the inmates were depressed and malnourished. The nutrient and food intake were far below the RDA suggested by Pasricha and Thimayamma (2005) and ICMR

(2004). All the elderly disregard of gender suffered from one kind of disease or other. But most of the elderly were functionally independent to perform the daily activities as rated by Activities of Daily Living (ADL) scale.

There observed a highly significant positive association between the Performance index of homes and the Health/Nutrition status of the inmates.

Further studies recommended:

Further, long term and indepth research along the following lines can be undertaken to design some specific and sustainable action plans for the care and welfare of the institutionalized elderly in Kerala.

1. Similar studies can be conducted involving all the old age homes in the state to develop a comprehensive database of old age homes and inmates in the state of Kerala.
2. Action research can be undertaken for improving the general health conditions and nutritional status of the elderly in old age homes, by way of nutritional supplementations and awareness building initiatives.
3. Study on the feasibility of having some income generating ventures in old age homes suitable to the interest and expertise of the inmates with a view to provide them psychological and economic security.
4. Indepth study can be conducted on the psychological problems of elderly in oldage homes and its impact on their health and nutritional profile.

5. An evaluation study of the Government policies and programmes for the elderly population in terms of coverage, appropriateness, awareness and extend of utilization of services by the beneficiaries.

Recommendations:

Other recommendations emerging out of this study specially directed to administrators and policy makers may be summerised as follows:

1. Health care system in India has already been designed special care for vulnerable groups of population like women and children. Similar arrangements for elderly need to be organized in general hospitals, Public Health Centres etc. to deal with the multiple health problems of aged people.
2. Mobile medical service can be initiated in the Government hospitals. Periodic visit to the old age homes of the respective localities will help to deliver the health care service at the door step of such institution.
3. The resources and services of the voluntary agencies and social service organizations like Rotary International, Jaycees etc. can be effectively channelised in an organized manner to provide necessary medical aid to the inmates of old age homes.

However in this context the significance of family environment cannot be overlooked as it is the most apt place for the elderly people to live. Moreover it is their right to be in the family during the difficult period of their life. So a family based approach always acquire tremendous importance. Both Government and non Governmental organizations together with media and educational institutions like

schools and colleges should come forward with viable strategies at various levels to revive the traditional practice of recognising and respecting the age and wisdom. Family especially the youngsters should be empowered to give due respect and dignity to elderly, prevent isolation, loneliness and the feeling of unwantedness through a pragmatic approach; thereby rendering the home environment most conducive for a comfortable, happy and healthy living of the older generation.