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
3.2 PLAN OF ACTION
3.3 SELECTION OF SAMPLE
3.4 SELECTION OF TOOLS AND DATA COLLECTION
3.5 ANALYSIS OF DATA

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 be 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, clinical 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 weight 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.,
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 (m²). 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 acromion). 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 (Whitehead, 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,

\[
\text{Raw equivalent of one food ingredient in a preparation} = \frac{\text{Total raw weight of the ingredient used in a preparation} \times \text{cooked weight of the preparation consumed by the individual}}{\text{Total cooked weight of the preparation}}.
\]

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.

\[ \text{Index} = \frac{S_i}{3n\times100} \]

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.