Methodology
Population aging is a universal phenomenon and will be the most important demographic problem of the 21st century. The rate of growth of population aging is higher in the developing countries than in the developed countries. The present study aims at finding out the quality of life of the elderly in Thiruvananthapuram district. In research, the success of any investigation depends largely upon the selection of a suitable methodology. This chapter is devoted to a description of the methods of investigation followed in the present study.

3.1 Locale of the study

Thiruvananthapuram is the southern most district of Kerala State and became its capital due to historical reasons. The district is bounded on the north by Kollam district, on the east by Tirunelveli district, on the south and south east by Kanyakumari district of Tamil Nadu and on the west by the
Lakshadweep sea. The district with an area of 2192 sq.kms had the largest elderly population of 32.35 lakhs in 2001 (Economic Review, 2007).

Thiruvananthapuram district, being the capital city of Kerala, has been selected as the area for the present study. The district can be divided into three geographical regions – highlands, midlands and low lands. There are 84 gram panchayats, 120 villages, 12 block panchayats, 4 taluks, one district panchayat, 4 municipalities and one corporation in the district. The details regarding the area of the study is picturized in Figure III.

3.2 Selection of the sample

The selection of a truly representative sample is essential to identify, the realistic aspects of any problem. A sample is that part of the universe which we select for the purpose of investigation. A total of 800 elderly people were selected as the sample for the study.

The elderly people were identified using the voter's list. From this entire list, the samples were selected using systematic random sampling method. Equal considerations were given to both the genders.

Even though, the rural – urban difference is hazy in Kerala (Nayar, 2000), proportionate sampling was done in order to get the proportionate number of samples from rural and urban areas. As per 2001 census, 25.97 % of the people in the district belong to urban areas. Thus, out of the total
Fig. 3
Map showing the locale of the study
800 samples selected, 208 samples were taken from urban areas and 592 samples were taken from rural areas.

Thiruvananthapuram district is divided into four taluks, viz: Thiruvananthapuram, Neyyattinkara, Nedumangadu and Chirayinkeezhu. Almost all the urban areas come under the Thiruvananthapuram taluk. The four taluks comprises of a total of 120 villages, which includes urban and rural areas. Out of these villages, every third village has been selected as the area for study. The details regarding the sample selection is shown in Figure 4.

3.3 Selection of method
The quantitative and qualitative data were collected for the present study, as the concept of quality of life of elderly is both quantitative as well as quantitative. Thus interview method was used to collect the data for the study. A cohort study was also carried out among selected five elderly in order to suggest possible remedial measures to improve the quality of life of the elderly.

3.4 Selection of tools
For any successful research, selection of suitable instrument is of vital importance. In order to select the appropriate tools for the study, the researcher examined a number of research reports and projects, and held
Fig. 4
Details regarding selection of samples
discussions with various experts in the related field. On the basis of their suggestions, discussions and reviews, the researcher identified and chalked out the various aspects for the study. Thus the following tools were developed systematically.

1. Interview schedule
2. Checklist
3. Quality of life assessment scale.

3.4.1 Interview schedule

In the interview method, the data are collected by the investigator directly from the respondents through face-to-face contact with the help of the preset items in the schedule.

A detailed interview schedule was prepared to elicit information regarding the following aspects.

3.4.1.1 Personal and socio economic status

The personal and socio economic status of the samples were found by collecting relevant information regarding the age, gender, place of residence, religion, marital status, educational qualification, professional status, retirement details, reasons for the present employment, family composition, income, its sources, expenditure pattern, details regarding children and pension status.
3.4.1.2 Familial variables and other variables

Apart from the personal and socio-economic data, details regarding the familial and certain other variables, which were found to be crucial for the study, were also collected using the schedule. It includes data related to the person with whom the elderly lives, number of friends, details regarding financial dependency, extent of decision making power in the family, extent of freedom enjoyed, details regarding the leisure time activities, availability of facilities, details regarding the participation in social events and activities, participation in various organizations, details regarding savings and possession of assets and vehicles.

3.4.1.3 Health and nutritional intake

The health and nutritional intake of the samples were assessed by using questions related to general health, physical health, disease conditions, treatment, extent of mobility, health check ups and details of dietary pattern.

3.4.1.4 Study of the sub samples

A sub sample of eighty numbers were selected in order to study the nutritional intake of the samples in detail. A twenty-four hour recall method was planned to find out the nutritional intake and dietary pattern of the samples and bio clinical assessment were done to understand the health profile of the elderly.
Plate 4
Interview in progress
3.4.1.4.1 Twenty four hour recall method

In the 24-hour recall method of oral questionnaire survey, a set of standard cups, spoons and glasses were used to collect information on the dietary pattern of the samples. The type of preparations made at breakfast, lunch, tea time and dinner were noted. An account of raw ingredients used for each preparation were recorded. The quantity of food consumed by the samples was also noted. The standardized cups and spoons helped the samples to recall the exact amount of foods consumed by them (Thimmayamma, 1987). With the help of this data, nutritive value of the diet was calculated using Food Composition Tables. The eight nutrients thus calculated were energy, protein, calcium, iron, vitamin A, thiamine, riboflavin and vitamin C. The nutritive values obtained were then compared with the RDA suggested by ICMR, 1998 (www.icmr.nic.in).

3.4.1.4.2 Bio clinical assessment

Bio clinical assessment was done among the sub samples to find out the health conditions of the elderly. Serum glucose level, serum cholesterol level, hemoglobin level and blood pressure of the samples were estimated with the help of a qualified nurse. The results obtained were compared with the standard values. The details regarding the bio clinical assessment is given on Appendix I.
3.4.2 Assessment of problems faced by the elderly

In order to identify the problems faced by the elderly, a checklist was prepared by the researcher. It consisted of 50 statements, under three sub headings such as physical problems, psychological problems and financial problems, each having two alternatives such as 'Yes'or 'No'.

A score value of '2' and '1' were given for the responses 'Yes' and 'No' respectively. The sum of the scores for all the questions will represent a score for the overall problems faced by the elderly. Thus the maximum score that can be obtained by a sample was '100' and the minimum was '50'.

3.4.3 Assessment of quality of life

A quality of life assessment scale was developed and standardized by the investigator to assess the quality of life of the elderly. It was intended to measure the various dimensions and components involved in the quality of life.

The term 'quality of life' has been defined by various authors and international organizations like the WHO, UNESCO, UNDP etc and developed indices in the form of 'physical quality of life assessment scale' or 'Human Development Index'. On the basis of an extensive review of literature, eleven attributes were chosen to assess the quality of life of elderly. They were
physical well-being, family life satisfaction, friendship, living arrangements, economic well-being, psychological well-being, recreational activities, religious activities, social network, health and decision making.

Initially, 118 statements were incorporated in the draft scale of the quality of life assessment scale. Discussions with subject experts in the connected field were carried out. In the light of their suggestions, necessary additions and deletions were made and the tools were modified accordingly. The relevancy of the statements were assessed, and the most relevant statements were selected for the final assessment scale. Thus a total of eighty statements were finalized and were included in the final scale which consists of eleven dimensions. The final form of the quality of life assessment scale is given on Appendix II.

3.4.3.1 Physical well-being

It refers to measuring the physical health status, functional outcome or quality of life of an individual. It is indeed a primary indicator of a healthy physical state of the people. Hence seven statements regarding physical ability of the elderly were incorporated under this section.

3.4.3.2 Family life satisfaction

Family, being the basic unit of social structure, is a crucial indicator for determining the quality of life of the people. Seven statements relating to the family life satisfaction were included under this attribute.
3.4.3.3 Friendship

Friendship is an important recreational aspect as far as an elderly is considered. It is a measure for rest, relaxation and enjoyment during old age. Hence, seven statements were included in order to find out the relationship with friends.

3.4.3.4 Living arrangements

It refers to an arrangement to allow people to coexist in a group which can be a family, a society or even a community. Living arrangements play a major role in determining the quality of life of the elderly. Information on the availability of proper food, clothing, shelter, security, privacy, safe drinking water, ventilation, light, space and toilet were gathered to assess the extend of living arrangements.

3.4.3.5 Economic well-being

Economic well-being denotes the financial independency of an individual. It is yet another aspect in the quality of life especially of an elderly. Statements regarding the financial status, dependency and extent of financial freedom enjoyed by the elderly were assessed by applying six statements.

3.4.3.6 Psychological well-being

Psychological well-being is a state in which an individual is able to use his or her cognitive and emotional capabilities, performance in society,
and coping with the ordinary demands of everyday life. Psychological well-being is crucial for ensuring good quality of life of an individual.

Questions regarding the state of mind, self-confidence, emotional capabilities, stress and strain in their daily living were incorporated.

### 3.4.3.7 Recreational activities

It refers to the activity engaged in by an individual, for relaxation and amusement, which determines his or her quality of life. It acts as a refreshment of one's mind or body after work through an activity that amuses or stimulates them. Thus statements relating to the leisure time activities and hobbies were asked under this attribute.

### 3.4.3.8 Religious activities

This represents the extent of involvement, one has in the activities related to his or her religion. Questions regarding faith in God, time spend for worshipping God and other religious activities were assessed.

### 3.4.3.9 Social network

Social network is widely recognized as social relationships and affiliations that have powerful effects on physical and mental health and thereby on the quality of living of an individual. It is also an association of people drawn together by family, work or hobby. Six statements relating to
the social status and participation in the welfare activities were incorporated in this section.

3.4.3.10 Health

Health can be defined as a state of complete physical, mental and physical well-being and not merely the absence of any such infirmities or diseases. Good health of an individual is a sign for a well determined quality of life. Four statements regarding the general health of the elderly were included under this section.

3.4.3.11 Decision making

Decision making, also referred to as problem solving, is the process of recognizing a problem and finding a solution to it. Decision making is an important factor in family living. The power of an individual has in decision making, is a predator for his or her well determined mental state, and hence is very crucial for determining the quality of life of the individual. Statements regarding the participation of the elderly in decision making in their family were included.
<table>
<thead>
<tr>
<th>Section</th>
<th>Attributes</th>
<th>Statements included in the draft scale</th>
<th>Statements included in the final scale</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Physical well-being</td>
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<td>7</td>
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<tr>
<td>2</td>
<td>Family life</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Friends</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Living arrangements</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Economic well-being</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Recreational activities</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>Religious activities</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Social network</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>Psychological well-being</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Health</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Decision making</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>118</strong></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

The final quality of life assessment scale consisted of 80 statements under eleven attributes. The respondents were asked to mark their opinion on a 5 point continuum. The five points were 'Strongly Agree' (SA), 'Agree' (A), 'Undecided' (UD), 'Disagree' (D) and 'Strongly Disagree' (SD). There were 62 positive statements and 18 negative statements that
were given scores of 5, 4, 3, 2 and 1 respectively for a positive statement and vice versa for a negative statement. The sum of the scores for all the items of an elderly represents a score for quality of life. Thus the maximum score that can be obtained, if an elderly answers all the statements positively was '400' and the minimum was '80'.

3.5. Calculation of reliability and validity

3.5.1 Reliability

The two essential characteristics of a sound test are its reliability and validity.

A reliable survey instrument is consistent; a valid one is accurate. A reliable instrument is one that is relatively free from 'measurement error'. Because of this 'error', individual's obtained scores are different from their true scores, which can only be obtained from perfect measures (Fink, 2001).

There are different methods commonly used for determining the reliability of a test- Test-retest method, parallel forms method, split-half method and methods of rational equivalence. The technique of split-half is the most basic method used when a measure contains a large number of items.

Therefore, the Guttman's split-half method was used in this study. From the reliability of the half test, the rate of the whole test was calculated
using the formula;

\[
\text{Reliability of the whole test} = \frac{2 \times \text{reliability of the half test}}{1 + \text{reliability of the half test}}
\]

The value of reliability of the whole test was calculated and found to be 0.5636. As this value is significant and reasonably high, it clearly indicates that the scale has high reliability.

### 3.5.2 Validity

Validity refers to the degree to which a survey instrument assesses what it purports to measure. Valid survey instruments serve the purpose they are intended to and provide correct information. Valid instruments are always reliable too (Fink, 2001).

The validity of the quality of life assessment scale was established through the Croubach's Apha methods (value = 0.8239), and were found to be significant, thereby indicating a reasonably high construct validity. The details regarding the reliability and validity is given in Appendix IV.

### 3.6 Pilot study

Any research work needs perfection and adaptability. Pilot study helps to eliminate the confusions, bias and misunderstanding that might occur while constructing the tools for the study. This will also help to improve the tools, the questions and also avoid repetitions. Hence a pilot study was
done among 50 elderly men and women. Necessary modifications were made in the tool after the pilot study. The tools were also prepared in Malayalam for the convenience of administration.

3.7 Collection of data

Both primary and secondary data were collected for the present study. Secondary data were collected from books, journals, magazines, articles, news reviews, research works, official and authorized websites, daily newspapers, voluntary agencies and Government offices.

Primary data for the study were collected from different villages throughout the district. A sample of 800 elderly men and women were identified. The data collection was done on an individual basis by interview method.

Each unit in the sample was approached individually after establishing a good rapport with them. During the interview session, sub samples were identified. Later they were grouped together for executing the bioclinical assessment.

3.8 Scoring and analysis of data

After collecting the data, the responses were coded, edited, classified, tabulated and analyzed to find out the significance of differences among the study groups with regard to the different variables of the study,
and also to identify the level and degree of relationship among different variables with regard to the present study groups.

### 3.8.1 Statistical tests applied

The following statistical techniques were used to analyze the data for the study.

1. Student's t-test
2. Analysis of variance along with Scheffe’s test
3. $\chi^2$ test
4. Mann-Whitney Test

The analyzed results are dully interpreted after ascertaining the level of significance of the results. The results of the analysis are shown in percentages.

### 3.9 Cohort study

A cohort study has been carried out in the present research work in order to understand whether any improvements can be made possible in the quality of life of the elderly. Hence, a group of five elderly, comprising three elderly women and two elderly men were randomly selected from the sub samples, who were interested in becoming a cohort. This group was under careful observation for a period of six months. An intervention
programme was carried out during this period, which includes assessment of anthropometric measurements, bio clinical analysis, diet counseling, yoga and mental counseling. Separate pamphlets were prepared for the cohorts regarding diet and yoga. An elderly camp was also organized as part of the intervention programme. A pamphlet was also prepared and distributed among the elderly, in the camp on healthy tips for healthy aging.