DESIGN OF THE STUDY
CHAPTER III

DESIGN OF THE STUDY

This chapter deals with the methodology followed in this study entitled “Determinants of Nutrition and Reproductive Health Cognition among School Going Rural Adolescents”. The methodology is discussed under the following headings:

3.1 Type of Study
3.2 Population of the Study
3.3 Subjects of the Study
3.4 Selection of the Subjects
3.5 Variables of the Study
3.6 Research Tools used for the Study
3.7 Methods of Data Collection
3.8 Intervention Programme
  3.8.1 Implementation of Intervention Programme
  3.8.2 Duration of the Study
3.9 Data Processing and Analysis

3.1 Type of Study

The present study entitled “Determinants of Nutrition and Reproductive Health Cognition among the School Going Rural Adolescents” is of descriptive type. It provides information on the knowledge level and attitude of selected school going rural adolescents on nutrition and reproductive health. The study also describes an intervention programme that was formulated on the basis of
the background information collected as well as its conduct and its effectiveness.

3.2 Population of the Study

School going rural adolescents (26850) belonging to the age group of 13 to 16 years were the population of the study. They were from Kazhakuttom Block of the Thiruvananthapuram district of Kerala state. This area was selected because earlier surveys done by a team of researchers of Thiruvananthapuram Medical College reported the incidence of low birth weight babies (Shenoy, 1999). Another study by Nair (2000) also reported that the prevalence of low birth weight in Kerala is high. While for India it is 33 per cent that of Kerala it is between 19 to 26 per cent and for the capital of Kerala, Thiruvananthapuram it is 24.5 per cent. The pre-disposing factor of this incidence was attributed to mainly poor adolescent nutrition status. Anaemia during pregnancy and maternal height less than 140cm and weight less than 40kg which is much less than the standard parameters were also found as causative factors of the incidence of low birth weight babies in this region. This finding brought to light the need for finding out whether lack of knowledge was basic to the problem. So an attempt was made to study the knowledge level of selected school going rural adolescents on nutrition and reproductive health. On the basis of the findings of this survey an intervention programme was planned.
3.3 **Subjects of the Study**

The subjects of the study comprised 505 school going rural adolescents. The subjects were drawn from the selected eight schools for the purpose of the study. There were 255 boys and 250 girls. They belonged to the age group 13 to 16 years. The subjects of the study were selected on random basis from VIII, IX, X and XI classes. The study subjects selected for undergoing the intervention programme belonged to 16 years age group. This group was selected because they would have better ability to understand and hence could be subjects for group learning. The main criterion used to select the 64 subjects, namely, 39 boys and 25 girls, for the intervention programme was the low initial knowledge scores obtained by them in the main survey.

3.4 **Selection of the Subjects**

Multi stage sampling method was followed for the selection of subjects. In stage one, eight high schools in Kazhakuttom block of Thiruvananthapuram district were selected out of the available 18 high schools by simple random sampling.

In stage two, an enlistment survey was conducted among the eight schools as a preliminary step to identify the children who had completed 13, 14, 15 years among girls and 14, 15, 16 years among boys by going through the admission register. The list consisted of 12650 girls and 14200 boys. From this list, a sample size of two per cent of the total population belonging to defined age groups was fixed intentionally.
Schoolwise distribution of sample is given in Table 3.1.

Table 3.1

Schoolwise Distribution of the Sample

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the School</th>
<th>Type of the School</th>
<th>Total Population of the Selected Age Group</th>
<th>Actual Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>High School, Sreekariyam</td>
<td>Government</td>
<td>3500</td>
<td>70</td>
</tr>
<tr>
<td>3.</td>
<td>Muslim High School for boys, Kaniyapuram</td>
<td>Aided</td>
<td>3400</td>
<td>66</td>
</tr>
<tr>
<td>4.</td>
<td>Muslim High School for girls, Kaniyapuram</td>
<td>Aided</td>
<td>3300</td>
<td>64</td>
</tr>
<tr>
<td>5.</td>
<td>Madhavavilasam Higher Secondary School, Thundathil</td>
<td>Aided'</td>
<td>3250</td>
<td>44</td>
</tr>
<tr>
<td>6.</td>
<td>Higher Secondary School, Pallithura</td>
<td>Aided</td>
<td>3350</td>
<td>46</td>
</tr>
<tr>
<td>7.</td>
<td>Aluthman Medium Secondary School, Kazhakottom</td>
<td>Unaided</td>
<td>2300</td>
<td>66</td>
</tr>
<tr>
<td>8.</td>
<td>Jyothinilayam Medium High School, St. Andrews</td>
<td>Unaided</td>
<td>2350</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>26850</td>
<td>505</td>
</tr>
</tbody>
</table>

Thus a total sample of 505 adolescents (boys 255 and girls 250) were selected. The details of the sampling is shown diagrammatically in Fig 3.1.
3.5 Variables of the Study

The study aimed to find out the determinants of nutrition and reproductive health cognition of school going rural adolescents. Accordingly, the dependent and independent variables selected were as follows:

3.5.1 Dependent Variables.

3.5.1.y1. Knowledge on nutrition: This was the score obtained in the knowledge test on nutrition.

3.5.2.y2. Attitude towards nutrition: This was measured using an attitude scale. On the basis of the scores it was decided...
whether they possessed favourable, neutral or unfavourable attitude.

3.5.3.y3. Knowledge on reproductive health: This was the score obtained in the knowledge test on reproductive health.

3.5.4.y4. Attitude towards reproductive health: This was measured using an attitude scale.

Nutrition cognition is the outcome of nutritional awareness. It is basically the knowledge of nutrients in food and their role in physiological and biochemical reactions in the body and the attitude towards food consumption pattern. Hence nutrition cognition is operationally defined as nutritional knowledge as well as nutritional attitude.

Similarly reproductive health cognition is operationally defined as knowledge on human sexuality and attitude towards reproductive health education.

3.5.2 Independent Variables. Based on the review of literature and discussions with experts 10 independent variables that were expected to be related with the selected dependent variables were identified. The independent variables selected for the study are listed below:

3.5.2.Xi Age: It referred to chronological age of completed years attained by the respondents collected from the school admission registers at the time of interview.

3.5.2.X2 Sex: Both boys and girls were included in the study.
Religion: Religious affiliations influence the attitude and behaviour of the individual. So care was taken to draw the sample belonged to different religions, namely, Hindu, Christian and Muslim.

Type of family: Three types of families were included. They were nuclear, joint and extended. Operationally, for the purpose of the study the term nuclear was applied to family units consisting of husband, wife and their unmarried children. The term 'joint' was used to the families having at least two married couples, living in a common residence and where the members were related as father son or as brother. The extended family type includes one or two relatives like the husband's unmarried brother or wife's unmarried sisters living along with the nuclear family members.

Birth order: The birth order of the individuals offer significant opportunities to acquire knowledge and develop attitudes. Birth order of adolescents considered in this study included first, middle and last born.

Maternal education: A higher maternal education level has an influence on the knowledge acquisition of adolescents. Various educational levels from no education, primary, secondary and collegiate were included in the present study.
3.5.2.X_7 Maternal employment: Categories included were unemployed, unskilled, white collar and professional.

3.5.2.X_8 Family income: Monthly family income from all sources was included. Categorization of the income for this study comprised low, middle and high.

3.5.2.X_9 Sources of information: It referred to the accessible sources of media of awareness creation such as television, radio, print materials etc.

3.5.2.X_10 Type of school: Government, aided and unaided schools were included in the study.

3.6 Research Tools Used for the Study

The tools used in the study included the following:

3.6.1. A questionnaire to elicit information on the socio economic background of the families of the rural adolescents and their personal characteristics (Appendix I)

3.6.2 One knowledge test each for determining the knowledge level of the rural adolescents on nutrition and reproductive health

3.6.3 An attitude scale each to describe the attitude of the rural adolescents towards nutrition and reproductive health aspects
3.6.1 Development of the Questionnaire. A questionnaire was constructed to collect information about the respondents’ sex, age, type of school, family composition, birth order, parental education, parental employment, family income and accessible sources of information for nutrition and reproductive health knowledge. There were questions to know about the physical amenities of the household, such as electricity, pipe connection and sanitary latrines. The questionnaire consisted of 14 questions. It was pretested before finalizing.

3.6.2 Construction of Nutrition Knowledge Test. Knowledge is one of the important components of behaviour and hence it plays a vital role in the performance of the individual. Knowledge is generally understood as an ultimate acquaintance of an individual with facts. Bloom et al. (1965) defined knowledge as those behaviour and test situation which emphasizes remembering either by recognition or recall of ideas, materials and phenomena.

In order to measure the knowledge level of the school going rural adolescents on nutrition, a nutrition knowledge test (Appendix II) was developed as detailed below:

Item Collection. Based on the content of the curriculum included in the science text books of high school classes, 55 items were collected to form the initial test battery to carry out item analysis for developing a knowledge test. The items for knowledge test were selected by consulting high school science teachers. A number of items were also obtained from nutrition experts of the Home Science Department, Kerala Agricultural University.
Item Analysis. Item analysis yielded two kinds of information, that is an index of item difficulty and index of item validity. The selected 55 items were administered to 60 rural adolescents randomly selected from a school which was not included in the main study. Each item had three answers, right, wrong and no idea. Every right answer was given a score 1, wrong response 0 and the ‘no idea’ response was given -1. There was thus a possibility for a respondent receiving a maximum of 35 score if all answers were correct or ‘zero’ if all answers were wrong or no idea. The total score for each respondent was thus calculated and arranged in descending order from higher to lower. After that the respondents were divided into six equal groups - G1, G2, G3, G4, G5 and G6 with 10 respondents in each group. For item analysis middle two groups, namely, G3 and G4 were eliminated retaining only the four terminal groups with high scores (G1 & G2) and with low scores (G5 & G6).

The next step was to determine item difficulty index. The index of the item difficulty indicator is the extent to which an item is difficult. An item should not be easy that all persons can pass it, nor should it be so difficult that none can pass it.

The item difficulty was worked out in the present study by employing the following formula:

\[
\frac{(S1 + S2) + (S5 + S6)}{n1 + n2} \times 100
\]
Where,

\[ S_1, S_2, S_5, S_6 \] were the frequency of correct answers in the age group \( G_1, G_2, G_5 \) and \( G_6 \) respectively and

\[ n_1 + n_2 = \text{total number of respondents in high and low groups.} \]

The item with difficulty values ranging from 20 to 80 only were considered for final selection of the knowledge test battery.

The second criterion for item selection was the discrimination index indicated by \( E_{1/3} \) value for an item. The function of item discrimination index is to find out whether an item nearly discriminates a well informed respondent from a poorly informed respondent. The formula used was as follows:

\[
E_{1/3} = \frac{(S_1 + S_2) - (S_5 + S_6)}{N/3}
\]

Where \( S_1, S_2, S_5 \) and \( S_6 \) are the frequencies of correct answers in the group \( G_1, G_2, G_5 \) and \( G_6 \) respectively. \( N \) was the total number of respondents in the sample collected for analysis.

In the present study the items with \( E_{1/3} \) values ranging from 0.20 to 0.75 were considered for inclusion in the knowledge test.

3.6.3 Construction of Nutrition Attitude Scale. A scale comprises a set of numerals given to the objects by using a certain rule of assignment. The scaling techniques have come into being because of the need felt by the social sciences to quantify the data which is otherwise qualitative in nature (Muthayya, 1976).
Thurstone (1946) defines attitude as the degree of positive or negative affect associated with some psychological object.

As attitudes cannot be directly measured and have to be inferred from the opinion and expressions of the individuals, it is imperative to have as many clear and simple statements as to provide opportunity to the respondents to reveal the extremes of his or her attitude. In the present study an attitude scale following the summated rating technique of Likert (1932) was developed to measure the attitude of school going rural adolescents towards nutrition (Appendix III).

The construction of attitude scale included the following:

**Collection of Items.** All possible statements which will discriminate the positive and negative attitudes of the adolescents towards Nutrition were collected through a pilot survey, discussion with experts and review of literature. Thus a total of 50 statements were identified.

**Selection of Items.** These statements were given to 30 experts (10 school teachers, 10 health professionals, 10 nutritionists), to test their relevancy to be included in the scale. The responses were collected in a four point continuum of Very Much Relevant (VMR), Much Relevant (MR), Some what Relevant (SR) and Not Relevant (NR). The scores were given as 4, 3, 2 and 1 for VMR, MR, SR, NR respectively. The total score for each statement given by the expert was calculated. The statements were ranked in descending order of their scores. From this 20 statements each with highest scores were selected and subjected to item analysis.
**Item Analysis.** Item analysis is an important step towards constructing a valid and reliable scale. The purpose of item analysis is to examine how well each item discriminates between persons having different attitudes. On the basis, items with good discriminated values were selected and others eliminated.

The statements were administered to 100 rural school going children of non sample area selected randomly. They were asked to respond to each statement in terms of their own agreement or disagreement on a five point continuum such as strongly agree, agree, undecided, disagree and strongly disagree. The various responses were assigned numerical weightage varying from 5 strongly agree, 4 agree, 3 undecided, 2 disagree, 1 strongly disagree for positive statements. For negative statements the order was reversed. The total score was the summation of numerical weight assigned to each response.

The subjects were then arranged in an array based on the total score obtained by them. Twenty five per cent of the respondents with higher total scores and 25% of the respondents with lower total scores were selected from among the respondents. These two groups formed the criterion groups. To evaluate individual statement, the critical ratio that is t value which is a measure to the extent to which a given statement differentiates between high and low group respondents was found out. For each statement t value was calculated. The statement with highest t value that is more than 1.75 was selected. Thus the finalized attitude scale consisted of 12 positive and 12 negative statements.
3.6.4 Reproductive Health Knowledge Test. A knowledge test on reproductive health was adapted from the one developed by National Population Education Project (NPEP) under National Council for Education Research and Training (NCERT, 1990) with necessary modification. The test consisted of 24 items on reproductive health, 8 questions regarding personal hygiene and 8 questions on health care practices (Appendix IV). Same procedure as was followed for the construction of Nutrition Knowledge Test was followed here also.

3.6.5 Reproductive Health Attitude Scale. An attitude scale on reproductive health was also adapted from the one developed by the NPEP under NCERT to suit the requirements of the present study which consisted of 22 statements, 11 positive and 11 negative statements which dealt with the importance of sex education, AIDS awareness and adjustment to pubertal changes (Appendix V).

3.6.6 Validity and Reliability of Tools. A test composed of items revised and selected on the basis of item analysis, will be a reliable one (Ebel, 1966). The procedure adopted for construction of the test provides ample evidence for the validity of the test.
Validity of the Tools. If any test measures that which is relevant is said to be a valid one. Since the tests were prepared by consulting the concerned experts and referring to relevant literature, the tools were considered to have content or intrinsic validity. Validity of the tools was ensured through a pilot study.

Reliability of the Tools. The reliability of the test was found out using the split half method. The correlation between the scores for the two halves was found out using Pearson’s Product-Moment Coefficient of Correlation. The reliability of the half test was 0.52. The obtained value of 0.52 half reliability was corrected using Spearman-Brown Prophecy Formula. The reliability of the full test was found 0.68 indicating that the prepared knowledge test had reasonably higher reliability.

The coefficient of internal consistency 'roe' of the nutrition attitude scale developed was worked out using the formula

\[
\text{Roe} = \frac{P_{xy}}{\sigma_x \sigma_y}
\]

roe = the correlation co-efficient between the sum of scores on odd and even numbered items in the scale

\[
P_{xy} = \text{the product moment of scores on odd and even numbered items}
\]

\[
\sigma_x = \text{the standard deviation of the distribution of scores on odd numbered items}
\]

\[
\sigma_y = \text{the standard deviation of scores on even numbered items}
\]
The obtained rtt value was 0.85 which showed high reliability.

The obtained rtt value was 0.85 which showed high reliability.

3.6.7 Pretesting the Tools. Research tools developed for the study was pretested with thirty school going adolescents who were not part of the total study sample, and necessary modifications were made based on the pretest.

3.7 Methods of Data Collection

The selected school children were administered the data collection instruments in groups within the class room by the interviewer herself because an interviewer administered questionnaire ensures answers to more complex questions, completion of all questions and an explanation of problems (Eastwood, 1997).

After briefing the students on the purpose of the study, they were given first, the questionnaire to elicit information on their family background as well as their personal characteristics. After collecting the filled in questionnaire, the knowledge test to assess their nutrition knowledge was given, followed by the nutrition attitude scale.
After taking back the filled in nutrition knowledge test and attitude scale, a briefing was given on the reproductive health knowledge test and attitude scale. These tools also were administered among the selected school children, one after another to collect their responses.

All the questions in the knowledge and attitude scales had multiple answers and the school children had to tick only the option of their choice. The instructions and items for each tool were read aloud to the subjects, as the case may be, during the time of data collection in order to ensure that reading level did not interfere with accurate completion of answers. The average time taken for data collection was one hour 30 minutes.

3.8 intervention Programme

On the basis of the findings about deficiency in knowledge in the selected areas, namely, nutrition and reproductive health, an intervention programme was planned. It was planned to evolve modules of teaching learning in the areas of nutrition and reproductive health so that the programme could be replicated in other schools also as a co-curricular activity. The course material formulated for the intervention programme (Appendix VI) had 5 modules comprising definition of Nutrition, Nutritive needs of adolescents, Nutritional deficiency, Reproductive health and Health care practices. The course material prepared was evaluated by 10 subject experts to assess its suitability for the intervention programme. Evaluation schedule formulated for subject experts is given in Appendix VII.
80 adolescents consisting of equal number of boys and girls, who had obtained low knowledge scores on Nutrition and Reproductive Health Cognition were selected to undergo the education intervention programme from Government Higher Secondary School Kulathoor, because the school had assured full cooperation for the implementation of the education intervention programme as part of their science club activity.

Parental consent had been obtained from the parents of the selected adolescents for undergoing the intervention programme as the programme was proposed to be conducted during out of school hours. Only 39 boys and 25 girls finally underwent the intervention programme. Single group pretest-posttest evaluation was followed to study the impact. No control group was fixed for the experimentation. Group teaching method was followed. Hence the participants were divided into 8 groups; each consisting of eight members. Education was imparted using the modules once in a week in the school during out of school hours. Reading material prepared on the topic nutrition and health in vernacular language was also distributed among the participants which is given in Appendix VIII. The course material was given to each group. Each unit in the course material was discussed in the group. The content of the topic was read by one of the group members before all the members of the group. After reading, the group discussed the topic and made a small write up. After one hour, all the eight groups assembled together and the leader of any one group summarized the messages learnt. The duration of the teaching session extended upto 90 minutes. The implementation of intervention was done over a period of 5 months (total 20 sessions). The
effect of the intervention programme on the knowledge gain and attitudinal change of intervention study sample was evaluated using the same knowledge tests and attitude scales developed for the total sample study. The analysis of the pre and post test responses of the participants showed the effect of the intervention programme.

3.8.2 Duration of the Study. The entire field work including data collection and the conduct of the intervention programme covered 11 months period in two sessions, from July 2001 to December 2001 for data collection and from June 2002 to October 2002 for implementation of intervention programme.

3.9 Data Processing and Analysis

Data analysis was done by using computer facility and Statistical Package for Social Science (SPSS). The statistical techniques used were measures of central tendency, measure of variability, correlation, multiple classification analysis and ANOVA. The details are as follows:

3.9.1 Frequency and percentage

Generated data were subjected to processing and interpreted in terms of frequency and percentages.

3.9.2 Mean, standard deviation and t values of nutrition knowledge scores and attitude scores as well as reproductive health knowledge scores and attitude scores in respect of selected socio economic variables was found out.
3.9.3 Karl Pearson's correlation were computed to find out the inter relationship and degree of association between the selected dependent variables, namely, Nutrition Cognition and Reproductive Health Cognition.

3.9.4 Multiple classification Analysis was done to find out the magnitude of influence of independent variables on the dependent variable.

3.9.5 ANOVA was resorted to for finding out the significant effect of the selected independent variables on the dependent variables.