CHAPTER III

METHODOLOGY

Research Methodology is the systematic, theoretical analysis of the methods applied to a field of study, or the theoretical analysis of the body of methods and principles associated with a branch of knowledge. The design of any research project requires considerable attention to the research methods and the proposed data analysis. It indicates the general pattern for organizing the procedure of gathering valid and reliable data for investigation.

The present chapter deals with a brief description of methodology adopted for the study. The content included in the chapter are Research Approach, Research Design, Variables under study, Setting, Population, Sample and Sample size, Sampling Technique, development and description of tool, data collection procedure, description of treatment, Validity and reliability, pilot study, and plan for data analysis for present study.

The researcher in the present study aimed at evaluating the effectiveness of Pulmonary Rehabilitation Program (PRP) on physiological parameters and quality of life among patients undergoing Coronary Artery Bypass Grafting (CABG) in selected hospital of Delhi with the help of structured Performa, structured interview schedule, observation checklist.
The research approach is an overall plan or blueprint chosen to carry out the study. For the present study a *quantitative experimental approach* was considered to be the most appropriate to accomplish the objective of the study. This approach will help to a great extent in evaluating the programs, procedure and technique.

Quantitative experimental approach to doing research is within the classical scientific paradigm of natural, "hard" sciences like physics. The scientific method implies postulating hypotheses, doing quantitative experiments, and then either sustains or reject the hypotheses based on statistical analysis of the measured data (verification or falsification of hypotheses). The scientific method may be claimed to be the "best" research approach in relatively well known areas of research and when natural laws can be assumed to exist (in the sense that phenomena are repeatable and to some degree controllable). Even if there are indefinitely many theories explaining a given set of data, experiments may be repeated and theories can be verified.

**RESEARCH DESIGN**

Design is a strategy that directs a researcher in planning and implementing a study in a way that is most likely to achieve the intended goal. Research design is an overall plan
for obtaining answers to the questions being studied and for handling some of the
difficulties encountered during the research process. Research design incorporates most
important methodological decisions that researcher makes in conducting the study.

According to Polit and Beck, (2010), “**The research design** is the researchers overall
plan for answering research questions. In quantitative studies, the design indicates
whether there is an intervention, the nature of any comparison, the method used to
control confounding variables, whether there will be masking (blinding), and the timing
and location of data collection”.

Keeping the hypothesis and objective in mind research design **selected for the present
study was quasi experimental design. Under quasi experimental design time series
non equivalent control group design was chosen.** To study the cause and effect
relationship by exposing the experimental group to the treatment and compared the result
with the findings of non equivalent control group which has not been exposed to
treatment.

According to Polit and Beck, (2010), “Quasi experiments (controlled trials without
randomization) involve manipulation but lacks a comparison group or randomization.
Strong quasi experimental design introduces controls to compensate for these missing
components”.

Quasi-experiments provide an important alternative when true experiments are not
possible. Quasi-experiments lack the degree of control found in true experiments; most
notably, quasi-experiments typically lack random assignment.
TIME SERIES NON-EQUIVALENT CONTROL GROUP DESIGN

Non-Equivalent control group design is a study design in which the control group is not selected by random means. In the non equivalent control group design, a treatment group and a comparison group are compared using pre test and post test measures. If the two groups are similar in their pre test scores prior to treatment but differ in their post test scores following treatment, researchers can more confidently make a claim about the effect of treatment. For the present study the time series non equivalent control group design is as follows :

Experimental Group (E)   O1  X  O2, O3, O4, O5, O6, O7
Non Equivalent
Control group (C )       O1  -  O2, O3, O4, O5, O6, O7
Here : E – Experimental group.
C – Control group.
X – Treatment
O1 to O7 – Observations on pre-operatively and then post operatively on 3\textsuperscript{rd} day, 7\textsuperscript{th} day, on discharge, 30\textsuperscript{th}, 60\textsuperscript{th} and 90\textsuperscript{th} day.
## RESEARCH DESIGN

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-operative Treatment</th>
<th>Postoperative</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obs. 1</td>
<td>Obs. 2 (Day 3)</td>
<td>Obs. 3 (Day 7)</td>
<td>Obs. 4 On discharge</td>
</tr>
<tr>
<td>HR</td>
<td>HR</td>
<td>HR</td>
<td>HR</td>
</tr>
<tr>
<td>RR</td>
<td>RR</td>
<td>RR</td>
<td>RR</td>
</tr>
<tr>
<td>BP</td>
<td>SYS</td>
<td>SYS</td>
<td>SYS</td>
</tr>
<tr>
<td>PF</td>
<td>IC</td>
<td>IC</td>
<td>IC</td>
</tr>
<tr>
<td>SaO2</td>
<td>SaO2</td>
<td>SaO2</td>
<td>SaO2</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Pain</td>
<td>Pain</td>
<td>Pain</td>
</tr>
<tr>
<td>QOL</td>
<td>QOL</td>
<td>QOL</td>
<td>QOL</td>
</tr>
<tr>
<td><strong>Control Group</strong></td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
</tbody>
</table>

HR – Heart rate; RR – Respiratory rate; BP – Blood Pressure; SYS – Systolic BP; DIA – Diastolic BP; PF – Pulmonary function; IC – Inspiratory capacity; PEF – Peak expiratory flow; SaO2 – Saturation of Oxygen; QOL – Quality of Life.

Figure 3.1 : Schematic representation of research design
VARIABLES

Variables are something that changes, an attribute or property of a person, event, or object that is known to vary in a given phenomenon. A variable is a measurable characteristic that varies. It may change from group to group, person to person, or even within one person over time. Variables are generally used in psychology experiments to determine if changes to one thing result in changes to another.

INDEPENDENT VARIABLE

The independent variable is the variable that is controlled and manipulated by the experimenter and influence on the dependent variable. In the present study the independent variable is **Pulmonary rehabilitation program**.

When we are looking for some kind of relationship between variables we are trying to see if the independent variable causes some kind of change in the other variables, or dependent variables.

DEPENDENT VARIABLE

Dependent variable is something that depends on other factors. Usually when we are looking for a relationship between two things we are trying to find out what makes the dependent variable change the way it does. The dependent variable is the variable that is
measured by the experimenter and is interested in understanding the outcome and effect of the independent variable.

In the present study, the dependent variable are following: **Heart rate**, **Respiratory rate**, **Blood Pressure**, **Pulmonary function (inspiratory capacity and peak expiratory flow)**, **Saturation of Oxygen**, **Pain**, **Anxiety** and **Quality of Life**.

**EXTRANEOUS VARIABLE**

Extraneous Variables are undesirable variables that influence the relationship between the variables that an experimenter is examining. These are variables that influence the outcome of an experiment, though they are not the variables that are actually of interest.

In the present study the extraneous variable are **general health status**, **cognitive development**, **personality trait**, **hydration and nutritional level** are built into the study.

**SETTING OF THE STUDY**

The setting is the physical location and condition in which data collection takes place in a study. The selection of the appropriate setting of the study is important because the setting can influence the way people behave or feel and how they respond.

Polit and Hungler, (1999), “Researcher need to decide, where the intervention will be implemented and where the data will be collected”.
The present study was conducted at:

- G.B. Pant Hospital, New Delhi (For experimental group)
- Safdarjung Hospital, New Delhi (For control group)

The rationale for selecting the setting was:

- Availability of the sample.
- Feasibility in conducting the study.
- Administrative approval and cooperation.
- Convenience for the researcher to travel.
- Familiarity with the setting.
- Specialized cardiac care ward.

**ETHICAL CONSIDERATION**

- Written permission was taken from Medical Superintendent of G.B. Pant and Safdarjung hospital.
- For ethical approval documents were submitted to the HOD of CTVS department in G.B. Pant and Safdarjung hospital.
- Sister-in-charge of the wards were informed and a copy of the permission letter was submitted.
- There was no interference on routine care and treatment of the subjects while collecting data.
- The researcher explained the study to the subject and relatives and consent was obtained.
- The anonymity and confidentiality of the subjects in relation to findings was protected.
- The subjects were given full autonomy to take decision for the participation or withdrawal from the research.

**POPULATION**

A research population is generally a large collection of individuals or objects that is the main focus of a scientific query. Population is a complete set of elements (persons or objects) that possess some common characteristic defined by the sampling criteria established by the researcher.

For the present study the population includes patients who are undergoing Coronary Artery Bypass Grafting (CABG).

**SAMPLE AND SAMPLING TECHNIQUE**

**SAMPLE**

Patients who are undergoing Coronary Artery Bypass Grafting (CABG) during the period of study at GB Pant and Safdarjung hospital in New Delhi.
SAMPLING TECHNIQUE

For the present study the sample selection was done by Non-Probability Consecutive sampling technique was used.

Non-Probability Sampling, refers to when researchers take whatever individuals happen to be easiest to access as participants in a study. This is only done when the processes the researchers are testing are assumed to be so basic and universal that they can be generalized beyond such a narrow sample.

CRITERIA FOR THE SELECTION OF SAMPLE SUBJECTS

- Adult Patients with Coronary Artery Bypass Grafting (CABG) admitted in selected hospital in Delhi.
- Willing to participate in the study.
- Patients who can read and write English or Hindi.

EXCLUSION CRITERIA

Pre-operative factors:

- Uncontrolled diabetic mellitus.
- Pre operative intensive care stay.
- Advance age (> 80 y)
- Impaired immune response.
Intra-operative factors:

- Use of bilateral mammary artery.
- Long operative time (> 5 hrs).
- Long Cardiopulmonary time (> 4 hrs).

Post-operative factors:

- Hypotension / hypo perfusion.
- Ventilatory support (> 72 hrs.)
- Post operative CPR
- Re-opening of chest.
- Severe hypoxemia.

**SAMPLE SIZE**

The sample size was determined by testing difference in proportions. In pilot study the difference in proportion for some of the variables were very minimum eliminating those and considering the variable with the differentials more than 5 in the mean values were considered. The sample size came out to be 230.

Therefore the average sample size was restricted to 240.

Tryout = 10 subjects (experimental and control group),

Pilot study = 30 subjects (experimental and control group),

Final study = 200 subjects (experimental and control group),
TOOLS/INSTRUMENTS

The phenomena in which the researcher is interested must ultimately be translated into data that can be analyzed. The most important and crucial aspect of an investigation is the collection of appropriate information which provides necessary data for the study.

The tools for the study were developed and for its preparation following steps were undertaken.

- Planning for the required tools.
- Review of research and non-research literature.
- Detailed discussion with supervisor.
- Opinion of experts sought regarding the clarity and appropriateness of the items.
- Informal discussions with patients, nursing staffs, colleagues in identifying the items.
- Experience of the researcher.

Based on the theoretical framework and objectives of the study, and after extensive review of literature, to know the effectiveness of Pulmonary Rehabilitation Program, the following tools were prepared.

1) Structured interview schedule to collect the demographic characteristics and disease related variables.

2) Observation schedule to observe the physiological parameters by Pulse Oximeter, Counting respiratory rate, BP Apparatus, Incentive Spirometer & Peak flow meter
3) Structured interview schedule for pain assessment by Visual Numeric pain scale.

4) State trait anxiety inventory by C.D. Spielberger’s – for anxiety level.

5) Structured interview schedule for assessment of Quality of Life by Modified WHO QOL BREF.

**TABLE 3.1**

**SUMMARY OF DATA COLLECTION TOOLS & TECHNIQUES USED**

<table>
<thead>
<tr>
<th>Criterion Measures</th>
<th>Tool</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Demographic profile</td>
<td>Structured Performa</td>
<td>Interview</td>
</tr>
<tr>
<td>- Disease related profile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Heart rate</td>
<td>- Pulse Oximeter</td>
<td>Measurement</td>
</tr>
<tr>
<td>- Respiratory rate,</td>
<td>- Counting</td>
<td></td>
</tr>
<tr>
<td>- Blood Pressure</td>
<td>- BP Apparatus</td>
<td></td>
</tr>
<tr>
<td>- Pulmonary function (IC &amp; PEF)</td>
<td>- Incentive Spirometer &amp;</td>
<td></td>
</tr>
<tr>
<td>- Saturation of O2</td>
<td>Peak flow meter</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>Visual Numeric pain scale</td>
<td>Self reporting</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Spielberger’s State trait</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Anxiety Scale</td>
<td></td>
</tr>
<tr>
<td>Quality of Life</td>
<td>Modified WHO QOL BREF.</td>
<td>Interview</td>
</tr>
</tbody>
</table>
DESCRIPTION OF TOOLS

a) Structured Performa was prepared by the investigator for collecting Demographic profile and disease related profile regarding the patients who were undergoing the Coronary Artery Bypass Grafting (CABG). The validity and reliability was also established. The structured interview schedule developed elicit data of the sample. It consists of 14 items on demographic data which includes age, gender, religion, education, occupation, marital status, habitat, lifestyle (active/sedentary), family type, history of smoking, alcohol, diet (vegetarian or non-vegetarian), history of illness, duration of illness, family history of CAD.

b) Observation schedule was prepared for the measurement of physiological parameters like heart rate, respiratory rate, blood pressure, pulmonary function (IC&PEF), oxygen saturation. Heart rate was measured with Dr. Morepen’s Pulse Oximeter, Respiratory rate was counted, Blood pressure measured using OMRON automatic Blood pressure monitor, Pulmonary function i.e. inspiratory capacity was measured with Incentive spirometer, Peak expiratory flow with CIPLA peak expiratory flow meter.

c) Visual Numeric pain scale was used for pain assessment which was scored on the said pain scale marked between 1 to 10. The pain was assessed on five occasions i.e. pain on chest incision at rest, pain on chest incision during change of position, pain on chest incision on walking, pain on chest incision on deep breathing, pain
on chest incision on coughing. For each occasion the scale was categorized as mild (1-4), moderate (5-7) and severe (8-10). Therefore score in one occasion was 10 and the total score for all occasion is 50. Each assessment was done on 3rd day, 7th day, on discharge and then on 30th, 60th and 90th day.

d) The State trait anxiety inventory by C.D.Spielberger’s were adopted to assess the anxiety level of the patient. The tool consisted of 20 items which was scored as 1,2,3 or 4 giving the range of anxiety. The scores on the anxiety scale range from 20-80. The anxiety level categorized were as : 20 denotes no anxiety, 21-35 – mild anxiety, 36-50 – moderate anxiety, 51-65 – severe anxiety and 66-80 – extreme anxiety.

e) A Modified WHO QOL BREF instrument was used to assess Quality of life. The tool consisted of 34 items which was scored as 1, 2 or 3 which reflected the range of Quality of Life. Each items provided three response categories – Always, Sometimes and Never. The scores on QOL scale range from 34 - 102. The quality of life was categorized as : Best QOL is the score ranged between 80 – 102 , Moderate QOL 57 - 79 , and Poor QOL between 34 - 56 .

DESCRIPTION OF TREATMENT

The Pulmonary rehabilitation program included individualized structured instructions for patients undergoing Coronary Artery Bypass Grafting (CABG) through Information Booklet (IB), demonstration by the researcher, clarification of doubts and taking
feedback. The information booklet was prepared after extensive study of literature in nursing, medicine and psychology. The investigators own experience in clinical field also helped considerably in structuring the information booklet. The opinion of the experts from the field of nursing and cardiology was also sought for validation. An information booklet (IB) was prepared which contains complete, adequate, accurate, and relevant content for the rehabilitation of patient after coronary artery bypass grafting.

The information booklet instructions gives the information on what is Coronary Artery Bypass Grafting? States the goals of the Pulmonary Rehabilitation Program. To achieve the goals of the program the complete information are abbreviated as READ so that the patients are able to memorize and recapitulate the instructions easily and remember it lifelong. READ stands for Relaxation, Exercise, Avoidance of risk And Dietary management.

**Relaxation**: Steps on how to achieve relaxation and carry out the deep breathing exercises are given in simple instructions.

**Exercise**: How to carry out the pulmonary exercises i.e. Deep breathing exercises, pursed lip breathing, breathing exercise with incentive spirometry, post expiratory pressure therapy with peak expiratory flow and diaphragmatic breathing. Ambulatory exercises includes sitting and standing exercise, arm exercises and stair climbing. It also includes how to warm up for exercises and cool down. When to stop exercise and seek medical
advice. It gives what are the points to be kept in mind for exercise. All points are given in step by step.

**Avoidance of Risk**: Avoiding the various risk factors like obesity, smoking, stress, sedentary lifestyle and the lifestyle modification after the surgery are given in simple language.

**Dietary Management**: What are the do’s and don’ts which are to be observed in dietary management are given in tabular method.

The information booklet was printed in English and for a better understanding the information booklet was also translated in local language i.e. Hindi by Hindi expert and retranslated in English.

The information booklet was administered to the patient by the researcher one week before the expected operating date and demonstrations were given on deep breathing exercise, pursed lip breathing, breathing exercise with incentive spirometer, post expiratory pressure therapy through peak expiratory flow, diaphragmatic breathing and to perform relaxation. The patients are then met twice pre-operatively to see the return demonstration on pulmonary breathing and relaxation. Along with the IB a self reporting Performa is pasted at the end of the book to get the feedback. In this self reporting Performa patients puts a tick mark if read the book and writes how many times he
practiced the relaxation and pulmonary exercise each day. Clarification of doubts are also done in these meetings.

**CONTENT VALIDITY**

Content validity of the tool and the information booklet was done by 11 experts including cardio-thoracic surgeons, medical surgical nursing experts and a statistical expert. They were requested to judge the items for relevance, clarity, appropriateness and the content area. The researcher met the experts to clarify any points regarding the tools and their organization. There was 100% agreement among all the experts on all items. Minor modifications were made in the tool after consultation with the research supervisor. The information booklet and all tools are translated into Hindi i.e. Demographic profile, Disease related profile, anxiety scale and quality of life scale. The Hindi version was retranslated into English and it was found that the tool and the information booklet conveyed the same meaning.

**TRYOUT OF THE TOOLS**

After obtaining administrative permission tryout was done on 10 samples in GB Pant hospital. The purpose of tryout was to check the clarity of items, their feasibility, practicability and to know the average time taken to administer tools. The subjects were chosen similar to the characteristics of the population under study. It took about 30-40 minutes to complete all tools. The tool were found to be clear, unambiguous, measurable
and practical in use. There was no problem in administering the tool in the tryout. Reliability of the tool was also established.

**RELIABILITY OF THE TOOL**

Reliability refers to the consistency with which an instrument measures the attribute. According to Polit and Beck, (2010), “Reliability a primary criterion for assessing a quantitative instruments, is the degree of consistency or accuracy with which an instrument measures an attribute. Higher the reliability of an instrument, the lower the amount of error in the obtained scores”.

Reliability of the tools for the present study was observed as below in table 3.2.

**TABLE 3.2.**

<table>
<thead>
<tr>
<th>Tool</th>
<th>Technique</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified WHO BREF Instrument for Quality of Life</td>
<td>Cronbach’s Alpha</td>
<td>0.88</td>
</tr>
<tr>
<td>Visual Numeric pain scale for Pain Assessment</td>
<td>Interrater reliability</td>
<td>1.00</td>
</tr>
<tr>
<td>Structured Interview Schedule for Demographic data</td>
<td>Pearson’s product- moment correlation coefficient</td>
<td>1.00</td>
</tr>
<tr>
<td>Observation Schedule for physiological parameters</td>
<td>Inter observer reliability</td>
<td>100%</td>
</tr>
</tbody>
</table>
**PILOT STUDY**

After obtaining formal approval the pilot study was conducted from 3rd week of December, 2011 till August 2012 at the Safdarjung Hospital and G.B. Pant Hospital. The patients from Safdarjung hospital were taken into control group and patients from G.B. Pant hospital were taken into experimental group.

A sample of total 30 patients who met the sampling criteria were taken into pilot study. 15 each into experimental and control group by purposive sampling technique. The consent of the subjects were obtained after explanation of the purpose of the study, expectation out of the subjects and gaining the confidence and cooperation of the subjects. Assessment was done for the physiological parameters i.e. heart rate, respiratory rate, blood pressure, oxygen saturation, pain & anxiety level and for quality of life.

Then information booklet was administered and demonstrations were given on pulmonary exercises. The patients are then met twice pre-operatively to observe the return demonstration on pulmonary breathing and relaxation. Patients were informed to put a tick mark on the self reporting Performa if they read the book and mentions number of times he practiced the relaxation and pulmonary exercise each day. Clarification of doubts are also done in these meetings.
PROBLEM FACED DURING PILOT STUDY

In the process of data collection, patient dropped out from experimental and control group occurred specially during the follow up period. To overcome the problem following steps were under taken:

- Additional sample had to be taken.
- Two research observers were appointed who visited the patients regularly during their stay in the hospital and also for further follow up visits in the OPD. The interrater reliability was established and it was found to be 0.99.

TRAINING OF THE OBSERVERS

The observers were B.Sc. (Nursing) graduates with 3-4 years of experience and were skilled to observe the physiological parameter (heart rate, respiratory rate, blood pressure, pulmonary function (IC& PEF), oxygen saturation) and were able to effectively communicate with the subjects.

Researcher gave them the explanation on various tools (i.e. tool to obtain the demographic data, observation schedule for physiological parameters, Visual Numeric pain scale for pain assessment, State trait anxiety inventory by C.D.Spielberger’s to assess the anxiety level, Modified WHO QOL BREF instrument used to assess Quality of life) and how to do the recording. Then researcher demonstrated the complete
procedure of data collection and took return demonstration. The observers were introduced to the Doctors and Nursing staff, permission was taken for doing the data collection procedure. After the training interrater reliability was established between researcher and the observer which was found to be 0.99.

**DATA COLLECTION PROCEDURES**

Formal administrative permission was obtained from the respective hospitals. The data collection procedure for final study started from September, 2012 and continued till March 2014. Approximately 120 sample were collected in control group (Safdarjung Hospital) and 129 sample in experimental group (G.B. Pant Hospital). Due to sample mortality sample the final size of the sample was kept 100 each from both the groups.

Data collection was done in following manner:

- Self introduction and establishment of rapport with subjects, staff nurses in the unit.
- Role of investigator was discussed.
- Finally interviewing the patients and observation was done.

Data collection period was extended to meet the desired sample size. After selecting the sample subject using **Non-Probability Consecutive** sampling technique, informed verbal consent was taken and data on demographic and disease related variable was collected.
followed by pre-test and post-test observation of physiological parameters, level of anxiety and quality of life were assessed. Pain was assessed postoperatively only.

For the experimental group, information booklets were distributed and demonstrations were given on pulmonary exercises. The subjects were encouraged to read the book and fill in the self reporting Performa and mention number of times they practiced the relaxation and pulmonary exercise each day. The patients were then met twice pre-operatively to observe the return demonstration on pulmonary breathing and relaxation. Clarification of doubts are also done in these meetings.
# DATA COLLECTION TECHNIQUES

<table>
<thead>
<tr>
<th>Group</th>
<th>Base Line Data pre test</th>
<th>Treatment</th>
<th>Post Test</th>
<th>Observation Days</th>
</tr>
</thead>
</table>
| Experimental    | • Physiological parameters (Heart Rate, Respiratory rate, Blood pressure, Pulmonary function (IC & PEF), Saturation of Oxygen).  
• Anxiety  
• Quality of Life | Information booklet on Pulmonary Rehabilitation Program | • Physiological parameters (Heart Rate, Respiratory rate, Blood pressure, Pulmonary function (IC & PEF), Saturation of Oxygen).
• Anxiety and Pain  
• Quality of Life) | 3rd, 7th, on discharge |
| Control Group   | - Do -                   | ---                                           | - Do -                                        | Do -             |
According to the objectives and hypothesis of the study it was planned to organize, tabulate, analyze and interpret the data by employing both descriptive and inferential statistics.

1) **Description of sample characteristics** –

   a) Frequency and Percentage to describe the demographic data and Chi-square between sample characteristics in experimental and control group to ascertain whether the group are similar in their characteristics.

   b) Frequency and Percentage to describe the diseased related variable and Chi-square between sample characteristics in experimental and control group to ascertain whether the group are similar in their characteristics.

2) **Effectiveness of Pulmonary Rehabilitation Program** -

   a) Computing mean, standard deviation and ‘t’ value to determine the significance of mean difference between experimental and control group in physiological parameters, level of anxiety, pain and quality of life on CABG patients.

   b) Repeated Measure ANOVA (RM-ANOVA) to compare the significance of mean difference in post-test observations of physiological parameters, pain, level of anxiety and quality of life of experimental and control group subjects.

   c) ANCOVA to test the significance of the covariates and also test the significance of group differences.
SUMMARY

This chapter dealt with methodology adopted for the present study. It includes research approach, research design, variables under study, setting, population, sample and sampling technique, description of tools, validity, reliability, try out, pilot study, problem faced during pilot study, procedure of data collection and the plan for data analysis. The next chapter contains analysis and interpretation of data.