

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

This chapter describes the research methodology used in this study including the research design. The research methods are described with reference to the research setting, target population, sample, sampling, data collection procedure as well as instrument used in data collection, pilot study, reliability and validity. Methods of data analysis and ethical considerations are also described.

3.2 PURPOSE AND OBJECTIVES

For consistency, the purpose and objectives of this study are repeated here.

The purpose of the study was to describe and compare intensive care nurses' and patients' perceptions of information needs of acute myocardial infarction patients at a public sector tertiary hospital in Johannesburg. Recommendations are made for clinical practice and education of intensive care nurses.

In order to meet this purpose, the following objectives were set:

- To assess the patients' perceptions of the importance to them of the items on the cardiac patients learning needs inventory (CPLNI).
- To assess the intensive care nurses' perceptions of the importance to patients of the items on the cardiac patients learning needs inventory (CPLNI).
- To compare patients perceptions with those of the intensive care nurses.

3.3 RESEARCH DESIGN

The research design is the overall plan for obtaining answers to the questions being studied and for handling some of the difficulties encountered during the research process (Polit & Beck, 2008). A non experimental, descriptive, comparative, prospective two phased design was utilized in order to meet the objectives of the study.

A non experimental design: in non experimental research, the study is carried out in a natural setting and phenomena are observed as they occur without manipulation of the variables (Brink, Walt & Rensburg, 2006:102). A non experimental design was suitable for this study as it took place in a natural setting (ICU in selected hospital) and there was no treatment or intervention administered. According to Polit & Beck (2004), non experimental research includes ex post facto- and descriptive studies. Polit and Beck (2008), state that when the researchers do not intervene by manipulating the independent variable, the study is considered nonexperimental.

The reason for undertaking this study approach is that the independent variable cannot be manipulated; there is variation in the independent variable; the circumstances make it ethically undesirable to carry out experimental or quasi-experimental studies and practical problems prevent the researcher from creating divided groups at random for experimental studies (Basson & Vys, 2000).

Comparative descriptive design: a comparative descriptive design is used to describe variables and to examine differences in variables in two or more groups that occur naturally in a setting (Burns & Grove, 2007: 244). This study was comparative in nature as it examined the difference between patients' and Critical Care Nurses' perceptions of CPLNI including the data collected by the researcher.

Prospective design: according to Brink *et al.* (2006: 10), a prospective study allows the researcher to measure variables that will occur during the course of the study, whereas Polit and Beck (2008) state that in a prospective study, information is first collected about a presumed cause or antecedent, and then subsequently the effect or outcome is measured. A prospective study was selected for this study as it would enable the researcher to collect the current patients' information in recovery stage when they are still in the Coronary Care Unit before discharge.

Two stage design

A two – stage design is considered as an important aspect for testing instruments and allowing valid comparison of the relationship between patients and critical care nurses' scores.

Stage one involved testing the instrument using the panel of expert members. Stage two established the psychometric properties of the cardiac patient learning need inventory (CPLNI) using a sample of patients and critical care nurses participants in two ICUs (coronary care unit = CCU and cardiothoracic ICU = CT ICU) following statistical tests for examining concurrent and construct validity as well as inter-rater reliability.

3.3.1 Research setting

The research setting is the location in which a study is conducted. There are three common settings for conducting research: natural, partially controlled, and highly controlled (Burns & Grove, 2007: 29).

The study was conducted in a coronary care unit and cardiothoracic ICU (CTICU) of an academic hospital in the City of Johannesburg in Gauteng which is a modern province. The patients were collected strictly from the Coronary Care Unit (CCU) as this was the only unit that accommodates patients with acute myocardial infarction. The nurses' data collection setting used the coronary care unit (patients setting) and cardiothoracic ICU as this unit receives also acute myocardial infarction patients on post operative care / post coronary artery bypass graft (CABG), and even sometimes preoperatively.

With regard to education, no formal sessions are provided for patients in the ward. The nurse subjects in this study all worked in two intensive care: in the CCU and cardiothoracic ICU. They were all therefore familiar with the usual care given to post-myocardial infarction patients.

3.4 RESEARCH METHOD

This study was conducted in two stages. In stage one: the data collection questionnaire, the cardiac patients learning needs inventory (CPLNI) by Timmins & Kaliszer (2003) was tested for suitability for the South African context. The researcher used a panel of expert members (n=7) to validate the questionnaire.

In stage two, the data collection instrument (CPLNI) was used to gather demographic data from participants. This was followed by collection of data using the data collection

instrument which was validated by the expert group in phase one of the study. A pilot study was conducted prior to commence with stage two.

3.5. STAGE I

In stage one, a non probability purpose sampling method was used to select the experts to validate the data questionnaire (CPLNI). Four cardiology medical doctors, two highly experienced cardiac nurses and one patient with a diagnosis of acute myocardial infarction were also approached to participate in the validation of the instrument (CPLNI). This process was similar to that of a focus group, and according to Burns and Grove (2007: 379) between six and ten participants is described as suitable for focus groups.

3.5.1. Population

A population is the entire aggregation of cases in which a researcher is interested (Polit & Beck, 2008: 337). The target population is the entire set of persons (or elements) who (or that) meet the sampling criteria and the accessible population is the portion of the target population to which the researcher has reasonable access (Burns & Grove, 2007).

Stage one of the study (expert validation of the instrument) used a panel of expert members (n=7). Both cardiology doctors (n=4), nursing staff (n=2) who were currently working in CCU, and one patient who had experience of acute myocardial infarction (n=1) was added as required by post graduate office. The total population for stage one was 7 (n=7). The cardiology medical doctors were included because of their multidisciplinary aspects.

3.5.2 Sample and Sampling Method

Polit and Beck, (2008: 339) defines sample as a subset of population elements and sampling as the process of selecting a portion of the population to represent the entire population so that inferences about the population can be made, whereas Burns and Grove (2007: 324) define sample as the selected group of people (or elements). Sampling involves selecting a group of people, events, behaviour or other elements with which to conduct a study. Samples are expected to represent a population of people.

In stage one: a non probability sampling method was used to select the experts to validate the data questionnaire (CPLNI). The experts were approached to participate in the validation of the instrument (CPLNI).

Inclusion Criteria

- Expert group working in CCU: Medical doctors cardiologists: 4 (n = 4), coronary care nurse (Intensive Care Nurse and shift leader): 1 (n = 1), critical care nursing educator 1(n=1), willing to participate to the study, provided a written consent to participate to the study was obtained.
- Patient: patient with a diagnosis of acute myocardial infarction: 1 (n = 1), able to read, speak and understand English; admission to coronary care unit with a diagnosis of acute myocardial infarction in recovery stage (patient due to be discharged home within 72 hours of completing the questionnaire); provided he was made aware of his diagnosis and his impending discharge; willing to participate to the study; free of serious co- morbidity , psychiatric illness, and narcotic analgesia; provided written consent to participate to the study was obtained.

3.5.3 Data Collection

Data collection is the precise, systematic gathering of information relevant to the research purpose or the specific objectives, questions, or hypotheses of a study (Burns & Grove, 2007: 41).The participants were invited to meet with the researcher ,the documents were handed out and procedures were explained in a formal process. The expert's group data collection commenced from the 1st July to the 5th July 2009, and the data collection for the main study was conducted over a three months period extending between July and September 2009.

Procedure (expert group)

The experts group who met the inclusion criteria was invited to participate in the study. Prior to the expert group meeting, all those who agreed to participate in the study were sent the following documentations: a letter outlining the study and its procedures (*refer Appendix A*), a consent form (*refer Appendix B*); in addition, the instrument cardiac patient learning needs inventory (CPLNI) by Timmins & Kaliszer(2003) (*Refer interview schedule CPLNI, Appendix F*).

A 5 - point Likert Scale was used where: 1 connoted not important, 2 slightly important, 3 moderately important, 4 important, 5 very important. Space was also provided for not applicable which was rated (6), and additional comments column.

3.5.4 Data Analysis

According to Burns and Grove (2007: 41), data analysis is conducted to reduce, organize, and give meaning to the data. The raw data for both stage one and two was transferred to an Excel spread sheet and was double checked for accuracy. The biostatistician was consulted for assistance with analyzing the study data. The Kappa measure of agreement and probability statistical tests were used to establish the tool validation in the South African setting (Johannesburg) by presenting the tool (CPLNI) to a panel of seven experts in the field of coronary care unit nursing. The level of agreement (kappa) could be the same or higher than the expected agreement. The size of kappa and the probability were considered when analyzing the data. The ranges of kappa are as follow: $< 0,4$ is considered weak agreement, $0,4 - 0,7$ moderate, $\text{kappa} > 0,7$ adequate /good. The expert commented both that all items were very important and no changes were made according to the results.

3.6 STAGE TWO

A non probability convenience sampling method was chosen to select the nurses and non purposive sampling method for patients. The sample size was comprised of 76 ($n = 76$) divided into two groups of patients 40 ($n = 40$) and intensive care nurses 36 ($n = 36$).

3.6.1 Population

The population of stage two was comprised of patients and nurses. Following consultation with the biostatistician, it was decided that 76 participants would constitute an adequate sample size. Using Stata 10, a sample size of 76 was computed so that in a large population, the researcher could have a 95% confidence that the proportion of the subjects obtained would fall between 12 % and 40% with a power of 90%, to consider the prevalence of the heart disease ranges between 12 and 40 percentages in South Africa. For this study, a lower number was obtained although the sample was still within the

acceptable minimum range of 80% power expected for the study to be reliable. The target population in this stage was comprised of all acute myocardial infarction patients in recovery stage admitted into the coronary care unit and intensive care nurses working in the coronary care unit and cardiothoracic ICU at the public sector hospital in Johannesburg.

A preliminary record review undertaken in March 2009 in the coronary care unit (CCU) indicated that approximately 178 patients with the diagnosis of acute myocardial infarction were admitted in CCU (n = 178) during the period of 1 September 2008 to 31 December 2008. This was an average of 59 patients per month with acute myocardial infarction.

3.6.2 Sample and Sampling Method

The patient's sampling was carried out in CCU and critical care nurses sampling were carried out in both CCU and CTICU due to a shortage of nurses and the statistic goal to achieve 36 nurses and 40 patients. The patients (group 1) and nurses (group 2) who fitted the eligibility criteria were selected to answer the questionnaire. Both critical care nurses and patients with myocardial infarction in recovery stage completed the same questionnaire (CPLNI), but with a different demographic check list.

Inclusion criteria

Group 1

Patients: admission to coronary care unit with a diagnosis of acute myocardial infarction in recovery stage (patients due to be discharged home within 72 hours of completing the questionnaire); providing they were made aware both of their diagnosis and their impending discharge; willing to participate in the study; the ability to speak, read and understand English (fluent in English); provided a written consent to participate to the study was obtained; free of serious co-morbidity, psychiatric illness, and narcotic analgesia.

Group 2

Nurses: intensive care nurses currently working in the coronary care unit and cardiothoracic ICU; experienced in the care of patients who have suffered myocardial infarction; provided written consent to participate to the study was obtained.

3.6.3 Data Collection

Procedure

Permission to conduct the study was sought from the Ethics Committee, the Chief Executive Officer (CEO) of the hospital being requested to participate to the study.

Those critical care nurses and patients who agreed to participate in the study were given an information letter outlining the study and its procedures (*refer Appendix D & E*). A consent form was also given to the patients who met the inclusion criteria (*refer Appendix B*). The patients who completed all the forms were all in recovery stage in CCU. Data was completed by means of a data collection tool (*refer Appendix F*) and 37 items derived from the instrument (CPLNI), comprising of 2 sections namely: patient participants' data collection questionnaire, nurse participants' data collection instrument. The Timmins & Kaliszer (2003) CPLNI instrument was used to capture patient,s details and a separate one to capture nurses details. The same CPLNI instrument was used on the participants, the participants demographic data were different. Regular intervals for measurement were determined by published studies, which were within the post 72 hours of admission from acute myocardial infarction in recovery stage in order to optimize consistency in the demonstration of concurrent validity and inter – rater reliability. The instrument was specifically designed for use in the coronary care unit for patients' participants exclusively, and cardiothoracic intensive care unit that could offer seventeen ICU nurses needed in the sample study was added due to the critical care nurses shortage in CCU.

3.6.4 Data Analysis

The demographic data was analyzed using descriptive and inferential statistics to evaluate the importance of the information needs of acute myocardial infarction patients. According to Polit and Beck (2008), descriptive statistics are used to describe and synthesize data whereas inferential statistics, which are based on the laws of probability, provide a means for drawing conclusions about a population, given data from a sample.

The following statistical tests were used in this stage:

- Percentage, frequency, confidence interval (CI), mean, standard deviation, degrees of freedom (df) were used to describe the participants data.
- A Cronbach's alpha was employed to determine the internal consistency of the CPLNI.
- Non parametric statistical test of Kruskal – Wallis and Chi – Square were used on assigning rank to the scores of various group. They were used to compare distribution of responses of the CPLNI between patients and nurses.
- Hotelling's Paired T^2 - test was specifically applied to the study to test the difference in mean response between the 2 interviews schedule (patient and nurse participants data collection questionnaire).
- Student t – test was applied to the study to test the differences between the responses of one population group (group 1 = patients) and another group (group 2 = nurses). The student t – test statistically determined whether the means of the two groups are significantly different (Rosnow & Rosenthal, 1996).
- Graphical methods were used to express agreement on scoring individual items between patients and nurses.

All these statistical procedures enabled the researcher to summarize, organize, interpret and communicate numeric information.

3.6.5 Instrument

In the USA, in 1984, Gerard and Peterson (1984) devised the cardiac patient learning needs inventory (CPLNI). This tool has been used and validated in several subsequent studies. It contained eight categories relevant to cardiac teaching. The cardiac patients learning needs inventory (CPLNI) devised by Gerard and Peterson (1984) and adapted for use in the United Kingdom by Turton (1998), used by Timmins & Kaliszer (2003) comprises 37 items which can be grouped into 8 sections, i.e. “anatomy and physiology”, “psychological factors”, life factors”, “medication information”, “dietary information”, “physical activity”, “symptom management”, “miscellaneous”. Each item is awarded from one to 5 points. The top grade is score five (very important). The higher score, the greater the need is required to care for the patient.

The CPLNI had previously undergone both reliability and validity testing (Gerard & Peterson, 1984; Turton, 1998) and was piloted by Turton (Turton, 1998). Gerard and Peterson (1984) devised the cardiac patient learning needs inventory (CPLNI). The same instrument was used by the 2 participant groups.

Group 1: Patient's instrument

The first part of the instrument was the patient instrument comprised of 12 items which reflects demographic data such as: research code, age, gender, date of admission, diagnosis, home language, population group, religion, occupation, education level, previous CCU admission, date of discharge.

The second part reflects 37 items derived from the cardiac patient learning need inventory (CPLNI) which is the assessment of patients' perceptions of information needs and start by the stem 'I need to know'.

Group 2: Nurses' instrument

The first part of the nurse's instrument comprised 6 items which are: research code number, age, professional qualification, educational qualification, experience, relationship to the patient.

The second part reflects the same instrument used by patients (37 items) derived from the CPLNI which is the assessment of nurses perceptions of patient information needs and starts with the stem 'the patient needs to know'. A 5 – point Likert Scale was used as described in stage one of the data collection procedure. The 37 items on both 2 groups' versions were grouped into eight categories relevant to cardiac teaching: Anatomy and physiology, Psychological factors, Lifestyle factors, Medication information, Dietary information, Physical activity, Symptom management, Miscellaneous (Timmins & Kaliszer, 2003).

3.7 PILOT STUDY

A pilot study is a smaller version of a proposed study conducted to develop and refine the methodology, such as the treatment, instruments, or data collection process to be used in

the larger study (Burns 2007: 549), sometimes called a feasibility study (Polit & Beck, 2004:196), which is sometimes referred to as the parent study (Polit & Beck, 2008) . Its purpose is to help the researcher fine – tune the study for the main inquiry and to determine whether the methodology, sampling, instruments and analysis are adequate and appropriate (De Vos, Strydom & Fouche, 2005). A pilot study was conducted prior to the beginning of the main data collection in order to refine the methodology and data collection instrument. The data collection tool was used on three patients and two intensive care nurses at the selected study site. The instrument CPLNI was given to three patients and two nurses' subjects. The nurses subjects enrolled for the pilot were approached whilst at work of the concerning setting and given the instrument to complete at the time. They were then interviewed using open and closed questions. The patient subjects enrolled for the pilot were recruited from the coronary care unit; those who complied with the inclusion criteria in recovery stage were given the instrument. Data from the pilot study was not included in the main study.

No change was made on the instrument CPLNI after the pilot study. The biostatistician who determined the sample size and statistical tests used in this study assessed the result obtained from the pilot study. The result obtained from the pilot study was not used in the main study. It is interesting to note that the term “risk factors” was replaced by “lifestyle factor” in the instrument following a pilot study by Turton (1998) who noted with surprise that spouses/partners and patients had trouble with interpreting this term.

3.8 RELIABILITY AND VALIDITY OF THE STUDY

3.8.1 Reliability

Reliability refers to the accuracy and consistency of information obtained in a study (Polit & Beck, 2008: 196) Reliability of a quantitative instrument is a major criterion for assessing its quality and adequacy. It is the consistency with which it measures the target attribute (Polit & Beck, 2004: 422).

In this study, reliability was maintained by the data being verified by the biostatistician for accuracy. The researcher collected data independently, data was collected at a

predetermined time (from July to September 2009) to ensure consistency of data collection, this was achieved through compliance by the researcher to the research design.

3.8.2 Validity

The validity of an instrument is a determination of how well the instrument reflects the abstract concept being examined (Burns & Grove, 2007: 365). In this study, validity was ensured by using an instrument CPLNI which has been used and validated in several subsequent studies (Gerard & Peterson, 1984; Timmins, 2005; Turton, 1998). In this study, the panel of experts validated the instrument and no change was made. The following was instituted by the researcher in order to ensure validity of the instrument: the researcher did not deviate from procedures that were stipulated in the protocol, collection and compliance to the data collection instruments was highly maintained. Seeking the advice and input from the biostatistician in data capturing, processing, analysis and interpretation, non-threatening environment was created by assuring the participants that participation in the study was voluntary and that anonymity would be ensured. A random sampling method was used to prevent selection bias.

3.9 ETHICAL CONSIDERATIONS

According to Burns and Grove (2007), the goal of research is to generate sound scientific knowledge, which is possible only through the honest conduct, reporting and publication of quality research. Prior to the commencement of the study, ethical clearance and permission to conduct it was obtained from the relevant authorities and university committees. The investigation conforms to the principles outlined in the declaration of Helsinki (Tarling & Crofts, 2002).

Concerning this, the following ethical considerations were applied in the proposed study:

- The research proposal and the instruments were submitted to the post graduate committee (Faculty of Health Sciences) of the University of the Witwatersrand for permission to undertake the research. Permission was obtained (*refer Appendix H*).
- The research proposal and instruments were submitted to the Committee for Research on human subjects of the University of the Witwatersrand to ensure

compliance with the ethical standards. The Committee issued a clearance certificate (*refer Appendix I*).

- Permission to conduct the research was obtained from the participating hospital management (CEO) and the Department of Health, Gauteng (*refer Appendix J*), the Director of nursing of the concerned hospital, the Head of department of cardiology of the setting hospital. Ethical approval was also obtained from the ethic committee (*Appendix I*).
- Consent information was presented orally to prospective participants while they were being recruited.
- A written informed consent was obtained from the group of experts (*refer Appendix B*).
- Before inclusion in the study, written informed consent was obtained from the patients and nurses (*refer Appendix B*).
- Anonymity of the participants was guaranteed in that names were not recorded. Consent forms and instruments were separated at time of data collection to maintain the anonymity of the participants.
- Confidentiality was guaranteed in that the researcher and her supervisor were the only people with access to the raw data.
- Participants were allowed to withdraw from the study at any time without penalty
- Permission to use the instrument cardiac patient learning needs inventory (CPLNI) was obtained from the author Timmins& Kaliszer (2003).

3.10 SUMMARY

In this chapter, the research methodology of the study has been described. The design, the research method, research setting target population, sample and sampling method including data collection and analysis and study instrument used for data collection, were also described. In addition, a pilot study and method ensuring validity and reliability related to this study including ethical considerations were discussed. The following chapter will present the data analysis and results of the study.