KNOWLEDGE OF STUDENT NURSES OF COST CONCEPTS IN HEALTH ECONOMICS

by

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in the subject

HEALTH STUDIES

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UNIVERSITY OF SOUTH AFRICA

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FEBRUARY 2017
DECLARATION

I declare that KNOWLEDGE OF STUDENT NURSES OF COST CONCEPTS IN HEALTH ECONOMICS is my own work and that all sources that I have used or quoted have been indicated and acknowledges by means of complete references and that this work has not been submitted before for any other degree at any other institution.

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Yolande Möller
ABSTRACT

The purpose of this study was to explore and describe the knowledge of student nurses regarding the cost concepts in health economics, specifically the efficient allocation of resources and determining the cost of interventions, in order to prepare them to deliver cost-effective yet quality nursing care. An explorative and descriptive quantitative design was used. A structured self-administered questionnaire was used for data collection. Respondents were student nurses studying towards becoming professional nurses in their final year of study (comprehensive programme). The results revealed an apparent lack of knowledge among student nurses regarding cost concepts in health economics, although respondents agreed that knowledge of health economics is essential for nursing practice. The results led the researcher to draw a strong conclusion that there is a need for the inclusion of a module regarding health economics in the nursing curriculum and in continuous professional development (CPD) workshops and in-service training.

KEY TERMS

Health economics; cost concepts; student nurses; efficient allocation of resources; cost of an intervention; nursing curriculum; cost-effective; quality care; continuous professional development (CPD); cost containment; economic accountability.
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Dedication

To Wallace and Nellie Louw
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ART</td>
<td>Antiretroviral therapy</td>
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<tr>
<td>CBA</td>
<td>Cost-benefit analysis</td>
</tr>
<tr>
<td>CEA</td>
<td>Cost-effectiveness analysis</td>
</tr>
<tr>
<td>CKD</td>
<td>Chronic Kidney Disease</td>
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<tr>
<td>COI</td>
<td>Cost of Illness</td>
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<tr>
<td>CPD</td>
<td>Continuous Professional Development</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>EBM</td>
<td>Evidence-Based Medicine</td>
</tr>
<tr>
<td>ECG</td>
<td>Electro-cardiograph</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>IOM</td>
<td>Institute of Medicine</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goal</td>
</tr>
<tr>
<td>MRSA</td>
<td>Methicillin-Resistant Staphylococcus Aureus</td>
</tr>
<tr>
<td>NEI</td>
<td>Nursing Education Institution</td>
</tr>
<tr>
<td>NHI</td>
<td>National Health Insurance</td>
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<tr>
<td>QALY</td>
<td>Quality-adjusted life years</td>
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<tr>
<td>SANC</td>
<td>South African Nursing Council</td>
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<tr>
<td>Unisa</td>
<td>University of South Africa</td>
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<tr>
<td>US</td>
<td>United States</td>
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<tr>
<td>WTP</td>
<td>Willingness-to-pay</td>
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CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

South Africa is in the process of introducing the National Health Insurance (NHI) health care system, which is an innovative system of health care financing. The NHI is intended to bring about reform that will improve service provision. It would ensure that everyone had access to appropriate, efficient and quality health services, but would entail changes in service delivery structures, administrative and management systems (South Africa 2011:4, 9). Muller, Bezuidenhout and Jooste (2011:9) describe the Batho Pele principles that should be put into practice in public health care services to improve quality service to the people of South Africa. One of these principles stipulates that public services should be provided in an economical and efficient way, in order to give patients/clients the best possible value for money. Procedures should be simplified to eliminate waste and inefficiency in health services. As nurses are seen as the main pillar of the healthcare system (Palese, Vianelli, De Maino & Bortoluzzi 2012:86), it may be argued that there is an important link between the nurse and the cost-effective implementation of health care activities in South Africa.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

Health economics and nursing professional curricula are described in the following section.

1.2.1 HEALTH ECONOMICS AND NURSING PROFESSION CURRICULA

Health economics is described by Guinness and Wiseman (2011:2) as the optimisation of health as it relates to other activities; it includes using resources in such a way that it improves health status and service delivery within the limited resources that are available. Nickitas (2011:229) calls for all nurses to have a better understanding of health economics and also to have greater economic accountability in professional
practice. All nurses can contribute to improving the quality of patient care and achieving better patient outcomes and greater costs savings.

Buerhaus (2009:249) compares the nursing profession to a basketball game. He indicates that in order to win the game (to increase nursing’s social relevance, to increase the health of people), the nursing profession needs to quickly and decisively reform nursing education curricula in all programmes to equip the profession with players who have the right knowledge and skills. All nursing education programmes should focus on increasing nurses’ understanding of the economic implications of clinical and administrative practice. As resources (in the game) are tight, the nursing players need to practise all aspects of nursing care more efficiently and be more closely aligned with delivery of the organisation’s economic performance. The importance of this knowledge is emphasised by Rutherford (2012:199), referring to Florence Nightingale, who in her book, *Notes on Nursing*, pointed out that nurses had an obligation to understand the financial aspects of patient care.

It is the belief of the researcher that the aim of delivering cost-effective quality nursing care within health care institutions may be achieved by student nurses learning about factors that influence cost in the daily implementation of nursing care activities in the clinical area. They should be able to efficiently allocate resources and determine the cost of an intervention. This belief may further be supported by changes currently under way in nursing education and training in South Africa.

The current R425 programme of the South African Nursing Council (SANC) does not include any specific reference to the economic or financial subject content that the student nurse should master in order to achieve the goals of an institution relating to economic performance (SANC 1985, Paragraph 6(2)(j)). Regulations for the new nursing education and training programmes (R174), however, refer to the minimum requirements for a student nurse leading to the registration in the categories ‘professional nurse and midwife’, specifically to exit-level outcomes for the programme and the associated assessment criteria related to the management of a health care unit in order to promote cost-effective and efficient service delivery (SANC 2013, Paragraph 2(1)(d); SANC [Sa]:6). These requirements will be further discussed in Chapter 2 (section 2.4.1).
Geyer (2014:10) explains that the SANC has initiated the development of a continuous professional development (CPD) system for nurses in South Africa, during which points will be collected annually. It might be advisable that training in the economic aspects of health care should be conducted in continuous development programmes in order to ensure cost-effective and efficient service delivery. This is further discussed in Chapter 2 (section 2.4.1) and Chapter 5 (sections 5.4.4, 5.5.1, 5.5.2 & 5.5.3).

1.2.2 Concepts of health economics

Economics may be described as the study of scarcity, and the means by which this problem is dealt with (Guinness & Wiseman 2011:8-9). Different economic problems exist in the health sector; they include consideration of questions such as the most cost-effective treatments for people with HIV. This implies that choices need to be made about how resources are to be used. The demand for health services continues to exceed supply, owing to factors such as ageing populations, new health technologies, and people’s increased expectations. Health economics should help decision makers in health care to make choices that maximise the health benefits to the population (Guinness & Wiseman 2011:17-19).

Economic evaluations may be done in order to compare two or more different options or programmes suggested by health care officials in order to improve health care, as well as to compare the costs of the alternatives related to their consequences or expected outcomes. The cost taken into account should include the resources needed for an intervention to affect health problems. Cost-benefit analyses as well as cost-effectiveness analyses are used in the health sector (Guinness & Wiseman 2011:188-196).

Guinness and Wiseman (2011:201) explain the valuation of resources to generate costs. Costs need to be identified by establishing certain information, such as: Who will be providing the care? What different activities are involved in the intervention? Who will ‘receive’ the intervention? Where will each part of the intervention be delivered? How long will the intervention run? Key concepts of ‘counting the cost’ are explained in detail in Chapter 2 (section 2.5.2).
Rutherford (2008:347-383) and Schuurman, Schoonhoven, Defloor, Van Engleshoven, Van Ranshort and Buskens (2009:390-415) recommend that costs related to treatment and care should be researched and addressed. However, the researcher could find few recent studies that specifically addressed ways of ensuring that cost-effective care is rendered. Palese et al (2012:86-93, 119) undertook a study to describe measures of cost containment and the impact of the economic crisis on daily nursing practice. Talley, Thorgrimson and Robinson (2013:77-82) stated in their study that grooming nurses at all levels of an organisation to master health care executive skills is critical to ensuring success in the organisation as well as the individual’s growth, and that the education and evolution of nurses as business managers is critical to building a strong professional nurse workforce.

1.3 THE RESEARCH PROBLEM

Financial constraints affect the daily implementation of nursing activities and the standard of care delivered (Guinness & Wiseman 2011:16-17). Thus nurses need to have sufficient knowledge and skills, including that of being economically accountable, in order to perform optimally. Nursing education programmes should focus on increasing nurses’ understanding of the economic implications of clinical and administrative practice. As resources are tight, all nurses need to practise all aspects of nursing care more efficiently, to be more closely aligned with delivery of the organisation’s economic performance.

As discussed above, the SANC R425 does not include any specific reference to the economic or financial subject content that the student nurse should gain knowledge about in order to achieve the goals of an institution relating to economic performance (SANC 1985, Paragraph 6(2)(j)). It was therefore important to explore the knowledge of nurses on aspects of health economics. This could lead to recommendations that could inform the nursing curricula. Furthermore, given the drive to get CPD in place (as prescribed and initiated by the SANC), it has become necessary to identify knowledge gaps that could be addressed in CPD and in-service training.

The problem identified is therefore that there appears to be a gap in nursing education and training programmes. In order to become professional nurses, student nurses need to gain knowledge of the cost concepts related to health economics, specifically to
efficient allocation of resources and determining the cost of interventions. This will help them to render cost-effective, yet quality care.

In the attempt to ensure cost-effective quality nursing care, the following question therefore arose:

*What is the knowledge of student nurses regarding the cost concepts of health economics, specific to efficient allocation of resources and determining the cost of an intervention?*

### 1.4 DEFINITION OF KEY CONCEPTS

For the purposes of this study the key definitions are defined as follows:

- **Explore:** investigate or discuss in detail *(Concise Oxford English Dictionary 2011:502).*
- **Knowledge:** information and skills which are acquired through education or experience and the sum of what is known *(Concise Oxford English Dictionary 2011:789).*
- **Cost concepts:** *cost* – requiring the payment of (a specified sum) or expenditure in order to be bought or obtained *(Concise Oxford English Dictionary 2011:323)*; *concepts* – an abstract idea or mental picture of a group or class of objects, formed by combining all their aspects *(Concise Oxford English Dictionary 2011:296).*
- **Health economics:** health economics is described by Guinness and Wiseman (2011:2) as the optimisation of health as it relates to other activities and includes using resources in such a way that it improves health status and service delivery within the limited resources that are available. Furthermore, health economics is concerned with improving the level and distribution of population health within the given resources *(Guinness & Wiseman 2011:20).*
- **Student nurse/learner:** *student* – a person studying at a university or any other institution of higher education *(Concise Oxford English Dictionary 2011:1432)* – the term *student* is therefore generally used in higher education (college or university); *learner*: a person who is acquiring knowledge of or a skill in (something) *(Concise Oxford English Dictionary 2011:811).* A learner is
furthermore defined as a person who is registered with the SANC in terms of section 32 “Registration of learners” of the Nursing Act (Act no. 33 of 2005) (South Africa 2005:36). A student nurse or learner nurse therefore refer to a person in higher education undergoing education and training in nursing.

- *Cost effective*: used to describe the relationship between inputs and outputs, thus concerned with maximising the benefits using the available resources, or minimising costs for a given level of benefit (Guiness & Wiseman 2011:7).

- *Nursing care*: nursing interventions and therapeutic activities provided by (nurses as) members of the health professions for the benefit of a patient or client, thus the application of knowledge to benefit a community or an individual patient in providing medical or health care-related service (www.thefreedictionary.com).

- *Service*: an action or process of service or assistance; a system which supplies a public need (Concise Oxford English Dictionary 2011:1317).

### 1.5 OPERATIONAL DEFINITIONS

For the purposes of this study the key definitions are operationalised as follows:

- *Exploring*: investigating and determining the knowledge of student nurses of the phenomenon under study (cost concepts relating to health economics specific to efficient allocation of resources and determining the cost of an intervention).

- *Knowledge*: information and skills which are acquired through education or experience and therefore the understanding (relating to the knowledge) that stimulates change or development.

- *Cost concepts*: various abstract ideas pertaining to the calculation of expenditure factors, thus determining the cost of an intervention and the valuation of resources to generate costs (such as those identified in calculating costs in health economics) pertaining to the set objectives of the proposed study.

- *Health economics*: the concepts related to the availability of resources (financial, material, and human) within the health care service (specific to the functioning in the nursing unit) and the interdependent activities (as reflected in the concepts) which are interconnected and denote effective utilisation of these resources during the implementation of nursing care activities (thus to achieve improved patient outcomes through cost-effective nursing care within the nursing unit).
• **Learner**: a person who is registered with the SANC in terms of section 32 “Registration of learners” of the Nursing Act (Act no. 33 of 2005) (South Africa 2005:36), thus in South Africa and in this context the term learner is used for such a person who is undergoing education or training in nursing.

• **Student nurse/learner**: in the context of this study, students currently registered for the SANC R425 programme: Education and training of a nurse (general, psychiatric and community) and midwife leading to registration (registered nurse); and in their final year of study (in 2016); thus preparing to enter into practice, and registered as students at the selected provincial site (Nursing Education Institution (NEI)) where the research was to be conducted – within the Republic of South Africa (see the eligibility criteria). The terms learner and student are used synonymously, but for the purposes of this study, reference is made to students or student nurses, unless referring to SANC documentation.

• **Cost effective**: cost saving and the efficient use of the available resources in the delivery of safe, quality nursing care.

• **Nursing care**: the effective and efficient implementation of nursing care actions, competently using knowledge and skills to ensure that the ultimate goal (comprehensive client health) of the health care organisation is reached economically within the given resources.

• **Service**: refers to nursing care, including non-nursing activities and any other health care activities.

### 1.6 PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of the study was to explore and describe the knowledge of student nurses regarding the cost concepts relating to health economics, specifically to efficient allocation of resources and determining the cost of interventions, in order to prepare them to deliver cost effective yet quality nursing care.

The objectives of this study were to:

• explore the knowledge of student nurses of health economics specific to cost concepts related to the efficient allocation of resources
• describe the knowledge of student nurses of health economics specific to concepts related to determining the cost of an intervention
• make recommendations for additions to the nursing curriculum content and development of CPD workshops and in-service training regarding health economics

The study aimed at exploring and describing the knowledge of student nurses regarding the cost concepts in health economics (phenomenon under study) and obtaining baseline data regarding knowledge, as the content does not currently form part of the curriculum. The attitudes and perceptions of the student nurses regarding the phenomenon were not included in the purpose of this study.

1.7 THE RESEARCH PARADIGM

The positivist paradigm underlies the quantitative research that was undertaken in this study. Positivist researchers use orderly, disciplined procedures with tight control of the research situation to test their intuitions about the phenomena being studied and relationships between them (Polit & Beck 2012:12-14) and obtain numerical data (Grove, Burns & Gray 2013:23). Statistical procedures are used for analysis of numeric information (Brink, Van der Walt & Van Rensburg 2012:11).

Quantitative research was relevant to this study as the researcher was focusing on a small number of concepts relating to the research problem to determine a solution and was not attempting to understand it in its entirety.

1.8 OVERVIEW OF THE RESEARCH DESIGN AND METHODOLOGY

Following is an overview of the research design and methodology used for the study. A more detailed description follows in Chapter 3 of the dissertation.

1.8.1 The research design

An explorative and descriptive quantitative design was used for this study. Exploratory research investigates the manner in which the phenomenon is manifested, and the other factors to which it is related (Polit & Beck 2012:18). Brink et al (2012:112) explain
that descriptive research is used to provide more information in a particular field by providing a picture of the phenomenon as it occurs naturally. The variables and their interpretation related to the phenomenon (cost concepts relating to health economics in cost-effective nursing care) were explored and described as they related to what economic health knowledge student nurses being prepared for professional nursing practice had, in order to answer the research question and possibly to identify problems with current practice.

1.8.2 Research methods

The research methods specific to the population, sample selection, data collection and data analysis are described in the following three subsections.

1.8.2.1 Population and sample selection

The accessible population for a study is the aggregate of cases that conform to the designated criteria (eligibility criteria) and are accessible as respondents (Polit & Beck 2012:274). The eligibility criteria specify the essential characteristics needed for a respondent to be deemed a member of the target population (Grove et al 2013:352). The population for this study was student nurses registered for the SANC R425 programme; in their final year of study in 2016; and registered as student nurses at the selected site (NEI) where the research was conducted. The researcher proposed to include the entire population under study, to obtain as many responses (data) as possible.

1.8.2.2 Data collection

Questionnaires are documents which are used to gather self-report data via self-administration of questions (Polit & Beck 2012:740). Grove et al (2013:425) point out that questionnaires can be designed in order to determine facts about the respondents, such as levels of knowledge, and attitudes or beliefs. For this study, a questionnaire was developed, based on a literature review to determine the knowledge that student nurses had on the concepts of health economics, specific to the objectives of the study.
Instruments should contain an introduction explaining the nature and purpose of the study. In the case of questionnaires, it may take the form of an accompanying covering letter (Polit & Beck 2012:306). In this study a covering letter was attached to the questionnaire, introducing the study to the respondents. Furthermore, implied consent to participate in a study may be assumed by a researcher based on a respondent’s actions, such as returning a completed questionnaire (Polit & Beck 2012:730). Friedrich-Nel and Munro (2015:27-28) conducted an online survey and explained that the action of completing the questionnaire was assumed to be confirmation of consent. In a study by Lun, Erdman, Fung & Reimer (2012:32), the completion of the questionnaire by respondents was assumed to imply consent to participate in the study. The contributions by these authors are further described in Chapter 3 (section 3.5.2.2). The researcher assumed implied consent in this study.

1.8.2.3 Data analysis

Statistical methods are used to summarise, organise, interpret and communicate quantitative data. Data may be explored and described by using descriptive statistics in which a collection of data is converted into an organised, visual representation in order to convey meaning to the readers of the research report. Frequency distributions, measures of central tendency and dispersion or variability may be utilised in the descriptive approach (Brink et al 2012:179). Numerical data was obtained in the study and these were analysed using the services of a statistician and a statistical program of analysis (SAS JMP version 12.0). The results are here presented in a dissertation (research report), using descriptive statistics.

1.8.3 Validity and reliability

Reliability relates to the accuracy and consistency of information obtained in a study, while validity is broadly concerned with the soundness of the study’s evidence (Polit & Beck 2012:175). In this study, a census was used (which includes the whole population) to obtain data. The researcher strove to achieve validity through compiling a questionnaire that was based on a thorough literature review relating to the concepts of health economics. A draft of the questionnaire was submitted for review to the supervisor of the study, as well as to a statistician who assisted in developing the questionnaire.
A pre-test may be used to identify problems with, or assess time requirements of, a newly developed instrument (Polit & Beck 2012:738). Brink et al (2012:175) reiterate that a researcher may choose to conduct a pre-test of the data-collection instrument to identify possible ambiguous instructions or wording in the instrument. Brink et al (2012:175) further support the value of conducting a pre-test of a questionnaire by explaining that it may identify errors which may prove costly in the actual study, and may therefore be avoided. The pre-test may also determine the adequacy of time limits estimated for the completion of the data-collection instrument such as a structured questionnaire.

A pre-test of the questionnaire was conducted in this study and the student nurses who completed the pre-test were requested to give feedback on the appropriateness of the timeframe allocated for completion of the questionnaire, as well as whether questions were clear enough to understand. The researcher controlled bias by choosing student nurses for the pre-test who were independent of those being researched. Conducting a pre-test of the data collection instrument, such as in the questionnaire used in this study, is especially of value as the researcher compiled the questionnaire specifically for the purposes of the study.

Grove et al (2013:428-429) describe questionnaire validity and explain that questionnaire response rate is generally lower than in the case of other forms of self-reporting. The response rate for mailed questionnaires is generally 25% to 35%, and even through randomisation it is difficult to obtain a representative sample. However the validity of the questionnaire as a data collection instrument is improved through consistent administration such as in a group setting. In this study the population was approached as a group.

1.8.4 Ethical considerations

Ethical considerations protect the rights and human dignity of the respondents, as well as the rights of the institution in which research is conducted.
1.8.4.1 Protecting respondents

Polit and Beck (2012:152-156) describe the principles of beneficence, non-maleficence, and respect for human dignity, as well as other ethical concepts pertaining to ethical conduct in a study. In this study, the respondents were given adequate information regarding the research in order to give informed consent to voluntarily participate or not (without discrimination) in the study. Confidentiality was maintained through anonymity.

1.8.4.2 Protecting the rights of the institution in which research is conducted

Ethical clearance and permission were obtained as required from the university where the study is registered (University of South Africa (Unisa) see Annexure A), the Provincial Department of Health Ethical Committee (see Annexures B and C for copies of request letter and approval granted) and from the Principal of the NEI (see Annexures D and E for copies of request letter and approval granted). The provincial approval of the study depended on a declaration by the researcher, to acknowledge the co-operation of the Department of Health of the specific province in which the study was conducted in any publication or public discussions and/or any such matters which might arise from this study. The province has been acknowledged under the 'acknowledgments' (see section 3.7.2), therefore the province will not be anonymous.

1.9 SIGNIFICANCE

The subject content of health economics may better prepare professional nurses to improve the quality of health care practice by ensuring that limited resources are applied in the most cost-effective way, while delivering quality health care services. The results of the study could be used to address the exit level outcome “3. Manage a health care unit and health facility based on the understanding of the roles and relationships within the multidisciplinary team”, of the Bachelor of Nursing and Midwifery Qualification Framework (New Nursing Qualifications) (SANC [Sa]:6). Nursing curricula development may determine the inclusion of content on health economics specifically related to the associated assessment criteria for “3.3 Systems established (to) promote cost effective and efficient service delivery within a health care unit” in the curriculum for teaching student nurses who are being prepared for professional nursing practice (SANC [Sa]:6).
The R425 programme is phasing out and the new Bachelor of Nursing and Midwifery qualification (R174) is proposed to be implemented in the near future (for those nursing education institutions who are ready to start) (Geyer 2014:9). The results of this study could be of value to add or expand on the content on health economics to be included in a module. This would promote cost-effective and efficient service delivery within health care units. Furthermore, given the drive to get CPD in place (as prescribed and initiated by the SANC), knowledge gaps identified in the study could be used to develop workshops to address in CPD and in-service training. The researcher proposed an outline for an introductory CPD workshop regarding the subject content of health economics. The content of the presentation may be conducted as a CPD workshop for nurse leaders, professional nurses and nurse educators to gain knowledge of health economics. Nurse educators require knowledge of health economics in order to participate in curriculum development for the inclusion of health economics subject content in a module (such as unit management) for all nursing programmes.

Exploring the knowledge level of student nurses regarding factors that influence the costs of delivering health care, could inform new curricula as well as CPD workshops. It could therefore lead to the expansion of curriculum content and the development of CPD workshops regarding health economics.

1.10 SCOPE AND LIMITATIONS

The study was conducted in a single province in the Republic of South Africa within a specific population of student nurses. There is only one NEI within the selected province that offers the education and training of nurses registered for the SANC R425 programme.

1.11 STRUCTURE OF THE DISSERTATION

The dissertation is presented in the format prescribed by the Department of Health Studies, Unisa for proposal, dissertation and thesis writing (Unisa 2013:74-84). The dissertation is structured as follows:

- Chapter 1: Orientation to the study
- Chapter 2: Literature review
• Chapter 3: Research design and method
• Chapter 4: Analysis, presentation and discussion of the research results
• Chapter 5: Conclusions, recommendations and limitations

Tables, figures or annexures referred to in the text appear on a relevant list for referencing and is included after the table of contents.

1.12 SUMMARY

Health economics refer to the optimisation of health through activities that include using resources in a way that improves health status and service delivery within the limited resources that are available. Nurses are seen as the main pillar of the health care system, which calls for all nurses to have better knowledge of health economics. All nursing education programmes should focus on increasing nurses’ knowledge and understanding of the economic implications of clinical and administrative practice.

An explorative and descriptive quantitative study was conducted with the purpose of exploring the knowledge that student nurses have of the concepts related to health economics, specific to efficient allocation of resources and determining the cost of an intervention. This would enable them to deliver cost-effective yet quality nursing care. A questionnaire was utilised to collect data, and descriptive statistical analysis was used to summarise and present data. Data are formally presented in a dissertation (research report). The study strove for validity and reliability. Ethical principles were adhered to in ensuring that the rights of all involved were protected.
CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The literature review provides information of what is known about the research problem. By conducting a comprehensive literature review, the researcher is able to develop a conceptual framework for the study. The literature review informs the researcher about the appropriate tools or instruments for data gathering (Brink et al 2012:54).

The researcher conducted the literature review to explore the phenomenon under investigation. The purpose and objectives of the study were used to guide the search for literature. With the assistance of a subject librarian, relevant primary and secondary sources were identified.

Computer-generated searches were conducted electronically using various search engines. The specific websites on the internet of known health economic journals that relate to nursing were also searched. Key words/concepts identified from sources were used in developing the questionnaire and then in later searches to find relevant literature. These key concepts that were included were determined by the conceptual framework.

Both primary and secondary sources were used. A limited number of primary sources were available that discussed health economics in nursing. Primary sources focused mostly on specific cost concepts used in a particular study. Primary sources were used by the researcher to illustrate the application of the various cost concepts in studies conducted by other researchers within the health care environment. The evidence from primary sources therefore supports the importance of results of the study for knowledge and application of these cost concepts in the health care unit. It was necessary to include various secondary sources to explain the relevant cost concepts that are included in economic evaluation of efficient resource allocation and those used in determining the cost of an intervention (see section 1.6).
The following conceptual framework guided the literature review:

**Figure 2.1 Conceptual framework for literature review**
2.2 HEALTH CARE SYSTEMS

Health care systems are highly dynamic and changing entities in most countries. Rising costs of health care result in the increase of inequality in health and health care. Governments have diminished ability to match limited health services and resources with increased pressure of demand for quality care, and ensuring efforts towards greater efficiency, effectiveness and cost containment (economy), in order to strike an adequate balance between demand and supply (Van Rensburg 2012:16).

General dissatisfaction exists among consumers, providers and governments with the overall performance of health care systems, the inefficiencies in the use of resources, neglect of primary and preventive care and lack of responsiveness of services to the needs of users. Health care reform focuses on improving efficiency, equity and effectiveness. Reforms in the health sector aim at aspects such as improved access to care, containment of costs, enhanced quality of care, and increasing patient choice and patient satisfaction. Reforms also emphasise promotion of healthy lifestyles. However, escalating costs of health services have a direct influence on reform attempts (Van Rensburg 2012:17).

South Africa is in the process of introducing the NHI health care system, which is an innovative system of health care financing intended to bring about reform that will improve service provision (see section 1.1). The NHI should ensure that everyone has access to appropriate, efficient and quality health services, but will entail changes in service delivery structures, administrative and management systems (South Africa 2011:4, 9). Some concerns about the quality of South African public health care facilities include those about staff attitudes, infection control, cleanliness, long waiting times, safety and security of staff and patients, and drug stock-outs. Improvement of quality is at the centre of the health sector’s reform attempts (South Africa 2011:4, 9). The NHI would improve access to quality health care services and provide financial risk protection, guided by the following principles: right of access; social solidarity; effectiveness; appropriateness; equity; affordability; and efficiency (South Africa 2011:15, 16-18).

One of the Batho Pele principles holds that public services should be provided in an economical and efficient way, in order to give patients the best possible value for money
(see section 1.1). Procedures should be simplified to eliminate waste and inefficiency in health services (Muller et al 2011:9). As nurses are seen as the main pillar of the health care system (Palese et al 2012:86), they have an important part to play in this.

2.3 HEALTH ECONOMICS

Health economics is described by Guinness and Wiseman (2011:2) as the optimisation of health as it relates to other activities, and includes using resources in a way that improves health status and service delivery within the limited resources that are available. McCrone (1998:1) explains that economics has developed in order to maximise the outcomes that can be achieved by optimally utilising the available resources; economists should therefore be seen as maximising outcomes, rather than cutting costs.

Macroeconomics (or the functioning of the economy as a whole) plays a role in the health of a country; in households it specifically relates to factors such as improved nutrition, sanitation, water and education. The influence of macroeconomics on the risk factors for disease relates to factors such as employment, nutrition, environmental conditions and education. These social factors influence communicable diseases (for example, increased international movement of people affects the movement of diseases such as SARS) and non-communicable diseases (for example, there is increased consumption of goods that may be harmful to health, such as the use of alcohol and ‘fast foods’). Macroeconomics further impacts on the health sector itself, as seen in the rising cost of health care. Most countries import products such as pharmaceuticals, surgical tools and consumer items such as light bulbs (used to provide health care), meaning the exchange rate influences the cost of health care (Guinness & Wiseman 2011:22, 26-29).

Different economic problems exist in the health sector; they include consideration of questions such as the most cost-effective treatments for people with HIV, or the choices to be made on the basis of cost between malaria prevention and malaria treatment programmes. Therefore choices need to be made about how resources are to be used, thus economics. It may therefore further be described as the study of scarcity, and the means by which this problem is dealt with (Guinness & Wiseman 2011:8-9, 17). The demand for health services continues to exceed supply, owing to factors such as an
ageing population (the elderly require more health services than younger adults), new health technologies (which make more conditions treatable), and the community’s increased expectations (see section 1.2.2). Health economics may inform decision makers in health care in making choices that maximise the health benefits to the population. (Guinness & Wiseman 2011:17-19).

Most health care systems pursue both efficiency and equity (Guinness & Wiseman 2011:16). Palmer and Ho (2008:26) point out that in the health area, there is evidence that greater efficiency is achieved in more equitable societies, which is reflected in their population’s enhanced levels of health status, often at lower cost.

Efficiency relates to maximising benefits with the available resources, while minimising costs. Efficiency may be improved in several ways, for example by increasing staff productivity, reducing length of stay, fully utilising equipment and maintaining it regularly, and properly managing drug ordering and storage and avoiding wastage and pilfering. Implementation of these measures might be difficult and requires staff to be aware of the financial constraints of the health care institution if implementation is to be effective (Guinness & Wiseman 2011:16-17).

Equity is described as being frequently incompatible with efficiency and is concerned with the fairness with which resources (health and health care) are distributed. Governments play a role in the provision, financing and regulation of health services, their aim being to promote equity (Guinness & Wiseman 2011:251). Guinness and Wiseman (2011:17) give the example that to fund health services concentrated in a small number of large centres may be efficient, but it is more equitable in terms of access to health services to rather fund a larger number of dispersed, smaller services.

Muller (2009:233) describes the unit manager as being responsible and accountable for the financial management of the nursing unit. Nursing personnel, medicine, supplies and equipment are identified as items or dimensions that have the greatest impact on the expenditure of the nursing unit. Effective and efficient management of these resources in the nursing unit is therefore important, as seen in the current economic climate. Patients expect value for money and in the context of health care service delivery, value for money means getting acceptable quality services to people who need them and making people as healthy as possible with the given resources.
Nurses are seen as the main pillar of the health care system and even those nurses who have managerial roles, and who are therefore not directly involved in clinical practice, strive to preserve patient care and safety as their primary priority. Despite the important role of nurses, Palese et al (2012:86) state that there are “no reports” (according to their article) which document the intensity of the economic crisis experienced at the bedside of the patient and the effects that cost-containment measures have on the daily practice of nursing activities.

Finkler, Kovner and Jones (2007:3-5) point out that nurse managers today must accomplish the delivery of clinical care with the resources provided. They need to assess what resources they will need and then must argue convincingly to acquire their share of limited available resources within the organisation. Needs projection and the efficiency with which care must be provided are of great import in today’s health care environment. The costs of health care services are higher than ever, and there is great pressure to control these costs. Nurse managers are ultimately responsible for ensuring that patient care is provided; this requires a cooperative relationship between managers and nursing personnel of all the organisation’s departments, specifically nursing departments where the rendering of patient care is implemented. Mellish and Wannenburg (1992:186-189) reiterate the role of the professional nurse in charge of the nursing unit as the facilitator of patient care, and explain that the principal reason for the existence of a registered professional nurse in charge of a unit is to ensure that patients obtain the best form of care.

Nurse managers are faced with budget constraints, staff shortages, and budget-cutting initiatives that may compromise their moral and ethical beliefs as well as their responsibility for providing the best and highest quality of care for patients. They need to make decisions about the appropriate time to replace equipment with the latest versions, or justify staffing increases. These problems must be carefully considered as to whether the investment is worth the cost and/or whether the investment is properly timed. Nursing is such an integral part of health care that variations in care that relate to nursing have implications for nurse managers. Variations in care (that is overuse, underuse or misuse of care) may affect quality based on patient outcomes and therefore costs. The use of current research and evidence-based practice to inform the
development of standards of care should be advocated, to ensure that nursing care and practice is based on the best available knowledge and research. Nursing’s impact on quality and costs of patient care must be understood and articulated to organisational leaders and staff (Finkler et al 2007:88-89).

Finkler et al (2007:71-72) cite data from the Institute of Medicine (IOM) report *To err is human: Building a safer health care system* (2000), which estimated that between 44 000 and 98 000 hospital deaths a year were due to preventable errors in health care, thus 1 in every 350 to 770 hospital admissions (figures based on approximately 34 million hospital admissions in 1997). Although the public have made few demands to improve deficiencies in the health care system, costs of health care system deficiencies are high. Another IOM report (Finkler et al 2007:71-72), *Crossing the quality chasm* (2001), provided solutions for overcoming barriers in the health care system that obstruct quality initiatives, and identified sources of overuse, underuse and misuse of the health care system; contributing to increasing direct, indirect and opportunity costs. Six aims were identified for the United States (US) health care system – care should be:

- safe (thus to avoid injury to patients)
- effective (care provided based on scientific knowledge while minimising the overuse, underuse, or misuse of care)
- patient-centred (thus being respectful, responsive and considerate to patient preferences, their needs and values)
- timely (minimising delay and wait times)
- efficient (avoiding waste)
- equitable (care provided in a way that does not vary on the basis of race, gender, geography, or socio-economic status)

Finkler et al (2007:72) cite another IOM report, *Preventing medication errors* (2007). The report suggested that medication errors are commonplace; it estimated that on average, a hospital patient runs the risk of being exposed to “more than one medication error each day”. The report estimated that approximately 1.5 million preventable adverse drug events occurred every year and determined that the cost of medication errors would be billions of dollars (based on an estimate of 400 000 adverse drug events per year in hospitals). These kinds of reports have drawn attention to the cost of
services that do not live up to expectations. The issue therefore is to change and improve the system to better meet the needs of society and to ensure a safe health care system. The relationship between health care quality, costs and financing therefore needs to be explored (Finkler et al 2007:72).

Thornlow and McGuinn (2010:71) point out that foundational enhancement in health care education is required to ensure progress toward superior health care quality. Thornlow and McGuinn (2010:71) suggest that the health professions bridge the gap between what is taught to students and how graduates practise. Undergraduate nursing programmes should strengthen quality and safety knowledge in their curricula.

The emphasis that Thornlow and McGuinn (2010:71) place on the importance of undergraduate curricula to include a foundation of quality and safety issues underlines the fact that cost-effective quality nursing care may be managed by nurse leaders, but that they require a team of knowledgeable, skilful nurses to perform nursing activities cost-effectively.

Nickitas (2011:229) calls for all nurses to have a better understanding about health economics and also to have greater economic accountability in professional practice. Nurses and nurse leaders should understand financial risks and should respond with greater accountability that goes beyond economic survival, but seeks sustainable nursing performance and growth. All nurses can contribute to improving the quality of patient care, improved patient outcomes and greater costs savings. They will achieve this if they engage in designing and developing incentives within their scope of practice, and thus achieve more efficiency, improved patient satisfaction and better clinical outcomes. Nurses therefore should focus on evidence-based practice and control the cost of care in order to meet the challenges of economic accountability. Nurses should appreciate how the cost of quality nursing care can generate potential savings through the avoidance of so-called “never” events (and medication errors).

Buerhaus (2009:249) maintains that the nursing profession needs to decisively reform nursing education curricula to equip the profession with ‘players’ who has the right knowledge and skills. All nursing education programmes should focus on increasing nurses’ understanding of the economic implications of clinical and administrative
practice. Nurses need to be more closely aligned with delivery of the organisation’s economic performance. Rutherford (2012:199) endorses this stance.

The nurse manager requires the support of professional nurses in order to deliver quality care in a cost-effective way. Therefore professional nurses should be able to efficiently allocate resources and determine the cost of an intervention. They need to implement patient care to required standards based on evidence-based steps, and to ensure positive patient-centred outcomes, related to nursing-centred interventions. The researcher suggests that, in order for nurse managers to succeed in ensuring the cost-effective functioning of the nursing unit within the health care organisation, all professional nurses should have an understanding of cost issues, such as factors that influence cost. This suggestion may further be supported by changes currently under way in nursing education and training in South Africa.

2.4.1 Health economics and nursing profession curricula in South Africa

The SANC Regulation R425: *Regulations relating to the approval of and the minimum requirements for the education and training of a nurse (general, psychiatric and community) and midwife leading to registration* includes several programme objectives for the curriculum in order to provide for the personal and professional development of the student nurse. These include that the student nurse, upon completion of the course of study, according to section 6(2)(j), “is able to manage a health service unit effectively”. It does not, however, include any specific reference to the requirement of economic or financial subject content that the student nurse should master in order to achieve the goals of an institution relating to economic performance (SANC 1985, Paragraph 6(2)(j)). It is therefore important to explore the knowledge of nurses about aspects of health economics. The macro curriculum of R425 does not currently require a subject or module that specifically teaches this. Nursing colleges determine their own meso and micro curricula, leaving possible gaps in this regard. As previously mentioned, gaining an understanding of the knowledge gaps should enable recommendations to be made that could inform the nursing curricula.

The South African Department of Health’s proposed *Regulations regarding the scope of practice of nurses and midwives*, made after consultation with the South African Nursing Council (SANC) under section 58(1)(q) of the Nursing Act, 2005 (Act no. 33 of 2005)
was published in Government Notice R786 of 15 October 2013. This proposed regulation states that the professional nurse, as an independent practitioner in clinical practice, should provide comprehensive nursing care and management for the nursing treatment and rehabilitation for all health problems of individuals, groups and communities. Section 4.3(h), for the scope of practice of a professional nurse; states the requirement that a practitioner should “effectively manage a health facility or service” (South Africa 2013:4-5).

The SANC Regulation R174 (new programme) *Regulations relating to the approval of and the minimum requirements for the education and training of a learner leading to the registration in the categories professional nurse and midwife*, states the requirement that a person shall only be registered in the category of professional nurse (and midwife) in terms of section 31(1)(a) and (b) (of the Nursing Act, 2005; Act no. 33 of 2005), if that person according to section 2(1)(d) “has been assessed and found competent in all exit level outcomes of the programme” (SANC 2013, Paragraph 2(1)(d)). The framework for the Bachelor of Nursing and Midwifery Qualification Framework (New Nursing Qualifications) as stipulated by the SANC (SANC [Sa]), specifies the promotion of cost-effective and efficient service delivery within a health care unit (associated assessment criteria 3.3). The exit level outcome 3 for managing a health care unit is addressed in this assessment criterion (SANC [Sa]:6). This inclusion in the curriculum required for student nurses who are being prepared for professional nursing practice in South Africa, may be used to further support the importance of the current study to expand on the specific content to be included in such a module or in the form of a workshop.

In order to ensure continuous development for cost-effective and efficient service delivery, training with regard to the economic concepts of health care has become necessary for professional nurses who have completed their basic nursing education and training without an economic or financial subject component. Geyer (2014:10) explains that the SANC has initiated the development of a CPD system for nurses in South Africa as raised under a few sections of the Nursing Strategy in order to revitalise nursing education and training. The CPD system is summarised as comprising 15 points collected annually; all nurses should submit an annual declaration to the SANC after which the SANC will conduct an audit on a sample of nurses to investigate whether they did attend all the declared activities. Points need to be collected in different
subjects or content areas, including that of leadership and management. Furthermore, given the drive to get CPD in place (as prescribed and initiated by the SANC), it has become necessary to identify knowledge gaps that could be addressed in CPD and in-service training.

2.4.2 Curriculum models – domains of learning

Curriculum models may be explained as a conceptual representation of education activities in a curriculum context and are important for effective curriculum design. Different models may be used to give direction and purpose to the process of developing a curriculum. The three generic curriculum models which may be used are the product (behavioural objectives) model, the outcomes model and the process model; the selection of which reflects the education philosophy and ideological position of the curriculum designer (Bruce, Klopper & Mellish 2011:170-180).

Bruce et al (2011:174-176) describe the different domains of the product model, in which the cognitive domain is related to the knowledge dimension of learning, while also expanding on the affective and psychomotor domains. Within the cognitive domain, differentiation is made between factual knowledge (basic, concrete information such as discrete facts and terminology that students remember or recall when communicating about and in a specific discipline – such as nursing); conceptual knowledge (concepts, elements or ideas that students can explain in their own words and relate them structurally, showing that they have understood the information and acquired the conceptual knowledge); and procedural knowledge (knowledge that the student is able to apply).

The structure of the affective domain, which concerns feelings, beliefs and values, consists of five main categories. These are receiving and attending (becoming aware of and sensitive to something); responding (responding to something by action); valuing (accepting a value and then committing to it); organising (therefore developing a value system); and characterising (the consistent reflecting of a value in behaviour). The psychomotor domain involves muscular action and requires neuromuscular co-ordination, which is divided into the categories of imitation, manipulation, precision, articulation and naturalisation.
Various cost concepts are used in economic evaluation and in determining the cost of an intervention.

### 2.5.1 Economic evaluation of the efficient allocation of resources

Economic evaluations may be done in order to compare two or more different options or programmes suggested by health care officials in order to improve health care, as well as to compare the costs of the alternatives related to their consequences or expected outcomes (see section 1.2.2). The cost taken into account includes the resources needed for an intervention to impact on health problems: the personnel; buildings and space; equipment; supplies and pharmaceuticals; transportation; training and social mobilisation and publicity (e.g. information, education and communication). Cost-benefit analysis may be performed where the monetary value of resources consumed by a health intervention (costs) are compared with the monetary value of the outcomes (benefits) achieved by the intervention. Commonly, cost-effectiveness analyses are used in the health sector to compare the value of the resources spent on an intervention with the quantity of health gained as a result (Guinness & Wiseman 2011:188-196).

An economic evaluation assesses the value for money of alternative health care interventions by comparing their costs and consequences. The goal of a health care intervention is to reduce the impact of a health problem. The impact of health problems can be measured by the number of cases; the number of deaths; and the amount of disability, suffering or pain, caused by the health problem. The number of people with a risk factor, the amount of money spent on a health problem and the amount of lost income due to a health problem are also used in measuring the impact of health problems (Guinness & Wiseman 2011:188-191). Guinness and Wiseman (2011:191) explain that the result of an intervention on a health problem may be measured in one of two ways. Firstly, the impact of the health problem before and after the intervention may be measured; secondly, the impact of the health problem with and without the intervention may be measured.

Guinness and Wiseman (2011:190) use an example of a health intervention in a developing country in order to emphasise the ‘cost’ of resources. These resources
include nursing staff, the equipment used for the programme, a vehicle that may be required (and its driver), the activities involved in maintaining vehicles and equipment, as well as the training of staff. Another resource identified is the client, who could be doing other activities instead of participating in the health intervention programme. The value of each resource used has to be calculated in order to establish the cost of the intervention. Using money as the measure is the most straightforward way to value resources. However, costing is not always an easy matter; for example, how do you estimate the value of time (such as that spent by the client waiting for the health intervention) in monetary terms?

Determining the cost of an intervention requires that the resources needed for implementing the intervention must be known, resources are also known as inputs (Guinness & Wiseman 2011:189). Effective care minimises the overuse, underuse, or misuse of care interventions, therefore efficient care interventions avoid waste. Nursing care interventions should furthermore be provided in a timely manner which minimise delays and wait times (Finkler et al 2007:72).

Quality (within nursing care) refers to the attributes or characteristics of excellence. Management’s expectations of excellence are concerned with clinical outputs reflected in the clinical indicators and the costs involved. Nursing managers, furthermore, expect that nursing care will be rendered in the most cost-effective and efficient manner that will mitigate any legal liabilities. Utilisation of resources is an important part of management’s responsibility for quality or excellence. Quality therefore concerns clinical excellence and also the effectiveness and efficiency of nursing in its entirety in the unit. The nursing practitioner should know what to do and how to do it correctly in accordance with the regulatory competency framework of professional and ethical competencies. Attitudes of all health care professionals are important, and principles and features of ‘right and wrong’ (theoretical and clinical components) are taught in educational institutions and form the basis of the nursing practitioner’s views on quality nursing care (Muller 2009:250-251).

The unit manager knows where wastage occurs in the nursing unit and should facilitate cost-effectiveness. The unit manager should make the nursing personnel aware of cost in the unit. Information may be made available regarding the price lists of medicines and general supplies; costs of linen, instruments, thermometers, and the like; the number of
personnel hours worked during the month; the monthly costs of agency personnel; personnel absenteeism and the financial implications thereof; the procurement cost of equipment; and the frequency of consumption of certain items within the nursing unit. Nursing personnel can play a meaningful role in mitigating indirect costs associated with implementing patient care, by managing patient care effectively (Muller 2009:244-245). Muller (2009:244-245) adds that a positive attitude towards cost control should be promoted as the most basic cost-saving measure – this requires a sound knowledge of health economics.

An intervention is considered to be efficient if the outcomes (in terms of money) exceed the costs (McCrone 1998:76). A cost-benefit analysis is an economic evaluation technique which measures both the costs and outcomes of an intervention in monetary terms (McCrone 1998:126; Guinness & Wiseman 2011:187). Cost-benefit analyses can be used to compare interventions with a range of different outcomes (Guinness & Wiseman 2011:193). McCrone (1998:77-78) applies the concept of cost-benefit analysis in an example of routine voluntary testing for HIV-antibodies. The costs involved in the procedure include the cost of the test and material used, the time of the health care worker to conduct the test and to counsel patients. The procedure may benefit patients and health care workers. Benefits to the health care worker include that they can take more precautions than usual to reduce the risk of infection in the case of a patient with HIV-positive status, thus potentially lives could be saved. Benefits to patients include that they could benefit from prophylactic treatment which might increase their lifespan and they could practise safer sex and thus reduce the risk of their partner being infected.

A cost-effectiveness analysis is an economic evaluation technique which measures the cost of an intervention in monetary units and measures the outcomes in medical/health units such as reduction in pain or life years saved (McCrone 1998:126; Guinness & Wiseman 2011:188). The value of the resources spent on an intervention is compared with the resulting quantity of health gained. Cost-effectiveness ratios are developed between costs and outcomes (thus costs divided by health outcomes) in order to compare interventions with one another (Guinness & Wiseman 2011:193-194). McCrone (1998:81) supports this statement.
Illness is expensive, not only financially, but also in terms of pain, fear, discomfort, and its impact on the individual, family and/or friends (McCrone 1998:8). A cost of illness analysis measures the overall economic consequences of an illness or disease and includes treatment costs and the cost of lost production (McCrone 1998:126).

Evidence-based medicine is the generic term used for the process in which health care interventions are implemented based on evidence that suggests they are effective (McCrone 1998:126). Current best evidence is used in making explicit and judicious decisions about the care of individual patients. Evidence-based medicine focus on the efficiency and effectiveness of health care interventions. Available resources in the health care environment need to be rationed or appropriately allocated, based on priorities of care which are informed by evidence-based medicine (McCrone 1998:90-93). Finkler et al (2007:72) reiterate the view that effective care should be provided based on scientific knowledge.

2.5.2 Key concepts in health economics for determining the cost of an intervention

Guinness and Wiseman (2011:201-203) explain the valuation of resources to generate costs (see section 1.2.2). Costs need to be identified by establishing certain information, such as: Who will be providing care (e.g. nurses or health workers)? What different activities are involved in the intervention (e.g. training, drug distribution)? Who will ‘receive’ the intervention (e.g. different age groups)? Where will each part of the intervention be delivered (e.g. inpatient or outpatient care)? How long will the intervention run (e.g. weight-loss programme for six months), and how often will individuals be seen (e.g. monthly check-ups)? Key concepts of ‘counting the cost’ include annual cost; annualised costs; average cost; capital cost; direct cost; discount rate; discounting; financial (budgetary) cost; indirect cost; intangible cost; marginal cost; overhead cost; recurrent cost; shadow price; time preference; total (economic) cost; fixed cost; variable cost.

Key concepts of ‘counting the cost’ are explained as follows:

- Annual cost: The cost of an intervention, including all capital and recurrent costs, calculated on a yearly basis (Guinness & Wiseman 2011:201). Calculating the
annual costs of a family planning clinic would typically include the following resources: equipment, buildings, vehicles and the initial training (nurses and midwives) (Guinness & Wiseman 2011:208-209). The cost concept of annual cost may for example be used to determine the savings between branded and generic antiretroviral therapy (ART) (Walensky, Sax, Nakamura, Weinstein, Pei, Freedberg, Paltiel and Schackman (2013:87)

- **Annualised costs**: Annual share of initial cost of capital equipment or investments, spread over the life of the project, taking depreciation into account (Guinness & Wiseman 2011:201). The annualised costs of a R100 000 X-ray machine which has a useful life of 10 years, may be calculated as R10 000 Guinness and Wiseman (2011:208).

- **Average cost**: Calculated by taking the total cost of an intervention and dividing it by quantity (Guinness & Wiseman 2011:201). Average cost gives an indication of how efficiently different providers are functioning on average (Guinness & Wiseman 2011:211). Tanuseputro, Wodchis, Fowler, Walker, Qing Bai, Bronskill & Manuel (2015:1-4) used the calculation of average cost (together with total captured annual cost) to describe the health care cost of dying in Canada (Ontario). The researchers determined health care costs by sector and included the calculation of average cost for inpatient rehabilitation and that of admission to hospital (which both proved to be high) in these calculations.

- **Capital cost**: The value of capital resources such as equipment, vehicles, buildings and one-off training programmes with a useful life of more than one year. Capital cost equates with start-up costs, because they are paid for at the beginning of a programme, but defined according to their useful life (Guinness & Wiseman 2011:201, 208). A cost-effectiveness analysis was conducted by Lapointe-Shaw, Tran, Coyte, Hancock-Howard, Powis, Poutanen and Hota (2016:6) of various strategies to treat recurrent clostridium difficile infection. The researchers report the requirement to include capital cost specifically related to equipment in the cost-effectiveness analysis regarding the various treatment strategies.

- **Direct cost**: Those resources used in the design, implementation, receipt and continuation of a health care intervention, thus the cost of providing or accessing health services (incurred by either provider or patient). Resources such as providing health education, laboratory equipment, salaries, soap for hand
washing, and training of staff are included in the calculation of direct cost (Guinness & Wiseman 2011:201, 205).

- **Discount rate**: The rate at which future costs and outcomes are discounted to account for time preference (Guinness & Wiseman 2011:202). Discount rate represent the rate at which a future value, such as costs or health outcomes, is converted to today’s equivalent or present value (Guinness & Wiseman 2011:215). Lapointe-Shaw et al (2016:8) used a discounting rate of 5% to calculate the annualised cost of capital costs over five years. This calculation of annualised cost using discounting rate, enabled the researchers to determine the typical cost of use (of equipment) per treatment.

- **Discounting**: A method of adjusting the value of costs and outcomes which occur at different times into a common time period (usually the present). Discounting converts a future value (for example health outcomes or costs), to today’s equivalent or present value (using *discount rate*). The future is uncertain and people value the utility (use) that would be derived from consuming a current amount of money in the future less than consuming it in the present (Guinness & Wiseman 2011:202, 214-215).

- **Financial (budgetary) cost**: The accounting cost of a good or service, usually representing the actual money spent on resources. Financial cost is used in programme planning and budgeting, and includes the price paid for personnel, supplies, maintenance and electricity (Guinness & Wiseman 2011:202-203).

- **Economic (opportunity) cost**: The level of benefit received in the next-best alternative option to the health intervention, such as prevention versus treatment. Economic or opportunity cost is used in economic evaluation and weighs alternatives in health service delivery (Guinness & Wiseman 2011:203).

- **Indirect cost**: The value of the resources used by patients and their carers to enable individuals to receive an intervention (such as the time the patient take up in going to the hospital, rather than working, or that of a family member in taking the patient to the hospital). Indirect cost is commonly measured using wages and earnings lost, such as the wages lost by a patient for time spent at a health care institution, instead of the workplace (Guinness & Wiseman 2011:202, 206).

- **Intangible cost**: Costs of factors such as pain, anxiety (about whether a treatment will be effective), discomfort (which include side-effects of treatment), or inconvenience. Intangible costs can be factors that affect the patient’s and
society’s decision regarding treatment options (Guinness & Wiseman 2011:202, 206). (Kirigia, Mwabu, Orem & Mathuri 2014:1-11) state in the report of their study that they omitted the cost of pain and suffering sustained before death occurred, and the grief of family members. The authors state that unfortunately the assumption was made that the economic value of these intangible losses is zero, although this is contested by the authors and many others.

- Marginal cost: The change in the total cost if one more unit of output is produced (Guinness & Wiseman 2011:202). Marginal cost can be used to calculate how much would be saved by contracting a service, thus outsourcing (Guinness & Wiseman 2011:211).

- Overhead cost: Any cost that is incurred, not in the provision of direct patient care, but that is necessary to support the organisation overall (for example personnel functions) (Guinness & Wiseman 2011:202). An article by Sabatini, Mathews, Ptak, Doshi, Tynan, Hegde and Burke (2016:319-328), describe the various costs which should be determined in a health economic cost-impact analysis. They make reference to the need for the inclusion of overhead costs in the comprehensive analysis of the full costs specifically related to laboratories providing clinical testing.

- Recurrent cost: The value of resources that have to be purchased at least once a year (irregularly but frequently: yearly, monthly, weekly, daily), thus with useful lives of less than one year (Guinness & Wiseman 2011:202, 208). Availability of funds to cover recurrent costs heavily influences the sustainability of a health service (Guinness & Wiseman 2011:208).

- Shadow price: The true economic price of a good, reflecting its true value to society (Guinness & Wiseman 2011:202).

- Time preference: The people’s preference for consumption (use of resources) now rather than later, because present consumption is valued more than the same consumption in the future. People live for today – the future is uncertain, and the value of a single unit of currency will be worth less at a future time than it is now; likewise, the individual might value health today more than being healthy at some time in the future (Guinness & Wiseman 2011:202, 214-215).

- Total (economic) cost: The sum of all the costs of an intervention or health problem. Total economic or opportunity cost influence the choice of the good (or service) that gives the greatest benefit (Guinness & Wiseman 2011:8, 202). Total
economic cost gives an indication of the overall costs of an intervention and includes the value of all the resources used (Guinness & Wiseman 2011:211).

- Fixed cost (Guinness & Wiseman 2011:83): Cost in which the cost of production does not vary with the level of output. Fixed cost would typically include cost such as the fee that needs to be paid monthly for the rental of a telephone line – the amount payable whether any calls were made or not (Guinness & Wiseman 2011:209).

- Variable cost (Guinness & Wiseman 2011:84): Cost in which the cost of production varies directly with the level of output. The amount used will dictate the amount payable for variable cost items (Guinness & Wiseman 2011:209). Little is known about the cost of providing practice facilitation to small primary practices as it relate to the potential of an organisation providing facilitation activities. The authors (Culler, Parchman, Lozano-Romero, Noel, Lanham, Leykum & Zeber 2013:207-211) of a study which determined practice facilitation costs in various practices in South Texas, reported several aspects of variable costs that they included in order to determine operating cost. They divide the variable cost of practice facilitation into key- and selected facilitation activities. Examples of variable costs that were included in the calculations were those of selected start-up activities, practice facilitation activities, monitoring following the practice facilitation, and travel and food cost associated with practice facilitation activities.

2.5.3 Research pertaining to health economics – application of concepts in nursing

Rutherford (2008:347) explains that rising health care costs and limited health care resources emphasise the need for data that document the true value of nursing; but that only a limited number of nursing studies exist that provide a cost/value analysis pertaining to nursing actions and care delivery. Choices need to be made when seeking effective distribution of health care resources. The field of economics can be used to study and evaluate these health care choices in order to determine what health resources are necessary and valued in life. This data is a critical requirement in order to ensure that health care systems do not under-invest in nursing services in the future. Valuation of nursing services is needed to support the importance of investing in them in order to improve the overall outcome of future health care.
Rutherford (2008:348-349) emphasises that data documenting both the tangible and intangible assets of nursing services (such as staff skills, strategic and process quality, as well as intellectual resources) is necessary to communicate their full value. Choices need to be made in health care; there are not enough resources to meet everyone’s needs, and therefore economic evaluation may identify which decisions result in the best value.

Economic analysis in this study included the concepts of cost-benefit analysis, willingness-to-pay’ cost minimisation analysis’ cost-effectiveness analysis, and cost-utility analysis (Rutherford 2008:349-350):

- **Cost-benefit analysis** compares the benefits related to a decision with the costs of that decision (including social costs) – if a benefit is greater than the costs it would make sense (and therefore have value) to select the benefit.

- **Willingness-to-pay** is closely related to the satisfaction of consuming a good and is therefore at the core of cost-benefit analysis. With limited income, the decision to purchase health care means that that income is unavailable to purchase other satisfying goods. The researcher may therefore examine the resources that have benefit, specifically related to the individual’s right to choose that which has value as identified by the person’s willingness to spend income.

- **Cost minimisation analysis** reflects the understanding that all activities have a cost and that choices are sought in order to minimise the input costs. Thus the process is used of reducing the value of future costs through discounting by using the discount rate. This indicates that the present value of, say, a dollar may be worth more today than a dollar in the future, but also includes the concept that some benefit is sacrificed by using resources for a specific use, rather than another, thereby losing the opportunity of using the resource elsewhere. Marginal cost versus total costs benefits must also be evaluated at all points in order to make the best choice.

- **Cost-effectiveness analysis** values the effectiveness of an outcome related to the costs. The type of cost relating to the intervention is studied and analysed, for example the costs of two (or more) glaucoma medications versus the reduction in intraocular pressure as the outcome. It is difficult to describe health care
outcomes in monetary terms, but years of life saved and more specifically Quality-adjusted life years (QALY) are included in this method.

- Cost-utility analysis measures output in only one kind of dimension, such as QALY, and estimates the satisfaction of the effect of a decision. Quantifying health care outcomes not resulting in life or death is, however, difficult, therefore cost-utility analysis is used when programmes have a wide range of outcomes and involve mortality and morbidity.

Patient level data (cost-driven data) need to be obtained in order to identify costs related to nursing services – patient-driven actual cost data may be used to demonstrate the cost of care and furthermore link the data to patient clinical outcomes, thereby offering an ability to connect the value of resources which increase the quality of adjusted life years. Cost-accounting software may be used to capture actual costs (across different departments contributing to patient care). Tracing the effect of patient variety and complexity to the process of care by capturing the actual patient-related costs is an improved method of analysing costs and confirmed by researchers. The call for data that documents the true value of nursing and the relationship between quality and cost of care has been brought about by rising health care costs and limited health care resources and is seen as essential in informing nursing leaders of the effectiveness and appropriateness of nurses in achieving the levels of quality required. Nursing administrators encourage nursing economic research, but clinical studies are still favoured by funding streams. Nevertheless, nursing needs valuation data to gain the status of leader within the health care delivery system, thereby bolstering its position and safeguarding its practice, which also supports funding and improves how nurses are able to nurse (Rutherford 2008:351).

Some of the concepts of health economics were included in a study to determine the cost of prevention and treatment of pressure ulcers from a hospital perspective (two teaching hospitals in the Netherlands) and to identify the least resource-intensive pressure-ulcer prevention strategy. Direct costs were used to perform a cost analysis from a hospital perspective (Schuurman et al 2009:390). Cost calculation methods included the following cost outcomes: cost per intervention (including hospital purchase prices of wound care products, special beds/mattresses, enteral nutrition and time input of personnel, calculated as average wage costs per minute for each specific staff category (but excluding indirect costs such as patient transport, central heating etc.);
cost of prevention (including costs of different interventions such as repositioning, mobilisation and resources); cost of treatment (as for prevention, and including wound care and according to severity of the pressure ulcer); cost per day (including total cost for prevention and treatment in the period of care, divided by the number of pressure-ulcer prevention and treatment days observed); and cost per patient receiving prevention or treatment. Another cost included in the cost study was annual national cost (to estimate national annual cost associated with treating pressure ulcers). The scenario analysis emphasised that nursing time (the human approach) is an important component in the cost of pressure ulcer care, as well as material costs (when a mostly technical approach is used) (Schuurman et al 2009:393-395). This study may be seen to indicate the use of the concepts of health economics in cost-effective clinical nursing practice.

Palese et al (2012:86) undertook a study to describe measures of cost containment and the impact of the economic crisis in daily nursing practice. The authors emphasise that despite the internationally recognised importance of the role of nurses, there are “no reports” which document the intensity of the economic crisis perceived at the bedside of the patient and the effects of the adapted cost-containing measures by health services in daily nursing practice. Cost-containment measures which were identified in the study and which affected patient care delivery included, for example, a freeze on hiring; rationing of resources at unit level (e.g. cutting down on personnel and materials); using cheaper materials/devices at the expense of quality; outsourcing of support service activities such as housekeepers; and increased standardisation of care processes to contain the nursing time (Palese et al 2012:89). The study emphasised the importance of nurse leaders and other stakeholders in identifying trends that might negatively affect patient care at the time and in the future. Nursing care outcomes should be systematically measured, not only at system level, but also hospital and unit level. The impact of economic conditions on nurses and nursing care should be monitored in order to develop polices which will protect the nursing system (Palese et al 2012:93).

Talley et al (2013:77) state in their study that grooming nurses at all levels of an organisation to master health care executive skills was critical to ensuring success in the organisation as well as the individual’s growth, and that the education and evolution of nurses as business managers was essential to building a strong professional nurse workforce. Talley et al (2013:78) explain that strategies to overcome severe shortages
of registered nurses (at Children’s National Medical Centre located in Washington, DC) in 2002 were effective, but that more advanced levels of professional development were deemed necessary to continue a climate of nursing excellence, to improve staff satisfaction and to ensure the growth of nurses as business leaders.

An article entitled “Financial literacy as an essential element in nursing management practice” describes ‘Budget Boot Camp’ programmes. It explains that these programmes review basic budget concepts, components and terminology and are available for all levels of nursing staff. The programmes include a framework for interpreting and understanding budget variances through the use of performance measures, conducting comparisons with and utilising external benchmarks, and mastering the business of nursing. Programme length and content vary depending on an individual student’s needs. Emphasis is placed on the need for communication of resource needs, from staff nurse level to nursing leadership, who can then communicate nursing resource needs to the highest organisational level (Talley et al 2013:79-80). Talley et al (2013:77) add that leaders are furthermore responsible for providing nurses with increased exposure to quality, safety and financial data, which will allow nurses to translate data while they achieve and sustain successful outcomes in best nursing practice.

2.6 SUMMARY

Health economics is the optimisation of health, relating to activities that include using resources in such a way that they improve health status and service delivery within the limited resources that are available. Nurses are seen as the main pillar of the health care system and this call for all nurses to have better knowledge of health economics. All nursing education programmes should focus on increasing nurses’ knowledge and understanding of the economic implications of clinical and administrative practice.

Cost concepts relating to the dynamics of health economics, specifically to efficient allocation of resources and determining the cost of interventions, have been explored and described in the literature review as pertaining to the knowledge of student nurses in order to prepare them to deliver cost-effective yet quality nursing care.
CHAPTER 3

RESEARCH DESIGN AND METHOD

3.1 INTRODUCTION

Research is important in any profession. It forms an integral part of health care practice, education and management, and refers to the careful study, exploration and discovery pertaining to unexplained phenomena. Characteristics include the fact that research should result in an increase in knowledge and therefore usually starts with a question or a problem. The methods used to gain knowledge include search (which should be systematic and thorough), discovery or enquiry by using purposeful process through the application of scientific methods (Brink et al 2012:1-2).

The researcher used existing literature sources to describe the fact that financial constraints exist which affect the daily implementation of nursing activities and the standard of care delivered (see sections 1.3 & 2.3). For this reason nurses need to have sufficient financial knowledge and skills, thus being economically accountable, to perform optimally. Resources are tight, therefore all nurses need to practise all aspects of nursing care more efficiently and be more closely aligned with delivery of the organisation’s economic performance. The researcher argued that nursing education programmes should focus on increasing nurses’ understanding of the economic implications of clinical and administrative practice.

For the purpose of this study the researcher has identified the problem that there appears to be a gap in what student nurses study in basic nursing education and training programmes to become professional nurses. They need to gain knowledge and skills of the cost concepts related to health economics, specifically the efficient allocation of resources and determining the cost of interventions, in order to render cost-effective, yet quality care. The following research question therefore arose:

What is the knowledge of student nurses regarding the cost concepts of health economics, specific to efficient allocation of resources and determining the cost of an intervention?
The objectives of this study were to:

- explore the knowledge of student nurses about health economics specific to cost concepts related to the efficient allocation of resources
- describe the knowledge of student nurses of health economics specific to concepts related to determining the cost of an intervention
- make recommendations for additions to the nursing curriculum content and development of CPD workshops and in-service training regarding health economics

### 3.2 RESEARCH APPROACH

A quantitative study was conducted in which a selection of concepts was focused upon to determine a solution to the research problem. Quantitative research was relevant, as the researcher focused on a small number of concepts relating to the research problem, and did not attempt to understand it in its entirety. The researcher did not participate in the events under investigation, and maintained objectivity in both the collection and analysis of information. Quantitative research was carried out in this study by using a structured questionnaire in order to obtain numerical data which could be analysed statistically (Brink et al 2012:11).

### 3.3 THE RESEARCH PARADIGM

A paradigm may be explained as a general perspective of the world and its complexities. Two broad paradigms are used in disciplined inquiry in nursing: positivism and constructivism. The positivist paradigm underlies the quantitative research which was undertaken in this study, which assumes an existing reality that can be studied and known. Positivists attempt to hold personal beliefs and biases in check to avoid contaminating the phenomenon under study, as they value objectivity. Biases are minimised and precision and validity are maximised by imposing conditions on the research situation for control. Positivist researchers use orderly, disciplined procedures. A systematic process is followed which starts with defining a problem and selecting concepts pertaining to the problem on which to focus, and moving to the solution of the problem (thus following an established plan) in order to collect the needed information to test their intuitions about the phenomena being studied and relationships between
them. Deductive reasoning is used in quantitative research to formulate predictions which may be tested in the real world (Polit & Beck 2012:12-14).

Grove et al (2013:23) explain that quantitative research is a formal, objective and systematic process which is implemented in order to obtain numerical data which lead to understanding of aspects of the world. Statistical procedures are used for analysis of numeric information. Investigation is done from a distance, thus the investigator does not participate in the events under investigation (Brink et al 2012:11).

In this study, the phenomenon which was studied was the knowledge of student nurses pertaining to the cost concepts of health economics, specific to efficient allocation of resources and determining the cost of an intervention in the delivering of cost-effective quality nursing care. The researcher followed a formal process in which firstly a research problem was identified. A research question was formulated upon which objectives for the study were based, leading to the development of a questionnaire which was used to obtain numerical data for statistical analysis in order to find a solution to the problem.

In this study the researcher deduced that there appears to be a gap in what student nurses study in basic nursing education and training programmes. Professional nurses are required to have knowledge of the cost concepts of health economics and skills in implementing them. A quantitative approach was selected for this study in order to explore the knowledge that student nurses being prepared for professional practice have pertaining to health economics. The results of the study (should a knowledge deficit exist to be corrected) may be used to add to the effectiveness and efficiency with which nurses deliver care. The researcher controlled her own biases by remaining independent from those being researched and adhered to a structured method (questionnaire) of obtaining information which was analysed statistically.

### 3.4 THE RESEARCH DESIGN

An explorative and descriptive quantitative design was used for this study. Exploratory research investigates the phenomenon’s full nature, the manner in which it is manifested, and the other factors to which it is related (Polit & Beck 2012:18). Grove et al (2013:370) explain that exploratory studies increase the knowledge of the
phenomenon under study. The intention of the researcher in this study was to explore and describe the knowledge of student nurses of the cost concepts in health economics. The study was only conducted in one province in South Africa and therefore the generalisability was identified as a limitation.

Brink et al (2012:112) explain that descriptive research is used to provide more information in a particular field through providing a picture of the phenomenon as it occurs naturally. Polit and Beck (2012:226) classify descriptive quantitative research as a non-experimental study whose purpose is to observe, describe and document aspects of a situation occurring naturally. Salaria (2012:1) describes descriptive research in terms of gathering information about present situations with the purpose of describing and interpreting them. This type of research method includes the proper analysis and interpretation of data obtained in the descriptive survey, in order to achieve generalisation and prediction. Salaria (2012:1) furthermore describes the significance of the descriptive survey method and its concern for the characteristics of the whole sample and not only those of individuals.

This study aimed to describe variables in order to answer the research question; it may also be used to identify problems in current practice. The concepts and their interpretation related to the phenomenon – knowledge of cost concepts of health economics in cost-effective nursing care – were explored and described by the researcher as they relate to the knowledge and understanding that student nurses being prepared for professional nursing practice have. The researcher used a literature review around the research objectives to develop a questionnaire which incorporated definitions and examples of the variables under study. The knowledge of the respondents was then explored regarding health economics, specific to concepts related to the efficient allocation of resources, and the knowledge of student nurses specific to concepts related to determining the cost of an intervention, which could then be described using descriptive statistics. The application of concepts by providing practical examples in the items of the questionnaire as well as open-ended questions (items) allowed for exploration of the knowledge of the respondents.
3.5 RESEARCH METHODS

Following is a discussion regarding the population and sample selection, data collection and data analysis.

3.5.1 Population and sample selection

The population and sample selection used in the study are described in this section.

3.5.1.1 Population

The population includes the total sum or collection of cases in which a researcher is interested, while the accessible population for the study is the aggregate of cases that conform to the designated criteria and that is accessible. The construct validity of a study is enhanced when there is a good match between the eligibility criteria and the population construct (Polit & Beck 2012:273-274). Grove et al (2013:351-352) explain that the accessible population is a portion of the target population. This portion might be reasonably accessible elements within for example a specific nursing unit, hospital or city.

The population for this study was student nurses registered for the SANC R425 programme at the selected NEI where the research was to be conducted and in their final year of study during 2016. The accessible population was all the student nurses registered in the selected province, who attended a specific class during a theory block on 15 July 2016, when data was collected.

3.5.1.2 Eligibility criteria

The eligibility criteria specify the essential characteristics needed to be deemed a member of the target population (Grove et al 2013:352), thus the population characteristics that the population must possess in order to be classified as a member of the population (Polit & Beck 2012:274).

The eligibility criteria for this study consisted of student nurses registered for the SANC R425 programme – *Education and training of a nurse (general, psychiatric and*
community) and midwife leading to registration (registered nurse); who were in their final year of study in 2016. Furthermore, student nurses must be registered at the selected site where the research was conducted – a public NEI within a specific province (one of the nine) of the Republic of South Africa.

3.5.1.3 Sample selection

Polit and Beck (2012:275-286) describe sampling as a process in which cases to represent an entire population are selected in order to draw an inference about the population. Key aspects of sampling include its representativeness (that the characteristics of the sample closely resemble those of the population) and size. Sampling design may be classified as either probability sampling (random selection of elements – greater confidence is placed in the representativeness of this method), such as simple random sampling and stratified random sampling; or nonprobability sampling (non-random methods are used; therefore every element does not necessarily have a chance of being included), such as convenience sampling and quota sampling. The size or number of the respondents in quantitative research studies needs to be considered in order to achieve statistical validity – the general recommendation is to use the largest sample possible (thus giving increased likelihood of representation of the population).

Given the size of the accessible population, a sample was not drawn from the population, but all members of the accessible population were approached to participate. A census covers the entire population (Polit & Beck 2012:721). Salaria (2012:2) explains the term ‘population’ as that group of people or observations that are included in a specific category as possible members of a well-defined class of people, events or objects. The population therefore represents a census (or the total number) of all the units of such a population that may be reached. Salaria (2012:2) adds that the value of using the census method is the representative nature of the results obtained, which are accurate and reliable, so that the question of error becomes less significant. The researcher proposed to use the census method (from the small population under study) in order to obtain as many responses as possible (data), as this would also enhance the validity of the study.
3.5.2 Data collection

Grove et al (2013:45) describe data collection as the systematic and precise gathering of information which is relevant to the purpose, objectives or hypotheses of a study. Quantitative studies usually yield numerical data, and the planning of data collection will enable the researcher to anticipate problems and to identify possible solutions. Polit and Beck (2012:293) emphasise the necessity for data collection plans for quantitative studies in order to obtain valid, accurate and meaningful data.

3.5.2.1 Data collection instrument

Questionnaires are documents which are used to gather self-report data via self-administration of questions (Polit & Beck 2012:740). Grove et al (2013:425) explain that questionnaires can be designed in order to determine facts about the respondents, such as levels of knowledge, and attitudes or beliefs. Respondents read written questions and give their answers in writing. Questionnaires are economical and may be distributed through the mail, but care should be taken to ensure that questions are worded clearly and simply (Polit & Beck 2012:265).

In the current study, the researcher set out to explore and describe the knowledge that student nurses have regarding certain cost concepts of health economics. The availability of existing instruments to measure knowledge on cost concepts of health economics was explored, but no suitable instruments could be found. The researcher therefore elected to use a self-administered instrument (questionnaire) for data collection from respondents in the study, which they completed in writing.

Polit and Beck (2012:297) describe how a structured self-report instrument may be designed and administered. A structured instrument consists of a set of questions (or items) and, in most cases, predetermined response alternatives, which are presented to each respondent in the same order and with the same set of response options. Closed or open-ended questions may be used. Closed-ended questions offer response options or alternatives from which the respondent must choose the option that most closely matches the appropriate answer. Closed-ended questions are more efficient for completion in a given amount of time, and respondents may be more willing to check off (tick) appropriate alternatives, rather than to compose written responses.
Bruce et al (2011:174-176) describe the different domains of the product model in which the cognitive domain is related to the knowledge dimension of learning, while also expanding on the affective and psychomotor domains (see section 2.4.2). Within the cognitive domain, differentiation is made between factual knowledge; conceptual knowledge; and procedural knowledge.

The researcher developed a questionnaire with closed-ended questions (items) and predetermined response alternatives which were self-administered by respondents. The questionnaire also contained a covering letter (introductory page) indicating the title of the study, instructions for completion of the questionnaire, information about the number of sections contained in the questionnaire which should be completed, and a declaration by the respondent.

The questionnaire was structured as follows:

- **Section A:** Demographic data of respondents. This section included questions on their experience in nursing as well as courses related to health economics.
- **Section B:** This section included items to determine the knowledge (factual, conceptual and procedural) that student nurses have on concepts of health economics specific to efficient allocation of resources.
- **Section C:** Items determining the knowledge of the costs of an intervention were included in this section.
- **Section D:** Section D required the respondents to provide additional comments regarding the phenomenon under study (health economics), exploring their responses in more depth. To allow for exploration open-ended questions were posed in order to assess the affective domain. Receiving, attending and responding may be assessed by the returning of completed questionnaires, while valuing may be reflected in the comments provided by the respondents to the open-ended questions in Section D.

The scoring of Sections B and C was based on the principle that an overall score of 50% or more shows that respondents are knowledgeable on the topic under investigation.
The construction of items and response alternatives in the questionnaire was based on a literature review (using textbooks and scientific journals) of the phenomenon under study – health economics. In the questionnaire, concepts from the literature were supplied with practical descriptions as an aid, to bring the items to the level of the respondents (see Annexure G for copy of the questionnaire).

The newly developed questionnaire was pre-tested prior to data collection and is discussed in section 3.6.

### 3.5.2.2 Data collection process

The researcher hand-delivered the questionnaires to the student nurses during a theory block (by appointment with the designated contact person and with the permission of the principal of the NEI). The researcher was therefore given opportunity to lobby the student nurses using an informative and positive approach by introducing the study personally and discussing the covering letter attached to each questionnaire. Individual contact was limited to handing out of questionnaires. The opportunity to lobby the student nurses however allowed the researcher the time to explain the importance of the study and the value of the potential respondents as respondents; however, autonomy and voluntary participation was emphasised. These aspects of initial communication by the researcher with the potential respondents are described in Grove et al (2013:374-375). Some positive and negative factors that may influence the respondents’ decision to participate in the study are identified. These include the respondents’ interest in the study topic, fear of the unknown and the nature of the informed consent (Grove et al 2013:374). A sealed box was placed at the NEI for the completed questionnaires to be posted in.

The questionnaires were self-administered and therefore also provided anonymity and confidentiality to respondents regarding answers to items which would determine their knowledge, but could not be connected to any specific respondent. This provided opportunity for the ethical principal of beneficence to be applied, in that respondents were not caused any discomfort that might have been experienced if, for example, they felt they had to acknowledge to the researcher directly that they did not possess the relevant knowledge.
Questionnaires were also an economical choice, considering the distance of approximately 330km between the place of residence/work of the researcher and the site of data collection.

Instruments should contain an introduction about the nature and purpose of the study. In the case of questionnaires, such an introduction may take the form of an accompanying covering letter (Polit & Beck 2012:306). Grove et al (2013:427) add that the covering letter may include the approximate amount of time required to complete the form and indicate that the completion of the questionnaire can be taken to imply informed consent.

In this study a covering letter accompanied each questionnaire, and introduced the study’s nature and purpose to the respondents, as well as serving the purpose of assuring them that the information would be anonymous and that participation in the study was completely voluntary. The covering letter also contained the contact details of the researcher should the respondents wish to contact her during or after the study (copy attached as Annexure F), as well as a declaration by the respondents that they had read and understood the information provided in the covering letter.

The researcher may assume implied consent to participate in a study from respondents’ actions, such as returning a completed questionnaire (Polit & Beck 2012:730), and therefore the researcher does not need to obtain written consent (Polit & Beck 2012:160). The practice of assuming informed consent based on the action of a respondent returning a questionnaire has been cited in other research studies. Friedrich-Nel and Munro (2015:27-28) conducted an online survey regarding radiographers’ opinion on patients’ rights to informed consent. In the description of the methods used, the researchers explained that the action of completing the questionnaire was assumed to be confirmation of consent (confidentiality regarding respondents’ identities was maintained, but they were also informed that the outcome of the survey would be published). In a study regarding dietary supplementation practices in Canadian high-performance athletes, respondents were given an explanation of the study and their completion of the supplement questionnaire was assumed to imply consent to participate in the study (Lun et al 2012:32). Kvist (2013:3) indicated the ethical considerations in the study and explained that respondents placed their questionnaires in an envelope. This made it possible for any respondent who did not
wish to complete the questionnaire to return it blank, without the cognisance of the researcher – a completed questionnaire was therefore assumed to imply informed consent.

In this study, the respondents were informed in the covering letter that the results of the study will be presented in the form of a dissertation for examination purposes. The data and results of the study will furthermore be used in research related documents (including for example journal articles) and will be made available to the authorities who provided permission.

In the current study the researcher assumed that the return of the completed questionnaire reflected voluntary consent to participate. The decision of this researcher not to have signed consent forms was based on a belief that anonymity can be better ensured in this way – therefore there is even less possibility of connecting a specific questionnaire with an individual respondent. In the current study, each questionnaire was in an individual envelope when handed to student nurses and could be placed back into this envelope and then sealed to maintain the ethical principles of anonymity and confidentiality (in addition, the researcher also provided a sealed box for completed questionnaires to be posted in), which was then collected by the researcher.

A census of all those student nurses of the population present during the time in block when the researcher distributed the questionnaires was used for data collection. The sample covered the entire accessible population conforming to the designated eligibility criteria, and who returned the completed questionnaire (expressed as “N”). The total number of responses was indicated as “n”.

The return (response) rate was calculated as 42%. Owing to this return rate of completed questionnaires, the researcher made a follow-up in various clinical facilities where student nurses had been placed after their block at the NEI. This follow-up was made to encourage any other student nurses who still wished to submit questionnaires to do so, in order for more data (responses) to be included in the final data analysis. However, no further voluntary submissions were obtained and this was respected by the researcher in the light of the ethical concept of autonomy.
Brink et al (2012:153) describe the strengths and weaknesses of both interviews and questionnaires. Some strengths of questionnaires include that they are a quick way of obtaining data and are less expensive (both in terms of money and time), they also support anonymity. One of the weaknesses is that the response rate may be low. Based on the returned questionnaires in this study, the researcher experienced this disadvantage (response rate: 42%). However, Grove et al (2013:429) mention that self-administered questionnaires often elicit a low response rate, but emphasise that validity is improved through consistent administration of the questionnaire.

Articles were obtained by the researcher in which the response rates were similar. Block, Condon, Kleinman, Mullen, Linakis, Rifas-Shiman and Gillman (2013:3) conducted a study investigating the estimation of calorie content of meals from fast-food restaurants (school-age children, adolescents and adults). The percentage of all those individuals who were approached and agreed to participate were reported as 45% of parents with school-age children, 42% of adolescents, and 40% of adults. In an article titled “Shift work disorder in nurses – assessment, prevalence and related health problems”, a questionnaire was administered by mail with a prepaid envelope for return of completed forms. Two reminders were sent and the questionnaire was also made available online. The final response rate was 38.1%, even though the nurses were also informed that they would take part in a lottery rewarding 50 individuals with a monetary reward each, provided they participated (Flo, Pallesen, Magerøy, Moen, Grønli, Nordhus and Bjorvatn 2012:2).

In their study into the health status of care home residents in the UK, Gordon, Franklin, Bradshaw, Logan, Elliott and Gladman (2013:2) reported that they approached 131 homes (in a designated area) by mail, of which only 16 agreed to participate. No attempt was made to further approach the non-participating homes to try to find their reason for not volunteering.

### 3.5.3 Data analysis

A structured questionnaire was used in order to obtain numerical data which could be analysed statistically.
Polit and Beck (2012:379-380) describe different aspects of the levels of measurement. The nominal level of measurement assigns numbers to classify characteristics into categories – thus does not have mathematical value, and therefore does not provide information about an attribute except equivalence and non-equivalence. The categories of the nominal level of measurement must be mutually exclusive and collectively exhaustive, for example male or female. The ordinal level of measurement orders attributes according to some criterion – therefore a relative ranking. The interval level of measurement specifies rank ordering and equivalent distance between numbers can be assumed. In interval scales there is no real or rational zero point, but they can be averaged meaningfully, such as the Fahrenheit scale. The ratio level of measurement provides information about ordering on a critical attribute, intervals between objects, as well as the absolute magnitude of an attribute, as it has a rational, meaningful zero such as weight. In this study, nominal levels of measurement were used such as the gender distribution of the respondents. The results of the scores obtained in the different sections represent the ratio level of measurement.

Statistical methods are used to summarise, reduce, organise, manipulate, evaluate, interpret and communicate quantitative data. Data may be described and summarised by using descriptive statistics, in which a collection of data is converted into an organised, visual representation in order to give meaning for the readers of the research report. Frequency distributions, measures of central tendency and dispersion or variability may be utilised in the descriptive approach, as well as measures of relationships in which the correlation between variables is described (Brink et al 2012:179). In this study, the data was analysed statistically and figures (such as graphs) and tables were used to visually represent the results (see section 4.3 and Annexure K).

Grove et al (2013:550-559) explain how statistics are used to describe variables. To summarise data, frequency distributions and measures of central tendency are used, while deviations in data are described by using measures of dispersion, normal curve, sampling curve, confidence intervals and degrees of freedom.

Frequency distributions are an important basic way to describe the sample in the beginning of data analysis and may be displayed in a table or figure. However, they may also be presented in graphs, histograms, charts, and frequency polygons. Frequency distributions include values of continuous variables (higher numbers present more of
that variable and vice versa; examples include age, weight, and perception of quality of life) and may further be ungrouped or grouped in order to provide the greatest possible meaning to the study. Percentage distributions indicate the percentage of the sample with scores which fall in a specific group. Frequency tables may be used to represent nominal data (and presented graphically) (Grove et al 2013:550-552). A perfectly normally distributed frequency distribution of a variable is known as a normal curve, thus perfectly symmetrical (Grove et al 2013:555). A skewed or asymmetrical curve may be positively skewed (the largest portion of data is below the mean) or negatively skewed (largest portion of data is above the mean) and therefore the mean, median and mode are not equal, which interferes with the validity of many statistical analyses. However, few samples are perfectly symmetrical, but as the deviation from normal symmetry increases, the impact on the statistical analysis increases. Kurtosis also describes the shape of the distribution curve as the degree of peakedness of the curve, which relates to the spread or variance of scores (Grove et al 2013:540-541). In this study, the frequency distributions of skewness and kurtosis were reported in table form for the variables tested in the different sections of the questionnaire (see Annexure K).

Measures of central tendency represent the centre or middle of a frequency distribution and three measures are commonly used: mode, median and mean. The mode refers to the numerical value which occurs with the greatest frequency in the data set. The score at the exact centre of an ungrouped frequency distribution is called the median. The most commonly reported measure of central tendency is the mean, which is the arithmetical average of all values of a variable under study (thus the sum of the scores divided by the number of scores summed). The mean is affected by outlier scores (extremes) and therefore could change the frequency distribution to, for example, a positively skewed distribution, in which case the median would be a better measure of central tendency (Grove et al 2013:552-553). The mean reflected the average resultant score that the respondents obtained for different sections or items in the questionnaire (see Annexure K).

Grove et al (2013:554-555) describe measures of dispersion or variability, which indicate how different the scores are (by measuring the individual differences of members of a population and sample) and provide data that is not obtained from measures of central tendency. Similar values (small variability) represent a relatively homogeneous sample, while wide variation is considered heterogeneous. Range may
be presented in two ways: by lowest and highest scores, or a difference score (calculated by subtracting the lowest score from the highest score). *Difference scores* or deviation scores indicate the extent to which the score deviates from the mean and are therefore obtained by subtracting the mean from each score – positive when above the mean; negative when below the mean. Extent of dispersion or spread of scores for a variable is represented by the *variance* – thus the larger the calculated variance for a study variable, the larger the dispersion. Variance is computed to derive the *standard deviation* (square root of the variance). The *standard deviation* is a measure of dispersion, which reflects important properties about the frequency distribution of the variable under study. The researcher reported the standard deviations for the different variables (sections) in the questionnaire in table form (see Annexure K).

Sampling error is described by *standard error of the mean*, which is calculated to determine the magnitude of the variability or dispersion associated with the mean. A small standard error indicates that the sample mean is close to the population mean, while a large standard error indicates less certainty. The standard error is used to build a *confidence interval*, which determines how closely the sample mean represents or comes close to the population mean (Grove et al 2013:557-558). In this study, the standard error mean was indicated in the tables representing the summaries of the statistical analysis (see Annexure K).

Data was analysed using a statistical program of analysis (SAS JMP version 12.0). The services of a statistician were sought to assist with the data analysis and interpretation. The results are presented in this dissertation (research report), using descriptive statistics. Descriptive statistics were used to indicate, for example, how many responses were received for a specific alternative response to a specific item. Measures of central tendency to indicate the average, and dispersion, to indicate how the data is spread, have been used (see Annexure K). Open-ended questions explored the knowledge of the respondents in more depth as they were asked to provide additional comments regarding the phenomenon under study (health economics). The open-ended questions were analysed by grouping similar responses together after which they were presented in statistical form. See Chapter 4 for further discussion.
3.6 VALIDITY AND RELIABILITY

The quality of a study may be assessed by using the criteria of reliability and validity. Reliability relates to the information obtained in a study, specifically the accuracy and consistency of such information. Validity broadly concerns the soundness of the study’s evidence, and refers to how unbiased and well-grounded the findings are (Polit & Beck 2012:175).

3.6.1 Reliability

Grove et al (2013:389) explain that the greater the reliability or consistency of the measures of a particular instrument, the less random error there is in the measurement method. There is a chance that the instrument is unreliable if the responses vary each time a measure is performed. Reliability of the instrument relates to the measure’s stability, consistency, or dependability, thus it should have the smallest variation possible in repeated measurements. Accuracy refers to the extent to which the instrument’s measures reflect true scores, so that measurement errors are absent from obtained scores (Polit & Beck 2012:331).

In this study, a census was used (which included the whole accessible population) to obtain data, which supported the reliability of the study.

3.6.2 Validity

Grove et al (2013:393) consider validity as a single broad measurement evaluation, referred to as construct validity, and including various types of validity (such as content validity). Validity of the instrument relates to the degree to which the instrument measures that which it is supposed to measure. Content validity of the data-collection instrument concerns the degree to which it contains an appropriate sample of items for the construct being measured and adequately covers the construct domain (Polit & Beck 2012:336). A homogeneous sample (Polit & Beck 2012:237) may be used as a control mechanism to ensure validity.

The researcher strove to achieve validity by compiling a questionnaire that was based on a thorough literature review in order to include appropriate items relating to the
concepts of health economics. All items in the questionnaire were based on factual information obtained from different sources pertaining to health economics, with specific reference to efficient allocation of resources and determining the cost of interventions (the study objectives), therefore supporting content validity. A draft of the questionnaire was submitted for review to the supervisor of the study, as well as an expert in health economics, to be validated for the correctness of the knowledge statements examples provided. The services of a statistician were also obtained in developing and validating the questionnaire.

3.6.3 Pre-testing the instrument

A pre-test of the questionnaire was conducted by giving the questionnaire to five student nurses who met the eligibility criteria for the study, but whose responses were not included in the results of the study. These student nurses were not included in the sample for the study. They were requested to give feedback on the appropriateness of the time allocated for completion of the questionnaire, as well as whether the items were clear and understandable. Polit and Beck (2012:738) explain that a pre-test may be used to identify problems with, or assess time requirements of, a newly developed instrument. In finalising the questionnaire the pre-test was also evaluated. Based on the feedback of the student nurses included in the pre-test, no changes were made to the questionnaire as developed by the researcher. Conducting a pre-test of the data collection instrument further ensured validity.

3.7 ETHICAL CONSIDERATIONS

Ethical considerations protect the rights of the respondents, as well as the rights of the institution in which the research is conducted.

3.7.1 Protecting respondents

The principles of beneficence, respect for human dignity and justice apply. Polit and Beck (2012:152-156) describe the principle of beneficence as stating that respondents have the right not to be harmed or to be caused discomfort. The researcher has the obligation to avoid, prevent or minimise harm to respondents – principle of non-maleficence. Respondents should be protected from exploitation. The researcher
should respect human dignity. Respondents have the right to self-determination or the right to decide (autonomy) voluntarily whether to participate in a study (or not). Full disclosure should be made by the researcher in describing the nature of the study, the researcher’s responsibilities, probable risks and benefits, and the person’s right to refuse participation. The principle of justice is explained in that the respondents have the right to be treated fairly. The rights of vulnerable individuals (those individuals who are unable to protect their own interests) should be protected to ensure that they are not exploited. All respondents have the right to privacy; therefore they may expect that the data that they provide will be kept in the strictest confidence.

The human rights of the respondents need to be protected, including the right to self-determination; specifically, persons with diminished autonomy (for example neonates, children and mentally incompetent persons) require protection. The right to privacy includes the right of the individual to determine the time, extent and general circumstances under which personal information will be shared or withheld. The right to autonomy and confidentiality, the right to fair treatment and the right to protection from discomfort and harm are also described by Grove et al (2013:163-175).

The rights of the respondents in this study were ensured as follows:

- **Beneficence**: The purpose of this study was to explore and describe the knowledge of student nurses regarding the cost concepts of health economics, specifically relating to efficient allocation of resources and determining the cost of interventions, in order to prepare them to deliver cost-effective, quality nursing care. Therefore it was the intention of the researcher to benefit the respondents in the study by ascertaining if there was a gap in what student nurses studied in nursing education and training programmes to become professional nurses; specifically whether they gained knowledge and skills about the cost concepts of health economics. No intervention was planned during the implementation of the study. However, the results of the study could be used to make recommendations for additions to the nursing curriculum content and development of CPD workshops and in-service training regarding health economics. This could better prepare professional nurses for quality health care practice by ensuring that limited resources were applied in the most cost-
effective way while not compromising the quality of service (see the third objective of the study).

- **Non-maleficence**: The researcher prevented harm to respondents in the study by contemplating aspects of the study which might cause either physiological or psychological harm or discomfort to the respondents. The researcher did not foresee any possibility of physiological harm, as a non-experimental explorative and descriptive study design was implemented, in which no intervention was planned. The covering letter stated that no risks were associated with the study. However, the researcher considered that the respondents might possibly experience psychological discomfort due to the determination of their knowledge, or lack of it, of the study subject. Therefore the researcher endeavoured to ensure anonymity of all the respondents. Respondents’ responses also did not give any indication of their academic performance in the class, in that they were not linked to them personally, nor were any marks allocated to the individual responses.

- **Respect for human dignity**: Respondents were given full information pertaining to the study by use of a covering letter attached to the questionnaire, as well as a contact number for the researcher in case of questions. No respondent was coerced (through for example the offer of monetary or other kind of reward) into participating in the study, and the principle of autonomy was implemented in that the covering letter explained that participation in the study was completely voluntary and the respondent may withdraw from the study at any time, or choose not to participate. The respondents were informed in the covering letter that voluntary informed consent to participate in this study would be assumed on the basis of a respondent’s action of returning a completed questionnaire. A ‘declaration by respondent’ section was included with the purpose that the respondents will acknowledge that they had read and understood the information provided in the covering letter. No respondent was forced to submit questionnaires in order to obtain a high return (response) rate and therefore autonomy was respected and implemented.

- **Justice**: No respondent who elected not to participate was subjected to unfair treatment or discrimination. The study design allowed for confidentiality of the respondents and therefore any respondent who elected to return a blank/incomplete questionnaire could not be identified either way. The researcher also provided envelopes for the questionnaires to be inserted in before
submission in the sealed box provided for them. The sampling method used, being a census method, also ensured that all respondents who satisfied the eligibility criteria had a fair chance to participate in the study if they so desired/decided.

- **Privacy:** Data obtained in the study have been kept confidential. Confidentiality was maintained through anonymity in which respondents and their data could not be connected – the questionnaires did not require identifying information, only demographic details. The respondents were informed in the covering letter (attached to each questionnaire) that the data would be used in research-related documents and also be presented in the form of a dissertation for the study of the researcher towards a Master’s degree in Nursing Science and in journal articles. In addition the results of the study would be made available to the authorities who had provided consent.

- **Data management:** All completed questionnaires were kept in a locked cupboard by the researcher. Only the researcher, supervisor and statistician had access to the completed questionnaires during data analysis. The completed questionnaires (locked away in a cupboard) as well as the electronic data will be kept for five years as required by the institution under which this study was conducted.

### 3.7.2 Protecting the rights of the institution in which research is conducted

Ethical clearance was obtained firstly from the Research Ethics Committee of the Department of Health Studies – Unisa (see Annexure A for copy of ethical clearance certificate). The title of the study was changed for editorial reasons after the study was completed. A new ethical clearance certificate (also included in Annexure A) was issued by the Research Ethics Committee of the Department of Health Studies – Unisa.

Permission was sought from the Provincial Department of Health Ethical Committee (specific to the province in which the research was conducted) to conduct the research at the specific public NEI in the specific province in the Republic of South Africa (see Annexures B and C for copies of request letter and approval granted). Once the provincial permission was granted, permission was sought from the Principal of the NEI (see Annexures D and E for copies of request letter and approval granted). Supporting
documents accompanied the letter to request approval (approved proposal, ethical clearance certificate).

The approval of the study, however, depended on a declaration, which was required by the provincial department, from the researcher to acknowledge the co-operation of the Department of Health of the province in which the study was conducted in any publication or public discussions and/or any such matters which might arise from this study. An extract of the provincial requirement for the declaration by the researcher was included in Annexure B.

Anonymity of the NEI was adhered to in that the researcher did not make reference by name to the NEI where the study was conducted and endeavoured to exclude all identifying terminology from the research report or dissertation. However, the provincial requirements for acknowledging the specific province/department as having granted permission for the study (see Annexure B) to be conducted have been honoured under the “Acknowledgements”. A report of the study will be made available to the authorities who provided permission (the specific provincial department as well as the NEI).

3.7.3 Research misconduct

Polit and Beck (2012:168-169) describe research misconduct and explain that it does not include honest error or differences of opinion, but includes issues such as fabricaton (of data or study results), falsification (manipulation of research material, equipment or processes – distorting results) or plagiarism (appropriation of the ideas of others without giving due credit to the source).

The researcher strove to adhere to ethical principles and to avoid any research misconduct. No data used for analysis was fabricated or falsified and data analysis was done with the assistance of a statistician. All literature resources used were referenced in both the text and the list of references.

3.8 SUMMARY

An explorative and descriptive quantitative study was conducted with the purpose of exploring the knowledge that student nurses have of the cost concepts related to health
economics, specifically regarding efficient allocation of resources and determining the cost of an intervention, which knowledge would help them to deliver cost effective, quality nursing care. A questionnaire was used to collect numerical data. Descriptive statistical analysis was used to summarise and present data. Open-ended questions explored additional comments by the respondents regarding the phenomenon under study (health economics). Data was formally presented in a dissertation (research report). Validity and reliability were striven for in the study. Ethical principles were adhered to in ensuring that the rights of all involved were protected.
CHAPTER 4

ANALYSIS, PRESENTATION AND DISCUSSION OF THE RESEARCH RESULTS

4.1 INTRODUCTION

Statistical methods are used to summarise, reduce, organise, manipulate, evaluate, interpret and communicate quantitative data. Data may be described and summarised by using descriptive statistics in which a collection of data is converted into an organised, visual representation in order to give meaning to the data. Frequency distributions, measures of central tendency and dispersion or variability may be utilised in the descriptive approach, as well as measures of relationships in which the correlation between variables is described (Brink et al 2012:179).

The research question which the researcher attempted to answer was: What is the knowledge of student nurses regarding the cost concepts of health economics, specific to efficient allocation of resources and determining the cost of an intervention? The objectives of this study were to:

- explore the knowledge of student nurses of health economics specific to cost concepts related to the efficient allocation of resources
- describe the knowledge of student nurses of health economics specific to concepts related to determining the cost of an intervention
- make recommendations for additions to the nursing curriculum content and development of CPD workshops and in-service training regarding health economics

Quantitative research was conducted in this study by using a questionnaire in order to obtain numerical data which could be analysed statistically.
4.2 DATA MANAGEMENT AND ANALYSIS

The researcher developed a questionnaire with closed-ended questions (items) and predetermined response alternatives, which as self-administered (see section 3.5.2.1). Items were formulated in such a way as to determine the knowledge (factual, conceptual and procedural) that student nurses have on concepts of health economics specific to efficient allocation of resources – Section B; and determining the cost of an intervention – Section C (see objectives of the study). Open-ended questions were included in Section D in order to assess knowledge on the affective domain. Receiving and attending, as well as responding, may be assessed by the return of completed questionnaires, while valuing may be reflected in the comments provided by the respondents to the open-ended questions in Section D. The construction of items and response alternatives in the questionnaire was based on a literature review of the phenomenon under study – health economics. Items included examples/descriptions of tasks (aspects affecting the affective skills of a student nurse) required and expected of a student nurse who is in the final year of training (based on R425). The questionnaire included descriptions of concepts from the literature, with practical definitions and descriptions, to bring the items to the level of the respondents (see Annexure G for copy of questionnaire). In view of the response rate, the decision to include practical descriptions of the concepts in the questionnaire proved to be justified.

Information regarding the exact number of questionnaires handed out according to the number of student nurses in the sample group (162) as well as the number of questionnaires returned (68) was calculated after completion of ‘fieldwork’. The return (response) rate was calculated accordingly (42%). Of the returned questionnaires, 9 were spoiled (not completed) and 59 (N=59; 100%) were used for analysis of data. “N” indicates the total number of respondents and “n” the total number of responses. Some questions were not answered by all the respondents, in which case the N value will be specifically indicated. Calculations were done using the appropriate N value for the specific question. This return rate was respected by the researcher in the light of the ethical concept of autonomy.

Data was analysed using a statistical program of analysis (SAS JMP version 12.0). The services of a statistician were sought to assist with the data analysis and interpretation. The results are presented in this report, using descriptive statistics. Descriptive statistics
were used to indicate, for example, how many responses were received for a specific alternative response to a specific item. Frequency distributions (skewness, kurtosis) and measures of central tendency (mean) have been used to summarise data. Statistics have been used to explore deviations in the data, including measures of dispersion (standard deviation) and sampling error and are reported in relevant tables for each section of the questionnaire.

4.3 RESEARCH RESULTS AND DISCUSSION

The results of the four sections of the questionnaire are now described. In the literature review, aspects of the need for content of health economics to be included in nursing education and training (curricula) have already been described. Specific articles specifically assessing knowledge of nurses were not found, but in this chapter the research results have been supported by further references in the literature regarding the application of cost concepts in research studies conducted in the health care environment and its importance in ensuring cost-effective, quality care.

A summary of the descriptive statistics for Sections B and C are provided in Annexure K.

4.3.1 Section A: Demographic data

The following analysis and description indicate the information obtained regarding the sample characteristics related to demographic data.

4.3.1.1 Gender

Respondents were 37% (n=22) male and 63% (n=37) female. These results indicate that the majority of the respondents were female (see Figure 4.1) which is similar to the national statistics on gender in nursing. Statistics obtained from the SANC website (www.sanc.co.za) indicate that the total number of student nurses registered (as on 2016.12.31) for universities were 6165 females and 1911 males. Those for nursing colleges totalled 9917 females and 3346 males. These statistics apply to student nurses registered for the R425 programme (Nursing (General, Psychiatric and Community) & Midwifery).
4.3.1.2 Age

Of the respondents, 41% (n=24) were 25 years or below, while 59% (n=35) were older than 26 years (see Figure 4.2). The majority of the respondents therefore were older than 26 years. According to statistics provided on the SANC website, the average age of student nurses who completed training in the R425 programme in 2016 was 29 years (www.sanc.co.za). The minimum age according to the statistics were indicated as 20 years and the maximum age as 60 years.
4.3.1.3  **Years of experience in nursing**

One respondent did not complete this item, thus N=58. Of the respondents, 45% (n=26) had three, but less than four years’ experience in nursing, while 47% (n=27) had four but less than five years’ experience in nursing. The majority of the respondents therefore – 92% – had between 3 and 5 years’ experience in nursing. The fewest, had between five and six years (3%, n=2), and six and seven years (3%, n=2) respectively, while only 2% (n=1) had between eleven and twelve years’ experience.

4.3.1.4  **Any other courses in financial management, economics or health economics prior to starting nursing training**

Of the respondents, 8% (n=5) indicated that they had had exposure to other courses in financial management, economics or health economics prior to starting nursing training; 92% (n=54) had no prior exposure (see Figure 4.3). Of the five respondents reporting prior knowledge, the following courses were indicated: advanced bookkeeping diploma; agri-business; agriculture economics; project management; property economics and finance.

![Figure 4.3 Courses in financial management, economics or health economics prior to starting nursing training](image_url)
4.3.1.5 Health economics part of nursing curriculum of current training

Of the respondents, 92% (n=54) indicated that health economics content did not form part of the nursing curriculum of their current training, while only 8% (n=5) responded that such content was included in their current training (see Figure 4.4). Of the respondents who affirmed, four indicated that the subject of health economics was integrated in other nursing subjects such as community health nursing, and ethos and professional practice. However, these same respondents also indicated that there was a specific subject of health economics in nursing training, but indicated the subjects as all subjects, ethos and professional practice, general nursing science, and maths.

![Figure 4.4 Health economics content part of nursing curriculum of current training](image)

4.3.2 Section B: Economic evaluation of the efficient allocation of resources

A total of 17 items were asked in Section B of the questionnaire to explore the knowledge of student nurses regarding the cost concept “economic evaluation of the efficient allocation of resources”. Concepts from the literature were provided with practical examples/descriptions to bring them to the level of the respondents.

Student nurses were required to respond by putting an “X” in the appropriate box of ‘True’ (agree) or ‘False’ (disagree) and were given the option to select ‘?’ (Do not know) for each item. Correct answers (responses) were calculated as 1 (one), while incorrect
answers and ‘Do not know’ were calculated as 0 (zero) by the statistician in the analysis of the data. Blank responses were not calculated in the final scores (percentages) obtained. As regards total true and false answers (responses); the raw data for each item was analysed (basic to describing the sample in the beginning of data analysis) using frequency distributions. Total percentages scored were rounded and simultaneously reflect the probability value.

The overall rounded correct score obtained by respondents for items regarding economic evaluation of the efficient allocation of resources (all concepts assessed under Section B combined) was 73%, as reflected by the mean for this section. This score (percentage) was calculated by using the average scores of the different concepts (not the different average scores of each individual question). Items were combined for the following summary of the results of Section B of the questionnaire. A more complete discussion follows after the initial summary. The researcher did not indicate “n” for the combined results (of all the average rounded scores) as not all of the respondents answered all the items testing the specific concepts.

- Cost-benefit analysis: Items 1-2: The average rounded correct score obtained by respondents for items regarding cost-benefit analysis was 67%.
- Cost-effectiveness analysis: Items 3-5: The average rounded correct score obtained by respondents for items regarding cost-effectiveness analysis was 31%.
- Cost of illness: Item 6: Only one item was included in the questionnaire to assess cost-of-illness concept. It was correctly answered by 85% of the respondents.
- Evidence-based medicine: Item 7-10: The average rounded correct score obtained by respondents for items regarding evidence-based medicine was 81%.
- Economic evaluation: Item 11-13: The average rounded correct score obtained by respondents for items regarding economic evaluation was 85%.
- Resources: Item 14-17: The average rounded correct score obtained by respondents for items regarding resources (specific to health economics) was 86%.

Figure 4.5 illustrates the “not correct” and “correct” scores obtained for each of the items in Section B of the questionnaire. “Do not know” (?) responses were calculated together
with “not correct” responses. ‘B1’ (for example) reflect item 1 in Section B of the questionnaire and the ‘T’ (True) reflect the correct response. The number 2 next to the ‘T’ indicates two levels of measurement for the item. The number in the last column reflects the relevant N value for the specific item.

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![Figure 4.5](image)

**Figure 4.5** Summary of scores for Section B (“Do not know” calculated together with incorrect)

Figure 4.6 illustrates the summary of the total “Do not know” (?), “True” and “False” responses for each item in Section B of the questionnaire. “True” or “False” responses may be either correct or incorrect.
The various concepts tested in Section B of the questionnaire were also used in a study conducted by Rutherford (2008:347-383), emphasising the importance of the concepts in the health care environment. Rutherford (2008:347) notes that choices need to be made when seeking effective distribution of health care resources (see section 2.5.3). The field of economics can be used to study and evaluate these health care choices in order to determine what health resources are necessary and valued in life. Rutherford (2008:349) explains that data documenting both the tangible and intangible assets, such as staff skills, strategic and process quality, as well as intellectual resources (Rutherford 2008:348) of nursing service is necessary to communicate their value fully. As explained in Chapter 2, section 2.5.3, choices need to be made in health care due to the understanding that there are not enough resources to meet everyone’s needs, and therefore economic evaluation may identify which decisions have the best value. Economic analysis in the study included the concepts of cost-benefit analysis, willingness-to-pay, cost minimisation analysis, cost-effectiveness analysis, and cost-utility analysis (Rutherford 2008:349-350).

Patient-level data (cost-driven data) need to be obtained in order to identify costs related to nursing services. Patient-driven actual cost data may be used to demonstrate
the cost of care. Tracing the effect of patient variety and complexity to the process of care through capturing the actual patient-related costs is an improved method of analysing costs and confirmed by researchers (Rutherford 2008:351).

Nursing administrators encourage nursing economic research but funding streams still favour clinical studies. However, nursing needs valuation data to gain the status of leader within the health care delivery system, thereby bolstering its position and safeguarding its practice, which also supports funding and improves how nurses are able to nurse (Rutherford 2008:351) (see section 2.5.3).

In the following discussion the “n” will not be indicated for the average rounded score of various concepts, as all of the respondents did not answer all the items testing the various concepts.

4.3.2.1 Cost-benefit analysis

Items 1 and 2 in Section B of the questionnaire set out to explore and describe the knowledge of student nurses regarding cost-benefit analysis.

Item 1: An intervention is considered to be efficient if the outcomes (in terms of money) exceed the costs (True): 58% (n=34) of the respondents answered this item correctly (true), while 34% (n=20) answered incorrectly (false) and 8% (n=5) indicated that they did not know.

Item 2: Cost-benefit analysis can be used to compare interventions with a range of different outcomes (True): 78% (n=45) of the respondents answered this item correctly (true), while 7% (n=4) answered incorrectly (false) and 16% (n=9) indicated that they did not know. One respondent did not answer this item (N=58).

The average rounded correct score obtained by respondents for items regarding cost-benefit analysis (items 1 and 2 of Section B combined) was 67% as reflected by the mean for these items.

Items 1 and 2 in Section B of the questionnaire specifically tested the knowledge of student nurses regarding the concept of cost-benefit analysis. Literature references are cited below in which cost-benefit analysis was used to assess different outcomes of
health care interventions. The studies referred to below did not test knowledge of student nurses regarding the concept, but emphasise the application thereof within the health care environment to establish the benefit of a selected programme in relation to the cost of the programme or between a choice of various programmes or interventions.

Trepanier, Early, Ulrich and Cherry (2012:207) conducted a cost-benefit analysis to assess the economic outcomes related to a residency programme for new registered nurses (utilising turnover rate and contract labour data). It was hypothesised that they were not well prepared for the demands of health care expectations. The health care environment today is characterised by nursing shortages and financial instability, which may pressure nurse leaders to reduce the orientation and on-boarding period for new nursing graduates in order to address financial budgetary concerns which relate to the costs of non-productive time. The cost-benefit analysis compared the traditional method of orientation with a new residency programme which was established to represent a more cost-effective, innovative approach, and the results found that there were monetary savings. Thus the innovation was an investment rather than an expense.

A paper by Walsh, Levin, Jaye and Gazzard (2013:962-965) defines different terms that are used in cost analysis. The paper makes specific reference to the cost of medical education: undergraduate, postgraduate and continued development for doctors, nurses as well as allied health professionals. Problems identified included the effective costing of educational interventions, and issues of what constitutes effectiveness or acceptability in medical education, because of the lack of clear understanding of the correct nomenclature in this field. The authors define cost-benefit analysis as the evaluation of alternatives with regard to their costs and benefits in monetary terms and state that it enables the comparison of costs and benefits of interventions with different outcomes.

4.3.2.2 Cost-effectiveness analysis

Items 3 to 5 in Section B of the questionnaire set out to explore and describe the knowledge of student nurses regarding cost-effectiveness analysis.

Item 3: A cost of illness analysis is conducted when the value of the resources spent on an intervention is compared with the health outcome results (False): 12% (n=7) of the
respondents answered this item correctly (false), while 72% (n=42) answered incorrectly (true) and 16% (n=9) indicated that they did not know. One respondent did not answer this item (N=58).

Item 4: Cost-effectiveness ratios are developed between costs and outcomes (thus costs divided by health outcomes) in order to compare the outcomes of interventions with one another (True): 69% (n=40) of the respondents answered this item correctly (true), while 12% (n=7) answered incorrectly (false) and 19% (n=11) indicated that they did not know. One respondent did not answer this item (N=58).

Item 5: A cost-of-illness analysis establishes whether interventions are patient-centred, thus being respectful, responsive and considerate to patient preferences, their needs as well as their values (False): 13% (n=7) of the respondents answered this item correctly (false), while 75% (n=42) answered incorrectly (true) and 13% (n=7) indicated that they did not know. Three respondents did not answer this item (N=56).

The average rounded correct score obtained by respondents for items regarding cost-effectiveness analysis (items 3 to 5 of Section B combined) was 31% as reflected by the mean for these items.

Walsh et al (2013:962-965) define cost-effective analysis as the evaluation of alternative educational approaches or interventions in relation to their costs and effects in producing a certain outcome. An important aspect emphasised by the authors is that this analysis requires the comparison of two or more approaches. The results show a lack of knowledge of the concept of cost-effectiveness analysis, which will affect the ability of student nurses to compare the costs and effectiveness of various programmes or health care interventions.

4.3.2.3 Cost of illness

Only one item was included in Section B of the questionnaire to explore and describe the knowledge of student nurses regarding cost of illness.

Item 6: Illness is expensive, not only financially, but also in terms of pain, fear, discomfort, and impacts on the individual, family and or friends (True): 85% (n=50) of
the respondents answered this item correctly (true), while 5% (n=3) answered incorrectly (false) and 10% (n=6) indicated that they did not know.

Only one item was included in the questionnaire to assess cost-of-illness concept. It was correctly answered by 85% (n=50) of the respondents.

The fifth Millennium Development Goal (MDG 5) of the United Nations aims to improve maternal health and drives the efforts internationally to reduce maternal morbidity and mortality. The authors of a report made to the African Commission for Women’s Health published an updated paper addressing the question of impact of maternal deaths on non-health Gross Domestic Product (GDP) in the WHO African Region. They explain that maternal deaths lead to losses in current and future production, income and consumption of non-health goods and services. They affect macroeconomic output through increased health expenditure, labour and productivity losses and the reduced investment in human and physical capital formation. They describe the interest of their study as market production lost, specifically GDP (which is defined as the total value of marketed final goods and services produced during a given time period in the economy), due to maternal deaths. They used the cost concept of discounting to measure how much future losses are worth today (Kirigia et al 2014:1-11).

They refer to several limitations of their study, which include aspects of the cost-of-illness analysis partially conducted in the study that excluded morbidity costs due to absenteeism from work and direct costs that might be incurred due to addressing maternal complications before death. Furthermore the cost of pain and suffering sustained before death occurred, and the grief of family members, was omitted and the authors state that unfortunately the assumption was made that the economic value of intangible losses is zero, although this is contested by the authors and many others (Kirigia et al 2014:1-11).

The results of the current study show that student nurses have knowledge of the cost of illness cost concept.
4.3.2.4 Evidence-based medicine

Item 7: Current evidence is used in making explicit and judicious decisions about the care of individual patients (True): 67% (n=39) of the respondents answered this item correctly (true), while 10% (n=6) answered incorrectly (false) and 22% (n=13) indicated that they did not know. One respondent did not answer this item (N=58).

Item 8: Evidence-based medicine focuses on the efficiency and effectiveness of health care interventions (True): 88% (n=52) of the respondents answered this item correctly (true), while 3% (n=2) answered incorrectly (false) and 8% (n=5) indicated that they did not know.

Item 9: Available resources in the health care environment need to be rationed or appropriately allocated, based on priorities of care (True): 84% (n=48) of the respondents answered this item correctly (true), while 7% (n=4) answered incorrectly (false) and 9% (n=5) indicated that they did not know. Two respondents did not answer this item (N=57).

Item 10: Effective care should be provided based on scientific knowledge (True): 91% (n=53) of the respondents answered this item correctly (true), while 5% (n=3) answered incorrectly (false) and 3% (n=2) indicated that they did not know. One respondent did not answer this item (N=58).

The average rounded correct score obtained by respondents for items regarding evidence-based medicine (items 7 to 10 of Section B combined) was 81% as reflected by the mean for these items.

The results show that student nurses do have knowledge of evidence-based medicine. The use of current research and evidence-based practice to inform the development of standards of care should be advocated to ensure nursing care and practice is based upon the best available knowledge and research. Nursing’s impact on quality and costs of patient care must be understood and articulated to organisational leaders and staff (Finkler et al 2007:88-89). Nickitas (2011:229) states that nurses should focus on evidence-based practice and control the cost of care in order to meet the challenges of economic accountability. Nurses should appreciate how the cost of quality nursing care
can generate potential savings through the avoidance of so-called “never” events (and medication errors).

### 4.3.2.5 Economic evaluation

Item 11: The goal of a health care intervention is to reduce the impact of a health problem (*True*): 93% (n=55) of the respondents answered this item correctly (true), while 5% (n=3) answered incorrectly (false) and 2% (n=1) indicated that they did not know.

Item 12: The impact of health problems can be measured using indicators such as number of cases; number of deaths; extent of disability, suffering or pain; amount of money spent on a health problem; amount of lost income due to a health problem (*True*): 91% (n=52) of the respondents answered this item correctly (true), while 4% (n=2) answered incorrectly (false) and 5% (n=3) indicated that they did not know. Two respondents did not answer this item (N=57).

Item 13: The result of an intervention on a health problem may be measured in one of two ways: measuring the impact of the health problem before and after the intervention or measuring the impact of the health problem with and without the intervention (*True*): 75% (n=44) of the respondents answered this item correctly (true), while 10% (n=6) answered incorrectly (false) and 15% (n=9) indicated that they did not know.

The average rounded correct score obtained by respondents for items regarding economic evaluation (items 11 to 13 of Section B combined) was 85% as reflected by the mean for these items.

Economic evaluations may be done in order to compare programmes suggested by health care officials and the costs of the alternatives (see section 2.5.1). The costs taken into account include the resources needed for an intervention to impact on health problems (Guinness & Wiseman 2011:189).

Economic evaluations assess costs and are conducted to inform decisions on resource allocation. They compare alternative courses of action in terms of consequences and costs. These evaluations are applied in assessment of prevention programmes (such as
vaccination, health promotion and screening), diagnostics, treatment interventions, the organisation of care and rehabilitation. Clinical studies report the consequences of an intervention, but economic evaluations require more reporting space for items such as costs, resource use and cost-effectiveness results. From a study conducted on behalf of the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) task force regarding economic evaluation, a 24-item checklist with recommendations was developed in an attempt to consolidate and update previous health economic evaluation guidelines – CHEERS statement (Husereau, Drummond, Petrou, Carswell, Moher, Greenberg, Augustovski, Briggs, Mauskopf & Loder 2013:1-6).

The results show that student nurses do have knowledge of economic evaluations to compare programmes and initiatives with the costs required for their implementation. The application of these concepts of health economics will enable more effective allocation of resources with resultant cost-effectiveness.

4.3.2.6 Resources

Item 14: The following are all examples of resources in health care delivery: personnel; buildings and space; training; equipment; supplies and pharmaceuticals; transportation; social mobilisation and publicity (including information, education and communication) (True): 90% (n=53) of the respondents answered this item correctly (true), while 3% (n=2) answered incorrectly (false) and 7% (n=4) indicated that they did not know).

Item 15: Effective care minimises the overuse, underuse, or misuse of care interventions and is therefore cost effective (True): 86% (n=51) of the respondents answered this item correctly (true), while 8% (n=5) answered incorrectly (false) and 5% (n=3) indicated that they did not know.

Item 16: Efficient care interventions limit waste (True): 81% (n=47) of the respondents answered this item correctly (true), while 12% (n=7) answered incorrectly (false) and 7% (n=4) indicated that they did not know. One respondent did not answer this item (N=58).

Item 17: Nursing care interventions should be provided in a timely manner which minimises delays and waiting times (and therefore minimises cost of nursing time spent)
(True): 90% (n=52) of the respondents answered this item correctly (true), while 5% (n=3) answered incorrectly (false) and 5% (n=3) indicated that they did not know (n=3). One respondent did not answer this item (N=58).

The average rounded correct score obtained by respondents for items regarding resources, specific to health economics (items 14 to 17 of Section B combined) was 86% as reflected by the mean for these items.

Resources form an integral part of any economic evaluation and determining the cost of an intervention. The results indicate that student nurses should be able to identify various resources used in the implementation of an intervention in order to determine costs. The important role that resources have in health economics are emphasised by Guinness and Wiseman (2011:2) who state that health economics are the optimisation of health and service delivery within the limited resources that are available. McCrone (1998:1) explains that economics has developed in order to maximise the outcomes that can be achieved by optimally utilising the available resources (see section 2.3 & 2.5.1).

### 4.3.3 Section C: Key concepts in health economics for determining the cost of an intervention

A total of 14 items (questions) were asked in Section C of the questionnaire to explore the knowledge of student nurses regarding the key concepts in health economics for determining the cost of an intervention – each item representing a concept. Concepts from the literature were provided, with practical examples/descriptions, to bring them to the level of the respondents.

Student nurses were required to respond by putting an “X” in the appropriate box of ‘True’ (agree) or ‘False’ (disagree) and were given the option to select ‘?’ (Do not know) for each item. Correct answers (responses) were calculated as 1 (one), while incorrect answers and ‘Do not know’ were calculated as 0 (zero) by the statistician in the analysis of the data. Blank responses were not calculated in the final scores (percentages) obtained. As regards total true and false answers (responses), the raw data for each item was analysed (basic to describing the sample in the beginning of data analysis) using frequency distributions. Total percentages scored were rounded and simultaneously reflect the probability value.
The overall rounded correct score obtained by respondents for items regarding key concepts in health economics for determining the cost of an intervention (all concepts assessed under Section C combined) was 47% as reflected by the mean for this section. The researcher did not indicate “n” for the combined result of Section C (of all the individual item scores) as not all of the respondents answered all the items testing the specific concepts.

Figure 4.7 illustrates the “not correct” and “correct” scores obtained for each of the items in Section C of the questionnaire. “Do not know” (?) responses were calculated together with “not correct” responses. ‘C18’ (for example) reflect item 18 in Section C of the questionnaire and the ‘T’ (True) reflects the correct response. The number 2 next to the ‘T’ indicates two levels of measurement for the item. The number in the last column reflects the relevant N value for the specific item.

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**Figure 4.7 Summary of scores for Section C (“Do not know” calculated together with incorrect)**

Figure 4.8 illustrates the summary of the total “Do not know” (?), “True” and “False” responses for each item in Section C of the questionnaire. “True” or “False” responses may be either correct or incorrect. A discussion of each individual item follows the Figure 4.8 of the summary of responses. As the items were not combined to explore
and describe a concept, a summary of combined results were not made here as for Section B of the questionnaire (see section 4.3.2).

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Figure 4.8  Summary of responses for Section C: Items 18–31

Schuurman et al (2009:390-415) conducted a study to determine the costs of prevention and treatment of pressure ulcers from a hospital perspective and to identify the least resource-intensive pressure-ulcer prevention strategy. Direct costs were used to perform a cost analysis. Cost calculation methods included the following cost outcomes: cost per intervention; cost of prevention; cost of treatment; cost per day; and cost per patient receiving prevention or treatment. Another cost included in the cost study was annual national cost (to estimate national annual cost associated with treating pressure ulcers) (Schuurman et al 2009:390-395).

This study may be seen to indicate the use of the concepts of health economics in cost-effective clinical nursing practice. Following is a discussion of the knowledge base of the respondents regarding the specific concepts included for determining the cost of an intervention.
4.3.3.1 Annual cost

Item 18: Calculating the annual costs of a family planning clinic includes the following resources: equipment, buildings, vehicles and the initial training (nurses and midwives) (True): 85% (n=50) of the respondents answered this item correctly (true), while 7% (n=4) answered incorrectly (false) and 8% (n=5) indicated that they did not know (n=5).

The item regarding annual cost was correctly answered by 85% (n=50) of the respondents.

Walensky et al (2013:84-92) conducted a study comparing (ART) costs. Specifically the annual cost of branded ART versus generic-based ART was established and compared in the study over an annual period (one year). The study concluded that the use of generic-based ART (in the US) could lead to considerable savings in HIV programmes. Determining the annual cost of an intervention may assist in decision making regarding the most cost-effective programme which will achieve quality health care.

4.3.3.2 Annualised costs

Item 19: A R50 000 ECG (electrocardiograph) machine which has a useful life of 10 years has an annualised cost of R5 000 per year (True): 44% (n=26) of the respondents answered this item correctly (true), while 12% (n=7) answered incorrectly (false) and 44% (n=26) indicated that they did not know.

The item regarding annualised cost was correctly answered by 44% (n=26) of the respondents and another 44% (n=26) indicated that they did not know, while 12% (n=7) answered incorrectly. These results indicate that the respondents show a lack of knowledge regarding the application of the concept of annualised costs.

4.3.3.3 Average cost

Item 20: Capital cost may be explained using the following example: 250 clients attended to daily in a wellness clinic is more efficient than attending 50 clients daily (False): 18% (n=10) of the respondents answered this item correctly (false), while 55%
(n=30) answered incorrectly (true) and 27% (n=15) indicated that they did not know. Four respondents did not answer this item (N=55).

The item regarding average cost was correctly answered by 18% (n=10) of the respondents, while 27% (n=15) indicated that they did not know and 55% (n=30) answered incorrectly.

Calculation of average cost (together with total captured annual cost) has been used in a study to describe the health care cost of dying in Canada (Ontario). End-of-life-care consumes a large proportion of Ontario’s health care budget according to the report of the study, specifically in-patient and long-term care. Data regarding population-level data on end-of-life-care use and cost will identify the level of care provided and those areas where care can be optimised through coordinated and appropriate health care (Tanuseputro et al 2015:1-4). Knowledge of the average costs of intervention may lead to better evaluation of the effectiveness of programmes and the coordination of health care services. It is therefore a concern to the researcher that a majority of the respondents answered this item incorrectly.

4.3.3.4 Capital cost

Item 21: The example of a ventilator to the value of R65 000 that will be useful for longer than one year may be used to determine average cost (False): 15% (n=8) of the respondents answered this item correctly (false), while 49% (n=27) answered incorrectly (true) and 36% (n=20) indicated that they did not know. Four respondents did not answer this item (N=55).

The item regarding capital cost was correctly answered by 15% (n=8) of the respondents, while 36% (n=20) indicated that they did not know and 49% (n=27) answered incorrectly.

Application of knowledge of capital cost to the budget of the nursing unit on an annual basis is important. It is therefore a concern to the researcher that a small percentage of the respondents were able to correctly answer this item.
4.3.3.5 **Direct cost**

Item 22: Direct cost may be established by including the cost of resources such as providing health education, laboratory equipment, salaries, soap for hand washing and training of staff *(True)*: 86% *(n=49)* of the respondents answered this item correctly (true), while 4% *(n=2)* answered incorrectly (false) and 11% *(n=6)* indicated that they did not know. Two respondents did not answer this item *(N=57)*.

The item regarding direct cost was correctly answered by 86% *(n=49)* of the respondents.

A descriptive study regarding the costs involved in the prevention and treatment of cervical cancer was conducted in Brazil in 2006. Different phases of cervical cancer care were included to provide information regarding costs: clinical treatment and surgical treatment of cervical cancer, treatment and diagnosis of precancerous lesions, and screening; this in both the public and private health care systems. **Direct medical costs** were estimated, such as outpatient visits, diagnostic tests (including diagnosis of precancerous lesions – colposcopy and cervical biopsy), procedures (for example screening such as Pap smears and implementing an HPV immunisation programme), clinical treatment (such as for precancerous lesions – cold knife conisation, the loop electrosurgical excision procedure, and the like), surgical interventions (for example inpatient abdominal hysterectomies for tumours), medications (including chemotherapy) and hospitalisations *(Novaes, Itria, e Silva, Sartori, Rama & De Soárez 2015:289-295)*.

Also included were **non-direct medical cost** (patient transportation for visits and procedures). The **indirect costs** resulting from the loss of productivity (thus loss of working days by both the patient and caregiver for the prevention, diagnosing and treating of the disease) related to illness were also estimated. The researchers pointed out that studies of the economic burden of cervical cancer have used different methodological studies in developed countries related to the population under study and included such aspects as the results of national annual cost of illness specific to the population size (influenced by the health care system characteristics). The researchers concluded that cost estimates of cervical cancer prevention and treatment (indicating the economic importance of cervical cancer screening and care) are of interest in
research and health care management and will be beneficial in monitoring the effect of the HPV vaccine introduction (Novaes et al 2015:289-295).

The application of both direct cost and indirect cost in the calculation of health care costs as a whole is of benefit in order to determine the most cost-effective choice when faced with decisions in health care services. As the majority of the respondents answered the item regarding direct costs correctly, the researcher deduces that they have knowledge of resources that contribute to the direct cost of an intervention. They may therefore be able to apply the evaluation of resources that contribute direct costs to health care costs.

4.3.3.6 Discounting

Item 23: Discounting may be illustrated with the following example: a person may currently be willing to pay R50 because of a current health need, but may be reluctant to pay the same R50 proactively to get the benefit in 10 years’ time (True): 67% (n=38) of the respondents answered this item correctly (true), while 18% (n=10) answered incorrectly (false) and 16% (n=9) indicated that they did not know. Two respondents did not answer this item (N=57).

The item regarding discounting was correctly answered by 67% (n=38) of the respondents.

Kirigia et al (2014:1-11) used the cost concept of discounting to measure how much future losses are worth today. This applied to market production lost, specifically GDP, due to maternal deaths. The result of the responses to this item indicates that the respondents may be able to apply the concept of discounting as it relates to health outcomes.

4.3.3.7 Financial (budgetary) cost

Item 24: Intangible cost is used in programme planning and budgeting, and includes the price paid for personnel, supplies, maintenance and electricity, thus the actual money spent on resources (False): 12% (n=7) of the respondents answered this item correctly.
(false), while 70% (n=40) answered incorrectly (true) and 18% (n=10) indicated that they did not know. Two respondents did not answer this item (N=57).

The item regarding financial (budgetary) cost was correctly answered by 18% (n=10) of the respondents, while 12% (n=7) indicated that they did not know and 70% (n=40) answered incorrectly.

A research article by Kerr, Bray, Medcalf, O'Donoghue and Matthews (2012:1-8) reports their findings on “Estimating the financial cost of chronic kidney disease to the NHS in England”. The financial cost of chronic kidney disease (CKD) was estimated by incorporating the annual cost based on direct and indirect costs arising from CKD. CKD-related prescribing and care and renal replacement therapy were assessed in the study, together with the increased incidence of strokes, myocardial infarctions and Methicillin-Resistant Staphylococcus Aureus (MRSA) infections in people affected by CKD. The researchers concluded that the financial impact of CKD is large with particularly high costs related to specifically identified complications.

The respondents appear to confuse intangible costs and financial costs. The results show that they are not able to do a financial cost analysis or determine factors that can contribute to financial costs.

4.3.3.8 Indirect cost

Item 25: The time the patient takes up in going to the hospital, rather than working, is an example of indirect cost (True): 54% (n=31) of the respondents answered this item correctly (true), while 23% (n=13) answered incorrectly (false) and 23% (n=13) indicated that they did not know. Two respondents did not answer this item (N=57).

The item regarding indirect cost was correctly answered by 54% (n=31) of the respondents, while 23% (n=13) indicated that they did not know and 23% (n=13) answered incorrectly.

Nursing personnel can play a meaningful role in reducing indirect costs associated with implementing patient care by managing patient care effectively (Muller 2009:244-245). The indirect costs resulting for example from the loss of productivity (thus loss of
working days by both the patient and caregiver for the prevention, diagnosing and treating of the disease) related to illness were estimated in a study by Novaes et al (2015:289-295). It is of concern that just over half of the respondents were able to answer this question correctly which indicate that they may have difficulty in determining factors which contribute to indirect costs.

### 4.3.3.9 Intangible cost

Item 26: Financial (budgetary) cost includes the costs of factors such as discomfort due to side-effects of medication *(False)*: 26.3% of the respondents (n=15) answered this item correctly (false), while 61.4% (n=35) answered incorrectly (true) and 12.3% indicated that they did not know (n=7). Two respondents did not answer this item (N=57). In order to achieve the total of 100%, the scores were not rounded in the report for this item, as the total percentage achieved when scores were rounded was 99%.

The item regarding intangible cost was correctly answered by 26.3% of the respondents, 12.3% indicated that they did not know and 61.4% answered incorrectly.

Kirigia et al (2014:1-11) refer to intangible losses in the report of their study. The authors contest the assumption that the economic value of intangible losses such as the cost of pain and suffering sustained before death as well as the grief of family members is zero (see section 2.5.2 and section 4.3.2.3 for further discussion). Rutherford (2008:348-349) included staff skills and intellectual resources as intangible assets in nursing services and emphasise that data documenting these is necessary to communicate their value (see section 2.5.3).

### 4.3.3.10 Overhead cost

Item 27: Recurrent cost includes that of personnel functions *(False)*: 13% (n=7) of the respondents answered this item correctly (false), while 67% (n=36) answered incorrectly (true) and 20% (n=11) indicated that they did not know. Five respondents did not answer this item (N=54).

The item regarding overhead cost was correctly answered by 13% (n=7) of the respondents, 20% (n=11) did not know and 67% (n=36) answered incorrectly.
Winterbauer, Singh, Tucker and Harrison (2016:9) developed a costing tool for use to collect primary data regarding aspects such as the number of services provided, staff employment and the costs that mandated environmental health services incur. The authors believe that such a tool is needed to provide information regarding the cost of public health services. The resultant tool included sections for agency/respondent information and service counts as well as the costing concepts of direct labour costs, direct non-labour costs, and indirect/overhead costs.

The results indicate that the respondents will not be able to identify costs which contribute to the overhead costs of an intervention. The respondents appear to be unable to differentiate between overhead cost and recurrent cost.

4.3.3.11 Recurrent cost

Item 28: Overhead cost includes the value of resources that have to be purchased only when necessary but at least once a year (False): 12% (n=7) of the respondents answered this item correctly (false), while 72% (n=41) answered incorrectly (true) and 16% (n=9) indicated that they did not know. Two respondents did not answer this item (N=57).

The item regarding recurrent cost was correctly answered by 12% (n=7) of the respondents, 16% (n=9) did not know and 72% (n=41) answered incorrectly.

Recurrent costs influence the sustainability of a health service (Guinness & Wiseman 2011:28). Prinja, Bahuguna, Pinto, Sharma, Bharaj, Kumar, Prasad Tripathy, Kaur and Kumar (2012:1) developed a model to estimate annual and recurrent costs for providing health services in order to deliver good quality care.

4.3.3.12 Economic cost

Item 29: Total economic cost reflects the sum of all the costs of a health intervention which will influence the best outcome (True): 86% (n=49) of the respondents answered this item correctly (true), while 7% (n=4) answered incorrectly (false) and 7% (n=4) indicated that they did not know. Two respondents did not answer this item (N=57).
The item regarding economic cost was correctly answered by 86% (n=49) of the respondents. The results achieved by the respondents for this item indicate that they have knowledge of the concept of economic cost.

Total economic cost includes the value of all the resources used for an intervention and therefore gives an indication of the overall costs of that intervention (Guinness & Wiseman 2011:211).

**4.3.3.13 Fixed cost**

Item 30: The fee that needs to be paid monthly for the rental of a telephone line per nursing unit or department/office in the institution is an example of fixed cost (True): 77% (n=43) of the respondents answered this item correctly (true), while 9% (n=5) answered incorrectly (false) and 14% (n=8) indicated that they did not know). Three respondents did not answer this item (N=56).

The item regarding fixed cost was correctly answered by 77% (n=43) of the respondents.

An example of a fixed cost is given by Guinness and Wiseman (2011:209) as the fee that needs to be paid monthly for the rental of a telephone line – the amount payable whether any calls were made or not. The results indicate that the respondents were able to apply the concept of fixed cost.

**4.3.3.14 Variable cost**

Item 31: Variable cost may be established by the amount used which will dictate the amount payable for variable cost items, such as the average number of clients seen in the casualty department on a monthly basis (True): 75% (n=41) of the respondents answered this item correctly (true), while 4% (n=2) answered incorrectly (false) and 22% (n=12) indicated that they did not know. Four respondents did not answer this item (N=55).
The item regarding variable cost was correctly answered by 75% (n=41) of the respondents.

Guinness and Wiseman (2011:84) describe variable cost as that in which the cost of production varies directly with the level of output. The majority of the respondents who answered this item correctly have knowledge of the concept variable cost.

4.3.4 Section D: Comments regarding health economics

The items in Section D of the questionnaire were phrased as questions. The researcher therefore refers to the items as questions in the report of the results.

Question 32: Respondents were asked whether in their opinion, the knowledge of health economics are necessary in nursing practice: 67% (n=38) of the respondents indicated (“yes”) that knowledge of health economics is necessary in nursing practice, while 33% (n=19) indicated that it is not (see Figure 4.9). Two respondents did not answer this question (N=57).

![Figure 4.9](image)

**Figure 4.9**  Knowledge of health economics necessary in nursing practice (N=57)

Twenty-six comments regarding which categories of nurses should have knowledge of health economics were received. Of the respondents, 67% (n=38) indicated that in their opinion, knowledge of health economics was necessary in nursing practice. These respondents indicated different categories of nurses who should have knowledge of health economics. Response comments included: “All categories for efficient and safe
use of resources”; “All professional nurses so that everyone can be part of progressive force”. Five respondents included non-specific comments such as: “Health”; “The community need to know how money is spent in health”. However, 33% (n=19) of the respondents indicated that in their opinion, knowledge of health economics was not necessary in nursing practice. This result raises a concern as literature references (Nickitas 2011:229) emphasise the importance of knowledge amongst nurses regarding health economics.

Nickitas (2011:229) calls for all nurses to have a better understanding about health economics and also to have greater economic accountability in professional practice (see section 2.4). All nurses can contribute to improving the quality of patient care as well as improved patient outcomes and greater costs savings.

Question 33: Respondents were asked the question whether they were involved in cost related activities during their nursing training. Of the respondents 10% (n=6) indicated “yes” that they were involved and 90% (n=53) indicated that they were not (see Figure 4.10). Of the respondents who indicated involvement, the following activities were noted: Budget Planning; Cost of equipment; Ordering of ward stock related to ward costs.

![Figure 4.10](image.png)

**Figure 4.10** Involvement in cost-related activities during nursing training

Question 34: Respondents were required to indicate if they would be interested to engage in a short course in health economics. Of the respondents 69% (n=41) indicated that they would be interested in engaging in a short course in health economics, and 31% (n=18) replied that they would not (see Figure 4.11).
Thirty-three comments were received regarding what information the respondents wanted. The respondents who indicated that they would be interested in a short course, mentioned that they would like to be actively involved, have application information, and be taught the theory. Comments supporting the specific information they would like include: “Theory in order to understand health economics”; “Yes! Active involvement”.

Rutherford (2008:347) states that rising health care costs and limited health care resources emphasise the need for data that documents the true value of nursing, and adds that only a limited number of nursing studies exist that provide a cost-value analysis pertaining to nursing actions and care delivery. Choices need to be made when seeking effective distribution of health care resources. The field of economics can be used to study and evaluate these health care choices in order to determine what health resources are necessary and valued in life. This data is a critical requirement for assuring that health care systems in the future do not under-invest in nursing services. Valuation of nursing services is needed to support the importance of investing in nursing services in order to improve the overall outcome of future health care (see section 2.5.3).

Question 35: Respondents were asked their opinion regarding whether service delivery should focus on cost-effectiveness or/and quality service. Respondents could indicate both options:
Question 35.1: cost-effectiveness: 75% (n=42) of the respondents indicated that “yes” service should focus on cost-effectiveness, while 25% (n=14) indicated “no” (see Figure 4.12). Three respondents did not answer this question (N=56). Seven respondents noted comments such as: “Cost-effective may improve the health of the community”.

![Figure 4.12 Cost-effectiveness (N=56)](image)

Question 35.2: quality service: 81% (n=46) of the respondents indicated that “yes” service should focus on cost-effectiveness, while 19% (n=11) indicated “no” (see Figure 4.13). Two respondents did not answer this question (N=57). Ten respondents noted comments such as: “For the community to obtain quality and total nursing care to live long”; “It helps improve care rendered to clients”.

![Figure 4.13 Quality service (N=57)](image)

According to 75% (n=42) of the respondents, service should focus on cost-effectiveness, whereas 81% (n=46) of the respondents indicated that the focus should
be on quality service (respondents could indicate both). Different reasons were provided by the respondents, as indicated in the comments above.

Commonly, cost-effectiveness analyses are used in the health sector where the value of the resources spent on an intervention is compared with the quality of health gained as a result (Guinness & Wiseman 2011:189). The unit manager knows where wastage occurs in the nursing unit and should facilitate cost-effectiveness. Nursing personnel can play a meaningful role in reducing indirect costs associated with implementing patient care by managing patient care effectively (Muller 2009:244-245). Muller (2009:233) points out that patients expect value for money and in the context of health care service delivery, value for money means getting acceptable quality services to people who need them and making people as healthy as possible with the given resources. South Africa is in the process of introducing the NHI healthcare system, which is an innovative system of healthcare financing. The NHI should ensure that everyone has access to appropriate, efficient and quality health services, but will entail changes in service delivery structures, administrative and management systems (South Africa 2011:4, 9). Both cost-effectiveness and quality service are important in the delivery of health care services. Results of the responses in this study confirm that the respondents agree with this statement.

Question 36: Respondents were asked whether if the institution management asked them to discuss their nursing unit’s budget/costing, if their knowledge would allow them to either attend to the matter personally; ask for help because they do not have enough knowledge thereof; or if they would refer the matter because they do not have any knowledge thereof:

- Question 36.1: attend to the matter personally: 39% (n=22) of the respondents indicated that they would attend to the matter personally, 61% (n=35) indicated that they would not (see Figure 4.14). Two respondents did not answer this question (N=57). Comments included: “I think I can”; “I’m not knowledgeable enough”.
Question 36.2: ask for help because you don’t have enough knowledge thereof: 74% (n=42) indicated that they would ask for help because they did not have enough knowledge thereof, 26% (n=15) indicated that they would not ask for help (see Figure 4.15). Two respondents did not answer this question (N=57). Comments included: “As I don’t have knowledge about it”; “I will ask for further training about budget and costing”.

Question 36.3: refer the matter, because you do not have any knowledge thereof: 68% (n=38) of the respondents said they would refer the matter, because they did not have any knowledge thereof, while 32% (n=18) would not refer (see Figure 4.16). Three respondents did not answer this question (N=56). Comments included: “By referring to the relevant personnel”; “Handle the matter”. General comments included: “I don’t have enough knowledge about the budget because they don’t involve student”; “No training obtained”.

Figure 4.14  Attend to the matter personally (N=57)

Figure 4.15  Ask for help because you don’t have enough knowledge (N=57)
Respondents were required to indicate how they would respond if the institution management asked them to discuss their nursing unit’s budget/costing. The respondents had to indicate whether their knowledge would allow them to attend to the matter personally, or if they would ask for help because they did not have enough knowledge thereof, or if they would refer the matter because they did not have any knowledge thereof. As shown above, 39% (n=22) indicated that they would attend to the matter personally, 74% (n=42) would ask for help because they did not have enough knowledge, and 68% (n=38) would refer the matter, because they did not have any knowledge. These results show that several respondents selected more than one option. Different reasons in support of statements were given by respondents, as indicated in the comments for each of the options.

Palese et al (2012:86-93) undertook a study to describe measures of cost containment and the impact of the economic crisis in daily nursing practice (see section 2.5.3). The impact of economic conditions on nurses and nursing care should be monitored in order to develop polices which will protect the nursing system (Palese et al 2012:93).

Talley et al (2013:77-82) explained that grooming nurses at all levels of an organisation to master health care executive skills was critical to ensure success in the organisation as well as the individual’s growth and that the education and evolution of nurses as business managers is critical to building a strong professional nurse workforce (see section 2.5.3). It explains that various programmes review basic budget concepts,
components and terminology and are available for all levels of nursing staff (Talley et al 2013:79-80).

4.4 DEVELOPING THE CPD WORKSHOP

A CPD workshop was developed based on the results of this study and the lack of existing literature specific to the knowledge of student nurses of the cost concepts in health economics.

The researcher developed a conceptual framework for the literature review (see figure 2.1) which was then also used to guide the structure of the CPD workshop. The CPD workshop was based on the literature sources used for the literature review and development of the questionnaire. Basic introductory content regarding health economics was included to address knowledge deficiencies (see section 5.4.5 and Annexure J).

The question of what health economics is was firstly addressed in the structure to place it in perspective relating to its place in macroeconomics and health care systems and reference is given to literature sources for health economics content. Economic evaluation of health care interventions or programmes was described next with specific definitions of the concepts which are used to compare the costs of alternatives (interventions or programmes) to make determinations for the efficient allocation of resources – thus costs compared to outcomes (an activity regarding economic evaluation was included). Counting the cost of a specific intervention to determine the total cost of that intervention was then described with definitions of specific cost concepts (activity included). The contribution of health economics in health care (future role) was emphasised with its place in nursing education and training (curricula) in South Africa (activity included) and CPD workshops after which the workshop was concluded (see section 5.4.5 and Annexure J).

4.5 SUMMARY

An explorative and descriptive quantitative study was conducted with the purpose of exploring the knowledge that student nurses have of the cost concepts related to health economics specific to efficient allocation of resources and determining the cost of an
intervention. A census was done using a questionnaire to collect numerical data. In this chapter, descriptive statistical analysis was used to summarise and present the data. Examples from the literature were provided to place the responses in perspective.
CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

5.1 INTRODUCTION

Chapter 4 described the results of the study, integrated with the literature. In this chapter, the conclusions of the study describe how the three objectives of the study were met. Recommendations are made for nursing education and CPD, nursing practice and future research. The chapter discusses the contribution made by this research and also its limitations.

5.2 PURPOSE OF THE STUDY

For the purpose of this study the researcher identified the problem that there appeared to be a gap in what student nurses study in basic nursing education and training programmes to become professional nurses. They need to gain knowledge about and skills in dealing with the cost concepts related to health economics. The following research question therefore arose which the researcher attempted to answer:

What is the knowledge of student nurses regarding the cost concepts of health economics, specific to efficient allocation of resources and determining the cost of an intervention?

It was important to first obtain baseline data of the knowledge of student nurses regarding the cost concepts of health economics, as it does not currently form part of the curriculum requirements.

The objectives of the study were to:

- explore the knowledge of student nurses of health economics specific to cost concepts related to the efficient allocation of resources
- describe the knowledge of student nurses of health economics specific to concepts related to determining the cost of an intervention
• make recommendations for additions to the nursing curriculum content and development of CPD workshops and in-service training regarding health economics

5.3 SUMMARY OF RESEARCH DESIGN AND METHODS

An explorative and descriptive quantitative research design was relevant for the purpose of this study to explore and describe the knowledge of student nurses of the cost concepts in health economics. It was important to determine a baseline of the knowledge of student nurses in order to ensure that limited resources are applied in the most cost-effective way while delivering a quality service. The study focused on a selection of concepts to determine a solution to the research problem. The researcher followed a formal process in which firstly a research problem was identified, followed by a research question upon which objectives for the study were based. A questionnaire was developed and used to obtain numerical data for statistical analysis in order to find a solution to the problem. The result might be used to add to the effectiveness and efficiency with which nurses deliver care.

Concepts and their interpretation related to the phenomenon (health economics) in this context were explored and described. The researcher used a literature review related to the research objectives to develop a questionnaire which was used to obtain data. The respondents completed the questionnaire in writing. A pre-test of the questionnaire was conducted. The questionnaire also contained a covering letter providing information regarding the study, and a declaration for the respondents to sign. The researcher controlled her own bias by remaining independent from those being researched and adhering to a structured method (questionnaire) of obtaining information that was analysed statistically. The researcher did not participate in the events under investigation, and maintained objectivity in both the collection and analysis of information. Ethical considerations were adhered to.

Data was analysed using a statistical program of analysis (SAS JMP version 12.0). The services of a statistician were sought to assist with the data analysis and interpretation. The results were presented in a dissertation, using descriptive statistics.
5.4 CONCLUSIONS OF THE STUDY

A total of 162 questionnaires were distributed. Of these 68 questionnaires were returned (response rate 42%); 9 spoiled and 59 used for data analysis. No additional completed questionnaires were received after a follow-up to invite student nurses to participate (see section 3.5.2.2).

5.4.1 Demographic data (sample characteristics)

The majority of the respondents were female (63%, n=37). The conclusion therefore may be drawn that there are still more females entering the nursing profession than males, as reflected by these results. As indicated in Chapter 4, section 4.3.1.1, statistics obtained from the SANC website (www.sanc.co.za) support this conclusion – the total number of student nurses on the register on 2016.12.31 for universities were 6165 females and 1911 males. The figures for nursing colleges were 9917 females and 3346 males. These statistics apply to student nurses registered for the R425 programme (Nursing (General, Psychiatric and Community) & Midwifery).

A conclusion may be drawn that the majority of the respondents who were 26 years or older (59%, n=35) did not enter into nursing education and training for the R425 programme (four-year programme) directly out of school, while the 41% (n=24) who were 25 years or below appear to have entered into the programme soon after completing their senior certificate. Comparing the age of the respondents with years of experience in nursing gives rise to the conclusion that a few respondents had either repeated some years or time periods of their training during the programme. They might have completed other programmes in nursing training before entering the R425 programme. This conclusion is further supported by the responses regarding years of experience in nursing, where the majority of the respondents (92%, n=53) had between three and five years of experience in nursing. According to statistics provided on the SANC website, the average age of student nurses who completed training in the R425 programme in 2016 was 29 years (www.sanc.co.za) (see section 4.3.1.2).

Only few of the respondents (8%, n=5) indicated that they had had exposure to other courses in financial management, economics or health economics prior to starting nursing training, while 92% (n=54) had no prior exposure. It was beyond the scope of
this study to correlate the knowledge of the respondents who had prior knowledge of health economics with those who did not have prior training in health economics.

The majority of the respondents (92%, n=54) indicated that health economics content did not form part of the nursing curriculum of their current training. These results are supported by the literature discussed in Chapter 2, section 2.4.1. The macro curriculum of R425 does not currently require a subject or module that specifically teaches economic or financial content that the student nurse should master in order to achieve the goals of an institution relating to economic performance (SANC 1985, Paragraph 6(2)(j)).

5.4.2 Economic evaluation of the efficient allocation of resources

The first objective of the study was to explore the knowledge student nurses have about health economics specifically about cost concepts related to the efficient allocation of resources. Definitions of the concepts under study were provided in the questionnaire (Section B) as based on a literature review. The overall rounded correct score obtained by the respondents for items regarding economic evaluation of the efficient allocation of resources (all concepts assessed under section B of questionnaire combined) was 73% as reflected by the mean for this section (see section 4.3.2 and Annexure K). Application of the concepts tested under economic evaluation of the efficient allocation of resources in health care service delivery has been discussed in Chapter 2, section 2.5.1.

Based on this overall result, it can be concluded that the respondents were mostly able to apply the information provided to answer the items regarding cost concepts related to the efficient allocation of resources. However, there does appear to be lack of knowledge, as supported by the number of incorrect answers and specifically reflected in the results for cost-effectiveness analysis.

This conclusion is supported by the combined correct results of the items testing each concept for Section B (“n” not indicated as not all respondents answered all the items testing these concepts):
In the items regarding *cost-benefit analysis*, the respondents achieved an overall combined result of 67%. The application of *cost-benefit analysis* in health care has been implemented in a study by Trepanier et al (2012:207). The results of their study suggested monetary savings when the traditional method of orientation was compared with a new residency programme which offered an innovative, more cost-effective approach, thus representing an investment rather than an expense (see section 4.3.2.1).

The overall combined result obtained by the respondents for items regarding *cost-effectiveness analysis* was 31%. This indicates a combined overall score; therefore n is not indicated as not all respondents answered all the items testing this concept. Walsh et al (2013:962-965) emphasise that a cost-effectiveness analysis requires the comparison of two or more approaches, such as the evaluation of alternative educational approaches or interventions (see section 4.3.2.2).

The respondents achieved 85% (N=59) in the item on the concept of *cost of illness*, the application of which is highlighted by the authors (Kirigia et al 2014:1-11) of a report made to the African Commission for Women’s Health. This report addresses the question of impact of maternal deaths on non-health GDP in the WHO African Region, specifically in relation to the fifth MDG 5 of the United Nations. The aim of MDG 5 is to improve maternal health and drives the efforts internationally to reduce maternal morbidity and mortality (see section 4.3.2.3).

Of the respondents, 81% (overall combined result) answered the items related to *evidence-based medicine* correctly. The importance of this concept is emphasised by Nickitas (2011:229) who states that nurses should focus on evidence-based practice and control the cost of care in order to meet the challenges of economic accountability (see section 4.3.2.4).

The respondents achieved and overall combined result of 85% (n not indicated as not all respondents answered all the items testing this concept) for items related to *economic evaluation*. The concept of economic evaluation is used in health care to assess costs and to inform decisions on resource allocation (Husereau et al 2013:1-6) (see section 4.3.2.5).

The last concept related to the efficient allocation of resources was *resources (specific to health economics)*, in which respondents achieved 86% (overall combined result) (see sections 4.3.2.6 & 4.3.3).
This study has repeatedly highlighted the importance of economics in health care (see sections 2.3 & 2.4). Guinness and Wiseman (2011:8-9, 17) explain that different economic problems exist in the health sector. Various economic problems include consideration of questions such as the most cost-effective treatments for people with HIV; the cost involved and therefore the choices to be made between for example malaria prevention and malaria treatment programmes. These economic questions imply that choices need to be made about how resources are to be used, thus. Chapter 2 and 4, sections 2.5.3 and 4.3.2 described the contribution of Rutherford. Rutherford (2008:348-349) states that data documenting both the tangible and intangible assets of nursing services (such as staff skills, strategic and process quality, as well as intellectual resources) is necessary to communicate its value fully. The field of economics can be used to study and evaluate health care choices in order to establish what health resources are valued in life and those which are necessary. Choices need to be made in health care due to the understanding that there are not enough resources to meet everyone’s needs, and therefore economic evaluation may identify which decisions have the best value (Rutherford 2008:349-350).

Conclusion statement: Economic evaluation of the efficient allocation of resources

The conclusion based on the overall result was that although respondents were mostly able to apply the information provided in answering the items, there appeared to be a lack of knowledge, as shown by the number of incorrect answers and specifically reflected by the result for cost-effectiveness-analysis (see section 4.3.2). It must also be noted that the definitions of the concepts which were tested were included in the questionnaire (Section B). Therefore respondents could use them to interpret the items.

5.4.3 Key concepts in health economics for determining the cost of an intervention

The second objective of the study was to describe the knowledge of student nurses of health economics specifically regarding concepts related to determining the cost of an intervention. Definitions of concepts under study were provided in the questionnaire (Section C), with examples based on a literature review. The overall rounded correct score obtained by respondents for items regarding key concepts in health economics for
determining the cost of an intervention (all concepts assessed under Section C of the questionnaire combined) was 47%, as reflected by the mean for this section (see section 4.3.3 and Annexure K). Application of the concepts tested for determining the cost of an intervention has been discussed in Chapter 2, section 2.5.2 and the results in Chapter 4, section 4.3.3 with supporting literature references.

The researcher drew the conclusion that the respondents showed a lack of knowledge, and was not able to apply the information provided to correctly answer the items about determining the cost of an intervention. This conclusion is supported specifically by the results (correct responses) which the respondents obtained for the concepts of annualised cost: 44% (n=26); average cost: 18% (n=10); capital cost: 15% (n=8); financial (budgetary) cost: 12% (n=7); intangible cost: 26.3% (n=15); overhead cost: 13% (n=7); and recurrent cost: 12% (n=7). For the concept of indirect cost, the respondents achieved 54% (n=31), which may be interpreted as average. However, it is noted that the respondents showed knowledge regarding the concepts of annual cost: 85% (n=50); direct cost: 86% (n=49); discounting: 67% (n=38); economic cost: 86% (n=49); fixed cost: 77% (n=43); and variable cost: 75% (n=41).

Literature references indicate the importance of knowledge (and the application thereof) regarding a selection of the concepts in health care service delivery which were tested in Section C of the questionnaire:

- **Annual cost**: Walensky et al (2013:84-92) conducted a study comparing (ART) costs over an annual period (one year) and concluded that the use of generic-based ART (in the United States) could lead to considerable savings in HIV programmes.

- **Average cost**: Data regarding population-level data on end-of-life-care use and cost, will identify the level of care provided including those areas where care can be optimised through coordinated and appropriate health care (Tanuseputro et al 2015:1-4).

- **Direct cost**: A descriptive study regarding the costs involved in the prevention and treatment of cervical cancer was conducted in Brazil in 2006. The researchers (Novaes et al 2015:289-295) concluded that cost estimates of cervical cancer prevention and treatment (indicating the economic importance of cervical cancer screening and care) are of interest in research and healthcare
management and will be beneficial in monitoring the effect of the HPV vaccine introduction.

- **Financial (budgetary) cost:** A research article by Kerr et al (2012:1-8) reports the finding of the study on the estimation of the financial cost of chronic kidney disease to the NHS in England. CKD-related prescribing and care as well as renal replacement therapy was assessed in the study together with the increased risk for specific complications in people affected by CKD. The financial cost of chronic kidney disease (CKD) was estimated. It was found that the financial impact of CKD is large.

- **Overhead cost:** Winterbauer et al (2016:9) developed a costing tool for use in collecting primary data regarding aspects such as the number of services provided, staff employment and the costs that mandated environmental health services incur.

Section C of the questionnaire included several items which required the respondents to apply their understanding of the concepts (definitions and examples provided). More respondents in section C (20%) indicated that they did not know the answers to items than in section B of the questionnaire (10%). The conclusion may be drawn that the respondents were unable to apply the definitions that were provided, to the items in this section of the questionnaire.

**Conclusion statement: Key concepts in health economics for determining the cost of an intervention**

The conclusion drawn was that the respondents showed a lack of knowledge regarding the concepts in health economics for determining the cost of an intervention and were not able to apply the information provided to answer the items about determining the cost of an intervention.

**5.4.4 Nursing curriculum: Health economics**

The third objective of the study was to make recommendations for additions regarding health economics to be made to the nursing curriculum content and the development of CPD workshops and in-service training. This might serve to better prepare professional nurses for quality health care practice by ensuring that limited resources are applied in
the most cost-effective way without compromising the quality of service. Given the drive to get CPD in place, it has become necessary to identify knowledge gaps that could be addressed in CPD and in-service training.

Chapter 4, section 4.3.4 described the results of Section D of the questionnaire. The following conclusions are based on the results obtained.

The conclusion was drawn that knowledge of health economics is necessary in nursing practice, as supported by a majority of the respondents (67%, n=38) who indicated that, knowledge of health economics was necessary in nursing practice. Of concern was that 33% (n=19) of the respondents indicated that, knowledge of health economics was not necessary in nursing practice. The researcher drew the conclusion that the lack of knowledge regarding the cost concepts in health economics as determined in this study, may mean that student nurses do not understand the importance of its application in health care service delivery. Nickitas (2011:229) calls for all nurses to have a better understanding about health economics and also to have greater economic accountability in professional practice. The results clearly indicated that cost-related activities do not form part of nursing training, as indicated by the majority (90%, n=53) of the respondents.

An important conclusion was that student nurses (69%, n=41) would be interested in engaging in a short course in health economics. Such a course should include theory relating to health economics, active involvement in costing activities in the nursing unit, and application information regarding concepts of health economics. However, a concern noted by the researcher is that 31% (n=18) of student nurses would not be interested in such a course. This result supports the conclusion that the lack of knowledge regarding the cost concepts in health economics, may mean that student nurses do not understand the importance of their application in the health care environment.

The researcher found support for the conclusion that student nurses are of the opinion that service should focus on both cost-effectiveness (75%, n=42) and on quality service (81%, n=46). In light of the NHI healthcare system which is in the process of being introduced in South Africa, these focus areas are important (South Africa 2011:4, 9).
The results also support the conclusion that student nurses would not be able to discuss their nursing units’ budget/costing with institution management personally due to the lack of knowledge. A majority of the respondents (74%, n=42) indicated that they would ask for help because they did not have enough knowledge thereof. A further majority of the respondents (68%, n=38) indicated that they would refer the matter, because they did not have any knowledge thereof. However, a minority of the respondents (39%, n=22) indicated that they would attend to the matter personally. These results show that several respondents selected more than one option of the pre-determined responses and therefore appear to be unsure, further supporting the researcher’s conclusion that student nurses have a lack of knowledge regarding the cost concepts in health economics.

Nurses are seen as the main pillar of the health care system; even those nurses who have managerial roles, and who are therefore not directly involved in clinical practice; strive to preserve patient care and safety as their primary priority. Despite the important role of nurses, (Palese et al 2012:86) emphasise that reports documenting the intensity of the economic crisis experienced at the bedside of the patient and the effects that cost-containment measures have on the daily practice of nursing activities are very limited, they refer to ‘no reports’.

Thornlow and McGuinn (2010:71) point out that foundational enhancement in health care education is required to ensure progress toward superior health care quality. The IOM is cited by Thornlow and McGuinn (200:71) in suggesting the health professions bridge the gap between what is taught to students and how graduates practise. Undergraduate nursing programmes should strengthen quality and safety knowledge in their curricula.

**Conclusion statement: Nursing curriculum: Health economics**

These results combined led the researcher to draw a conclusion that there is a need for the inclusion of a module regarding health economics in the nursing curriculum and in CPD workshops and in-service training. This would be of value in order to better prepare professional nurses for quality health care practice by ensuring that limited resources are applied in the most cost-effective way while not compromising quality of service.
5.4.5 Presentation for CPD workshop

The CPD system, as developed by the SANC for all categories of nurses in South Africa comprises a points system in which 15 points must be collected annually in different subjects or content areas, including that of leadership and management (Geyer 2014:10). It has therefore become necessary to identify knowledge gaps that could be addressed in CPD workshops and in-service training. CPD workshops may be developed at institutional level (health care service) or by NEIs and accredited with the SANC.

CPD accredited workshops, short courses or in-service training should be developed and/or presented on the subject of health economics for all categories of nurses. These could include cost concepts in health economics and their application in the nursing care environment. It will better prepare not only professional nurses, but all categories of nurses for quality health care practice by ensuring that limited resources are applied in the most cost-effective way without compromising on quality.

Based on the results of the study (see sections 5.4.2, 5.4.3 and 5.4.4 for summary), the researcher developed a presentation as a guideline for an introductory CPD workshop regarding health economics. As described in section 4.4, the workshop was developed based on the conceptual framework (see figure 2.1) which guided the literature review.

The researcher propose that this basic introductory content regarding health economics may be beneficial to nurse educators for gaining knowledge in the subject of health economics. Nurse educators should participate in the development of nursing curricula for all nursing programmes with the aim of including the subject content of health economics in a module such as unit management. The content of the proposed presentation may be further developed to include more advanced information in a module of the curriculum.

Nurse educators, nurse leaders, professional nurses and student nurses could benefit from developmental workshops on health economics. The presentation was developed from the concepts that were highlighted in this study as indicated by the different sections in the questionnaire. Table 4.8 provides an outline of the content with the
applicable slide numbers. A CPD workshop titled “Introduction to understanding health economics” was proposed. The presentation addresses specific knowledge deficiencies and may be presented using the lecture method as a teaching strategy (Windsor 2005:131-134).

Table 4.1  Outline of the CPD workshop on health economics

<table>
<thead>
<tr>
<th>Theme</th>
<th>Refer to Slides:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title: Health Economics – Introduction to understanding health economics</td>
<td>1</td>
</tr>
<tr>
<td>Structuring of the content</td>
<td>2</td>
</tr>
<tr>
<td>What is health economics?</td>
<td>3-8</td>
</tr>
<tr>
<td>Introduction to the literature of health economics</td>
<td>9</td>
</tr>
<tr>
<td>Economic evaluation:</td>
<td>10-14</td>
</tr>
<tr>
<td>- Activity and Feedback</td>
<td>15-16</td>
</tr>
<tr>
<td>Counting the cost</td>
<td>17</td>
</tr>
<tr>
<td>Key concepts of counting the cost</td>
<td>18-21</td>
</tr>
<tr>
<td>- Activity and Feedback</td>
<td>22-24</td>
</tr>
<tr>
<td>The future role of health economics in health care</td>
<td>25-26</td>
</tr>
<tr>
<td>Nursing education and training in South Africa</td>
<td>27-30</td>
</tr>
<tr>
<td>- Activity and Feedback</td>
<td>31-32</td>
</tr>
<tr>
<td>CPD workshops</td>
<td>33</td>
</tr>
<tr>
<td>Conclusion</td>
<td>34-36</td>
</tr>
<tr>
<td>References</td>
<td>37-39</td>
</tr>
</tbody>
</table>

A copy of the presentation is attached in Annexure J. An electronic version of this PowerPoint presentation could be obtained from the researcher (yolande.moller@yahoo.com).

5.5  RECOMMENDATIONS

Recommendations are made for nursing education, nursing practice and future research.

5.5.1  Recommendations for nursing education

The researcher will make the dissertation available to the NEI that provided permission for the study. It is the intention of the researcher to increase awareness of the importance of including specific subject content on health economics in the curriculum.
for the education and training of professional nurses in a dedicated module. The content should be included in subject content of nursing curricula such as those for Ethos and Professional Practice (for example unit management). The researcher recommends that content for health economics should be included in the education and training of all (including staff and auxiliary) nurses. This inclusion may be accomplished by making changes to the curricula of all nursing education and training programmes conducted by NEIs in South Africa.

The content of the CPD presentation developed by the researcher may be used as a baseline for the subject content of health economics which could be included in the curriculum. However the content could be expanded to include more advanced aspects of health economics. It is strongly recommended that all nurse educators and clinical facilitators undergo training in health economics as part of CPD. Such knowledge should be integrated into all teaching and clinical facilitation.

Specific subject content in health economics should be included in nursing curricula in order to fulfil the requirements of the proposed regulations regarding the scope of practice of nurses and midwives for the professional nurse. This will contribute to nurses practising as independent practitioners in the clinical environment, while providing comprehensive nursing care and management for the nursing treatment and rehabilitation of all health problems of individuals, groups and communities as well as the effective management of the health facility or service (South Africa 2013:4-5).

The subject content of health economics may better prepare professional nurses to improve the quality of health care practice by ensuring that limited resources are applied in the most cost-effective way, while delivering quality health care services. The results of the study could be used to address the exit level outcome “3. Manage a health care unit and health facility based on the understanding of the roles and relationships within the multidisciplinary team”, of the SANC Bachelor of Nursing and Midwifery Qualification Framework (New Nursing Qualifications) (SANC [Sa]:6). Nursing curricula development may determine the inclusion of content on health economics specifically related to the associated assessment criteria for “3.3 Systems established (to) promote cost effective and efficient service delivery within a health care unit” in the curriculum for teaching student nurses who are being prepared for professional nursing practice (SANC [Sa]:6).
5.5.2 Recommendations for nursing practice

By receiving training with specific subject content on health economics, nurses will be better equipped to increase efficiency in health care service delivery (specifically in nursing care). This will maximise benefits of the available resources to patients and clients of health care institutions while minimising costs, and will help to promote the Batho Pele principles in the public health care arena, and to improve quality of service to the people of South Africa. Furthermore, nurses will be able to collect CPD points in order to achieve the annual requirement and be licensed for annual practice by the SANC.

The CPD presentation developed by the researcher may be used to increase the knowledge of professional nurses and nurse educators who had not previously received education and training in health economics (see sections 4.4 and 5.4.5).

Other initiatives which may be implemented together with training in order to maximise benefits while minimising costs include making nurses more aware of the cost of the stock and resources they use. For example the price of medicine used regularly in the nursing unit may be indicated on the shelf where the medicine is stored – minimum/maximum level and price (such as Augmentin 1,2gr vials; minimum: 20; maximum: 65; price: R21, 22 per vial). The same may be done for diverse stock (surgical supplies). Invoices for telephone lines/calls may be specifically issued per nursing unit per month for their records. Information regarding the cost of food stuff purchased per month by the kitchen to provide patient meals may be disseminated to nurses – or more specific the cost per patient per day (for meals and tea/coffee).

5.5.3 Recommendations for future research

The researcher recommends that a similar study be conducted in other provinces of South Africa which provide the programmes for registration as a professional nurse with the SANC (R425 degree and diploma). Such a study could determine if results similar to those of this study regarding the knowledge of student nurses of the cost concepts in health economics are found with other NEIs conducting the programme. Results may indicate differences in meso- and micro-curricula of different institutions.
In order to develop curricula, the researcher recommends that the needs of educators regarding a possible knowledge deficit be established through research. Identifying gaps in knowledge will determine the content required that should be included in for example CPD accredited workshops in order to equip educators with the required knowledge. Knowledge of health economics will enable the educators to not only develop curricula and subject content to be included in training, but also to teach the subject content to student nurses. Identifying a knowledge gap regarding health economics also applies to nurse managers, who need to be involved in identifying staff needs to be addressed in in-service training or CPD-accredited workshops. In order to develop an accredited workshop, the manager needs to have sufficient knowledge of the subject content.

Given the fairly low response rate in this study, it would be of value to explore the attitudes and perceptions of student nurses regarding health economics. This recommendation came from the researcher’s conclusion that it was possible that student nurses knew that they had a lack of knowledge on the topic and therefore did not want to participate.

Development needs of nurses in general regarding delivery of cost-effective, quality nursing care and their attitudes, feelings and beliefs regarding this might be investigated in a qualitative study by using, for example, focus groups to identify factors which influence cost-effective, quality nursing care and the ability of the nurses to manage this.

5.6 CONTRIBUTIONS OF THE STUDY

Financial constraints affect the daily implementation of nursing activities and the standard of care delivered. In order to perform optimally, nurses need to have sufficient economic knowledge and skills and to be economically accountable. Because resources are tight, nurses need to practise all aspects of nursing care more efficiently and be more closely aligned with delivery of the organisation’s economic performance. Knowledge and therefore training and education with regard to health economic concepts have become necessary for professional nurses.
Gaining an understanding of the possible gaps in nurses’ training could help the researcher to make recommendations that could inform the nursing curricula. Furthermore, given the drive to get CPD in place (as prescribed and initiated by the SANC), it has become necessary to identify knowledge gaps that could be addressed in CPD and in-service training. A presentation was developed as an example for introductory CPD regarding health economics subject content and may be used to inform curricula development.

Becoming aware of the gaps in the knowledge of student nurses about factors that influence the costs of delivering health care and the impact of cost factors on clinical nursing interventions could inform new curricula and CPD workshops. It could therefore lead to the expansion of health economics content in curricula in order to better prepare professional nurses to ensure that limited resources are applied in the most cost-effective way. The results of the study therefore address the exit level outcome “3. Manage a health care unit and health facility based on the understanding of the roles and relationships within the multidisciplinary team” as stipulated in the Bachelor of Nursing and Midwifery Qualification Framework (New Nursing Qualifications) (SANC [Sa]). Specifically relevant is the associated assessment criteria for “3.3 Systems established (to) promote cost effective and efficient service delivery within a health care unit” may be further expanded in the curriculum for teaching student nurses who are being prepared for professional nursing practice (SANC [Sa]:6).

The results of this study could be of value in the designing of further content (such as health economics) to be included in a curriculum module, for example unit management, or to develop CPD workshops or in-service training.

5.7 LIMITATIONS OF THE STUDY

The study was conducted in one province in the Republic of South Africa within a specific population of student nurses. There is only one NEI within the selected province that offers the education and training of nurses registered for the SANC R425 programme. Therefore the results may not be generalisable to the whole of South Africa. However, the researcher did not draw a sample from the population, but conducted a census, not only to promote generalisability of the study, but also to ensure the maximum response rate.
A response rate of 42% was obtained in the study (see section 3.5.2.2). The researcher did make a follow up to encourage any more members of the population who still wanted to submit completed questionnaires. However, no more completed questionnaires were received by the set extended date. The researcher, in view of the ethical considerations and the concept of autonomy, did not force any student nurse to take part. The response rate in the current study was similar to other completed studies with valid and reliable results (see section 3.5.2.2).

The questionnaire was self-administered and therefore offered limited clarification of aspects of the study, but sections for comments by the respondents were included in the questionnaire.

It was beyond the scope of this study to correlate the knowledge of the respondents who had prior knowledge of health economics with those who did not have prior training. The influence that prior knowledge may therefore have had on the knowledge displayed by an individual respondent was not determined.

5.8 CONCLUDING REMARKS

Health economics is the optimisation of health relating to activities that include using resources in such a way that they improve health status and service delivery within the limited resources that are available. Nurses are seen as the main pillar of the health care system; this calls for all nurses to have better knowledge of health economics. All nursing education programmes should focus on increasing nurses’ knowledge and understanding of the economic implications of clinical and administrative practice.

The researcher concludes that the respondents showed a certain lack of knowledge regarding the cost concepts of health economics and a definite wish to obtain more knowledge.

The results obtained in the study may be used to inform nursing curricula and the development of CPD workshops or short courses in health economics. Expanding the knowledge of nurses with regard to health economics could promote cost-effective and efficient service delivery within health care units.
LIST OF REFERENCES


SANC see South African Nursing Council.


South African Nursing Council. [Sa]. *Bachelor of Nursing and Midwifery Qualification Framework (New Nursing Qualifications).*


Unisa see University of South Africa.


**INTERNET SOURCES**


ANNEXURES
UNIVERSITY OF SOUTH AFRICA
Health Studies Higher Degrees Committee
College of Human Sciences
ETHICAL CLEARANCE CERTIFICATE

REC-012714-039

Date: 26 February 2015  Student No: 3207-6991

Project Title: Exploring the knowledge of nursing students regarding the cost concepts of the dynamics of health economics.

Researcher: Yolande Möller

Degree: MA in Nursing Science  Code: MPCHS94

Supervisor: Prof GH van Rensburg

Qualification: D Litt et Phil

Joint Supervisor: -

DECISION OF COMMITTEE

Approved [ ]  Conditionally Approved [ ]

Prof L Roets
CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE

Prof MM Moleki
ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRIES
UNISA

UNIVERSITY OF SOUTH AFRICA
Health Studies Higher Degrees Committee
College of Human Sciences
ETHICAL CLEARANCE CERTIFICATE

REC-012714-039

Date: 26 February 2015
Student No: 3207-699-1

Project Title: Knowledge of student nurses of cost concepts in health economics.

Researcher: Yolande Möller

Degree: MA in Nursing Science

Code: MPCHS94

Supervisor: Prof GH van Rensburg
Qualification: D Litt et Phil
Joint Supervisor: -

DECISION OF COMMITTEE

Approved ✓ Conditionally Approved □

Prof L Roets
CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE

Prof MM Moleki
ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES
ANNEXURE B

Letter requesting permission to conduct research and ethical approval – Mpumalanga Department of Health

TO : MR MOLEFE MACHABA
RESEARCH ETHICS COMMITTEE
MPUMALANGA DEPARTMENT OF HEALTH

FROM : MS Y. MÖLLER
MCUR STUDENT NURSING SCIENCE – UNISA
LECTURER: STANDERTON HOSPITAL NURSING SCHOOL

DATE : 22 JULY 2015

SUBJECT : REQUEST FOR PERMISSION TO CONDUCT RESEARCH & ETHICAL APPROVAL

I, Yolande Möller, a Lecturer at Standerton Hospital Nursing School and UNISA student, registered for a Master Study in Nursing Science, herewith request permission to conduct research for the proposed study: Exploring the knowledge of nursing students regarding the cost concepts of the dynamics of health economics. The research will be conducted at Mpumalanga College of Nursing (Kabokweni).

The purpose of the study is to explore and describe the knowledge of nursing students regarding the cost concepts relating to the dynamics of health economics, specific to efficient allocation of resources and determining the cost of an intervention, in order to prepare them to deliver cost effective, quality nursing care. The data obtained in the study may lead to the expansion of content pertaining to health economics included in the module on managing a health care unit (education curriculum preparing nurses for professional practice) specifically to achieve the outcome of promoting cost effective and efficient service delivery. Thus to better prepare professional nurses for improved health care practice in insuring that limited resources are applied in the most cost-effective way while delivering a quality service as well as to develop CPD workshops and in-service training to achieve the same.
Ethical consideration to protect the study participants/respondents as well as protecting the rights of the institution in which the research is conducted will be maintained during the research. Permission will furthermore be obtained from the public nursing education institution of Mpumalanga College of Nursing, from the College Principal herself (Ms J Maunye), through submission of a letter to request permission to conduct the research together with the letter from the Provincial Ethical Committee granting approval to conduct research in the province (based on approved proposal as well as the letter of ethical clearance from the Research Ethics Committee of the University ~ see attached). There will be no financial implications/expenses to the Province/Mpumalanga Department of Health.

The study will be reported in the form of a dissertation to the University of South Africa (the University of Study for examination purposes), at scientific gatherings such as conferences and in scientific journals. In communicating the results of the study, ethical considerations will be maintained to protect the respondents and institutions involved.

The supervisor for this study is Prof Gisela H van Rensburg (vrensch@unisa.ac.za) of the Department of Health Studies (UNISA), contact telephone no.: (012) 429 6514.

Thanking you in advance

Ms Y. Moller

Email: vplande.moller@yahoo.com
Tel. no.: (017) 719 9600 (ext. 2010) (office hours)
Cell no.: 082 952 4907
(Lecturer: Standerton Hospital Nursing School)
Extract of permission requested – completed document (declaration to acknowledge Mpumalanga Department of Health)

for professional nursing practice. All nursing education programs should focus on increasing nurses' knowledge and understanding of the economic implications of the clinical and administrative practice.

3) Is likely to result in the publication of articles in local or journals, or presentations at congresses, etc.

The study will be reported in the form of a dissertation to the University of South Africa (the University of Study for examination purposes), at scientific gatherings such as conferences and in scientific journals. In communicating the results of the study, ethical considerations will be maintained to protect the respondents and institutions involved.

4) Is likely to lead to positive collaboration with other departments within Mpumalanga Province, other Provinces or institutions.

5) Results can be practically implemented

Given the drive to get CPD in place (as prescribed and initiated by SANC), knowledge gaps identified in the research study could be used to develop workshops to address in CPD and in-service training.

G. DECLARATION BY RESEARCHER(S)

Should this project be approved by the Mpumalanga Department of Health REC:

1. I/we fully understand that this project, if recommended, is done so for the sole overall purpose for the benefit of health care development and promotion for the people of Mpumalanga Province.

2. I/we undertake not to change the procedure as detailed in the protocol but will submit a further application to the REC if changes become necessary in the course of the project.

3. I/we understand fully that the Mpumalanga Department of Health will not be held responsible nor will I/we make claims against the Department for any financial or other debts incurred in the course of this project. This is declared with the
exception of any specific registered and approved financial support given to the project by the Mpumalanga Province Department of Health.

4. I/we agree to respect the integrity of the project and will not falsify any results.

5. I/we agree to acknowledge the co-operation of the Mpumalanga Department of Health in any publications, public discussions, and/or matters arising from this project.

6. I/we fully understand the conditions under which I am/ we are sanctioned to carry out the above-mentioned research project.

7. I/we guarantee to secure compliance with these approved conditions.

CHIEF RESEARCHER:

SURNAME: MÜLLER NAME: YOLANDE TITLE: Ms.

SIGNATURE: ___________ DATE: 2015.08.26

(IF PROJECT IS FOR THE RESEARCHER’S ACADEMIC PURPOSES)

HEAD OF DEPARTMENT/ INSTITUTION/ FACILITY:

SURNAME: VAN RENSBURG NAME: GISELA H TITLE: PROF.

SIGNATURE: ________________________________

DATE: 25/8/2015
ANNEXURE C
Letter of approval – Mpumalanga Department of Health

Department of Health
Mpumalanga Provincial Government

Building No. 7, No. 7 Government Boulevard, Rietvlei Park Extension 2, Mbombela, 1200, Mpumalanga
Postal Box 32863, Mbombela 1200, Tel: 011 766 3120, int: 27 15 766 3120, Fax: 011 766 3139, int: 27 15 766 3139

Enquiries: Thembza Mulungu (011) 766 3511

01 September 2015

Ms. Yolande Moller
PO Box 598
Standerton
2430

Dear Ms. Yolande Moller

APPLICATION FOR RESEARCH & ETHICS APPROVAL: EXPLORING THE KNOWLEDGE OF NURSING STUDENTS REGARDING THE COST CONCEPTS OF THE DYNAMICS OF HEALTH ECONOMICS

The Provincial Health Research and Ethics Committee has approved your research proposal in the latest format that you sent.

PHREC REF: MP_2015RP21_854

Kindly ensure that you provide us with the soft and hard copies of the report once your research project has been completed.

Kind regards

[Signature]

MR. JERRY SIGUDLA
RESEARCH AND EPIDEMIOLOGY
ANNEXURE D
Letter requesting permission to conduct research – Mpumalanga College of Nursing

TO : MS T.J. MAUNYE
    PRINCIPAL: MPUMALANGA COLLEGE OF NURSING

FROM : MS Y. MÖLLER
    MCUR STUDENT NURSING SCIENCE – UNISA
    LECTURER: STANDERTON HOSPITAL NURSING SCHOOL

DATE : 07 SEPTEMBER 2015

SUBJECT : REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I, Yolande Möller, a Lecturer at Standerton Hospital Nursing School and UNISA student, registered for a Master Study in Nursing Science, herewith request permission to conduct research at Mpumalanga College of Nursing (Kabokweni) for the proposed study: Exploring the knowledge of nursing students regarding the cost concepts of the dynamics of health economics.

The purpose of the study is to explore and describe the knowledge of nursing students regarding the cost concepts relating to the dynamics of health economics, specific to efficient allocation of resources and determining the cost of an intervention, in order to prepare them to deliver cost effective, quality nursing care. The data obtained in the study may lead to the expansion of content pertaining to health economics included in the module on managing a health care unit (education curriculum preparing nurses for professional practice) specifically to achieve the outcome of promoting cost effective and efficient service delivery. Thus to better prepare professional nurses for improved health care practice in ensuring that limited resources are applied in the most cost-effective way while delivering a quality service as well as to develop CPD workshops and in-service training to achieve the same.
Ethical consideration to protect the study respondents (fourth year students currently registered at the College for the R425 Nursing Programme) as well as protecting the rights of the institution in which the research is conducted will be maintained during the research. Permission have been requested from the Mpumalanga Department of Health Provincial Ethical Committee to conduct the research at the public nursing education institution of Mpumalanga College of Nursing through submission of a letter to request permission to conduct the research (based on approved proposal as well as the letter of ethical clearance from the Research Ethics Committee of the University – see attached) – Approval PHREC REF: MP_2015RP21_854 (attached). There will be no financial implications/expenses for the Mpumalanga College of Nursing.

Results will be made available in the form of a dissertation to the University of South Africa (the University of Study for examination purposes), at scientific gatherings such as conferences and in scientific journals. In communicating the results of the study, ethical considerations will be maintained to protect the respondents and institutions involved.

The supervisor for this study is Prof Gisela H van Rensburg (vrensg@unisa.ac.za) of the Department of Health Studies (UNISA), contact telephone no.: (012) 429 6514.

Thanking you in advance

Ms Y. Moller
Email: yolande.moller@yahoo.com
Tel. no.: (017) 719 9900 (ext. 2010) (office hours)
Cell no.: 062 952 4607
(Lecturer: Standerton Hospital Nursing School)
ANNEXURE E
Letter of approval – Mpumalanga College of Nursing

(REQUEST FOR PERMISSION TO CONDUCT A STUDY AT AN INSTITUTION OF NURSING IN MPHUMALANGA PROVINCE IN SOUTH AFRICA (SA))

Approval to conduct a study at a selected higher education institute of nursing in Mpumalanga Province, (SA) on: EXPLORING THE KNOWLEDGE OF NURSING STUDENTS REGARDING THE COST CONCEPTS OF THE DYNAMICS OF HEALTH ECONOMICS in a selected higher education institute of nursing in Mpumalanga Province, South Africa." is hereby granted on condition that you will provide clearance certificate from the Ethics Committees of your University and the Mpumalanga Provincial Department protocol approvals to conduct your study; and that disruption of teaching and learning is to be avoided at the time of data collection. It is also requested that results of the study be shared with the institution to contribute to future positive recruitment and retention of nurse educators.

Thank you

Ms TJ Maunye
PRINCIPAL
MPUMALANGA COLLEGE OF NURSING

DATE
20/6/06
7/12
ANNEXURE F
Covering letter to respondents

EXPLORING THE KNOWLEDGE OF NURSING STUDENTS REGARDING THE
COST CONCEPTS OF THE DYNAMICS OF HEALTH ECONOMICS

Dear Respondent

The researcher is conducting a study to explore the knowledge regarding cost concepts of health economics that nursing students have which enable them to deliver cost effective, quality nursing care. The study will enable the researcher to propose suggestions for the expansion of content pertaining to health economics included in the module on managing a health care unit (education preparing nurses for professional practice) specifically to ensure cost effective and efficient service delivery as well as CPD workshops and in-service training to achieve the same.

You have been included by virtue of your registration as a fourth year student of the SANC R425 programme (comprehensive four-year nursing course) at the Nursing Education Institution (NEI) where the study (data collection - questionnaire) will be conducted. Participation in the study is completely voluntary and you may withdraw at any time without fear of unfair treatment or recrimination. There are no risks associated with the study. Data of the study will be kept confidential and will be used in research related documents and also be presented in the form of a dissertation (examination purposes) for the study of the researcher towards a Master degree in Nursing Science as well as at scientific gatherings. The study is not financed by a specific institute, and you will not be remunerated in any way for participating in the study. Ethical clearance was granted by the Research Ethics Committee of the Department of Health Studies at Unisa for the study and permission was obtained from the relevant Department of Health in the province as well as from the Principal of the NEI where the full study will be conducted. Results of the study will be made available to the authorities who have provided consent/permission.

Would you please assist the researcher with your experiences, in order for the researcher to acquire a clearer picture of the understanding that nursing students have regarding the cost concepts of health economics relating to delivering cost effective, quality nursing care. Please complete the questionnaire which is anonymous (you are not asked to put your name on it) – it should take about 30 – 40 minutes. Please seal the completed questionnaire in the envelope provided and deposit it in the sealed box before 28 July 2016 (box stationed in Ms. K.B. Nkosi’s office), which will be collected by the researcher on 29 July 2016. You will have no expense or inconvenience to post the completed questionnaire. By returning the completed questionnaire you will be granting voluntary consent for participation in the study. If you have questions about the questionnaire, feel free to contact me, Ms Y. Möller, on (017) 719 9600 (ext. 2010), during office hours. The supervisor for this study is Prof Gisela H van Rensburg of the Department of Health Studies (Unisa), contact telephone no.: (012) 429 6514.

Thanking you in advance for your voluntary participation in the study.
Declaration by respondent:
I have read and understood all of the above information for the study ‘Exploring the knowledge of nursing students regarding the cost concepts of the dynamics of health economics’, and hereby agree to participate.

Signature of respondent: __________________
ANNEXURE G

Questionnaire (for student nurses – exploring the knowledge of student nurses regarding cost concepts of health economics)

QUESTIONNAIRE

EXPLORING THE KNOWLEDGE OF NURSING STUDENTS REGARDING THE COST CONCEPTS OF THE DYNAMICS OF HEALTH ECONOMICS

Instruction on completing the questionnaire:
- Answering the questionnaire should take you about 30 – 40 minutes
- Answer each question by putting an “X” in the appropriate box
- Please ensure you answer all the questions, based on your current knowledge
- Indicate if you agree (TRUE) or disagree (FALSE) with the statements regarding the concepts of health economics, using the following code (rating scale):
  - T : TRUE (Agree)
  - ? : Do not Know (Have no knowledge of the concept – unfamiliar)
  - F : FALSE (Disagree)

- The questionnaire consists of four (4) sections
  - SECTION A: Demographic Data
  - SECTION B: Economic Evaluation for the Efficient Allocation of Resources
  - SECTION C: Key Concepts In Health Economics For Determining The Cost Of An Intervention
  - SECTION D: Comments
SECTION A: DEMOGRAPHIC DATA

1. Gender:
   - MALE
   - FEMALE

2. Age:
   - 25 or Below
   - 26 or Above

3. How many years’ experience do you have in nursing?
   ............................................................... years (including all nursing training)

4. Have you done any courses in financial management, economics or health economics prior to starting your nursing training?
   
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<th>YES</th>
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<td>If Yes, please indicate what course:</td>
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5. Did health economics form part of the nursing curriculum of your current training?
   
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<th>Integrated in other subjects?</th>
<th>YES</th>
<th>NO</th>
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<tr>
<td>If yes, which subject? ..........</td>
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<td>Specific subject of health economics</td>
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Please turn over for Section B
SECTION B: ECONOMIC EVALUATION OF THE EFFICIENT ALLOCATION OF RESOURCES

Consider the following statements regarding concepts of economic evaluation of the efficient allocation of resources and then answer the questions that follow by putting an “X” in the appropriate box:

- Cost-Benefit Analysis (CBA): A cost-benefit analysis is an economic evaluation technique which measures both the costs and outcomes of an intervention in monetary terms.
- Cost-Effectiveness Analysis (CEA): A cost-effectiveness analysis is an economic evaluation technique which measures the cost of an intervention in monetary units and measures the outcomes in medical/health units such as reduction in pain or life years saved.
- Cost of Illness (COI): A cost of illness analysis measures the overall economic consequences of an illness or disease and includes treatment costs and the cost of lost production.
- Evidence-Based Medicine (EBM): Evidence-based medicine is the generic term used for the process in which health care interventions are implemented based on evidence that suggest they are effective and therefore also cost effective.
- Economic Evaluation: An economic evaluation assess the value for money of alternative health care interventions by comparing their costs and consequences.
- Resources: Determining the cost of an intervention requires that the resources required to implement the intervention must be known, resources are also known as inputs.

QUESTIONS:

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<tr>
<td>1.</td>
<td>An intervention is considered to be efficient if the outcomes (in terms of money) exceed the costs</td>
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<td>2.</td>
<td>Cost-Benefit Analysis can be used to compare interventions with a range of different outcomes</td>
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<td>3.</td>
<td>A cost of illness analysis is conducted when the value of the resources spent on an intervention is compared with the health outcome results</td>
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<td>4.</td>
<td>Cost-effectiveness ratios are developed between costs and outcomes (thus costs divided by health outcomes) in order to compare the outcomes of interventions with one another</td>
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<td>5.</td>
<td>A cost of illness analysis establishes whether interventions are patient-centred, thus being respectful, responsive and considerate to patient preferences, their needs as well as their values</td>
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<td>6.</td>
<td>Illness is expensive, not only financially, but also in terms of pain, fear, discomfort, and impacts on the individual, family and or friends</td>
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<td>7.</td>
<td>Current evidence is used in making explicit and judicious decisions about the care of individual patients</td>
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<td>8.</td>
<td>Evidence-based medicine focuses on the efficiency and effectiveness of healthcare interventions</td>
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<td>9.</td>
<td>Available resources in the healthcare environment need to be rationed or appropriately allocated, based on priorities of care</td>
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<td>10.</td>
<td>Effective care should be provided based on scientific knowledge</td>
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<td>11.</td>
<td>The goal of a health care intervention is to reduce the impact of a health problem</td>
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<td>12.</td>
<td>The impact of health problems can be measured using indicators such as number of cases; number of deaths; extent of disability, suffering or pain; amount of money spent on a health problem; amount of lost income due to a health problem</td>
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13. The result of an intervention on a health problem may be measured in one of two ways: measuring the impact of the health problem before and after the intervention or measuring the impact of the health problem with and without the intervention

14. The following are all examples of resources in health care delivery: personnel; buildings and space; training; equipment; supplies and pharmaceuticals; transportation; social mobilization and publicity (including information, education and communication)

15. Effective care minimises the overuse, underuse, or misuse of care interventions and is therefore cost effective

16. Efficient care interventions limit waste

17. Nursing care interventions should be provided in a timely manner which minimises delays and waiting times (and therefore minimises cost of nursing time spent)

SECTION C: KEY CONCEPTS IN HEALTH ECONOMICS FOR DETERMINING THE COST OF AN INTERVENTION

Consider the following statements regarding concepts in health economics for determining the cost of an intervention and then answer the questions that follow by putting an “X” in the appropriate box:

- Annual cost: The cost of an intervention, including all capital and recurrent costs, calculated on a yearly basis
- Annualized costs: Annual share of initial cost of capital equipment or investments (spread over the life of the project) – taking depreciation into account
- Average cost: The total cost (of an intervention) divided by quantity
- Capital cost: The value of capital resources (thus have useful lives greater than one year). Usually include resources such as equipment, vehicles, buildings and one-off training programmes with useful life of more than one year. Equated with start-up
costs because they are paid for at the beginning of a programme, but defined according to their useful life

- **Direct cost**: Those resources used in the design, implementation, receipt and continuation of a health care intervention, thus cost of providing or accessing health services (incurred by either provider or patient/client)
- **Discounting**: A method for adjusting the value of costs and health outcomes over a period of time
- **Financial (budgetary) cost**: The accounting cost of a good or service, usually represent the actual money spent on resources
- **Indirect cost**: The value of the resources used by patients and their carers to enable individuals to receive an intervention (e.g. the time the patient take up in going to the hospital, rather than working, or that of a family member in taking the patient to the hospital). Commonly measured using wages and earnings lost
- **Intangible cost**: Costs of factors such as pain, anxiety, discomfort or inconvenience. Intangible costs can be factors that affect the patients’ and society’s decision regarding treatment options
- **Overhead cost**: Any cost that is incurred, not by providing direct patient care, but which is necessary to support the organization overall
- **Recurrent cost**: The value of resources that have to be purchased at least once a year (thus: irregular but frequent e.g., yearly, monthly, weekly, daily), with useful lives of less than one year
- **Total (economic) cost**: The sum of all the costs of an intervention/health problem
- **Fixed cost**: The cost of production does not vary with the level of output
- **Variable cost**: The cost of production varies directly with the level of output
**QUESTIONS:**

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<tr>
<td>18.</td>
<td>Calculating the annual costs of a family planning clinic includes the following resources: equipment, buildings, vehicles and the initial training (nurses and midwives)</td>
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<td>19.</td>
<td>A R50 000 ECG (electrocardiograph) machine which has a useful life of 10 years has an annualised cost of R5 000 per year</td>
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<td>20.</td>
<td>Capital cost may be explained using the following example: 250 clients attended to daily in a wellness clinic, is more efficient than attending 50 clients daily</td>
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<td>21.</td>
<td>The example of a ventilator to the value of R65 000 that will be useful for longer than one year may be used to determine average cost</td>
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<td>22.</td>
<td>Direct cost may be established by including the cost of resources such as providing health education, laboratory equipment, salaries, soap for hand washing and training of staff</td>
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<td>23.</td>
<td>Discounting may be illustrated with the following example: a person may currently be willing to pay R50 because of a current health need, but may be reluctant to pay the same R50 pro-actively to get the benefit in 10 years' time</td>
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<td>24.</td>
<td>Intangible cost is used in programme planning and budgeting, and include the price paid for personnel, supplies, maintenance and electricity, thus the actual money spent on resources</td>
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<td>25.</td>
<td>The time the patient take up in going to the hospital, rather than working is an example of indirect cost</td>
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<td>26.</td>
<td>Financial (budgetary) cost includes the costs of factors such as discomfort due to side effects of medication</td>
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<td>27.</td>
<td>Recurrent cost includes that of personnel functions</td>
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<td>28.</td>
<td>Overhead cost includes the value of resources that have to be purchased only when necessary but at least once a year</td>
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<td>29.</td>
<td>Total economic costs reflects the sum of all the costs of a health intervention which will influence the best outcome</td>
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<td>30.</td>
<td>The fee that needs to be paid monthly for the rental of a telephone line per nursing unit or department/office in the</td>
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Institution is an example of fixed cost

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<tr>
<td>31.</td>
<td>Variable cost may be established by the amount used which will dictate the amount payable for variable cost items, such as the average number of clients seen in the casualty department on a monthly basis</td>
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**SECTION D: COMMENTS**

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<tr>
<th>No.</th>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Comment</th>
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<td>32.</td>
<td>In your opinion, is knowledge of health economics necessary in nursing practice?</td>
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<td>If yes, which categories of nurses should have this knowledge?</td>
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<td>33.</td>
<td>Where you involved in cost related activities during your nursing training?</td>
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<td>If yes, which activities (e.g. budget planning with Professional nurse)?</td>
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<td>34.</td>
<td>Would you be interested to engage in a short course in health economics?</td>
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<td>If yes, what information do you want (e.g. theory, application, active involvement)?</td>
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<td>35.</td>
<td>In your opinion, should service focus on:</td>
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<td>(May indicate both options for question 35.)</td>
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<td>35.1 cost-effectiveness</td>
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<td>35.2 quality service</td>
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<td>36.</td>
<td>If the institution management asks you to discuss your nursing units'</td>
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<td>budget/costing, will your knowledge allow you to:</td>
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<td>36.1</td>
<td>attend to the matter personally</td>
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<td>36.2</td>
<td>ask for help because you don't have enough knowledge thereof</td>
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<td>36.3</td>
<td>refer the matter, because you do not have any knowledge thereof</td>
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</table>

You have now completed the questionnaire.
Thank you for your participation.
To whom it may concern:

I certify that I am a professional, experienced and accredited editor and that I have edited the Master’s dissertation in Health Studies entitled “Knowledge of student nurses of cost concepts in health economics”, by Yolande Möller.

I have edited the dissertation for clarity and correctness of language and expression. I have also checked the references to the best of my ability.

The dissertation left my hands on 24 February 2017.

Marion J Marchand
BA, H Dipl Lib, HED,
Postgraduate Certificate in Editing UP; Accredited Translator (Afrikaans to English) and English Editor, South African Translators' Institute, Member of the Professional Editors’ Guild; Member of the English Academy
ANNEXURE I
Statistician's letter

22 February 2017

RE "Exploring the knowledge of nursing students regarding the cost concepts of the dynamics of health economics"

To whom it may concern

This serves to confirm that HJ Gerber were involved in the empirical research efforts of Yolande Moller for her Masters study at the University of South Africa.

HJ Gerber can vouch for the accuracy of the statistical evaluation undertaken for the empirical chapter of the student's dissertation.

Although every effort was made to ensure that the student presented the statistical results correctly, HJ Gerber cannot accept responsibility for the structure and presentation of the results of this study.

Kind Regards
Hennie Gerber
Health Economics

Introduction to understanding Health Economics

Structuring of the content

- What is health economics?
- Introduction to the literature of health economics
- Economic evaluation
- Counting the costs
- Key concepts of counting the costs
- The future role of health economics in health care
- Nursing curricula and CPD workshops
- Conclusion
- References
What is health economics?

- Macroeconomics – the functioning of the economy as a whole
- Plays a role in the health of a country
- Relates to factors such as improved nutrition, sanitation, water and education in households
- Macro-economy influences risk factors for disease such as:
  - employment
  - nutrition
  - environmental conditions
  - education

What is health economics? (cont)

- Social factors influence communicable diseases:
  - example: increased international movement of people affects the movement of diseases such as SARS
- Social factors influence non-communicable diseases:
  - example: increased consumption of goods that may be harmful to health, such as the use of alcohol and ‘fast foods’
- Macro-economy impacts on the health sector itself – rising cost of health care
What is health economics? (cont)

- The exchange rate influences the cost of health care – most countries import products to provide health care (such as pharmaceuticals, surgical tools and consumer items e.g. light bulbs)
- Resources are limited – this scarcity affects individuals, organisations and governments
- The lives of people are influenced by the health care available to them – scarce resources are more emotive in health service
- Health care is of great importance, therefore demand is high

What is health economics? (cont)

- Efficiency → maximising benefits with the available resources, while minimising costs
- Efficiency improved by:
  - increasing staff productivity
  - reducing length of stay
  - fully utilising equipment and maintaining it regularly
  - properly managing drug ordering and storage
  - avoiding wastage and pilfering
- Implementation requires staff to be aware of the financial constraints of the health care institution
What is health economics? (cont)

- Equity concerned with the fairness in which resources are distributed - health and health care
- Equity described as being frequently incompatible with efficiency
- Governments aim to promote equity, thus play a role in the provision, financing and regulation of health services
- Health economics - optimisation of health as it relates to other activities
- Using resources to improve health status and service delivery within the limited resources that are available

What is health economics? (cont)

- Demand for health services exceeds supply, owing to factors such as:
  - ageing populations
  - new health technologies
  - people's increased expectations
- Health economics should help decision makers in health care to make choices that maximise the health benefits to the population
**Introduction to the literature of health economics**

- Increase in the development of interest in the subject of health economics
- Increase of research projects in health services featuring economic analysis
- Significant increase in literature related to health economics
- Specialised journals in health economics:
  - the *Journal of Health Economics* and
  - the *European Journal of Health Economics*
- Health economics textbooks and literature

**Economic evaluation**

- Done in order to compare two or more different options or programmes suggested by health care officials
- Used to compare the costs of the alternatives related to their consequences or expected outcomes
- Cost-benefit analysis - performed where the monetary value of resources consumed by a health intervention (costs) are compared with the monetary value of the outcomes (benefits) achieved by the intervention
- Cost-effectiveness analyses - used in the health sector to compare the value of the resources spent on an intervention with the quantity of health gained as a result
Economic evaluation (cont)

- Illness is expensive – financially and in terms of pain, fear, discomfort
- Illness impacts on the individual, family and/or friends
- Cost of illness analysis – measures the overall economic consequences of an illness/disease; includes treatment costs and the cost of lost production
- Evidence-based medicine – generic term for the process in which health care interventions are implemented based on evidence that suggests they are effective
- Evidence-based medicine focus on the efficiency and effectiveness of health care interventions

Economic evaluation (cont)

- Goal of a health care intervention – to reduce the impact of a health problem
- Impact of health problems can be measured by the:
  - number of cases
  - number of deaths
  - amount of disability, suffering or pain
  - number of people with a risk factor
  - amount of money spent on a health problem
  - amount of lost income due to a health problem
Economic evaluation (cont)

- Resources (inputs) required to implement an intervention must be known to determine the cost of the intervention.
- Costs calculated according to the resources needed for an intervention to impact on health problems:
  - personnel
  - buildings and space
  - equipment
  - supplies and pharmaceuticals
  - transportation
  - training
  - social mobilisation and publicity (including information, education and communication)

Economic evaluation (cont)

- Effective care minimises the overuse, underuse, or misuse of care interventions.
- Nursing care interventions should be provided in a timely manner → minimise delays and wait times
Activity: Economic evaluation

- Identify the costs and benefits of routine voluntary testing for HIV-antibodies

Feedback: Economic evaluation

- Costs
  - include cost of test (laboratory) and material used, time of health care worker to conduct test and counsel patients before conducting the test and after result (specifically when positive)
- Benefits (outcomes)
  - health care worker: can take more precautions than usual to reduce the risk of infection in the case of a patient with HIV-positive status, thus potentially lives could be saved;
  - patients: could benefit from prophylactic treatment which might increase their lifespan, could practise safer sex and thus reduce the risk of their partner being infected
Counting the costs

- Cost of an intervention – important whenever a decision has to be made about the implementation of one (health care) intervention, rather than another

- Identify costs by establishing certain information:
  - Who will be providing care (e.g. nurses or health workers)?
  - What different activities are involved in the intervention (e.g. training, drug distribution)?
  - Who will ‘receive’ the intervention (e.g. different age groups)?
  - Where will each part of the intervention be delivered (e.g. inpatient or outpatient care)?
  - How long will the intervention run (e.g. weight-loss programme for six months)?
  - How often will individuals be seen (e.g. monthly check-ups)?

Key concepts of counting the costs

- Annual cost: The cost of an intervention – include capital and recurrent costs – calculated on a yearly basis

- Annualised costs: Annual share of initial cost of capital equipment or investments, spread over the life of the project – taking depreciation into account

- Average cost: Total cost divided by quantity

- Capital cost: Value of capital resources with useful lives greater than one year – such as equipment, vehicles, buildings and one-off training programmes – equated with start-up costs as they are paid for at the beginning of a programme, but defined according to their useful life
Key concepts of counting the costs (cont)

- **Direct cost**: Resources used in the design, implementation, receipt and continuation of a health care intervention – cost of providing or accessing health services
- **Discount rate**: Rate at which future costs and outcomes are discounted to account for time preference
- **Discounting**: Method of adjusting the value of costs and outcomes which occur at different time periods into a common time period (usually the present) – converting a value in the future (e.g. health outcomes or costs) to today's equivalent or present value (using discount rate)
- **Financial (budgetary) cost**: Accounting cost of a good or service – usually represent the actual money spent on resources

Key concepts of counting the costs (cont)

- **Economic/opportunity cost**: The level of benefit received in the next-best alternative option to the health intervention – such as prevention versus treatment – used in economic evaluation of alternatives in health care service delivery
- **Indirect cost**: Value of resources used by patients and their carers to enable individuals to receive an intervention – commonly measured using wages and earnings lost
- **Intangible cost**: Costs of factors such as pain, anxiety, discomfort, or inconvenience – affect the patient's and society's decision regarding treatment options
Key concepts of counting the costs (cont)

- Overhead cost: Any cost that is incurred to support the organisation overall, such as personnel functions – not in the provision of direct patient care
- Recurrent cost: Value of resources that have to be purchased at least once a year (e.g., yearly, monthly, weekly, daily)
- Time preference: People's preference for consumption of resources, now rather than later – present consumption is valued more than the same consumption in the future
- Total (economic) cost: Sum of all the costs of an intervention
- Fixed cost: Cost of production does not vary with level of output
- Variable cost: Cost of production varies directly with the level of output

Activity: Key concepts of counting the costs

- Indicate whether the following statements regarding cost concepts are true or false:
  a. Calculating the annual costs of a family planning clinic includes the following resources: equipment, buildings, vehicles and the initial training (nurses and midwives)
  b. A R100 000 X-ray machine which has a useful life of 10 years has an annualised cost of R10 000 per year
  c. Direct costs related to resources includes the costs of providing health education, laboratory equipment, salaries, soap for hand washing and training of staff
  d. Financial (budgetary) costs are used in programme planning and budgeting, and includes the price paid for personnel, supplies, maintenance and electricity
Activity: Key concepts of counting the costs (cont)

- Indirect costs include that of wages lost by a patient for time spent at a health care institution, instead of the workplace.
- Marginal cost can be used to calculate how much would be saved by contracting a service, thus outsourcing.
- Overhead cost includes any cost that is incurred, not by the provision of direct patient care, but which is necessary to support the organisation overall, such as personnel functions.
- The fee that needs to be paid monthly for the rental of a telephone line is fixed (the amount payable whether any calls were made or not), is an example of fixed cost.

Feedback: Key concepts of counting the costs

- a – h: True
- See text reference (Guinness & Wiseman 2011:202-211)
The future role of health economics in health care

- Nurses play an important role in the health care system
- Economic crisis experienced at the bedside of the patient
- No reports document the effects that cost-containment measures have on the daily practice of nursing activities
- All nurses should have an understanding of health economics – economic accountability in professional practice
- Financial risks should be understood – nurses to respond with accountability – seek sustainable nursing performance and growth

Future role of health economics (cont)

- Nurses contribute to improving quality of patient care
- Improved patient outcomes and greater costs savings – achieve efficiency, improved patient satisfaction and better clinical outcomes
- Challenges of economic accountability met through evidence-based practice and control of the cost of care
- Costs of quality nursing care can generate potential savings through the avoidance of so-called “never” events (e.g. medication errors)
Nursing education and training in SA

- Foundational enhancement in health care education required to ensure progress toward superior health care quality
- The gap between what is taught to student (nurses) and how graduates practice should be bridged
- Strengthen quality and safety knowledge in undergraduate nursing programmes curricula
- Reform nursing education curricula to equip professionals with the right knowledge and skills

Nursing education and training in SA (cont)

- Increase nurses' understanding of the economic implications of clinical and administrative practice through education programmes
- Align nurses closely with delivery of the organisation's economic performance
- Nursing education and training in South Africa – Curriculum development by nurse educators:
  - Training regulations and qualification frameworks for new programmes
Nursing education and training in SA (cont)

- For information specific to the education and training of professional nurses and midwives in South Africa, refer to the following:

[Continued overleaf]
Activity: Nursing education and training in SA

- Access the website of the SANC and answer the following:
  a) Identify the new programme regulation for the education and training of professional nurses and midwives in South Africa
  b) Identify the exit level outcome relevant to the associated assessment criteria "3.3 Systems established (to) promote cost effective and efficient service delivery within a health care unit" as stated in the Bachelor of Nursing and Midwifery Qualification Framework (New Nursing Qualifications)

Feedback: Nursing education and training in SA

a) The SANC Regulation R174 (new programme) Regulations relating to the approval of and the minimum requirements for the education and training of a learner leading to the registration in the categories professional nurse and midwife, (SANC 2013).
b) The exit level outcome "3. Manage a health care unit and health facility based on the understanding of the roles and relationships within the multidisciplinary team" (SANC [Se]:6) (should be read together with Regulation R174).
CPD workshops

- A Continuous Professional Development (CPD) system for nurses in South Africa has been initiated by the SANC.
- The CPD system is summarised as comprising 15 points collected annually – subjects or content areas include that of leadership and management.
- All nurses should submit an annual declaration to the SANC – the SANC will conduct an audit on a sample of nurses to investigate whether they did attend all the declared activities.
- Nurse leaders should identify knowledge gaps (such as health economics) that could be addressed in CPD (and in-service training) – to successfully implement CPD.

Conclusion

- Efficient allocation of resources are called for in the health care arena.
- Economic evaluation is necessary to allocate scarce resources between alternative health care interventions.
- Health economics are used in health care evaluation.
- Health economics are used in itself as a resource by health care decision makers to benefit patient care.
- Nurse leaders and educators should engage in the development of CPD workshops and curricula specifically related the content of health economics.
Conclusion (cont)

- Economic concepts of health care training necessary for professional nurses – ensure continuous development for cost-effective and efficient service delivery.

- CPD workshops for professional nurses who have completed basic nursing education and training without an economic or financial subject component.

- Nurse educators should receive training to expand their own knowledge on the subject content of health economics – requirement in order to participate in curriculum development of nursing programmes for the inclusion of health economics content.

Conclusion (cont)

- Presentation developed by the researcher serve as guideline for introductory content regarding health economics that may be included in a module (e.g. unit management) of the curriculum for the education and training of professional nurses and midwives – may be further developed to include more advanced information.

- The presentation may be used as an introductory CPD or in-service training workshop regarding health economics for all nurses and nurse educators.
References


References (cont)


References (cont)


ANNEXURE K

Summary of the descriptive statistics for Sections B and C

Table K.1  Summary statistics: Economic evaluation of the efficient allocation of resources (all concepts assessed under Section B combined – statistics)

|                          | Value  
|--------------------------|--------
| Mean                     | 72.681954 
| Standard Deviation       | 16.156182 
| Standard Error Mean      | 2.1033557 
| Upper 95% Mean           | 76.892278 
| Lower 95% Mean           | 68.47163 
| N                        | 59 
| Skewness                 | -1.218698 
| Kurtosis                 | 1.242136 |

Table K.2  Summary statistics: Cost-benefit analysis

|                          | Value  
|--------------------------|--------
| Mean                     | 66.949153 
| Standard Deviation       | 36.683842 
| Standard Error Mean      | 4.7758294 
| Upper 95% Mean           | 76.509014 
| Lower 95% Mean           | 57.389291 
| N                        | 59 
| Skewness                 | -0.634804 
| Kurtosis                 | -0.868846 |

Table K.3  Summary statistics: Cost-effectiveness analysis

|                          | Value  
|--------------------------|--------
| Mean                     | 30.508475 
| Standard Deviation       | 20.796529 
| Standard Error Mean      | 2.7074775 
| Upper 95% Mean           | 35.92808 
| Lower 95% Mean           | 25.00887 
| N                        | 59 
| Skewness                 | 0.0569997 
| Kurtosis                 | -0.348999 |
Table K.4  Summary statistics: Evidence-based medicine

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Table K.5  Summary statistics: Economic evaluation

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Table K.6  Summary statistics: Resources

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Table K.7  Summary statistics: Key concepts in health economics for determining the cost of an intervention (all concepts assessed under Section C combined – statistics)

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