

**ASSESSMENT OF KNOWLEDGE AND ATTITUDES TOWARDS HEALTH  
RESEARCH AMONG NURSES WORKING IN PUBLIC HEALTH FACILITIES IN  
BOTSWANA**

by

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submitted in accordance with the requirements for the degree of

**MASTER OF PUBLIC HEALTH**

at the

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**SUPERVISOR: Prof GH van Rensburg**

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## DECLARATION

I declare that **ASSESSMENT OF KNOWLEDGE AND ATTITUDES TOWARDS HEALTH RESEARCH AMONG NURSES WORKING IN PUBLIC HEALTH FACILITIES IN BOTSWANA** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the dissertation to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.



**SIGNATURE**

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03 January 2020

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**ABSTRACT**

Nurses as professionals and front-liners in patient care should possess good knowledge about health research, as this is critical in improving patient outcomes. The purpose of this study was to determine the level of knowledge and attitudes that public health clinic nurses possess regarding health research in Botswana in order to make recommendations to enhance a research culture among nurses. A quantitative study with a cross-sectional study design was used. Twenty-six clinics in Gaborone were sampled and 168 nurses participated in the survey. Data was analysed using Stata version 15.1. Only 51% of the nurses demonstrated satisfactory knowledge of health research. Despite this limited knowledge, nurses had a good attitude towards health research (66%). Degree nurses were more likely to have satisfactory knowledge, as were those who reported research training and experience. Additionally, research training and experience were associated with a good attitude. Recommendations include provision of research training and practicums as part of the nursing education curriculum, as well as in-service training, in order to improve the levels of knowledge of health research among nurses.

**Key concepts**

Attitude; clinician; health research; knowledge; nurse; registered nurse; research culture.

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*I dedicate this dissertation to my husband Bernard Sekoto, my two sons Obakeng and Gape Sekoto, and my one and only daughter Gaositwe Daphney Sekoto for their unwavering and invaluable support as I pursued my studies.*

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**LIST OF ABBREVIATIONS**

CHN	Community Health Nursing
EC	Ethics Committee
ENT	Ear Nose and Throat
FNP	Family Nurse Practitioner
IRB	Institutional Review Board
HRDC	Health Research and Development Committee
MoHW	Ministry of Health and Wellness
NO	Nursing Officer
PRN	Principal Registered Nurse
SDL	Self Directed Learning
SRN	Senior Registered Nurse
UNISA	University of South Africa
WHO	World Health Organization

# CHAPTER 1

## ORIENTATION TO THE STUDY

### 1.1 INTRODUCTION AND ORIENTATION

The nursing profession in the 21<sup>st</sup> century is confronted with complex and challenging societal and professional expectations. Nurses are increasingly expected to understand research as it is necessary for the development of scientific knowledge for any profession (Oluwatosin 2014:139). Nurses account for a significant proportion of the health care workforce in most countries, including Botswana. Nurses are the pillar of the public health care system (Jahan & Maqballi 2016:1-2), and are encouraged to integrate research into clinical and operational processes (Scala, Price & Day 2016:423). Delivery of quality nursing care depends largely on the ability of nursing professionals to update their knowledge through research (Xie, Zhou, Xu, Ong & Govindasamy 2017:6) which may improve their attitudes and become motivated to conduct research of their own.

Health research is important for the prevention, diagnosis and treatment of diseases. Nurses as professionals are expected to demonstrate some level of competence and relevant research knowledge (Leach, Hofmeyer & Bobridge 2016:195; Martin 2017:209). Possessing research knowledge gives the nurse the foundation to appreciate and value health research (Thompson, Thompson & Thompson 2017). Health research facilitates knowledge generation, supports better decision making and most importantly contributes to the development of research knowledge and positive attitudes among nurses (Halabi 2016:118). A research literate or knowledgeable nurse is expected to show critical thinking capacity, analytical skills, ability to read and appraise research and awareness of ethical issues (Hines, Ramsbotham & Coyer 2015:265). It is therefore imperative that nurses have basic knowledge and positive attitudes towards health research. Acquisition of this basic knowledge and improved attitude towards health research can be achieved when nursing colleges and universities provide a strong research foundation (Caldwell, Coltart, Hutchison, McJury, Morrison, Paterson & Thomson 2017:2; Halabi 2016:118; Roets & Lubbe 2016:3;) for nursing students which will provide them with basic research knowledge. This is also alluded to by Furaikh, Omain and Ganapathy (2017:185), in their argument that

prospective nurses will appreciate the concept of research only when they are involved in research activities during their academic studies. Hines et al (2015:266), however, argue that research education that is only provided during nursing training does not necessarily seem to translate into a strong understanding of research after graduation. To bridge this gap of continuity, Caldwell et al (2017:2) highlight the need to promote continuous research training beyond nursing schools, as education and training is key to equipping nurses with research knowledge within their clinical settings. Also, on-the-job training by mentors or the provision of opportunities for nurses for continuing education during their employment can enhance the knowledge that nurses acquire and can improve their attitude towards health research. Nurses should not be scared by health research. Although research training has been introduced into the nursing curriculum, many nurses still find research incomprehensible and irrelevant to their practice (Hendricks & Cope 2016:45). The desire to embrace and learn more about health research will motivate nurses to yearn to learn more for their professional growth and development. Professional development is enhanced by a consistent and ongoing commitment to lifelong learning (Botswana Nurses and Midwives Continuing Professional Development Framework 2014).

Nurses are expected to demonstrate the ability to search, collect, evaluate and critically interpret relevant information about a particular phenomenon (Martin 2017:209). However, despite the expectation for nurses to possess research knowledge, lack of research training and a shortage of research mentors are two of the challenges that limit nurses in understanding research (McMaster, Jammali-Blasi, Andersson-Noorgard, Cooper & McInnes 2013:155). Providing opportunities for research training, observation and engagement in ongoing research can enhance the knowledge of nurses about research (Roll, Stegenga, Hendricks-Ferguson, Barnes, Cherven, Docherty, Robb & Haase 2013:1). Shortage of health research capacity in less economically developed countries has been identified as a concern (Dhodi, Thakkar, Billa, Khobragade, Sinha & Patel 2013:238). This shortage may be influenced by several factors, including limited funding, lack of research knowledge and skills in research training, work load and also attitudes towards health research (Aljadi, Alrowayeh, Alotaibi, Taaqi, Alquraini, Alshatti, 2013:561-562; Paget, Lilischkis, Morrow & Caldwell 2014:86). This limited research knowledge is also alluded to by Chu, Jayaraman, Kyamanywa and Ntakiyiruta (2014:1), who have argued that research capacity in Africa is much less developed than in high-

income countries, because of less qualified researchers and more limited expertise in the preparation of manuscripts for publication.

## **1.2 BACKGROUND TO THE RESEARCH PROBLEM**

Health research is critical in continuously influencing public health and clinical practice as well as improving health care outcomes of patients (Jahan & Maqbali 2016:1). Nurses as professionals must possess basic knowledge about health research. However, in most clinical settings, there is no strong culture of research within public health care facilities where most nurses are employed which may provide nurses with opportunities to acquire knowledge about health research (Lode, Sørensen, Salmela, Holm & Severinsson 2015:674). Lack of research culture may be attributed to the fact that, clinicians working in non-academic and or non-research organisations are not required to conduct research for professional development or promotions (Paget et al 2014:88; Siddiqui 2015:95). Roll et al (2013:1), McKee, Codd, Dempsey, Gallagher and Comiskey (2017:2), as well as Nkrumah, Atuhaire, Priebe and Cumber (2018:2), corroborate the fact that, in as much as research capacity building is seen as a priority for nurses, the emphasis has been mainly on nurses in academia rather than on nurses with a clinical role. The view or perception of nurses in clinical settings identifying direct patient care as their core business (Paget et al 2014:88) deny them opportunities to acquire more knowledge about health research. The lack of access to research training and other factors may influence the knowledge and attitudes that nurses` possess (Mutisya, KagureKarani & Kigonde 2015:101). Jahan and Maqbali (2016:2) and Lode et al (2015:665) point to the need for the linkage of public health care facilities with academic institutions, so that health care workers can be mentored and provided with regular health research training and can acquire research knowledge.

Nurses form an important component in the field of health sciences committed to the provision of optimum medical, clinical and therapeutic services to their patients (Parandavar, Rahmanian & Badiyepymaie Jahromi 2015:82). The commitment to provide quality care by nurses calls for continuous adaptation to the ever-changing environment and endeavours to accept responsibility towards learning (Malekian, Ghiyasvandian, Cheraghi & Hassanzadeh 2015:157). Learning can be in the form of reading research articles to improve the knowledge of nurses on health research. It may also involve participation in the research process if nurses are interested in conducting

their own health research projects or forming partnerships with researchers from academic or other tertiary institutions to build the research knowledge base and improved attitudes (Paget et al 2014:86).

The literature reports varying levels of knowledge of and attitudes towards health research among other health disciplines, which may be applicable to nurses. An observational study on awareness about medical research by Gupta, Malhotra and Malhotra (2018:862) among postgraduate medical students revealed a good knowledge of and positive attitudes towards medical research. Similar findings are reported by Aljadi et al (2013:565) who reported positive attitudes towards research in a study among physical therapists in Kuwait. In contrast, a study by Giri, Bangal and Phalke (2014:22) among postgraduate medical students in India showed that participants had inadequate knowledge of health research; for instance, only 18.9% could correctly define what a research hypothesis was. They did show, however, positive attitudes towards health research.

A research utilisation study among nurses at a teaching hospital in Kenya by Mutisya et al (2015:102) found that while nurses expressed great interest in accessing opportunities to take part in research, they also reported inconsistent knowledge as a barrier to utilising research. Another study by Black, Balneaves and Garossino (2016:14) among point-of-care clinicians in a Canadian urban health organisation, half (52%) of which were nurses, reported a statistically significant improvement in research knowledge following participation in research workshops. The aim of the study was to evaluate a research training intervention for clinicians and the mean knowledge score increased significantly between the baseline and subsequent surveys.

On the other hand, Adeleke, Adekanye, Jibril, Danmallam, Inyinbor and Omokanye (2014:105) found that health workers, including nurses, in Nigeria had a negative disposition towards research due to a perception that they are primarily service providers, not researchers. A study conducted by Evans, Duggan and Boldy (2014:229) also found the same results, where some nurses felt research was not part of their work and should be done by people not providing direct patient care. This belief by nurses that they are not researchers may impact on their zeal to acquire knowledge about health research, as well as influence their attitudes towards it.

As an integral part of any health research in public health facilities, nurses serve as sources of information for communities they live and/or work in, serve as patients' advocates and provide health education to patients under their care. Nurses are important partners in decisions made by patients as to whether they take part in research or not (Browning, Page, Kuhn, DiLiberto, Deschenes, Taillie, Tomanio, Holubkov, Dean, Moler, Meert & Pemberton 2016:121). To provide this important role of patient advocate, nurses need to be knowledgeable about health research in terms of different types of research, various health research designs, and regulatory and ethical aspects associated with health research. They also need to update themselves continuously on current health research. The advocacy role and trust that patients have in health care providers is confirmed by a study in the United States of America, cited in Massawe, Lusingu and Manongi (2014:2), where parents were willing to allow their children to participate in research if asked by their health care provider. This confirms the need for nurses to be knowledgeable in health research, and to be able to support their patients in making appropriate decisions on matters related to health research.

The current study sought to describe knowledge of and attitudes that nurses in Botswana possess towards health research. The study did not examine nurses' behavioural patterns or practices developed through utilisation of research outcomes or conducting health research themselves as a result of the knowledge they possessed or attitudes reported, as this would be beyond the scope of the current study. The motivation for this study arose from the researcher's experience and observations as part of clinical research exposure and interactions with nurses in public health facilities in Gaborone, Botswana. It is during these interactions that the researcher observed some degree of limited knowledge and reservations among nurses towards health research.

### **1.3 STATEMENT OF THE RESEARCH PROBLEM**

There is a need to build research knowledge, as well as positive attitudes towards research, among nurses to allow them to move with dynamism within the nursing field (Van Rensburg, Armstrong & Geyer 2018:5). The building of research knowledge could be achieved by the deliberate provision of a strong foundation of research knowledge among nurses while at nursing college (Roets & Lubbe 2016:4). It could also be attained by the exposure of nursing students to a more intense and realistic research

experience (Slattery, Logan, Mudge, Secore, Reyn & Maue 2016:413), for example, through assigning students to research projects, or engaging students as interns to work on research projects and providing opportunities to receive research training.

A study by Yanagawa, Takai, Yoshimaru, Miyamoto, Katashima and Kida (2014:1) that examines the awareness of clinical research by nurses in a Japanese University Hospital has suggested limited knowledge of clinical research among nurses. Another study of attitudes by Browning et al (2016) among nurses reported positive perceptions of nurses towards clinical research, especially if nurses had previous experience of caring for a research participant. Berthelsen and Hølge-Hazelton (2015:82) conducted a study among orthopaedic nurses in a Danish regional hospital, the results of which revealed that nurses had low theoretical research knowledge. They were, however, interested in improving their research knowledge. Additionally, those nurses with a good knowledge of health research had a better attitude towards the practice of health research. This underscores the importance of a good knowledge level among nurses regarding health research.

Studies assessing the knowledge of nurses and their attitudes towards health research have been conducted in African countries such as Nigeria, Ghana and Kenya, as well as in Asia (China, Japan, and India), Europe, Canada and Australia. During the literature search conducted by the author, however, no literature or articles were found on knowledge of and attitudes towards health research among nurses in Botswana.

The researcher, who is a nurse by profession and currently works in a predominantly clinical research environment and who has gained vast experience and passion for health research, has noted through informal interactions that nurses outside the clinical research fraternity may have limited knowledge or negative attitudes towards health research. This could be due to lack of exposure and opportunities that provide for health research training. Therefore, the following question arose: What is the knowledge and attitudes of nurses towards health research?

#### **1.4 PURPOSE AND OBJECTIVES OF THE STUDY**

In order to guide the study, a purpose statement and objectives are provided. The objectives will also guide the concluding statements provided in Chapter 5.

### **1.4.1 Research purpose**

The purpose of this study was to determine the level of knowledge and attitudes that public health clinic nurses possess regarding health research in Botswana in order to make recommendations to enhance a research culture among nurses.

### **1.4.2 Research objectives**

The objectives of this study are to

- determine the level of knowledge regarding health research among nurses in Botswana
- assess the attitudes towards health research among nurses in Botswana
- identify factors that may influence knowledge and attitudes of nurses towards health research

## **1.5 SIGNIFICANCE OF THE STUDY**

Nurses are expected to possess a certain level of research knowledge and portray a positive attitude towards health research as the foundation of their professionalism.

Information obtained from this descriptive study will serve as a baseline for further research and development of interventions that may benefit nurses in Botswana. The baseline results will identify any gaps in knowledge and attitudes as well as the factors associated with good knowledge and good attitudes. Understanding the identified gaps and factors influencing good knowledge and attitudes will enable the design of interventions to improve the knowledge and attitudes of nurses towards health research in Botswana.

The other contribution this study could make to the nursing profession in Botswana is to sensitise and motivate nurses taking part in this study, and inspire them to reach out and look out for opportunities that may enhance their knowledge and improve their attitudes towards health research.

## **1.6 DEFINITION OF KEY TERMS**

### **1.6.1 Attitudes**

Attitudes are evaluations of various aspects of the social world, or the extent to which we have favourable or unfavourable reactions to issues, ideas, persons, social groups and objects (Baron & Branscombe 2014:140). It is also defined as a feeling or opinion about something or someone (*Cambridge Advanced Learner's Dictionary* 2013, sv "attitude"). In this study, attitudes were measured with items that elicited nurses' level of agreement with any of the given statements in the health research attitude scale as an indication of a favour or disfavour of the statement.

### **1.6.2 Clinician**

A clinician refers to someone specialised, such as a doctor or nurse, who has qualifications in an area of very skilled health work (*Cambridge Advanced Learner's Dictionary* 2013, sv "clinician"). In this study, clinician refers to a registered nurse.

### **1.6.3 Health research**

The term *health research*, sometimes also called *medical research* or *clinical research*, refers to research that is done to learn more about human health. Health research aims to find better ways to prevent and treat disease (A Countway Library of Medicine [s.a.]).

Health research is also defined in the South African National Health Act 61 of 2003 (NHA), cited in the South African Ethics in Health Research: Principles, Processes and Structures (2015:8), as "research that contributes to knowledge of biological, clinical, psychological, or social welfare matters including processes as regards humans". In this study, health research refers to medical, clinical or nursing research.

### **1.6.4 Health worker**

Health workers are people whose job it is to protect and improve the health of their communities (World Health Organization 2006:1). In this study, health worker refers to

any person who provides health care services to patients in a public health facility, including a registered nurse.

### **1.6.5 Knowledge**

Knowledge is the acquisition, retention and use of information or skills (Badran 1995, cited in Rav-Marathe, Wan & Marathe 2016:4). Knowledge is acquired both through education and experience (Rav-Marathe et al 2016:4). For the purposes of this study, knowledge refers to the amount of information that nurses possess regarding health research and is assessed by demonstration of what health research is, what health research is intended for, the different types of health research and ethics related to health research.

### **1.6.6 Registered nurse**

A registered nurse refers to a nurse who has completed the general nursing programme as described by the Nursing and Midwifery Council of Botswana and who is registered in a register for general nurses.

A nurse is a person who cares for the sick or infirm, or specifically a licensed health care professional who practises independently and who is skilled in promoting and maintaining health (*Merriam-Webster Online Dictionary* [s.a.]). In the case of Botswana, a nurse is also defined as a person who has completed a programme of basic, generalised nursing education and passed such examination in the practice of nursing as may be determined by the Nursing and Midwifery Council of Botswana (Nurses and Midwives Act No. 1, 1995) (Botswana Statute Law 1995). In this study, a nurse refers to a registered general nurse.

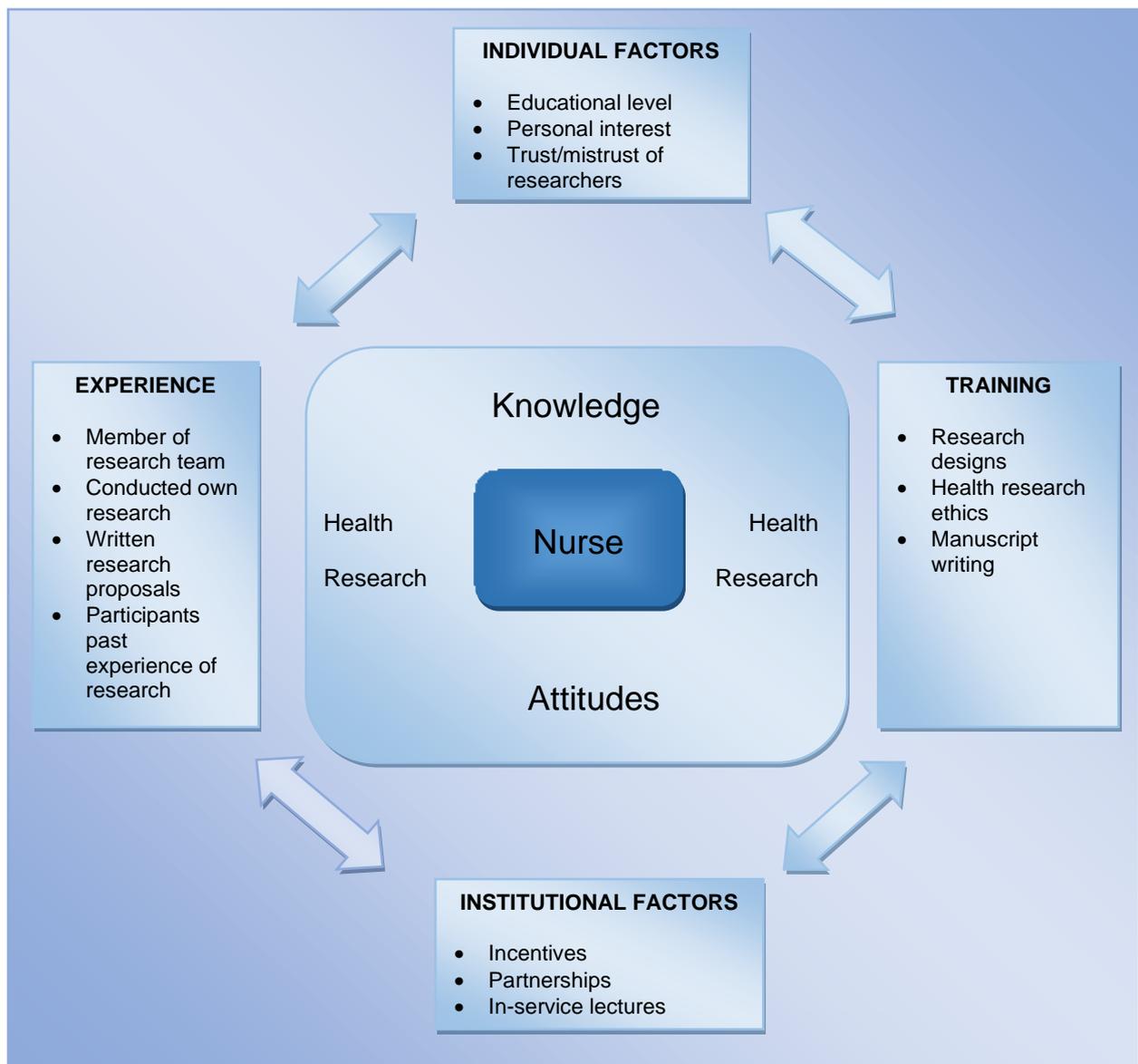
### **1.6.7 Research culture**

Research culture refers to provision or establishment of an environment that allows for research productivity, positive relationships and effective research processes and training (Wilkes 2015:1). In this study, a research culture refers to nurses' knowledge and attitudes towards research productivity, positive relationships with research-related activities, the research process and education and training in research.

## **1.7 CONCEPTUAL FRAMEWORK**

The researcher developed the conceptual framework from the literature review. The purpose of the framework was to guide and focus the study on a particular phenomenon and to be able to address the study objectives. The researcher used the conceptual framework to guide the development of the data collection instrument (questionnaire).

The constructs of the conceptual framework depict how knowledge and attitudes of nurses towards health research are related to different factors. The factors may interact with each other to influence the health research knowledge nurses possess and the associated attitudes. The factors include individual factors, the research experience that nurses possess, training in health research, and institutional factors as depicted in Figure 1.1 below.



**Figure 1.1 Factors influencing nurses' knowledge and attitudes towards health research**

## 1.8 OVERVIEW OF RESEARCH DESIGN AND METHOD

In this section, an overview of the research methodology is provided. The detailed discussion will be in Chapter 3.

### 1.8.1 Research design

A quantitative non-experimental, descriptive, cross-sectional design was used for this study as the major outcomes of the study are knowledge and attitudes, which are categorical variables. Cross-sectional study design involves collection of data at a single time point and is appropriate for describing the status of phenomena at that time.

### 1.8.2 Study setting

The study was done in public health facilities (clinics only) in Gaborone, the capital city of Botswana. Gaborone is situated in the southeastern part of Botswana. It has a population of approximately 200 000 inhabitants (census 2011) and has one public referral hospital, two private hospitals and thirty public health clinics providing integrated health services.



**Figure 1.2 Map of Botswana showing study setting: Gaborone**  
(Source: Botswana Map [s.a.]

### **1.8.3 Study population**

The population for the study was registered nurses with a minimum qualification of general nursing. There were a total of four-hundred and nineteen registered nurses who were working in the thirty public health clinics in Gaborone, Botswana. One-hundred and sixty-eight took part in the study.

### **1.8.4 Sample size and sampling**

A multi-staged sampling that included both probability and non-probability sampling was utilised. The first stage included selecting a random sample of clinics and the second stage included the random selection of nurses from the selected clinics. A sampling frame listing all the thirty clinics and number of nurses in each clinic was developed. A minimum sample size of 197 was calculated. More detail about sampling methods and sample size calculation is described in Chapter 3.

### **1.8.5 Data collection**

Research data was collected using a structured self-administered anonymous questionnaire where respondents completed the instrument themselves after reading and understanding the instructions provided on how to complete the questionnaire. The questionnaire was in a paper format. The questionnaire consisted of a set of multiple choice close-ended questions as well as scaled questions to assess the attitudes of nurses (Annexure 7).

### **1.8.6 Data analysis**

With the assistance of a statistician and two experts in bio-statistics from inception of the study to the end, data was analysed using Stata version 15.1 (Statacorp, college station, TX, USA). A clean database was used to generate the necessary tables and figures in accordance with a pre-approved and designed analysis plan. The data analysis focused on knowledge of, and attitude towards health research as major outcomes including the factors influencing knowledge of and attitudes. For both outcome measures, proportions with 95% confidence intervals were determined. Cross

tabulations including associations with knowledge and attitude were also determined. Descriptive and inferential statistics were computed from this study.

### **1.8.7 Validity and reliability**

Validity refers to the extent to which something measures what it is supposed to measure (Curtis & Drennan 2013:351). This means the resulting outcome of the measure validly reflects the construct being studied, not something else (Polit & Beck 2017:309). Polit and Beck (2017:309) emphasise the fact that validity is difficult to evaluate, but it is an evidence-building enterprise. Hence, it is very important to have a valid data collection instrument to increase the amount of evidence for the construct under study. In this study, validity was achieved through discussions and input from experts experienced in research. The supervisor also reviewed and provided guidance in the development of the data collection instrument. A statistician reviewed and evaluated whether or not the items in the data collection instrument were relevant and appropriate in terms of the constructs under study.

Reliability on the other hand refers to the extent to which something gives the same measurement each time it is used. This means how free from error the measure is (Curtis & Drennan 2013:351). Polit and Beck (2017:303) define reliability as consistency or absence of variation in measuring an attribute for an individual or consistency or repeatability of an instrument (Creswell & Creswell 2018:154) or the extent to which a questionnaire, test, observation or any measurement procedure produces the same results on repeated trials (Bolarinwa 2015:198). In this study, reliability was achieved by pre-testing the instrument among nineteen nurses and appropriate revisions made.

### **1.8.8 Ethical considerations**

The researcher obtained permission to conduct the study from the appropriate regulatory authorities and satisfied the basic ethical principles as will be fully described in Chapter 3. Approval to conduct the study was obtained from the Research Ethics Committee of the Department of Health Studies at UNISA (Annexure 1) and the Health Research and Development Committee (HRDC) of the Ministry of Health and Wellness Botswana (Annexures 2a and 2b). Permission was obtained from the district health

management and the clinic managers (Annexures 3 and 4) to approach nurses working in their health facilities to participate in the study.

#### **1.8.8.1 *Autonomy or respect to persons***

The study respondents were afforded the respect that they deserve. The study purpose and objectives were fully described to them to make an independent informed decision (Annexure 6). A structured anonymous self-administered questionnaire (Annexure 7) was given to those who were interested to participate in the study. It was emphasised that participation was voluntary. Written consent was obtained for those interested in taking part (Annexure 5). Respondents were also informed that they would not receive any payment for taking part in the study.

#### **1.8.8.2 *Justice***

Participant selection was based on the sampling requirement employed and objectives of the study. Respondents who volunteered to take part in the study were treated with respect even when they decided not to complete the questionnaire. Respondents were assured that the questionnaire was anonymous and would not be linked to any particular participant. The researcher assured all respondents that all completed questionnaires would be safely and confidentially stored, and that raw data would be kept in accordance with the policies and procedures of the institution and ethics committees overseeing the study.

#### **1.8.8.3 *Beneficence***

Respondents were informed they might not directly benefit by taking part in the study, but that information obtained from the study may help determine future directions regarding the knowledge and attitudes of nurses towards health research in Botswana and possible interventions to address the study outcomes.

#### **1.8.8.4 *Non-maleficence***

The study was minimal risk and respondents did not incur any costs of participating in the study, as the questionnaires were delivered directly to them at their respective

clinics. Respondents were recruited within their respective clinical areas of work. There were no anticipated negative effects for the participants as the study was non-experimental. However, respondents could feel uncomfortable while responding to the questionnaire and the researcher was available to respond, address any questions or concerns, and alleviate any possible anxiety.

## **1.9 SCOPE AND LIMITATION OF THE STUDY**

The study focussed on assessing and describing the knowledge of and attitudes of nurses towards health research in Gaborone, Botswana. As with all research, this study had limitations. The study was conducted in one district of Gaborone. It is not possible to generalise the findings of the study to the entire country of Botswana, as the findings might only be applicable to the nurses working in Gaborone Health District where the study was conducted.

## **1.10 STRUCTURE OF THE DISSERTATION**

The dissertation consists of five chapters, each with a specific focus. Chapter 1 provides the introduction and background of the study, significance, study purpose and objectives. It also provides a brief overview of the research methodology together with a brief literature review. Chapter 2 provides a detailed literature review on health research knowledge and attitude towards research among nurses. Chapter 3 explains the methodological aspects of the study, including the study design, data collection and the data collection instrument and the validity and reliability of the tool thereof. Chapter 4 presents the study results, encompassing the analysis and description of the research findings. Chapter 5 provides the interpretation of study results, conclusions, limitations and recommendations by the researcher.

## **1.11 SUMMARY**

Knowledge and attitudes towards health research are important among nurses. Possessing adequate knowledge and positive attitudes can motivate nurses to seek opportunities that may enable them to receive health research education and training.

This chapter described the introduction and background of the research, and presented the research problem, purpose of the study and its objectives and the significance of the study. It also provided a brief conceptual framework, definition of key concepts, as well as an overview of the research methodology and the layout of the dissertation.

Chapter 2 discusses the literature review conducted for the study.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 INTRODUCTION

This chapter presents a critical review of international, regional and local literature related to the knowledge of, and attitudes towards, health research among nurses. The focus of the study is to determine the level of knowledge nurses possess regarding health research and explore the attitudes they have towards health research. A comprehensive literature review was conducted in order to inform and address the study purpose and objectives, to clarify concepts and to provide an overview of the available evidence to demonstrate the need for further research.

Ehrlich and Joubert (2017:69) describe literature review as the process of taking stock of the existing knowledge that helps the researcher to make informed decisions about his or her research. It is also a process of locating, obtaining, reading and evaluating the available information about the area the researcher is interested in (Bordens & Abbott 2016:66). A literature review also serves as the critical summary of the research on the topic of interest and it helps the researcher to put the problem under investigation into context (Polit & Beck 2017:733).

Literature review often helps the researcher to see how others have approached a similar research project, and it serves as the most efficient way to know one's research project (Ruane 2016:70). Literature review helps reveal other questions that remain unanswered. It may also serve as a resource for addressing design questions of the topic of interest (Bordens & Abbott 2016:66). For the purposes of this study, the literature review was meant to identify what is already known about the knowledge and attitudes of nurses towards health research and to contextualise these in the Botswana situation. Extensive literature review provides a basis for new evidence and is often collected before data collection (Polit & Beck 2017:54).

Taking into account the conceptual framework tied to the study, the researcher searched for studies across the globe that assessed the level of health research

knowledge that nurses in different settings possess, what attitudes they have, and the factors associated with this knowledge and attitudes towards health research. The associated factors of interest were experiential and individual, and included any previous research training and educational factors for individual nurses.

A significant number of papers were identified. Many of them covered the knowledge and attitudes of nurses towards health research in relation to “Evidence Based Practice” and “Research Utilization”. Few studies assessed knowledge of health research and attitudes in a general context. The search also failed to uncover any publication on such topics within Botswana, adding to the justification that such a study is necessary as a starting point. Sources of information were mainly research articles from the internet and those obtained through the University of South Africa (UNISA) library services. The researcher mainly used Google Scholar articles and electronic databases such as ProQuest, CINAHL, EBSCO Host and Curationis.

The major concepts of the study were used as key words for the literature search. These included: nurse’s knowledge and health research, attitudes towards health research, medical research, clinical research, clinical trials, and nursing research.

## **2.2 NURSES` KNOWLEDGE AND ATTITUDES**

It is important for nurses to understand and embrace health research regardless of their practice setting. Health research enterprise in the medical profession, including nursing, increasingly requires a workforce that is knowledgeable about research (Galassi, O`Mara & Belcher 2014:466). Nurses need to have adequate research knowledge and skills commensurate with their professional preparation and responsibility (Wu et al 2019:2). Having sufficient knowledge and good attitudes about health research are instrumental in professional role development and the upholding of research culture (Robichaud-Ekstrand 2016:246). Development of research culture among nurses is an important part of capacity building, and this can be attained through several means and interventions which include, but are not limited to, inspiring and motivation of clinical nurses who are interested in research (Lode et al 2015:674).

The amount of health research knowledge and attitudes displayed by nurses can be influenced by several factors. The literature has identified several factors that may be

relevant or applicable. These include the characteristics of individual nurses (such as their educational background, personal interests or motivation about health research);, the priorities and tensions between patient care and research; the characteristics of the institution the nurse is working for (including the availability of appropriate support, resources such as time, and the availability of research mentors); and the acquisition of research-related training; and research experience (such as ever having been a member of a research team or having conducted a personal research study).

Research knowledge gaps have been identified between nurses in academia and nurses in clinical practice. This is because nursing research has been traditionally undertaken by nursing faculty employed by academic institutions (Hagan 2018:209-210). It is, however, important to highlight that research should not only be confined to academia, but should form part of professional development for all nurses (Loke et al 2014:136). In order to bridge the gap between nurses in academia and those in clinical practice, non-academic institutions need to partner with academic institutions to improve research capacity, access to training and education, and provide mentors to guide nurses through the research process (Hagan 2018:218-219). Nurses with an interest in research should be encouraged to seek training outside of workplace at conferences and through continuing education courses (Galassi et al 2014:470). Clinical-academic research networks to build strong clinical research capacity and sustain research culture in clinical settings need also to be created (Robichaud-Ekstrand 2016:254).

### **2.2.1 Health research knowledge**

Studies have been conducted among nurses to assess the amount of knowledge they possess regarding health research. Indicators often used to assess the knowledge among nurses range from nurses' ability to define health research, different types of health research, developing a research question, research methodology, data collection methods and tools, statistical packages for data analysis, manuscript or abstract writing, and regulatory requirements surrounding health research.

The evidence suggests that nurses generally have limited levels of research knowledge. In a study among clinical nurses in Japan by Yanagawa et al (2014), fewer than half ( $\leq 50\%$ ) were aware of four critical issues assessed regarding clinical research. Despite limited general clinical research knowledge, more than 95% of respondents were

confident and quite aware of informed consent and related issues in clinical research because those are familiar concepts to nurses engaged in clinical nursing practice. The finding of low knowledge of health research among nurses was replicated by a study conducted by Kao, Hamilton, Lin and Hu (2019:493) among ward based nurses in Taiwan. The level of clinical research knowledge was found to be low with a mean knowledge score of 4.5 ( $SD=1.9$ ). The major reason for this low level of knowledge was postulated to be because clinical research education had not been extensively integrated into their nursing education system and because of the level of education of nurses. In this study by Kao et al (2019:493), nurses with higher academic education performed better in their knowledge scores ( $r=0.176$ ;  $p=.025$ ).

A cross-sectional survey by Berthelsen and Hølge-Hazelton (2015) was conducted to determine the self-perceived theoretical knowledge and practical research competencies orthopaedic nurses in a Danish hospital possessed. Nurses in the study rated their degree of theoretical research knowledge to be low or none, and the practical research competencies rated lowest were writing a scientific paper (83.7%), writing a professional paper (74.4%) and using statistical analysis (65.1%). This was an unexpected outcome, as 44% of the nurses surveyed held bachelor's degrees and were expected to have enough or higher level of research knowledge as alluded to by several studies.

Another cross-sectional survey was conducted among mental health nurses in Australia by McMaster et al (2013). Approximately half of the participants rated their research knowledge as "somewhat poor" and expressed a need for assistance with all steps of the research process. This finding confirms an inadequate amount research knowledge among the nurses studied as reported by other studies. Poor research knowledge among nurses was a significant finding, due to a lack of experience and the lack of research training provided.

A study done in Nigeria by Adeleke et al (2014) among health workers assessed research knowledge and behaviour of health workers. The study found out that only 59% of nurses knew what an abstract was, compared to 83% of medical doctors; 25% of nurses knew the first step in research process, compared to 33% of doctors; only 10% of nurses knew what SPSS was, compared to 50% of doctors; and lastly, 3.4% of nurses knew the website that indexes African related researches (AJOL) compared to

16.7% of doctors. Research experience and educational level was found to be a significant factor affecting the level of knowledge among the nurses studied.

Aksoy, Arici, Ucku and Gelal (2018) assessed nurses' knowledge, attitudes and opinions towards clinical trials in a university hospital in Turkey. The study revealed that nurses who correctly answered questions about clinical research design did not exceed 37.8%, and more than fifty percent (50%) of nurses had no idea about regulatory bodies that guide clinical research and good clinical practice. Knowledge was significantly higher among nurses with clinical research training and previous research experience.

### **2.2.2 Attitudes**

Attitude is described as a feeling or opinion about something or someone, or a way of behaving that is caused by this (*Cambridge Advanced Learner's Dictionary* 2013, sv "attitude"). Attitudes can influence how people think, even though they are not always reflected in people's behaviour (Baron & Branscombe 2014:141). Though not always expressed in behaviour, attitude tells us about a certain amount of affect towards the subject matter under discussion.

Evidence from several attitude studies conducted among nurses with regard to health research report positive attitudes. Cross-sectional studies by Akerjordet, Lode and Severinsson (2012), Glaken and Chaney (2004), Kajermo et al (1998) and McMaster et al (2013) among 364 clinical nurses from a Norwegian university hospital cited in Berthelsen and Hølge-Hazelton (2015:75) reported that 40% of nurses had a positive attitude towards research and 56% wanted to increase their research competencies. Inner motivation and support from colleagues and supervisors and having role models were reported to be important in influencing this positive attitude among nurses. The same results were reported by Caldwell et al (2017:2) in a research awareness study among clinical staff in a regional cancer centre in Scotland, which found out that majority of nurses had a positive attitude towards health research. All participants felt clinical research was at least important and 86.2% felt it was very important.

Aksoy et al (2018) reported a positive attitude towards clinical research, and nurses with prior research-related training scored high. The study also showed a significant positive correlation between the knowledge level and attitudes scores towards clinical research.

Importantly, Halabi (2016) conducted a study among nursing students entitled “*Attitudes of Saudi nursing students toward nursing research*”. The majority of the nursing students had positive attitudes towards research, believed research was useful for their professional work (Halabi 2016:123) and were personally interested in research.

However, whether or not positive attitudes and good knowledge will necessarily translate into positive research behaviour after nursing school is another question. In a study by Galassi et al (2014:469), nurses reported that the research knowledge that they gained at nursing school did not contribute much to their current knowledge around research. Instead, further education and experiential on-the-job training made them realise the importance of research, because as students they were not aware of the importance of research, nor were they interested in it. The notion of on-the-job training is also alluded to by Loke et al (2014:137), that research knowledge and skills obtained from the nursing curriculum should be followed through in health care institutions where nurses are employed, to offer them hands-on research experience. Robichaud-Ekstrand (2016:254) emphasises the need to engage nurses in research projects to provide experiential learning and foster among nurses an understanding of research methods that lead to critical evaluation of research done by others.

Adeleke et al (2014:109) found a positive attitude towards health research among health workers, including nurses. Participants who had previous experience (96%) displayed more positive attitudes towards research than those with no experience. Previous research experience had statistical significance on health research knowledge and the attitude of staff towards research. Interestingly, the same study also found that male health workers had better research knowledge and attitudes than their female counterparts.

Although a majority of studies report positive attitudes towards research by nurses, a study by Kao et al (2019:495) among ward-based nurses found the opposite. The study indicates that the attitude of nurses towards clinical research was generally negative, due to a marginal understanding of clinical research. Nurses lacked information about governance and regulation of biomedical and behavioural research, as they were more concerned about patient’s safety in clinical research. This could indicate that ward-

based nurses may be overwhelmed with bedside clinical work and are unable to find time to engage in research.

Findings from these studies highlight the fact that, in as much as nurses may be challenged or have limited theoretical and/or practical research competencies, they are positive towards the whole research enterprise and will support it. This positive outlook will be important in the implementation of research training initiatives geared towards capacitating nurses with appropriate and applicable research knowledge skills.

The amount of health research knowledge and attitude displayed by nurses can be influenced by several factors. The literature has identified several factors that may be relevant or applicable.

The following factors have been found by different studies to have an impact on the level of knowledge nurses possess about health research and the attitudes they display:

### **2.2.3 Research experience**

Experience is the process of acquiring knowledge from doing, seeing or feeling things (*Cambridge Advanced Learner's Dictionary* 2013, sv "experience").

Research experience is any professional or academic research activity acquired in any research field in the public or private sector.

Nurses may gain experience in research as researchers or as research participants. Each of these (researcher or participant) can influence the knowledge they acquire to be able to conduct research in their own capacity as a researcher or what they learn from taking part in research as research participants. Being a health researcher or having been a research participant before can contribute to the attitudes nurses have towards health research in general.

#### **2.2.3.1 Member of research team**

Several authors advocate and recommend that nurses be provided with opportunities to gain research experience. This can be achieved by a shift in focus on educational

training from imparting contents to providing opportunities to experience the research process through direct interaction or engagement with research teams within their environment (Loke et al 2014:132).

Providing opportunities for nurses to be part of research teams helps them gain confidence in research methods and processes and improve their research knowledge (McMaster et al 2013:159). This is corroborated by Jahan et al (2016:2), who believe individuals who are exposed to or take part in research have enhanced research knowledge and critical thinking abilities. Providing nurses with opportunities to be part of research teams in ongoing research after their nursing training helps nurses to gain knowledge in health research and improves their attitudes towards research (Roll et al 2013:1).

Nurses regularly constitute part of research teams. Often, the role of nurses within health research teams involve duties such as data collection, collecting samples, monitoring the vital signs of participants, taking part as investigators (Aksoy et al 2018:2; Loke et al 2014:135), recruitment of research participants (Caldwell et al 2017:5) and completion of study questionnaires or performing chart reviews (Hagan 2018:217). Although this provides nurses with research experience, this level of engagement may not expose them to opportunities to develop their research skills (Robichaud-Ekstrand 2016:248) or gain the required level of experience. To gain experience, nurses should be involved at levels that will provide them with sound research knowledge like proposal writing, different research methodologies, data analysis and research regulation.

### **2.2.3.2 Conducted own research**

Conducting own research provides nurses with an opportunity to learn the research process and responsibilities associated with research in general. Nurses who conduct own research will learn different research methodologies and proposal/scientific writing.

It is evident that few nurses have conducted own research. Most nurses conducted own research because of academic requirements, involving little or limited practical research experience at that level. A limited number of nurses conduct own research beyond nursing school. Only 20.6% and 21.2% of nurses in research utilisation studies in Kenya

and Nigeria respectively reported having done research other than what was required at nursing school. Reasons cited for nurses not conducting own research included lack of research training and limited skills in research conduct. Another study by Nkrumah et al (2018), among Ghanaian nurses in three hospitals, found that out of the 36.1% of nurses who conducted research after graduating from nursing school, only 1.9% of them were principal investigators of those studies and were hence exposed to high level of research knowledge. It is necessary to provide opportunities for nurses, combining these with personal volition of individual nurses, to build appropriate and relevant research experience through the conduct of own research.

### **2.2.3.3 Past research experience**

Research experience among nurses seems to be lacking, as reported in the literature. In the studies reviewed, nurses expressed no prior research experience as a barrier to their involvement in health research. In a study conducted by Oluwatosin (2014) among nurses from various health care institutions in Nigeria, very few nurses (16.9%) reported previous research experience. Similar findings are reported by Aksoy et al (2018), who found that only few nurses surveyed had prior experience in clinical research.

Past research experience has been found to be related and linked to the amount of knowledge and attitudes nurses have towards health research. Browning et al (2016:124), in a study among paediatric/cardiac intensive care nurses, found that nurses with previous research experience, such as caring for a patient in any research study, were more likely to have positive perceptions towards health research than those who had not. This is corroborated by Adeleke et al (2014) whose study reported that almost all health workers (which included nurses) with prior research experience had a positive attitude towards research and had good knowledge of research. Similar study results were found by Evans et al (2014:231) and Kao et al (2019:493), in which lack of research knowledge was cited by participants with no previous research experience. Nurses with research experience were found to have higher positive attitudes towards clinical trials than those without ( $t=-2.276$ ;  $p=.024$ ).

## 2.2.4 Research training

Health research training has been recognised as an important component of nursing education and was included as part of the nursing curriculum many years ago (Galassi et al 2014:466). Research training improves research literacy among nurses and increases the levels of research knowledge and attitudes a nurse possesses (Black et al 2016:16; Leach et al 2016:195). A research-training programme implemented in a study by Black et al (2016) comprised of workshops that provided nurses with basic knowledge about research processes, research methods, research ethics and literature review techniques.

It is evident that nurses generally lack training in most important aspects of health research, as they continue to express their lack of research training which needs to be addressed. Caldwell et al (2017) conducted a survey to establish the level of research awareness and attitudes among clinical staff comprising of doctors, nurses and allied health professionals in a regional cancer centre in Scotland. In this study, almost all nurses were in much greater need of research training than the doctors and other allied health professionals. Similar results are reported by Paget et al (2014:88), whose study reported that clinicians in a tertiary teaching hospital expressed the need to be provided with access to education and training about the research process so as to improve their involvement in research. Mutisya et al (2015:101) corroborated the same results in a study among nurses in a teaching hospital in Kenya. Nurses expressed their lack of training in research, as confirmed by the quotes below:

*“Nurses lack training in research”, “Nurses need extra training”, “Give nurses knowledge/trainings showing them it is not difficult”.*

Additionally, in a study by Jahan et al (2016:4) conducted among health care professionals working in a primary care service centre to determine their attitudes towards research, more than half of the participants were nurses, while Wu et al (2019:7-8) conducted a study among clinical nurses in China. The results of both these studies showed that more than half of the nurses lacked health research training in writing a protocol, literature review, statistical support, manuscript writing, and publication and presentation of research. They therefore expressed the need for training in health research.

This lack of health research training among nurses is a concern to the nursing fraternity, and may result in a negative disposition towards clinical research due to lack of information and training (Kao et al 2019:495).

Continuous research training therefore is essential to motivate nurses to learn more about research and contribute to its productivity (Jahan et al 2016:4). Also, nurses who are interested in research should be supported and motivated to take part in research activities (Lode et al 2015:674), including training.

### **2.2.5 Institutional factors**

Institutional factors are those that nurses interact with by virtue of working under particular conditions on a regular basis in the execution of their professional duties. These institutional factors may influence whether or not nurses have an opportunity to acquire basic research knowledge and influence their attitudes towards health research.

Generally, nurses have expressed multiple institutional factors that hinder them from participating in research-related activities leave them deficient in research knowledge and skills. Lack of mentorship and lack of management and administrative support have been identified as major issues (McMaster et al 2013:159; Mutisya et al 2015:102; Hagan 2018:217). Nurses also expressed concerns about working in isolation and lack of opportunities to collaborate and learn from academics and colleagues with similar research interests (McMaster et al 2013:159). When non-academic and academic institutions work together, as recommended by nurses, research will be integrated into a holistic educational approach, which would result in the building of research networks to increase research participation and lift the nursing profession as a whole (Wu et al 2019:2). This is supported by Roets and Lubbe (2016), who identified the need for support from academic institutions and knowledgeable mentors or educators so as to build a research culture within the institutions that train nurses and lay the foundation for research knowledge at an earlier stage of the professional development of nurses (Halabi 2016:118).

Even though nurses have shown some enthusiasm for doing research, they feel there are no incentives for being active researchers. They note the lack of appreciation

among colleagues and supervisors for nurses doing research, and they feel that doctors are supported more than them. There is no dedicated time for them to do research, and they spend personal family resources, such as money and time, to do research (Loke et al 2014:135-136).

It has also been found that the extent to which institutional factors affect the opportunities of nurses to engage in health-research depends on their level of education. Nurses with higher levels of education might be more dissatisfied with a lack of research opportunities than less educated ones (Hagan 2018:217). The same sentiment is alluded to by Robichaud-Ekstrand (2016:251), who found that nurses with a Baccalaureate perceived less support for research in their workplace than diploma nurses, because they know what is required to conduct research. In order to bridge the gap in health research between diploma and degree nurses, Martin (2017) proposes that student nurses could be integrated into existing research groups within their universities or nursing colleges, so that they participate in actual research activities which will eventually help them understand the importance of health research in their future nursing careers. The notion is supported by Caldwell et al (2017:2), as they recommend that research training should be provided at sufficient levels during undergraduate training for health care professionals with continuous support throughout their careers. This sentiment is shared by Loke et al (2014:136), who believe research knowledge and skills implanted in the nursing curriculum can be continuously experienced in the work situation and can be improved and enhanced. This is also alluded to by Lode et al (2015:674), who argue that research training improves the research capability and knowledge of nurses.

Institutions are expected to promote a research-friendly environment to motivate nurses to engage in research. In the clinical setting, promoting and facilitating research is achieved through provision of incentives, access to training and education, and mentors to guide nurses through the research process (Hagan 2018:219). In institutions or organisations where support and research opportunities are available, more nurses are able to learn and conduct research, leading to improved knowledge (Loke et al 2014:132).

## **2.2.6 Individual factors**

These are factors that are controlled by individual nurses as to whether to engage in a certain behaviour or not. Individuals have an internally driven capability to want to learn or engage in an activity that will help them gain new knowledge, known as self-directed learning [SDL] (Van Rensburg & Botma 2015:1). SDL helps individuals to take responsibility to change their world view, to reach out for opportunities that will help them gain knowledge about a specific subject matter, and assists them to be highly motivated to acquire more knowledge (Malekian et al 2015:157).

Some of individual factors identified to influence the knowledge and attitude of nurses towards research are discussed below.

### **2.2.6.1 Education**

Educational background and qualification have been found to be associated with the amount of health-research knowledge and the attitude nurses possess towards health research (Nkrumah et al 2018:4; Water, McCall, Britnell, Rea, Thompson & Mearns 2018:35). This is alluded to by Asuquo, Etowa, John, Ndiok, Sampson-Akpan and Edet (2013:44) and Lode et al (2015:672), that educational preparation has influence on the knowledge of nurses and their attitudes towards research. Nurses possessing a graduate degree or Master's degree displayed a higher level of research knowledge compared to their diploma or certificate counterparts (Wu et al 2019:303). This is because, with advanced education, nurses tend to understand the fundamentals of research better, which in turn contributes to understanding of health research (Kao et al 2019:493). The level of education positively influenced the views of nurses on health research in a study by Robichaud-Ekstrand (2016:248); they valued and showed interest in research ( $P=0.001$ ). A similar finding was obtained by Kao et al (2019:493) in which nurses with higher academic preparation had better health-research knowledge ( $r=0.176$ ;  $p=.025$ ). It is believed nurses with lower educational levels may have been exposed to limited instruction in the area of research within their nursing programmes (Hendricks & Cope 2016:47). Another study by Kovačević, Prlić and Matijašević (2017), looking at attitudes among nurses towards nursing research in a clinical hospital, found a significant difference in attitudes towards research with regard to the level of

education. Nurses with a Bachelor of Science degree in Nursing had more positive attitudes towards research (Kovačević et al 2017:79).

#### **2.2.6.2 Personal interest**

There are nurses who are interested and motivated to learn and improve their research knowledge and skills. There are also nurses who are not interested in health research for various reasons. A Norwegian study conducted by Berthelsen and Hølge-Hazelton (2015:79) among orthopaedic nurses found that only 16.3% of nurses reported a lack of interest in increasing their knowledge and competence in research, while 74% indicated their motivation to increase their health research knowledge. Similar results were reported by McMaster et al (2013), who found that over 90% of nurses reported reading peer-reviewed journal articles and using Internet resources to keep abreast of new research knowledge. Over 53% of these nurses reported having research goals over the next 12 months and of these, 29% reported being very likely to publish a paper in a refereed journal.

Other factors include past experience of nurses of research, as well as their personal views about patient care versus research. A study among Swedish ophthalmic nurses brought to light that experience with health research can influence overall attitudes towards health research among specific nurses. In the study, many nurses expressed frustrations they experienced when writing their Bachelor's or Master's thesis. Some nurses in the same study expressed the satisfaction they derived from working solely with patients, rather than being "theorists" (Martin 2017:213).

In addition, some nurses in clinical practice prioritise taking care of their patients above participation in research (Berthelsen & Hølge-Hazelton 2016:852). Lack of interest was expressed by nurses in a study by Evans et al (2014:229), as illustrated in the quote: "*I am not really all that interested in research to be honest. I never have been.*" A similar finding was reported in a research utilisation study by Hendricks and Cope (2016:47), in which 64% of the respondents did not feel the need to pursue knowledge in research, and hence did not value research. Similar results were found by Nkrumah et al (2018:4), who found that nurses perceived research to be irrelevant both to their nursing role and their professional profile [P-value of 0.04]. This is a concern, as this is an indication that nurses do not relate research to the care they provide to their patients.

### **2.2.6.3 *Mistrust of researchers***

In the literature reviewed, no source discussed how the trust that nurses have in researchers affected their level of knowledge or attitudes. However, in a study by Aksoy et al (2018), an item indicating that clinical research is reliable received the lowest positive score (45.4%), which demonstrates that these nurses did not trust clinical research.

## **2.3 SUMMARY**

Nurses as professionals are required to possess basic knowledge about health research, as this will allow them to apply their knowledge in their nursing responsibilities. Positive attitudes and inner motivation will determine what direction nurses will take, and enable them to look for opportunities that will enhance their knowledge about health research and develop professionally. This chapter reviewed literature related to nurses' knowledge and their attitudes towards health research, together with factors that may influence the amount of knowledge and attitudes that nurses possess.

The studies that were consulted were mainly conducted in Europe, Australia, and the Middle East, while there were fewer from Africa and the United States. All have a common finding, in that nurses revealed some limited levels of research knowledge. However, nurses also do display a positive attitude towards research. Variations in the degree of knowledge and attitudes within these different regions do exist, due to differences in the qualifications of nurses, their roles in their place of work, their length of service and the personal attributes of individual nurses.

Although many studies from different continents have assessed the knowledge and attitudes of nurses towards health research, an apparent gap was found in the literature: no studies that were conducted in southern Africa, including Botswana, were located.

Chapter 3 describes the research design and methodology.

## **CHAPTER 3**

### **RESEARCH DESIGN AND METHOD**

#### **3.1 INTRODUCTION**

This chapter focuses on the study's methodological approach, driven by its study purpose and objectives. Research designs are important to the success of the research project. The chapter describes the research design and the setting where the study was conducted, and it highlights the description of the study population and sample. Procedures for data collection, sampling techniques, inclusion criteria, instruments used to collect data, data analysis and ethical considerations related to data collection are described.

The purpose of this study was to describe the knowledge and attitudes of nurses working in public health clinics in Botswana towards health research in order to make recommendations to enhance a research culture among nurses. In order to address the purpose, the knowledge nurses possessed was described, attitudes of nurses were explored and factors that may influence the knowledge and attitudes were identified.

#### **3.2 RESEARCH DESIGN**

A research design refers to a structured approach by researchers to answer a particular question, or the "architecture" of the study (Ehrlich & Joubert 2017:78). Creswell and Creswell (2018:250) describe research designs as types of inquiries that provide a specific direction for procedures in a research study. A research design spells out the basic strategies that researchers adopt to develop evidence that is accurate and interpretable (Polit & Beck 2017:164). Polit and Beck (2017:743) continue to describe research design as the overall plan that the researcher utilises to address a specific research question. This research plan will often include specifications for enhancing the study's integrity (Polit & Beck 2017:743). The study design determines how the population under study is sampled, as well as how data is collected and analysed (Ehrlich & Joubert 2017:78).

The researcher used a quantitative, non-experimental, descriptive, cross-sectional design to determine the knowledge of, and attitudes of nurses towards health research in Botswana. The justification and application of the chosen design for this study are described below.

### **3.2.1 Quantitative approach**

The quantitative approach observes and measures information numerically and often utilises closed-ended questions (Bordens & Abbott 2016:231; Creswell & Creswell 2018:18). The quantitative approach was used for this study, as the data was collected numerically from the respondents by the use of a questionnaire. This approach was more objective as the researcher and respondents remained independent and did not influence one another and the outcome of the study, hence minimising bias. The researcher chose the quantitative design, which uses structured procedures and formal instruments, to collect data. The structured approach of the measurement makes the design reliable and valid as bias is minimised. The researcher selected a quantitative approach as the study sought to measure the levels of knowledge of health research numerically. In order to identify factors associated with good knowledge, the researcher intended to use logistic regression to identify individual factors that would be statistically associated with good knowledge levels. This would require a quantitative approach rather than a qualitative approach. In addition, the quantitative design was used for expediency and ease of administration, to be able to meet the timelines of the study without jeopardising the integrity of the study results.

### **3.2.2 Non-experimental design**

Non-experimental study design aims at measuring or observing phenomena without any manipulation or intervention from the researcher (Polit & Beck 2017:203). Non-experimental designs are also known as observational studies and allow “nature to take its course”; in other words, the researcher observes a phenomenon as it evolves without intervention or alteration of any factors (Ehrlich & Joubert 2017:78). Non-experimental designs include cross-sectional descriptive study design. This design was appropriate for this study to describe the knowledge of, and attitudes of nurses towards health research, as they occur at the time of data collection within their natural work environment. The researcher described the current state of nurses’ knowledge and

attitudes as they were provided and presented in the data collection instrument, without any intervention to improve the knowledge and attitudes of nurses.

### **3.2.3 Descriptive research design**

A descriptive approach answers research questions by describing and summarising data without making inferences (Gliner, Morgan & Leech 2017:14). Ruane (2016:36) also describes descriptive approach as one that seeks to find the “what’s happening” and “who is involved” details of a situation. This involves describing the characteristics of a particular situation, event or case, by asking “when”, “where”, “who” and “how” for this event or case (Goyal 2013:45). Descriptive studies often take the form of a survey and they set out to quantify the phenomenon under study (Ehrlich & Joubert 2017:79). Descriptive designs describe frequency of occurrence of behaviour and do not involve the establishment of the relationship between variables (Polit & Beck 2017:206). This study used the descriptive design through a structured self-administered anonymous questionnaire to describe the personal and demographic characteristics of nurses who participated in the study in Gaborone in Botswana between the months of May and July 2019. The study described the amount of knowledge of, and the attitudes they displayed towards health research. In addition, this study described the factors that may influence knowledge of and attitudes towards health research among nurses in Botswana.

### **3.2.4 Cross-sectional studies**

Cross-sectional studies or cross-sectional surveys are done “to estimate a population parameter like prevalence of some disease in a community or finding the average value of some quantitative variable in a population” (Charan & Biswas 2013:121). Data collection in cross-sectional study is done at a single point in time (Rebar & Gersch 2015:348; Ruane 2016:78; Polit & Beck 2017:725). In this study, the author estimated the level of knowledge of health research among the nurses in Botswana and the attitude of nurses to health research. This data was collected once during a specific period from a sample of nurses who were available to take part in the study during the data collection period. Nurses responded to a single anonymous questionnaire, and there were no further subsequent follow-up interactions after the completion of the questionnaire.

Cross-sectional studies are said to be relatively easy and economical to conduct (Ehrlich & Joubert 2017:82). This is also alluded to by Ruane (2016:78), as the researcher gathers data on all pertinent variables via a single data collection effort, with no further follow-up or extension of data collection over time which may require more resources. Ruane (2016:79) further attests to the fact that cross-sectional or survey designs are remarkably robust and a reasonable strategy in pursuing descriptive research projects, as they quantify the magnitude of the phenomena as they are observed. It was easy for the researcher to conduct this study within the stipulated time, as the study population was accessible. The study was also conducted in an inexpensive manner.

### **3.3 RESEARCH METHOD**

Research methods are techniques used by researchers to structure a study and to collect and analyse information in a systematic manner (Polit & Beck 2017:743), or forms of data collection, analysis and interpretation that researchers propose for their studies (Creswell & Creswell 2018:250). This section describes issues related to the sampling, study population, data collection, data collection instrument, data analysis and ethical issues related to data collection.

#### **3.3.1 Population**

Population is defined as the entire set of individuals or objects having some common characteristics, sometimes called “universe” (Polit & Beck 2017:739) or all possible individuals making up a group of interest in a study (Bordens & Abbott 2016:G-9). A study population is also defined as the group from which the researcher wants to gather information and draw conclusions (Ehrlich & Joubert 2014:98). The target population for this study were registered nurses working in the thirty public health clinics in Gaborone, Botswana, while the accessible population were those registered nurses who were available to take part in the study at time of data collection in the thirty public health clinics in Gaborone, Botswana.

### 3.3.2 Sample

A sample has been defined as a group of people or things that is chosen out of a larger group and is asked questions or tested in order to get information about the larger group (*Cambridge Advanced Learner's Dictionary* 2013). Polit and Beck (2017:743) and Ruane (2016:232) also define a sample as a subset of a population comprising those selected to participate in a study. A sample was selected from a population of four hundred and nineteen nurses working in the thirty public health clinics in the Greater Gaborone District at the time of the research. The final sample of two hundred and eighteen nurses was selected based on the calculation provided in section 3.3.2.1 below.

#### 3.3.2.1 Sample size

The sample size was determined by the following equation:

$$n = \frac{(z^2 * p * q + ME^2)}{[ME^2 + z^2 * p * q/N]}$$

Where:

ME = is the margin of error. The margin of error expresses the maximum expected difference between the true population parameter and a sample estimate of that parameter. We selected a margin of error as +/-2.5%, with a confidence level of 95%. This means that if the survey were repeated many times with different samples, the true proportion of nurses who are knowledgeable about research would fall within the margin of error 95% of the time.

p = the estimated proportion of the variable or behaviour of interest at the time of the survey. With no literature to give an idea of the proportion of nurses with good knowledge of research, we assumed a proportion of 40% of nurses in Gaborone would have good knowledge of research.

$q = 1-p$

$z$  = the  $z$ -score corresponds to the probability with which one can be certain that an observed proportion of  $p$  did not occur by chance (that is the  $z$ -score corresponding to desired level of significance). The researcher uses 95% significance level and corresponding two-sided  $z$ -score).

$N$  = the size of the population of nurses in clinics in Gaborone, which is 419.

Using a stat trek calculator, we calculated the minimum sample size, given a margin of error of at most 0.050, a confidence level of 95%, and assumed rate of knowledge at 40% and obtained a sample size of 197. An adjustment was made to account for a possible 10% of refusals (this was based on anecdotal information obtained from researchers who have conducted studies among health workers in Botswana), and calculated a sample size of 218 nurses.

### **3.3.3 Sampling**

Sampling refers to the process of selecting cases to represent an entire population so that inferences can be made relating to that population (Polit & Beck 2017:250). Robust sampling methods enable researchers to draw samples which can be considered representative of the target population (Ehrlich & Joubert 2017:99). Sampling is necessary as it is not always possible or practical to include the entire population in the study. Sampling involves taking into consideration the study population, sampling methods to be used, eligibility criteria, and the sample size.

The following section will discuss how sampling was applied to achieve the research study objectives.

#### **3.3.3.1 *Sampling methods***

Sampling methods are classified as either probability or non-probability sampling (Polit & Beck 2017:250). Probability sampling is a selection approach that ensures that the sample is representative of the study population (Creswell & Creswell 2018:250; Ehrlich & Joubert 2014:99). Non-probability sampling entails selection by non-random methods,

and there is no way of estimating the probability that each element has of being included in the sample. Usually, each element does not have an equal chance for inclusion (Polit & Beck 2017:250). A random or probability, and non-random and non-probability sampling was utilised for this study.

### 3.3.3.1.1 *Random selection of elements representing population*

All nurses from all the 30 clinics were listed (represented by a code number and clinic name) to generate a sampling frame from which the required number of nurses were randomly selected. The total number of elements in the sampling frame was 419. All the elements were put in a box and the researcher randomly selected by picking an element until the sample size of 218 determined for the study was met. From the random selection of elements representing nurses from each clinic, the researcher determined the number of nurses drawn during the random selection per clinic. For example, a total of ten were selected for the Bontleng (BON) clinic, which meant that at least ten nurses from this clinic should be included in the study (Table 3.1).

**Table 3.1 Number of nurses sampled in each clinic**

<b>Clinic code</b>	<b>Number of nurses</b>	<b># randomly selected</b>
Ext 15	11	7
Ext 14	8	5
Ext 2	22	10
BON	19	10
GBN	10	4
GHP	6	3
ONC	31	16
*THP	2	0
GWC	26	15
BH 1	8	5
BH 2	12	7
*MMK	3	0
BH 3	30	13
BTA	11	5
PH 2	11	9
BLK 9	28	14
MMP	9	4
BLK 8	18	9
NKP	26	13
LSR	35	18

Clinic code	Number of nurses	# randomly selected
TLK	12	8
MLC	10	6
MFK	29	17
MOG	10	6
METSI	10	4
SEB	7	4
NHP	5	3
KHP	6	3
*St Jo	2	0
*TLKW	2	0
<b>Total</b>	<b>419</b>	<b>218</b>

\*These were not drawn during the random selection process.

During the random selection process, from a total of thirty clinics, only 26 clinics were represented in the sample of nurses that was selected while four were not drawn. The four clinics who were not drawn during the random selection are those that had a few number of nurses. Each of the four clinics had a staff complement of two to three nurses.

### 3.3.3.1.2 *Sampling of potential study participants at clinic level*

Upon completion of random selection of potential participants from the sampling frame, the researcher employed a non-probability technique of convenience sampling to select nurses at the clinic level. All nurses available at the time of study were approached, and those who agreed to take part were included in the study. The exercise continued until at least the expected number of nurses from that particular clinic was reached.

The eligibility criteria for this study was any registered nurse working in any of the thirty clinics in Gaborone at the time of data collection. This meant any registered nurse with a minimum qualification of general nursing recognised by the Nursing and Midwifery Council of Botswana. Possession of any other nursing qualification obtained after general nursing was not an inclusion or exclusion criterion.

### 3.3.4 **Ethical issues related to sampling**

The study adhered to ethical principles relating to sampling. Participant selection was based on the study's inclusion and exclusion criteria as stated in 3.3.3.1.2 above. All

registered general nurses working in public health clinics in Gaborone Botswana were eligible to participate in the study.

### **3.3.5 Data collection**

Data collection is the gathering of information to address a research problem (Polit & Beck 2017:725). Data collection is the process where data is formally recorded for later analysis (Bordens & Abbott 2016:28). In this study, a structured data collection approach was used. Structured data collection involves utilisation of fixed set of questions to be answered in a specified sequence with predesignated response options (Polit & Beck 2017:174). This approach entailed respondents completing an anonymous self-administered questionnaire (Annexure 7) containing a fixed set of questions that were expected to be answered in a specified sequence. Structured data collection was suitable for this study, as it is more objective and more easily analysed, as the data would be obtained from respondents readily quantified.

#### ***3.3.5.1 Data collection approach and method***

This study employed a questionnaire to collect data. The questionnaire was in English (Annexure 7). The researcher distributed questionnaires directly to nurses within the local clinics. The nurse in charge was the focal person with whom the researcher interacted for the follow-up of completed questionnaires. Respondents who were interested to take part read the participant information sheet (Annexure 6) and subsequently signed the consent form (Annexure 5). Respondents then filled in the anonymous questionnaire and returned it to the researcher in a sealed self-addressed envelope that was provided for by the researcher. Respondents who wanted a copy of the information sheet and/or the consent form were provided with appropriate copies.

#### ***3.3.5.2 Development and testing of the data collection instrument***

The questions included in the questionnaire were obtained from an extensive literature review. Most of the content was adapted from previous studies, with attempts made to make the questionnaire more applicable to the local context. The research supervisor from the UNISA Department of Health Studies reviewed the draft copy of the questionnaire. A statistician and two mentors who are experts in biostatistics reviewed

and made inputs to the questionnaire to ensure reliability and validity of the data collection instrument. The questionnaire was pre-tested among nineteen nurses who met the inclusion criteria but who were not part of the study sample. After the pre-testing exercise, the questionnaire was corrected and finalised (see section 3.3.5.4).

### ***3.3.5.3 Characteristics of the data collection instrument***

The data collection instrument was a structured self-administered questionnaire consisting of six sections with 47 questions (Annexure 7). The questionnaire comprised of closed ended, yes/no, multiple-choice and rating-scale questions. It had sections containing demographic questions, knowledge questions, attitude questions intended to explore attitudes of nurses towards health research, research experience questions on past and current health research experience, research training questions, and institutional factors or work environment questions that may have had an influence on the knowledge or attitudes of nurses towards health research.

#### ***3.3.5.3.1 Sections of the questionnaire***

The questionnaire consisted of several sections, each intended to elicit information to address the study objectives as described below:

- ***Demographics questions***

Section 1 of the questionnaire consisted of eight items. The demographic questions aimed to obtain information about the details of respondents, which included each participant's age, gender, nationality, nursing qualifications, length of nursing experience, any post basic qualifications they possessed, their current position or role in the clinic and the type of health facility or clinic they worked in. The purpose of these items was to obtain data about the basic characteristics of the respondents, which may have some bearing on how much knowledge and what attitudes respondents possess towards health research.

- *Health research knowledge questions*

Section 2 consisted of ten multiple-choice questions. Each had one correct and two false choices, a “don’t know” and an “other” option, to provide respondents with a choice of answers they think may be appropriate. The questions aimed to elicit nurses’ knowledge regarding health research. Respondents were asked questions about the ethical conduct of research, ethics committees and their role in health research, and informed consent in health research. Respondents were also asked to name types of health research study they were aware of, medical databases, what an abstract is and health research dissemination modes. The purpose of these questions was to assess each nurse’s knowledge regarding health research. Based on review of literature in which knowledge was assessed, the respondents were scored 1 for a correct answer and 0 for a wrong answer. The sum of questions that were answered correctly was calculated and was categorised to pre-fixed scores as follows:

7-10   satisfactory score

5-6     fair score

<5     poor score

- *Attitudes towards health research questions*

Section 3 comprised of twenty attitude questions to explore the views of nurses regarding health research, whether or not they viewed it positively or negatively, and if they were interested in doing research themselves. Respondents were asked to respond to attitude statements and rate themselves on a Likert Scale. This comprised of declarative statements that state a view on a subject. Respondents were requested to grade how they agree or disagree with a statement in a range from “strongly agree” to “strongly disagree”. Each answer was scored on a scale of 0 (negative attitude) to 1 (positive attitude). For each individual, the score for the questions was added up and converted into a percentage (from 0 to 100) to represent the attitude score. With guidance from the literature of other attitude studies, the scores were categorised as follows:

70-100      positive attitude score  
<70          negative attitude score

- *Research experience questions*

Section 4 consisted of five applicable response questions. The questions included any experience in health research, either as a researcher or as participant. The purpose of establishing the experience of nurses with research was to assess if previous research experience has an association with the level of their knowledge regarding health research and whether it affected their attitudes either positively or negatively towards health research.

- *Research training questions*

Section 5 consisted of three research training questions, to establish if nurses have had exposure or opportunities to undergo any form of health research-related training, topics or areas covered in this training, and where they received it. Respondents were asked to choose from a list of topics provided and to indicate which ones were covered in the health research training they attended.

- *Institutional factors questions*

The conceptual framework indicates various factors affecting knowledge of, and attitudes towards health research. The factors related to research experience, research-related training and individual factors were determined in section 1-5 of the questionnaire. Section 6 addressed institutional factors that may have promoted a research culture among nurses and establish if this had any influence on their knowledge and attitude towards health research. These included finding out if the institution where they are currently working encourages or supports health research, if they are supported to attend conferences, and if there are any incentives for nurses who are involved in research.

#### **3.3.5.4 Pre-testing of the questionnaire**

Pre-testing is the trial administration of the data collection instrument to identify flaws and to gain a better understanding of how the constructed questions are conceptualised by respondents (Polit & Beck 2017:740). Pre-testing of the questionnaire is required to assist the researcher to refine the instrument, and it provides the researcher with an opportunity to have an in-depth examination of the questionnaire with the aim of improving its quality (Ehrlich & Joubert 2017:121). Pre-testing helps to establish the content validity of scores on the instrument, and it helps to improve questions, format and instructions (Creswell & Creswell 2018:154).

The questionnaire was pre-tested among nineteen nurses who met the inclusion criteria but who were not part of the study sample. The pre-testing aimed at determining the time taken to complete the questionnaire, to identify questions that were not clearly understood by respondents, and to evaluate the content. The pre-testing of the questionnaire was conducted between 1 April and 17 April 2019. Upon completion of the pre-testing exercise, the sequencing of some questions was revised, while some questions were dropped and others were rephrased to improve on the flow and provide clarity.

#### **3.3.5.5 Data collection process**

Data collection commenced once all the approvals were obtained (see section 1.8.8). The researcher presented clinic managers or the nurses in charge with the approval letter from the District Management to allow the researcher to access the respondents. Data was collected from 13 May to 12 July 2019. The researcher hand-delivered the questionnaires to the respective clinics around Gaborone. The researcher visited the clinics within greater Gaborone, and made presentations to nurses during their morning reports. Those who were interested in taking part were given the participant information sheet to read, and they proceeded to sign the consent form if they were willing to complete the study questionnaire. For clinics with multiple working shifts like morning, evening and night shifts, the researcher arranged to present the study to nurses coming for a particular shift to ensure that as many as possible potential respondents were reached. The respondents were requested to drop the completed questionnaires in a sealed box, which was made available in the clinic and was kept in the office of the

nurse in charge. The respondents were given three weeks to provide them enough time in addition to their primary responsibility of patient care to complete and return the questionnaire. The researcher was in regular contact with the nurse in charge to check if there were any completed questionnaires ready for collection.

#### *3.3.5.5.1 Ethical considerations related to data collection*

The following section describes how the ethical principles were adhered to during the data collection process. Data collected was used for research purposes only. The questionnaires were anonymous and did not bear the names of respondents.

Before the commencement of data collection, the study had to be deemed to adhere to basic ethical principles [autonomy or respect for persons, justice, beneficence and non-maleficence] of human participant research per the Belmont Report (1979) as described in Bordens and Abbott (2016:197). The study obtained approval from appropriate regulatory bodies (see section 1.8.8).

- *Autonomy or respect for persons*

This principle refers to treating respondents as autonomous beings, who know what they want and what is right for them, without any coercion. It also emphasises the need to disclose information fully about the study to respondents, so that they make informed decisions. Respondents in the study were fully informed about the study, so that they could make an informed decision as to whether or not to participate in the study. Despite the fact that the study was anonymous, written consent (Annexure 5) was obtained from participants. A participant information leaflet (Annexure 6) was provided to the potential research participants, with all the necessary information about the purpose, risks, and benefits, and what they were expected to do. Respondents were allowed to keep the information leaflet for themselves. Respondents were permitted to withdraw from the study at any time without any penalty. However, the respondents in this study were informed that after they submitted the completed questionnaire, it would not be possible to withdraw, as the questionnaires did not bear their names and hence it was not possible to link any questionnaire to a particular individual.

In order to minimise or avoid disruption of clinic activities at the time of the study, the researcher presented it to nurses during morning reports, before the start of clinic activities. Nurses completed the questionnaire at a time convenient for them, so that they could see their patients and attend to the study activities when free to do so.

- *Justice*

Justice is the ethical principle that means participants must be treated fairly without any prejudice to those not interested in taking part. Participation in the research study was voluntary and respondents were free to withdraw at any stage in the research without penalty. The study did not discriminate in the selection of respondents based on any other criteria, apart from the inclusion criteria. The questionnaire was pre-tested to determine the time required for completing the questionnaire. Only information required to meet the study objectives was collected by the approved study questionnaire. Respondents who volunteered to take part in the study were treated with respect, even when they decided not to complete the questionnaire. They were treated the same as others, and not victimised. Respondents were assured that the questionnaire was anonymous and would not be linked to any one of them. Raw data would be kept in accordance with the policies and procedures of the institution and ethics committees overseeing the study. For example, hard copies will be locked away, while electronic copies will be stored on the computer under password protection for at least five years after completion of the study. Only the researcher and the supervisor will have access to the original documents.

- *Beneficence*

This ethical principle requires researchers to protect the well-being of research participants and to do them no harm, to avoid discomfort and to maximise any benefits that may be derived from the study. Beneficence also refers to avoiding the exploitation of respondents by using the information they provide for the study against them. Respondents were informed that while this study did not have any direct benefit for them, information obtained from the study might help determine future directions regarding the knowledge and attitudes of nurses towards health research in Botswana and possible interventions to address the study outcomes. Respondents were also informed of possible discomfort when they did not know the correct answers or when

responding to attitude questions. Respondents were assured there were no right or wrong answers, enabling them to respond as honestly as possible, and that their responses would be kept confidential.

- *Non-maleficence*

This principle refers to avoiding or preventing any form of harm to the respondents. The study was non-experimental in nature and posed minimal risk to respondents. Potential risks to respondents were more psychological, related to disclosure of personal and other information when completing the questionnaire. Respondents were reassured that their answers were very important for the study and would not be shared with any person outside the research. Respondents did not incur any costs of participating in the study, as the questionnaires were delivered to the clinics directly. The study may have inconvenienced nurses in terms of their time. Respondents were provided sufficient time to complete the questionnaire to limit any inconvenience and to prevent the need to complete it during working hours and thus interfering with patient care. A copy of the information leaflet that explained the purpose and the processes of data collection and the time required for the participant to fill in the questionnaire was provided.

- *Scientific integrity*

Scientific integrity refers to adherence to scientific ethos and scientific rigour and avoiding research misconduct. Research misconduct refers to fabrication, falsification and plagiarism in the conduct or reporting of research results (Polit & Beck 2017:153). Scientific integrity protects study participants through the trust bestowed upon the researcher by the public. Steneck (2007:3) in the United States National Institutes of Health (NIH) Office of Research Integrity (ORI) Responsible Conduct of Research (RCR) guideline describes the values that researchers must adhere to all the time when conducting research as:

*Honesty:* The researcher must convey information truthfully.

*Accuracy:* The researcher must report findings precisely and take care to avoid errors.

*Objectivity:* The researcher must let the facts speak for themselves and avoid bias.

For this study, the researcher adhered to scientific ethos and rigor in conducting the research. The researcher utilised the prescribed format, structure and organisation of the research report according to the Department of Health Studies at UNISA. The researcher strived to cover the whole research process and provided a factual account of the whole project. This report shows how the research was done and includes findings of the research study as they are. The researcher utilised the recommended referencing style (the abbreviated Harvard system), which was used consistently in the research report and in the bibliography of the sources consulted. Importantly, the researcher conducted a comprehensive literature review to provide scientific merit to the study and also acknowledging and referencing other researchers' work.

### **3.3.6 Data analysis**

Polit and Beck (2017:725) describe data analysis as “the systematic organisation and synthesis of research data”. Data analysis is also defined as the process that draws information together to make a clearer picture of all the information collected (Rebar & Gersch 2015:348). In preparation for data analysis, the researcher performed some checks on the questionnaires to ensure data completeness and accuracy. Data was entered into an excel spreadsheet to create a complete data set. After entry, the data were cleaned and analysed using Stata version 15.1 (Statacorp, college station, TX, USA).

A clean database with transcription errors corrected was used to generate the necessary tables and graphs, in accordance with the pre-designed analysis plan in the research consistency matrix. A summary of descriptive statistics was conducted to summarise data. These included the calculation of averages and proportions. The primary independent variables of interest were knowledge and attitudes. The knowledge and attitude scores were calculated as described above. Cross-tabulations and multivariate analyses, including associations with good knowledge and attitudes, were also conducted. Fisher's Exact test or Chi-square was used to assess these associations. The Chi-square test is used to determine whether an association (or relationship) between two categorical variables in a sample is likely to reflect a real association between these two variables in the population. The sample data is used to calculate a single number (or test statistic), the size of which reflects the probability (p-

value) that the observed association between the two variables has occurred by chance.

Bi-variate analyses were used to identify correlates of good knowledge and good attitudes (demographics, research experience, research education training and Institutional factors). Multivariate logistic regression analysis was performed to adjust for possible confounding factors. Possible explanatory variables were entered into these models, including age category, gender, and nationality. Variables in each model with a p value of 0.05 or less were then included in the multivariable model. For all, 95% confidence intervals (CIs) were determined. Logistic regression models for binary response variables allowed to estimate the probability of the outcome (in this case good knowledge or good attitude), based on the values of the explanatory variables (research training, research experience). Running the logistic regression model enables the calculation of p-values for each explanatory variable and identification of all explanatory variables that are statistically significant. Each variable that is statistically significant provides evidence that it has an independent effect on the probability of occurrence of the response variable (rather than just a difference observed due to chance). It also provides information on whether the effects are positive or negative and how strong they are.

### **3.4 INTERNAL AND EXTERNAL VALIDITY OF THE STUDY**

This section will discuss issues relating to measures that the researcher took to enhance the study's integrity that will include aspects related to the study validity.

Polit and Beck (2017:747) refer to validity as the "degree to which inferences made in the study are accurate and well-founded". Validity is also described as the extent to which a measuring instrument measures what it was designed to measure (Bordens & Abbott 2016:129). Measures which the researcher took to ensure internal and external validity will be described together with how the study questionnaire's validity was ensured.

### **3.4.1 Internal validity**

Internal validity refers to the ability of the chosen research design to test the hypothesis it was designed to test (Bordens & Abbott 2016:111) or the extent to which it is possible to make an inference that the independent variable, rather than another factor, caused the outcome (Polit & Beck 2017:223). Internal validity was enhanced by pre-testing the data collection instrument among nineteen nurses who did not form part of the main study to avoid “*testing effects*” as described by Bordens and Abbott (2016:114). Bias often threatens validity of a study (Ehrlich & Joubert 2014:163). The utilisation of applicable and appropriate sampling methods and a cross-sectional research study design improved the internal validity of the study. Conducting a literature review of existing scientific information helped the author determine what other researchers have done to devise and improve methods that are valid in collecting the same information. Use of similar methods as seen in literature review provides additional confidence in the validity of the chosen research design.

### **3.4.2 External validity**

External validity refers to the degree to which study results can be extended beyond the sample in which they were obtained (Bordens & Abbott 2016:115) or whether inferences about observed relationships will hold over various persons, settings, time or measures of the outcomes (Polit & Beck 2017:216). External validity was enhanced by providing all the clinics in the Gaborone District an opportunity to be selected to take part in the study and an adequate representative sample size of nurses participating in the study.

### **3.4.3 Instrument validity**

The purpose of the pre-testing of the instrument was further to determine the time taken to complete the questionnaire, to pick out questions that were not understandable to participants, to evaluate content, and to face validity. The research instrument was reviewed and approved by a statistician and the supervisor. The review was meant to establish relevance, comprehensiveness and whether or not the content represents the domains of the construct in a balanced manner. The questionnaire designed and used by the researcher in this study was based on an in-depth literature review.

#### **3.4.4 Questionnaire reliability**

Reliability is whether or not a measure or questionnaire produces the same or similar responses with repeated administrations of the same or a similar instrument under identical conditions (Bordens & Abbott 2016:126) or the extent to which scores are free from measurement error (Polit & Beck 2017:303). For an instrument to be reliable, repeated use of the measure must attain similar values. Reliability of an instrument is generally measured using Cronbach's alpha or a *coefficient alpha*. The Cronbach alpha value close to +1 indicates that the instrument is measuring consistently what it is supposed to measure (Polit & Beck 2017:308). The researcher ensured that the research instrument was reliable by conducting a pre-test among nineteen nurses. Pre-testing enabled refinement of the questionnaire and thus improved its quality. The Cronbach alpha or *coefficient alpha* of the final refined questionnaire was 0.97, which indicates a very high degree of internal consistency.

### **3.5 SUMMARY**

The main aim of this study was to determine the knowledge nurses had about health research and the attitudes they possess towards health research. This chapter described the methodology followed by the researcher to address the research question. It provided an overview of the selected approach. The chapter also provided insight into how data was collected, processed, and analysed, and how basic ethical principles were observed during the data collection phase of the study.

Chapter 4 will provide a detailed presentation of the study results.

## **CHAPTER 4**

### **ANALYSIS, PRESENTATION AND DESCRIPTION OF RESEARCH FINDINGS**

#### **4.1 INTRODUCTION**

Chapter 3 discussed the research design, methods of data collection and data analysis plan. Chapter 4 presents the data analysis and interpretation of research findings. Data analysis is the systematic organisation and synthesis of research data (Polit & Beck 2017:725).

Quantitative research was conducted by using a structured questionnaire in order to obtain numerical data that was analysed statistically. Data was analysed using Stata version 15.1 (Statacorp, college station, TX, USA). The findings of this study are discussed according to the section of the questionnaire used to collect data from study participants as below:

Section 1: Demographic information (8 items)

Section 2: Knowledge questions (10 items)

Section 3: Attitudes questions (20 items)

Section 4: Research experience (5 items)

Section 5: Research education Training (3 items)

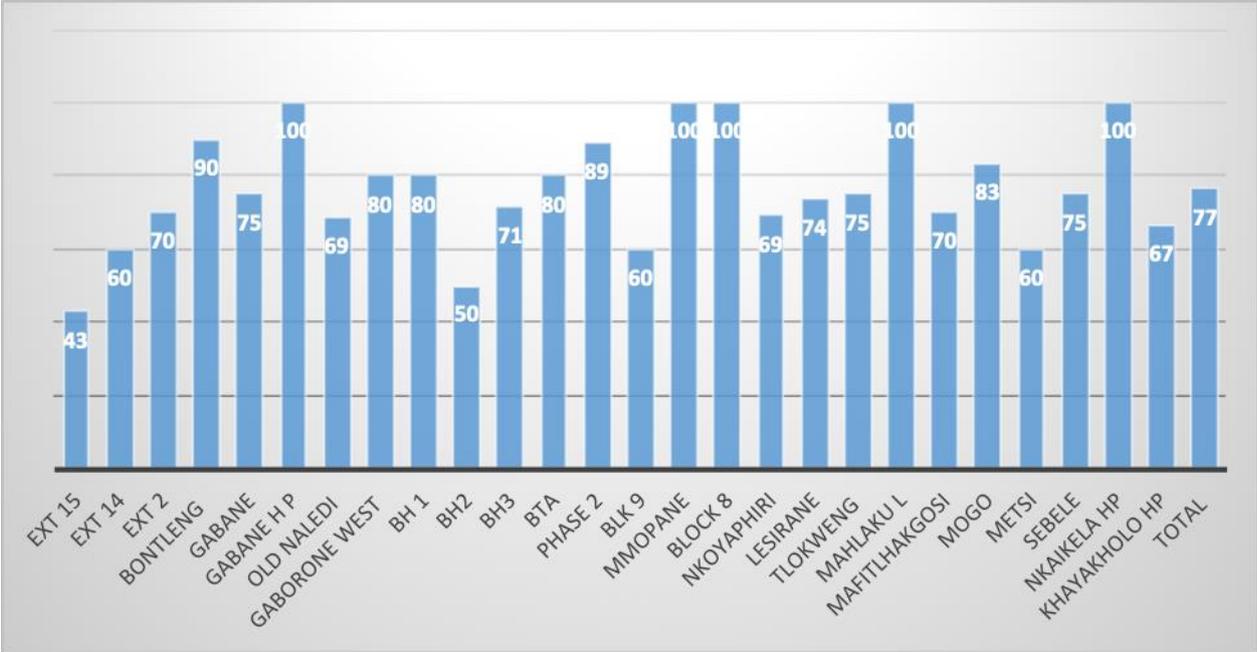
Section 6: Institutional factors (5 items)

#### **4.2 DATA MANAGEMENT AND ANALYSIS**

Data collection occurred from 13 May to 12 July 2019. The researcher personally distributed 218 questionnaires across the 26 clinics that were sampled.

The questionnaires were assigned identification numbers before data was entered into the computer for analysis. Data was then entered into data entry forms for analysis. Descriptive statistics were used to describe the characteristics of the sample from which data was collected. One hundred and sixty-eight (100%, N=168) questionnaires were

returned, which gave a response rate of 77% as depicted in Figure 4.1 below. The response rate across all the clinics was good. In about three-quarters of the clinics, the response rate ranged between 70 and 100%.



**Figure 4.1 Response rate by clinic participating in the study**

**4.3 RESEARCH RESULTS**

The results of individual sections of the questionnaire are described below. The statistics will be presented as follows: ‘N’ will be used for the entire sample of 168 respondents who returned the completed questionnaires, whereas ‘n’ will be used for all other responses obtained. Percentages were rounded off to the nearest full percentage, except for where the confidence interval was calculated (see sections 4.4 and 4.5).

**4.3.1 Sample characteristics**

This section discusses the respondents’ demographic information that includes age, gender, nationality, nursing qualification, post basic qualification, current position, length of service as a nurse and the type of clinic nurses are currently working in.

**4.3.1.1 Age of respondents**

The results show that most of the respondents were aged between 35-44 years (34%, n=58), a third were 25-34 years (30%, n=50) and a quarter were aged 45-54 years (26%, n=44). The least-represented age groups were the oldest and youngest age

groups of 55 years and above at 7% (n=11) and 18-24 years at 3% (n=5) respectively (Table 4.1). This is similar to the mean age of nurses in a research utilisation study by Mutisya et al (2015) in Kenya, where the mean age of respondents was 39 years (range 28-57 years) and majority (40%, n=73) were aged 32-43 years.

#### **4.3.1.2 Gender**

Out of 168 respondents, the majority were females (81%, n=136), while only 19% (n=32) were males (Table 4.1). This is representative of the nursing population in Botswana, which consists predominantly of females. According to the Nursing and Midwifery Council of Botswana, 12 179 nurses were registered for 2019, 72% (n=8 801) of whom are females and 28 % (n=3378) are males (Kau-Kigo 2019).

#### **4.3.1.3 Nationality**

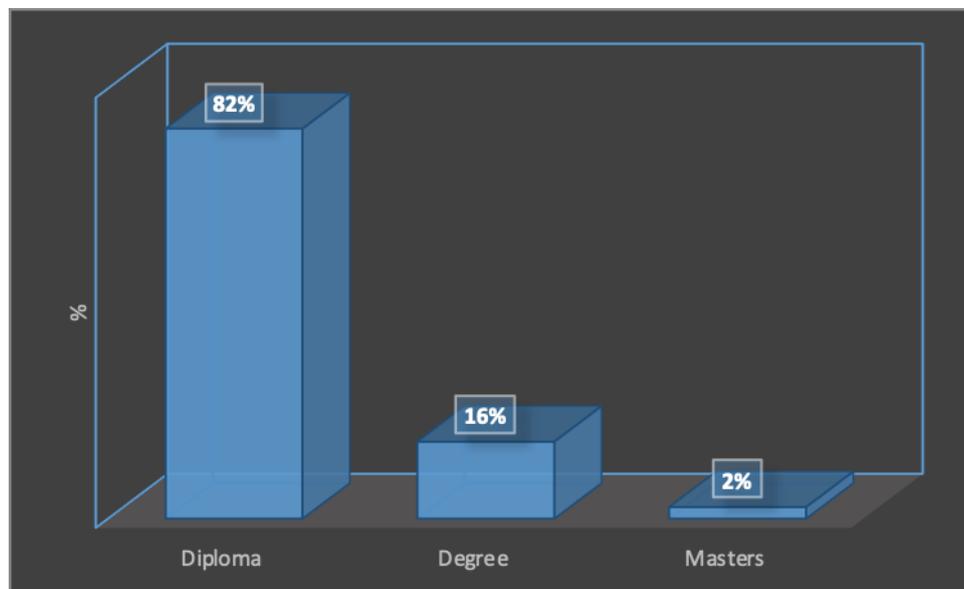
Among those who responded (n=163), nearly all (99%, n=161) of the nurses who responded to the questionnaire were Botswana citizens. Only two (1%) non-citizens participated in the survey (Table 4.1). Most nurses in public facilities are citizens. Five respondents did not report their citizenship and were not included in the data analysis.

**Table 4.1 Age, gender and nationality distribution of respondents**

<b>Variable</b>	<b>n</b>	<b>%</b>
<b>Age category (N=168)</b>		
18-24	5	3
25-34	50	30
35-44	58	34
45-54	44	26
55+	11	7
<b>Gender (N=168)</b>		
Male	32	19
Female	136	81
<b>Nationality (n=163)</b>		
Citizen	161	99
Non-citizen	2	1

#### **4.3.1.4 Nursing qualification**

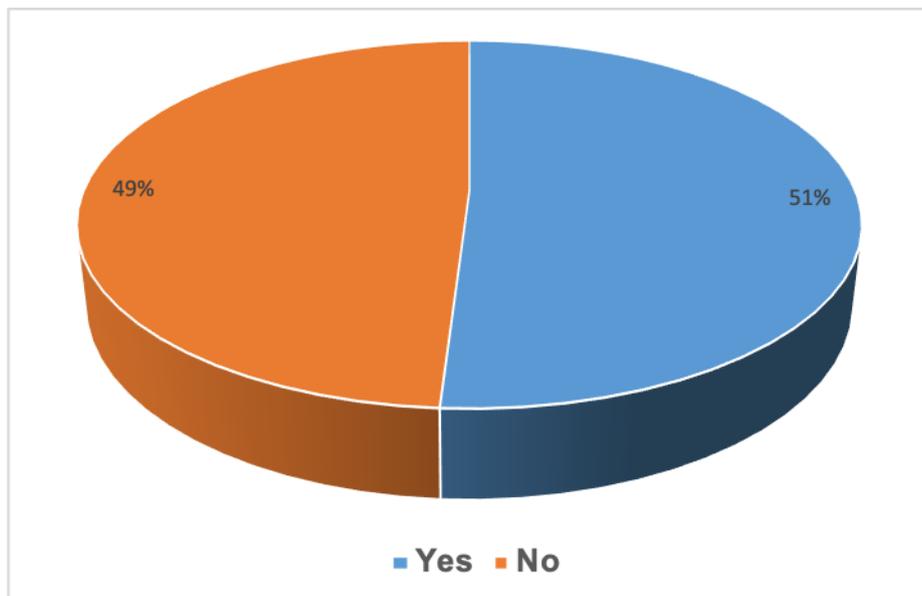
Figure 4.2 depicts the nursing qualifications of the respondents. The majority of respondents had a diploma (82%, n=137), followed by (16%, n=27) who had a degree. Few of the respondents, (2%, n=4), had a Master's degree. None of the respondents had a doctoral qualification. This is consistent with local context, as the nursing degree is relatively new in Botswana. Before the year 2000, the nursing diploma was the entry nursing qualification, and nurses who previously had a certificate in nursing (enrolled nurses) were all upgraded to diploma level and added to the number of diploma holders.



**Figure 4.2 Nursing qualifications of respondents (N=168)**

#### **4.3.1.5 Post-basic qualification**

The respondents were split in the middle regarding the possession of a post-basic qualification. Among 168 respondents, 51% (n=84) indicated that they had a post-basic qualification, while 49% (n=83) had no post-basic qualification. One respondent did not indicate whether they had a post-basic qualification.



**Figure 4.3 Possession of post-basic qualifications by respondents (n=167)**

#### ***4.3.1.6 Type of post-basic qualifications possessed by respondents***

Respondents were asked to indicate all the applicable post basic qualifications they possessed (which may be more than 1). A total of 84 respondents (51%) had indicated they possessed a post-basic qualification as described in section 4.3.1.5 above. However, 86 respondents (52%) answered the question on which post-basic qualification they had. Among these 86 responses, the majority of the respondents (79%, n=68) reported a midwifery qualification, followed by 7% each (n=6) of family nurse practitioner (FNP) and community health nursing (CHN) as depicted by Table 4.2 below. Mental health had the least representation among respondents (6%, n=5). Midwifery training has been the most common primary post-basic course traditionally provided in Botswana for years and it is the only post-basic course currently registered with the Nursing and Midwifery Council of Botswana (Nurses and Midwives Act No.1, 1995) (Botswana Statute Law 1995).

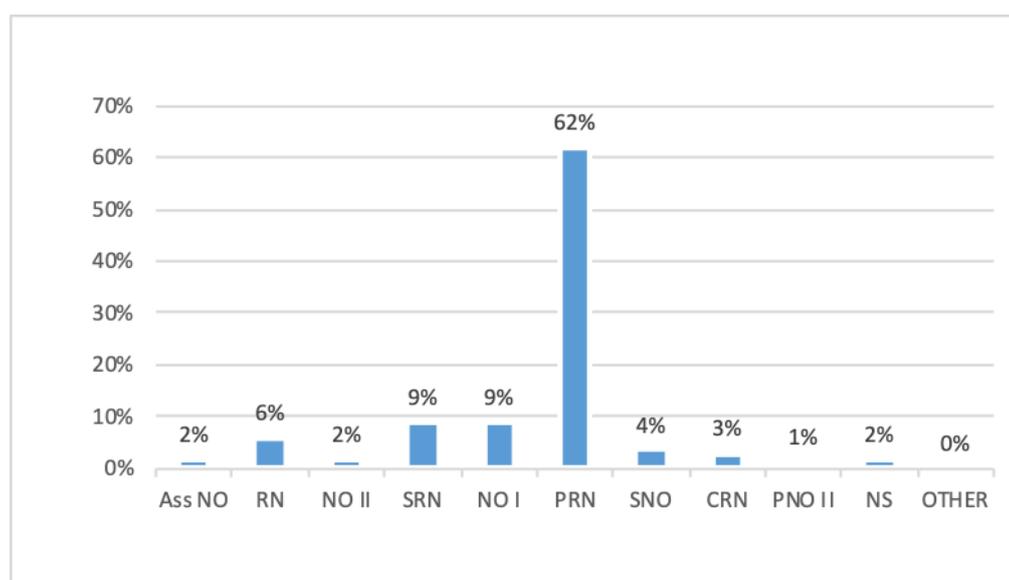
**Table 4.2 Detailed post-basic qualification of respondents (n=86)**

Qualification	N	%
Family nurse practitioner	6	7
Midwifery	68	79
Mental health	5	6
Community health nursing	6	7
Public health	2	2
Nursing management	2	2
Psychology	1	1
<b>Other</b>		
Human resource management	1	1
Health and social services	1	1
Infection prevention and control	1	1

\*A nurse can have more than one post-basic qualification.

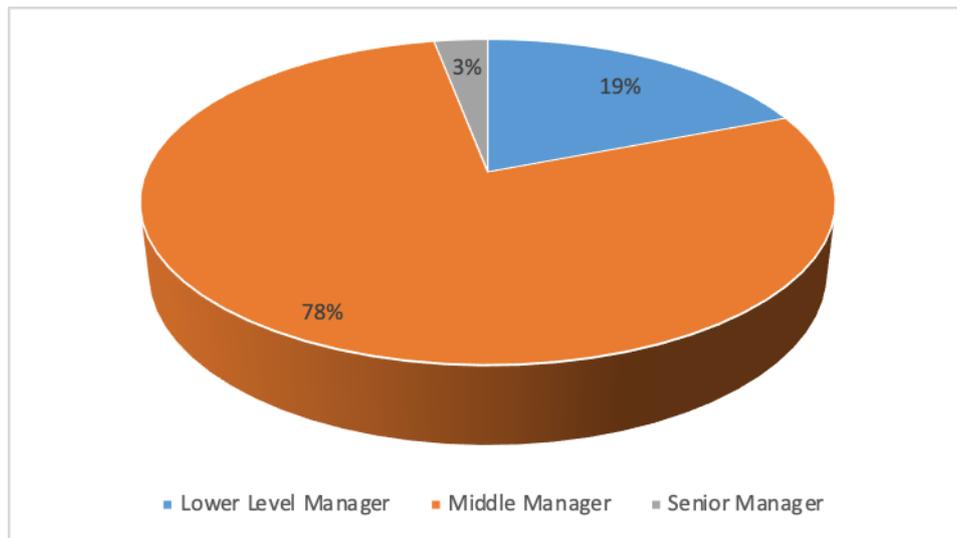
#### **4.3.1.7 Current position**

The majority of the respondents as shown in Figure 4.4 were principal registered nurses (PRN) (62%, n=104), followed by nursing officer I (NO I) (9%, n=16), senior registered nurse (SRN) (9%, n=15) and registered nurse (RN) (6%, n=11) respectively. Other positions ranged between 1% and 4%. This means the majority of nurses were in the middle management level involved in the running of the clinics.



**Figure 4.4 Current position held by respondents (n=135)**

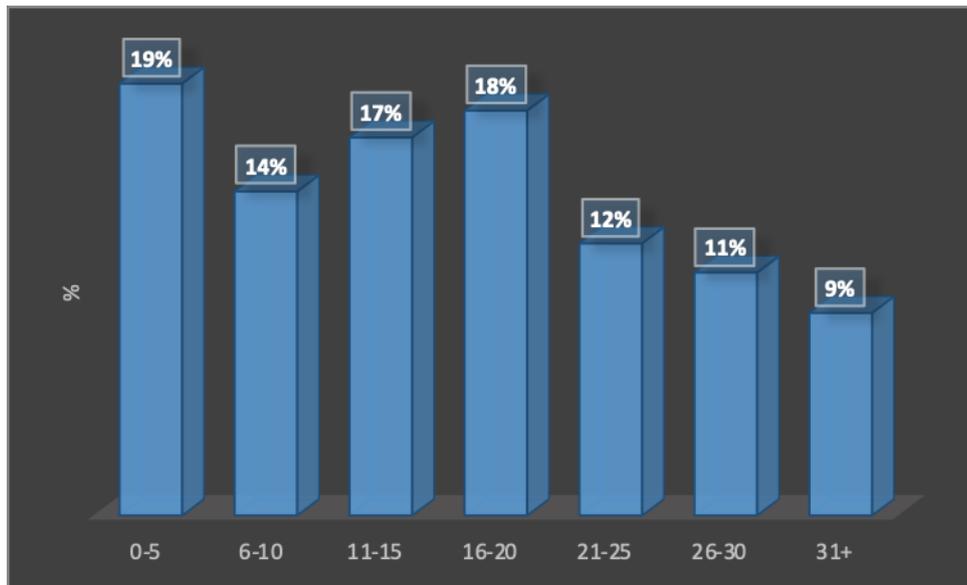
Additionally, the researcher reclassified respondents' positions into low-level management, mid-level management and senior-level management nursing positions, in order to clarify further the positions within the health facility in terms of level of management. This reclassification is depicted below in Figure 4.5. The majority of respondents (78%, n=131) were middle managers responsible for the running of the health facilities.



**Figure 4.5 Managerial roles of respondents (N=168)**

#### **4.3.1.8 Length of service as a nurse**

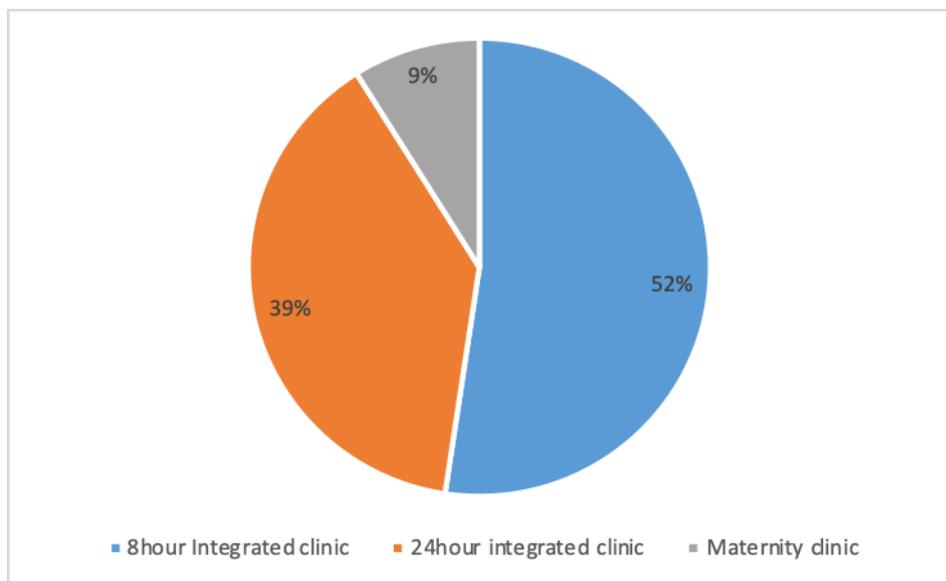
Respondents were asked to indicate the number of years they had worked since their first appointment. Results shown in Figure 4.6 below indicate that 19% (n=32) fell in the 0-5 years category, 18% (n=30) in the 16-20 years category, 17% (n=28) in the 11-15 years category, 14% (n=24) in the 6-10 years category, 12% (n=21) in the 21-25 years category and 11% (n=18) fell in the 26-30 years in service category. Nine percent (9%, n=15) of respondents indicated they had been working for 31 years and more.



**Figure 4.6 Number of years working since first appointment (N=168)**

#### **4.3.1.9 Type of clinic they are working in**

At the time of the survey, half of the respondents (52%, n=88) worked in an 8-hour integrated services clinic, 39 % (n=65) worked in a 24-hour integrated clinic, and only 9% (n=15) worked in a maternity clinic.



**Figure 4.7 Type of clinic working in at time of survey (N=168)**

#### **4.3.1.10 Summary of sample demographic information**

The results show that respondents were predominantly female (81%, n=136), Botswana citizens (99%, n=161), and diploma holders (82%, n=137) and worked in an 8-hour integrated services clinic (52%, n=88). In addition, the majority of respondents were principal registered nurses (PRN) (62%, n=104). Half of the respondents had a post-basic qualification, and of note, among those who indicated that they possessed a post-basic qualification, the most common type was midwifery at 79% (n=68).

This gender structure is typical of the ratio of male nurses to their female counterparts in Botswana and other settings across the world. In the majority of articles reviewed where nurses were respondents, females were in the majority. For example, Hagan (2018), Kovačević et al (2017) and Oluwatosin (2014) reported a higher percentage of female respondents than males in their studies. In Botswana, a total of 12179 nurses have been registered with the Nursing and Midwifery Council of Botswana for 2019, and 72% (n=8801) are females while 28% (n=3378) are males (Kau-Kigo 2019).

Similarly, the educational structure is consistent with the nursing programmes offered in Botswana. For an extended period, the nursing diploma was the entry qualification in Botswana, until the early 2000s when the Bachelor of Nursing programme was introduced. In addition, there are numerous nursing colleges offering a nursing diploma compared to only one university that offers the nursing degree programme. Further, there is a higher number of 8-hour integrated service clinics distributed across the whole country than 24-hour and maternity clinics.

#### **4.3.2 Health research knowledge**

Respondents were asked questions to assess the knowledge they possessed in respect of certain aspects of health research (see Table 4.3 below):

**Table 4.3 Description of research knowledge**

<b>Health research knowledge</b>			
<b>Questions</b>	<b>Correct n (%)</b>	<b>Incorrect n (%)</b>	<b>Don't know n (%)</b>
<b>Q1.</b> In health research, ethical conduct refers to (n=159)	132 (83)	9 (6)	18 (11)
<b>Q2.</b> What do Ethics Committees (EC) or Institutional Review Boards (IRB) do in health research? (n=166)	149 (90)	2 (1)	15 (9)
<b>Q3.</b> From whom do researchers seek approval to conduct health research in Botswana (n=166)	125 (75)	18 (11)	23 (14)
<b>Q4.</b> In health research, representativeness is a key characteristic of a: (n=163)	71 (44)	56 (34)	36 (22)
<b>Q5.</b> A type of experimental health research (n=161)	91 (56)	54 (34)	16 (10)
<b>Q6.</b> MEDLINE is: (n=155)	46 (30)	45 (29)	64 (41)
<b>Q7.</b> What is an abstract? (n=159)	110 (69)	33 (21)	16 (10)
<b>Q8.</b> When should consent be obtained in health research? (n=163)	159 (97)	3 (2)	1 (1)
<b>Q9.</b> A research report can also be referred to as (n=162)	62 (38)	82 (51)	18 (11)
<b>Q10.</b> Another form of disseminating health research results (n=155)	95 (61)	42 (27)	18 (12)

In response to **Q1**: (n=159) “*In health research, ethical conduct refers to*”, 83% (n=132) of respondents, or the majority, selected the correct answer, 6% (n=9) selected the wrong answer, and 11% (n=18) selected the “don’t know” option. Most respondents knew that the ethical conduct of health research entails provision or disclosure of all the information about the study to potential participants so that they can make an informed decision, which is consistent to nursing practice where patients need information to help in their clinical care or be partners in their care.

**Q2**: (n=166) “*What Ethics Committees (EC) or Institutional Review Boards (IRB) do in health research*”: the majority (90%, n=149) of the nurses provided the correct answer, while a few (1%, n=2) selected the wrong answer and the “don’t know” option (9%, n=15) respectively. Nurses as professionals are familiar with ethical conduct and structures designed to promote participant’s rights. It was befitting for them to have responded in that manner. The outcome is consistent with results of a study by Aksoy et al (2018), which sought to determine that nurses know that clinical research may not be

started without ethics committee approval and that nurses are well aware of this. The item received the highest number of correct answers.

**Q3:** (n=166) “*From whom do researchers seek approval to conduct health research in Botswana*”, three-quarters of respondents (75%, n=125) knew the correct answer, 11% (n=18) selected the wrong answer, and 14% (n=23) did not know the answer. Nurses continued to demonstrate good knowledge of the process of ethical review, including the body assigned the role of approving health research in Botswana.

**Q4:** (n=163) *What “representativeness” related to in health research*: fewer than half of respondents (44%, n=71) selected the correct answer, while the rest did not know or selected a wrong answer. This was the second-worst performance in terms of knowledge scores. This result confirms that nurses are not familiar with health research terminology. Poor performance in a similar question was found among medical students and interns, where 12% (n=30) provided a correct answer for the question “*sample must be representative*” (Ibrahim, Fetyani & Bashwari 2013:434) .

**Q5:** (n=161) “*Select an example of experimental health research*”: slightly over half of the respondents (56%, n=91) selected the correct answer, 34% (n=54) selected the wrong answer and 10% (n=16) did not know. Nurses in this study were not familiar with types of experimental research.

**Q6:** (n=155) “*MEDLINE is*”: fewer than a third of the respondents (30%, n=46) selected the correct answer (that it is a medical database), 29% (n=45) chose the wrong answer and 41% (n=64) did not know. This was the worst-performing question. The interviewed nurses are very unfamiliar with and do not access resources like MEDLINE that are important for improving health research knowledge which could also have an impact on nursing practice. A similar finding was reported by Adeleke et al (2014) in which only 10% of health workers in the study could identify the African Journal.

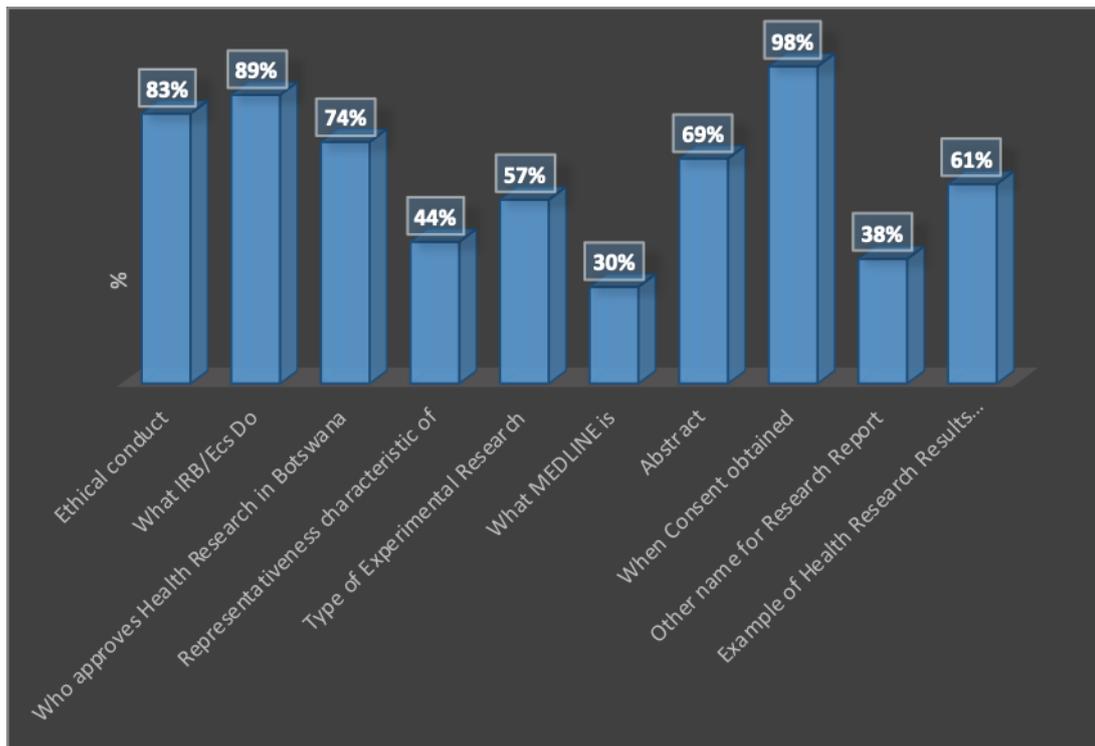
**Q7:** (n=159) “*What is an abstract*”: about two-thirds (69%, n=110) of respondents selected the correct answer, 21% (n=33) respondents selected the wrong answer and 10% (n=16) did not know the answer. Knowledge of an abstract is an indicator of knowledge of the use of health data to produce information that can be assimilated by

health care workers and nurses and that can contribute to evidence-based practice. A third of the nurses in this study do not know what an abstract is.

**Q8:** (n=163) *“When consent should be obtained in health research”*: Almost all the respondents provided the correct answer (97%, n=159), a few selected a wrong answer (2%, n=3) and 1% (n=1) did not know the answer. This was the best performance in terms of knowledge score. This finding is expected, because obtaining informed consent is among the responsibilities of nurses in their routine clinical practice (Aksoy et al 2018:4). Nurses obtain consent from patients for minor and major surgical procedures and are well conversant with issues and requirements of informed consent.

**Q9:** (n=162) *“A research report can also be referred to as”*: The majority of respondents (51%, n=82) selected the wrong answer, 38% (n=62) selected the correct answer (which was a journal article), and 11% (n=18) did not know the answer. Lack of knowledge of what a journal article refers to is a concern for nursing practice, as this means nurses do not read and keep abreast of what informs their nursing practice. If nurses do not know journals, they will not be able to produce any publication from their own research, as reading journals will inform their research too. In a study by Oluwatosin (2014) among nurses in Nigeria, it was found that publication of research reports was very low: only 4% (n=10) of respondents had published a research article.

**Q10:** (n=155) *“Health research results can be disseminated through”*: more than half (62%, n=95) selected the correct answer (which was “Kgotla meeting”). A kgotla is a traditional meeting place in Botswana where issues concerning communities are discussed and messages to community members are relayed through the kgotla traditional system, 27% (n=42) selected the wrong answer, while 12% (n=18) did not know the answer. The response showed that nurses could relate to other fundamental non-contemporary methods of interacting with communities to share information from health research.



**Figure 4.8 Summary of correct responses for each question (N=168)**

#### **4.3.2.1 Summary of research knowledge responses**

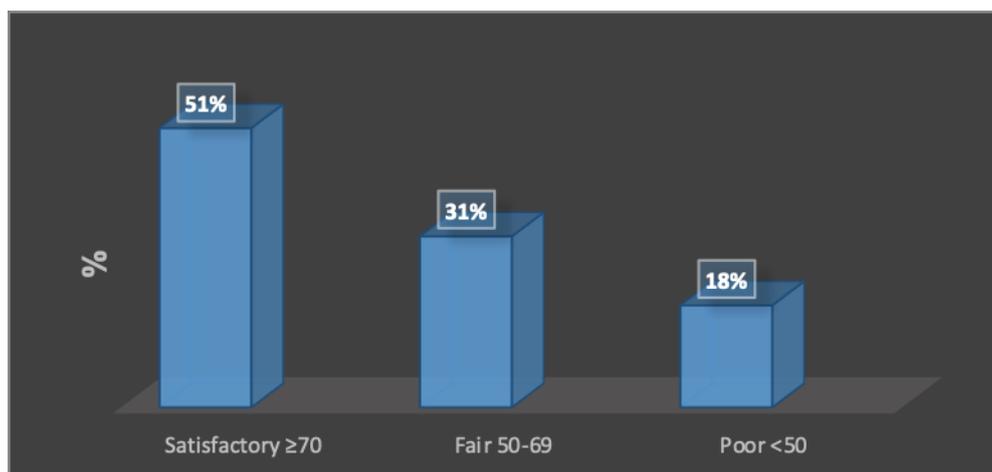
Respondents scored high in questions that referred to concepts that were familiar to the nursing profession. For example, the majority of the respondents performed very well on the question that asked about consent, where 97% (n=159) of respondents were correct. Respondents also performed well in questions that asked about ethical conduct of research, what ethics committees do, and where to get approval for health research in Botswana. Similar results were found in a study among nurses in a Japanese hospital, which showed that more than 95% of respondents were aware of informed consent and related issues and 71.5% were aware of ethics committees (Yanagawa et al 2014). Informed consent and issues related to ethics are part of nursing responsibilities which nurses are aware of as part of their nursing practice. Nurses in this study displayed that they are well conversant with ethical issues that are important for nursing practice, and they will be able to uphold patients' rights and protect them against any forms of injustice.

However, the majority of respondents scored below the pre-determined satisfactory 70% mark in questions that required concrete or substantive knowledge and/or experience in health research terminology. For example, respondents did not know

what representativeness related to, could not give an example of experimental research, and did not know what MEDLINE was. They also did not know the scientific name for a research report (journal article) (Figure 4.8). The results are consistent with a knowledge, attitude and practice study among medical students, by Dhodi et al (2013:240), where it was found that while 50.6% of respondents knew the types and scope of clinical research and had basic knowledge about it, 61% of them could not answer the question about methodology and regulatory requirements associated with clinical research. A similar finding is reported by Giri et al (2014) among Indian doctors: only 18.9% knew the definition of research hypothesis, 17.2% knew the full form of MEDLARS and 21.5% knew what MEDLINE was. The results from both these studies as well as the current study show that research terminology is a challenge among clinicians, which may be due to limited understanding of search engines and academic terms used in research articles.

#### **4.3.2.2 Knowledge score**

According to the knowledge score computed in Figure 4.9 below, only half of respondents (51%, n=85) answered at least seven questions out of ten correctly, which was considered to be satisfactory knowledge of health research. More than a quarter of the respondents had what was considered poor knowledge of health research, while a third were considered to have a fair grasp of health research knowledge. This finding indicates that nurses have limited research knowledge. Poor research knowledge among nurses has been reported in most studies assessing either research utilisation or evidence-based practice among nurses. For example, nurses scored low (M=14.06, SD=3.86) on a knowledge assessment test (KAT) in a study by Xie et al (2017:1) in a psychiatric setting, suggesting lack of evidence-based practice knowledge. Nurses express several factors that limit their research knowledge, including lack of training, lack of support from managers and a lack of mentors (Oluwatosin 2014:144).



**Figure 4.9 Knowledge score (N=168)**

### 4.3.3 Attitudes towards health research

Respondents were asked to respond to attitudes statements and rate themselves on a Likert Scale. Below is a summary of the scores:

**Table 4.4 Attitudes scoring**

Statement	5 n (%)	4 n (%)	3 n (%)	2 n (%)	1 n (%)
1. I feel performing research is only relevant for nurses in leadership positions (n=166)	98 (59)	50 (30)	8 (5)	6 (4)	4 (2)
2. In my opinion, health research is important as it is necessary for nursing practice (n=167)	6 (4)	2 (1)	6 (4)	43 (25)	110 (66)
3. I feel nursing education does not promote health research in their teaching(n=166)	30 (18)	56 (34)	23 (14)	41 (25)	16 (9)
4. Education on research training should be offered to all nursing students (n=163)	6 (4)	1 (1)	4 (2)	46 (28)	106 (65)
5. Skills that I gain during research are not useful in my future work (n=164)	88 (54)	59 (36)	7 (4)	5 (3)	5 (3)
6. Research is important because it improves critical thinking (n=164)	1 (1)	NA	3 (2)	51 (31)	109 (66)
7. Research is beneficial because it helps improve health care (n=161)	2 (1)	NA	5 (3)	45 (28)	109 (68)

<b>Statement</b>	<b>5 n (%)</b>	<b>4 n (%)</b>	<b>3 n (%)</b>	<b>2 n (%)</b>	<b>1 n (%)</b>
8. Nurses are provided with regular educational programmes to improve their research knowledge (n=165)	37 (22)	53 (32)	33 (20)	31 (19)	11 (7)
9. I feel I am familiar with health research ethics terminology (n=165)	32 (19)	50 (30)	46 (28)	23 (14)	14 (9)
10. I don't trust the research results reported to the public (n=164)	23 (14)	76 (46)	49 (30)	8 (5)	8 (5)
11. I will be glad to participate in research education lessons (n=161)	5 (3)	5 (3)	18 (11)	74 (46)	59 (37)
12. I feel time spent giving patient care is more important than time spent for health research (n=165)	25 (15)	70 (42)	38 (23)	21 (13)	11 (7)
13. I am interested in conducting my research project and publish results (n=166)	4 (2)	5 (3)	43 (26)	64 (39)	50 (30)
14. I feel confident in my ability to interpret research findings (n=164)	9 (5)	32 (20)	56 (34)	38 (23)	29 (18)
15. I feel confident about my ability to design a research study (n=164)	15 (9)	44 (27)	49 (30)	32 (19)	24 (15)
16. I will fully support health research activities conducted by other researchers in my health facility (n=164)	4 (3)	2 (1)	12 (7)	57 (35)	89 (54)
17. It is unnecessary for junior nurses to conduct research (n=165)	93 (56)	32 (20)	7 (4)	21 (13)	12 (7)
18. Conducting research is difficult (n=162)	24 (15)	31 (19)	52 (32)	39 (24)	16 (10)
19. Research improves communication skills (n=163)	3 (2)	7 (4)	15 (9)	62 (38)	76 (47)
20. Nurses can carry out a research and write a paper (n=161)	3 (2)	10 (6)	21 (13)	59 (37)	68 (42)

(Key: 5=Strongly Disagree; 4=Disagree; 3=Neutral; 2=Agree; 1=Strongly Agree)

The following describes the reported attitudes of respondents towards each item in Table 4.4 above:

**Statement 1:** *“I feel performing research is only relevant for nurses in leadership positions”*: (n=166). A total of 59% (n=98) of respondents strongly disagreed with the statement, 30% (n=50) disagreed, 5% (n=8) were neutral, and 4% (n=6) and 2% (n=4) agreed and strongly agreed with the statement respectively. The response to this statement indicates that respondents believe that research is for all nurses irrespective of their positions.

**Statement 2:** *“In my opinion, health research is important as it is necessary for nursing practice”*: (n=167). Two-thirds of the respondents (66%, n=110) strongly agreed with the statement, 26% (n=43) agreed with it, 4% (n=6) were neutral, while 4% (n=6) and 1% (n=2) strongly disagreed and disagreed respectively with the statement. Nurses are positive that health research is important for nursing practice. The same sentiment was shared by nurses in a study by Robichaud-Ekstrand (2016), in which 95.1% of nurses wanted to be involved in the inclusion of evidence-based findings into their practice.

**Statement 3:** *“I feel nursing education does not promote health research in their teaching”*: (n=166). One-third of the respondents (34%, n=56) disagreed with the statement, 18% (n=30) strongly disagreed, 14% (n=23) were neutral, while 25% (n=41) agreed and 10% (n=16) were strongly in agreement with the statement. This is a positive attitude displayed by nurses in response to the statement. In congruence to this response, Slattery et al (2016:413) allude to the fact that as the nursing profession evolves, there is need and interest to expose nursing students to a more intense and realistic research experience and instil a research culture among them, so as to improve the knowledge and attitude they display towards research.

**Statement 4:** *“Education on research training should be offered to all nursing students”*: (n=163). A majority of the respondents, that is 65% (n=106) strongly agreed, 28% (n=46) agreed, 4% (n=6) strongly disagreed, and only 2% (n=4) were neutral. Most respondents in this study believe all nursing students should be provided with the opportunity for research training while at nursing college or university. Provision of research education training to student nurses may improve the acceptance of research by clinical nurses, as they will transition from student nurse to registered nurse with a

good attitude towards research (Leach et al 2016:202). It is therefore important for nursing colleges to orientate students about research benefits for nursing practice, and the curricula of nursing colleges should promote values of evidence-based practice (Halabi 2016:122).

**Statement 5:** *“Skills that I gain during research are not useful in my future work”*: (n=164). Respondents overwhelmingly strongly disagreed and disagreed with the statement, at 54% (n=88) and 36% (n=59) respectively. Only a small number of participants agreed (3%, n=5) and strongly agreed (3%, n=5) with the statement, and 4% (n=7) were neutral. This is a positive attitude, as it means nurses appreciate that research is important for their career and professional growth. Similar findings are reported by Roets and Lubbe (2016:8) among nursing students who wanted to be involved in research projects before developing their own, as they would gain research skills to allow them do their own work in future. The same result is alluded to by Ibrahim et al (2013:437) among medical students and interns, as they agreed that research is beneficial for their future career.

**Statement 6:** *“Research is important because it improves critical thinking”*: (n=164). Most respondents (66%, n=109) strongly agreed with the statement, 31% (n=51) agreed, 2% (n=3) were neutral and 1% (n=1) strongly disagreed. The response shows that nurses believe research is important for decisions that they make and can improve their cognitive abilities, and hence improve the care they provide to patients. Critical thinking skills can be improved by reading journal articles and being aware of what the literature says. Nurses in a study by Water et al (2018) cited self-education (58%, n=109/188) and keeping up to date with new practices (54%, n=101/188) as reasons why they read professional journals. The acquisition of critical thinking skills has been shown to be a significant predictor of positive attitudes toward research (Martin 2017:215).

**Statement 7:** *“Research is beneficial because it helps improve health care”*: (n=161). Sixty-eight percent (n=109) of respondents strongly agreed, 28% (n=45) agreed, while 3% (n=5) were neutral and 1% (n=2) strongly disagreed. The response indicates that most of the respondents agree that research is important for the benefit of the patients they take care of. In order to realise the improvement of patient care through research, some nurses in a Danish hospital showed an interest in research by doing research

aimed at decreasing the waiting time in outpatient facilities and decreasing medication-related adverse events. Others were to embark on studies on patient empowerment in caring for leg wounds and improving care for orthopedic trauma patients (Berthelsen & Hølge-Hazelton, 2015:79).

**Statement 8:** *“Nurses are provided with regular educational programmes to improve their research knowledge”*: (n=165). Thirty-two percent (n=53) disagreed and 22% (n=37) strongly disagreed. On the other hand, 19% (n=31) and 7% (n=11) agreed and strongly agreed, while 20% (n=33) were neutral and could not explicitly state their views. This finding suggests that nurses feel there are no opportunities provided for them to learn and gain skills about health-research knowledge, as knowledge can be acquired through structured educational programmes within the work environment.

**Statement 9:** *“I feel I am familiar with health research ethics terminology”* (n=165). Thirty percent (n=50) disagreed, 19% (n=32) strongly disagreed, 28% (n=46) were neutral, while 14% (n=23) and 8% (n=14) agreed and strongly agreed with the statement. The responses indicate that most of the respondents are not familiar with research ethics terminology, which is contrary to the response obtained when assessing knowledge. Respondents performed better in questions related to ethics, such as the informed consent and the role of ethics committees. This may demonstrate a lack of confidence in their knowledge levels and a desire to have specific training to improve knowledge levels as well as confidence in that knowledge.

**Statement 10:** *“I don’t trust the research results reported to the public”*: (n=164). Forty-six percent (n=76) disagreed, 30% (n=49) were neutral, and 14% (n=23) strongly disagreed. Cumulatively, 10% (n=16) agreed and strongly agreed with the statement. Trust is a crucial element in health research bestowed upon researchers, including nurses, by the public. Respondents agreed that they trusted research results reported to the public, which is a positive attitude. A study by Aksoy et al (2018:3), however, reported to the contrary, as fewer nurses agreed with the statement that said “clinical research is reliable”.

**Statement 11:** *“I will be glad to participate in research education lessons”*: (n=161). A number of respondents expressed agreement with the statement (46%, n=74), while 37% (n=59) strongly agreed, 11% (n=18) were neutral and 6% (n=10) disagreed and

strongly disagreed respectively. This is a positive attitude, which was also expressed by nurses in a research training needs study in China, reported by Wu et al (2019:307).

**Statement 12:** *“I feel time spent giving patient care is more important than time spent for health research”*: (n=165). Forty-two percent (n=70) of respondents disagreed and 15% (n=25) strongly disagreed. On the other hand, 23% (n=38) of respondents were neutral, while 13% (n=21) agreed and 7% (n=11) strongly agreed. This result indicates that slightly above half of the respondents believe time spent doing health research is as important as patient care. However, a few felt patient care is more important than health research, while another one-third were not sure or did not want to commit to any of the views.

**Statement 13:** *“I am interested in conducting my research project and publish results”*: (n=166). Thirty-nine percent (n=64) and 30% (n=50) of the respondents agreed and strongly agreed with the statement, 26% (n=43) were neutral, while 3% (n=5) and 2% (n=4) disagreed and strongly disagreed respectively. Respondents are interested in doing their own research and sharing the results with the rest of the world. This is however contrary to findings by Paget et al (2014:87) in a study among clinicians, in which nurses reported less motivation to conduct their own research. Further, Black et al (2016:17), have noted that there was no significant improvement in the willingness to conduct research among point-of-care clinicians, of which majority were nurses, after provision of research training workshops.

**Statement 14:** *“I feel confident in my ability to interpret research findings”*: (n=164). The majority of respondents, at 34% (n=56) were neutral and could not explicitly state their position on the issue, while 23% (n=38) agreed, 18% (n=29) strongly agreed, 20% (n=32) disagreed and 5% (n=9) strongly disagreed. Most of respondents were uncertain about their ability to interpret research findings.

**Statement 15:** *“I feel confident to design a research study”*: (n=164). A similar response as for interpretation of research findings was obtained, 30% (n=49) of respondents were neutral, which was the majority, (27%, n=44) disagreed, 9% (n=15) strongly disagreed, 19% (n=32) agreed and 15% (n=24) strongly disagreed.

**Statement 16:** *“I will fully support health research activities conducted by other researchers in my health facility”*: (n=164). Respondents were very clear and expressed their commitment to support health research activities conducted by other researchers in their health facilities; 54% (n=89) strongly agreed, 35% (n=57) agreed, 2% (n=4) strongly disagreed, 1% (n=2) disagreed and 7% (n=12) were neutral. The response indicates that nurses will be supportive of health research activities taking place in their respective health facilities.

**Statement 17:** *“It is unnecessary for junior nurses to conduct research”*: (n=165). Fifty-six percent (n=93) of respondents strongly disagreed, 19% (n=32) disagreed, while 13% (n=21) and 7% (n=12) agreed and strongly agreed respectively. Only 7% (n=12) of respondents were neutral. This is a positive outcome, as any nurse either at leadership or at junior positions can conduct research.

**Statement 18:** *“conducting research is difficult”*: (n=162). Thirty-two percent (n=52) of respondents were neutral, 24% (n=39) agreed, 19% (n=31) disagreed and 15% (n=24) strongly disagreed. Only 10% (n=16) strongly agreed. Even though some respondents were uncertain about whether conducting research is difficult or not, about the same number agreed that conducting research is difficult. This result aligns with what was expressed by nurses in Kenya, who wanted to be trained in research, to have it clearly explained to them and be given the assurance that they can also do it (Mutisya et al 2015:97). Similar results are reported by Loke et al (2014:136), that research is regarded as a difficult process for nurses.

**Statement 19:** *“Research improves communication skills”*: (n=163). Respondents portrayed a positive attitude, as 47% (n=76) strongly agreed with the statement, 38% (n=62) agreed and 9% (n=15) were neutral. A handful, (4%, n=7; 2%, n=3), disagreed and strongly disagreed respectively. Agreement with the statement is a positive attitude and is similar to what was expressed by respondents in a study by Jahan et al (2016:4), in which more than one-third identified that research promotes critical thinking which is important for improved communication.

**Statement 20:** *“Nurses can carry out research and write a paper”*: (n=161). Respondents were positive that nurses can conduct research and produce results, as 42% (n=68) and 37% (n=59) strongly agreed and agreed with the statement. Only 13%

(n=21) were neutral, while 6% (n=10) and 2% (n=3) disagreed and strongly disagreed respectively. The result, however, contradicts the fact that nurses reported that conducting research is difficult.

#### 4.3.3.1 Summary of attitudes towards health research

Generally, respondents felt health research is important and expressed the view that nurses should be given training, both at nursing school and during their careers, as it is important for nursing practice and helps in developing critical thinking. Respondents were willing to be provided with opportunities for further training and were interested in conducting research themselves – although 34% of them felt conducting research was difficult. Respondents also pledged their support for research conducted by other researchers within their health facilities. These results are in line with what has been found in previous studies. Nurses in a Kenyan teaching hospital, in a study by Mutisya et al (2015), expressed the need to be informed and updated with research knowledge, emphasised the lack of training offered, and hence stressed the need to be provided with training and offered the assurance that they can also do it. This finding is also alluded to by Evans et al (2014); nurses in their study felt nursing research increased their professional knowledge base and improved clinical practice and patient outcomes.

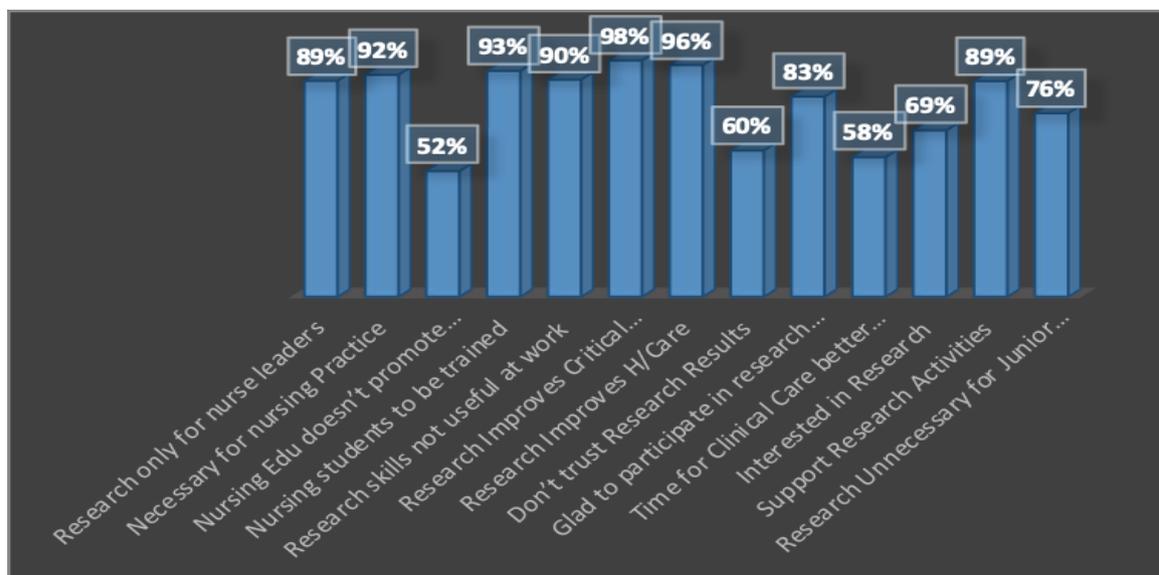
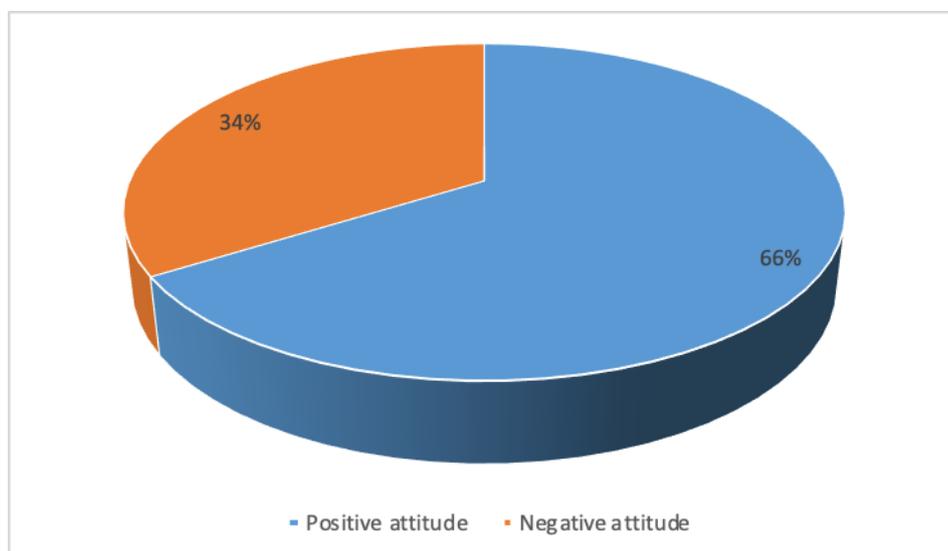


Figure 4.10 Summary of attitude for each statement (N=168)

#### 4.3.3.2 Summary of attitude score

According to the attitude score computed in Figure 4.11 below, more than half of respondents (66%, n=111) scored 70% and above, thus revealing a positive attitude towards health research, while 34% (n=57) displayed a negative attitude. From this finding, generally nurses have a positive attitude towards research. This finding is similar to what has been found in most studies. Although nurses may have a low degree of research knowledge, they are still interested and motivated to improve their research skills (Berthelsen & Hølge-Hazelton 2015:80). Additionally, “attitude towards health research is one of the important predictors of evidence-based practice” (Soe, Than, Lwin, Htay, Phyu & Abas 2019:5).



**Figure 4.11 Attitude score (N=168)**

#### 4.3.4 Research experience

Respondents were asked to self-report if they had had an opportunity to take part in health research as researchers or as research participants. Table 4.5 below depicts that half of the respondents (50%, n=83) report that they had had an opportunity to be researchers as part of their academic qualification, while the other half (50%, n=82) reported the opposite, that is, they had not been researchers for their academic qualification requirements. The results also show that 84% (n=136) of respondents reported not being researchers during their nursing careers after completion of nursing school, while 16% (n=26) had been researchers after nursing school. Furthermore, a

third (31%, n=8) of respondents who have been researchers during their nursing careers were degree holders and 14% (n=18) were diploma holders. In addition, 96% (n=157) of respondents were not currently involved in health research.

With regard to being involved in research as participants, 40% (n=66) of the respondents had not been research participants before, while 60% (n=100) have been research participants before. The majority of respondents also indicated their willingness to volunteer to take part in health research as research participants (84%, n=141), while 16% (n=26) were not keen to take part in health research as research participants.

**Table 4.5 Research experience of respondents**

<b>Research experience (RE)</b>	<b>Yes n (%)</b>	<b>No n (%)</b>
<b>RE 1.</b> Have been a researcher for academic qualification: (n=165)	83 (50)	82 (50)
<b>RE 2.</b> Have been a researcher during nursing career: (n=162)	26 (16)	136 (84)
<b>RE 2a.</b> Principal investigator	1 (4)	
<b>RE 2b.</b> Research assistant	11 (46)	
<b>RE 2c.</b> Research/study nurse	12 (50)	
<b>RE 3.</b> Currently involved in health research as a researcher: (n=164)	7 (4)	157 (96)
<b>RE 3a.</b> Principal investigator	2 (25)	
<b>RE 3b.</b> Research assistant	2 (25)	
<b>RE 3c.</b> Research/study nurse	3 (38)	
<b>RE 3d.</b> For academic purposes	1 (13)	
<b>RE 4.</b> Ever been a research participant before: (n=166)	66 (40)	100 (60)
<b>RE 5.</b> Would volunteer to take part in health research as a research participant: (n=167)	141 (84)	26 (16)

#### **4.3.4.1 Summary of research experience**

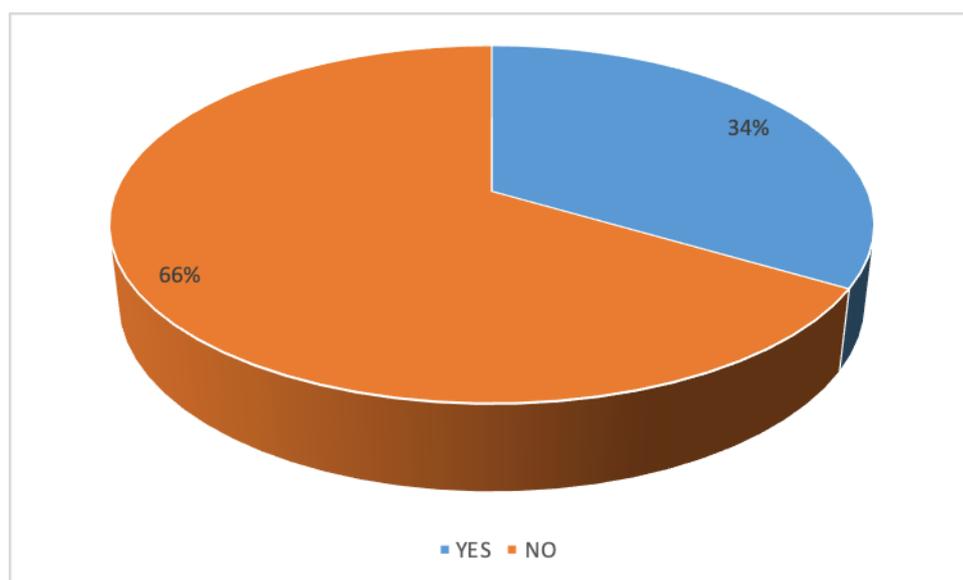
Among the nurses surveyed, there is a similar proportion of nurses who had the opportunity to be researchers for their academic qualification and those who have not (50%, n=83 vs 50%, n=82). In addition, the majority of nurses (84%, n=136) have not had the opportunity to be researchers during their nursing careers. However, degree holders have had research experience through doing research for academic qualifications and have had an opportunity to be researchers during their nursing

careers, unlike their diploma counterparts. Similar results are reported by Robichaud-Ekstrand (2016:250), in which nurses with degree qualifications had more research experience and participated more in research activities. Nurses with degree qualifications are more involved in research activities, because they view research as a vital source for personal development and patient care, while diploma nurses might not have yet internalised the relationship between clinical experience and research (Robichaud-Ekstrand 2016:251). Involvement in research activities by degree nurses may suggest that the foundation of research they acquired at nursing school translates to evidence-based practice in their nursing careers.

Despite lack of research experience reported, nurses are willing to take part as research participants, as reported by (84%, n=141) of the respondents.

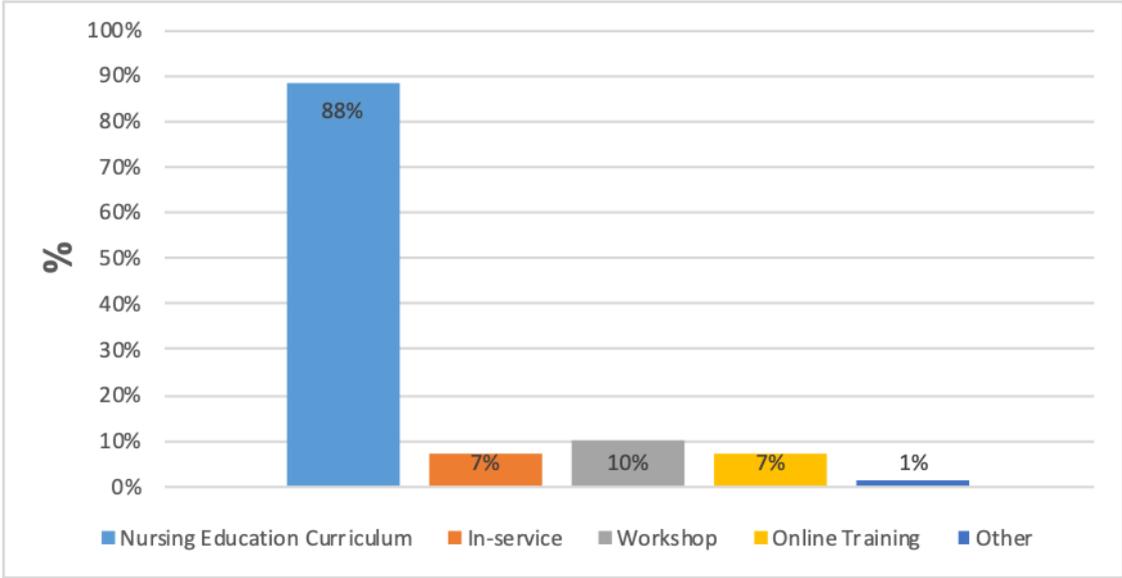
#### 4.3.5 Research related training

One hundred and sixty-four (n=164 of 168) respondents answered the question which asked if they had ever received health research-related training, while four did not respond. Only respondents who provided answers are included in the statistics. Figure 4.12 below shows that more than two-thirds (66%, n=109) of respondents never received any form of health research training, and 34% (n=55) reported they have received health research training.



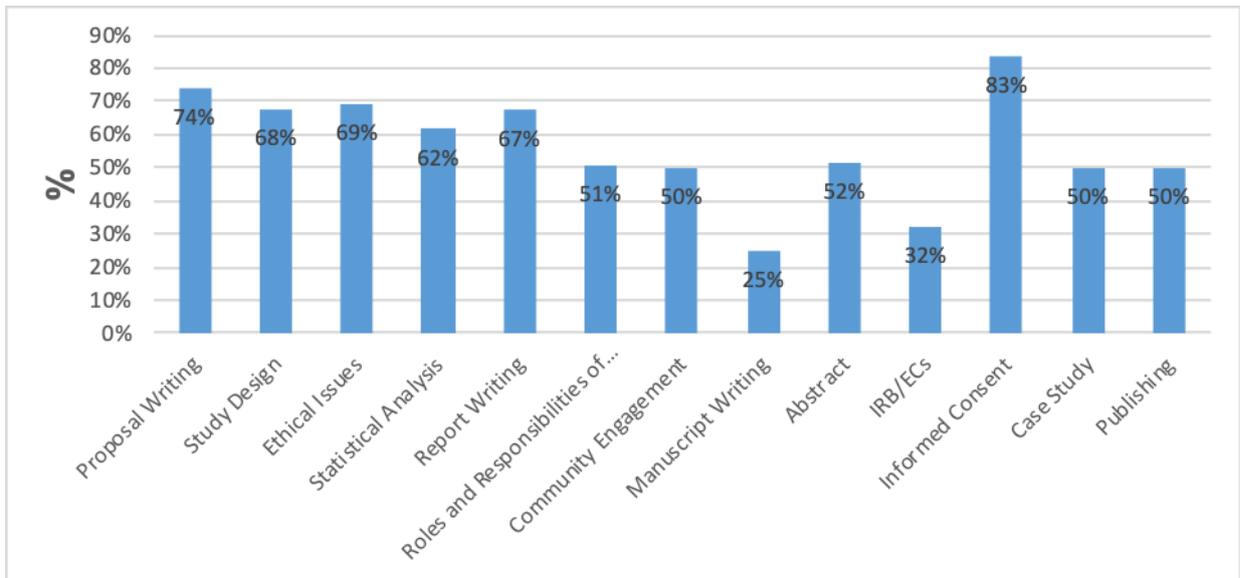
**Figure 4.12 Respondents who ever received health research-related training (n=164)**

Respondents reported different fora where they received research related training as depicted by Figure 4.13 below. A total of 88% (n=61 of 69) of those who responded to the question indicated they obtained the training through their nursing education curriculum, (10%, n=7 of 69) received it through workshops, while (7%, n=5 of 68) each obtained the training through in-service lecture/seminar and online trainings respectively.



**Figure 4.13 Providers of health research training for respondents**

When asked to report the topics covered during the health research trainings they attended, results are depicted by Figure 4.14 below. Informed consent and proposal writing were the most covered topics, as reported by 83% (n=55 of 66) and 74% (n=48 of 69) of respondents respectively among those who responded to the question.



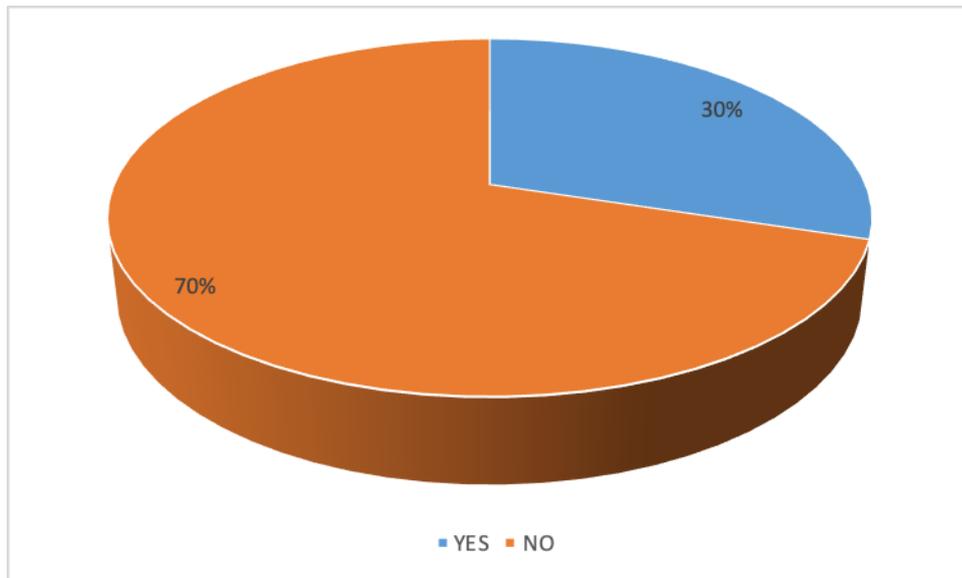
**Figure 4.14 Topics covered during health research trainings**

#### **4.3.5.1 Summary of health research training**

Health research training is low (34%, n=55) among the respondents of this study. This is similar to the results of the study conducted by Aksoy et al (2018), in which only 3.8% of nurses had undergone research training. In the current study, the majority of research education training was provided through the nursing education training, as compared to other avenues such as in-service training or workshops that often occur after nursing school. Some may view research-related training provided for at pre-service level as insufficient, because at that level some participants expressed the view that nurses would not have enough understanding of how to apply it in practice. Hence, research knowledge skills will increase only after further education (Evans et al 2014).

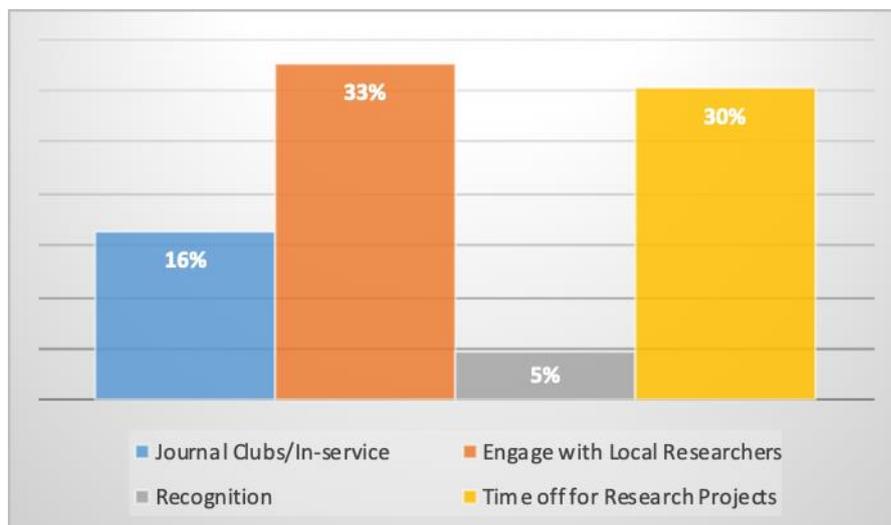
#### **4.3.6 Institutional factors**

Institutional factors were specifically asked in this section while other factors were integrated in the preceding sections. Respondents were asked to report whether they believed their workplace promoted health research culture or not. A total of 144 (100%) responded to the question. Respondents expressed lack of support for promotion of health research culture by their institutions, as only about a third (30%, n=43) indicated that their workplace promoted a health research culture as depicted by Figure 4.15 below.



**Figure 4.15 Workplace promotion of health research culture (n=144)**

Among nurses who believed their workplace promoted health research culture, the study sought to understand how that culture was promoted. A third (33%, n=14) of these respondents reported that local research organisations engage with nurses during health research results dissemination activities. Another one-third (30%, n=13) reported that nurses who have health research projects are allowed time off to provide them the opportunity to work on their projects. Finally, 16% (n=7) reported that there are regular in-service trainings for nurses on health research-related topics and 5% (n=2) reported that nurses who are engaged in health research and produce evidence-based knowledge are well recognised, and may also be given opportunity for further professional training and or development.



**Figure 4.16 Institutional factors promoting health research culture**

#### **4.3.6.1 Summary of institutional factors**

The majority of respondents felt their workplace does not promote health research culture. This finding is similar to those found by Mutisya et al (2015), Oluwatosin (2014) and Al Khalaileh et al (2016), in all of which nurses express lack of support, encouragement and cooperation from their health facilities. However, engagement with local researchers and being given time off to carry out their own research projects reported by some respondents in the current study is a positive development that may give nurses an opportunity to learn more about health research and improve their knowledge about health research. Studies by Oluwatosin (2014), Jahan et al (2016), Martin (2017) and Nkrumah et al (2018) report lack of time as the major factor that nurses express as the reason for not engaging in health research. Findings from the current study demonstrate that there is an opportunity for improvement in public health facilities about promoting a culture of health research.

#### **4.4 FACTORS INFLUENCING KNOWLEDGE**

The study sought to identify any factors that were independently associated with a good knowledge score. Chi-square tests were employed to determine which factor was associated with a good knowledge score. This was determined by computing an odds ratio (OR) and a p-value (p). An odds ratio greater than one (1) with a p-value of less than 0.05 was statistically significant and was then considered indicative of a factor associated with a good knowledge score. The larger the value of the odds ratio, the stronger the influence of that factor. An odds ratio less than one (<1) with a p-value of less than 0.05 was statistically significant and was considered as a factor associated with a poor knowledge score. Any factors that did not yield a p-value of less than 0.05 were considered statistically insignificant, and were identified as a factor that is not associated with a good knowledge score.

**Table 4.6 Factors influencing knowledge**

<b>Characteristics</b>	<b>%, 95 CI</b>	<b>OR, p-value</b>
<b>Age</b>		
18-24	20 (2.1-74.7)	1
25-34	46 (32.6-60)	3.4, 0.29
35-44	50 (37.2-62.8)	4.0, 0.23
45-54	56.8 (41.7-70.7)	5.3, 0.15
55+	63.6 (32.3-86.5)	7.0, 0.13
<b>Gender</b>		
Male	62.5 (44.5-77.6)	1
Female	47.8 (39.4-56.3)	0.55, 0.12
<b>Nursing qualification</b>		
Diploma	45.9 (37.7-54.5)	1
Degree	70.4 (50.4-84.7)	2.8, 0.02
Master's	75.0 (17.7-97.7)	3.5, 0.28
<b>Post-basic qualification</b>		
Yes	55.9 (45.1-66.3)	1
No	45.1 (34.6-56.1)	0.7, 0.16
<b>Nursing level</b>		
Low-level	34.4 (19.9-52.5)	1
Mid-level	54.2 (45.5-62.6)	2.3, 0.048
High-level	60 (16.7-91.8)	2.9, 0.286
<b>Length of service</b>		
0-5	31.3 (17.5-49.4)	1
6-10	54.2 (34.1-72.9)	2.6, 0.09
11-15	60.7 (41.5-77.1)	3.4, 0.02
16-20	50.0 (32.4-67.6)	2.2, 0.14
21-25	61.9 (39.6-80.1)	3.6, 0.03
26-30	55.6 (32.3-76.6)	2.8, 0.09
31+	46.7 (23.3-71.6)	1.9, 0.31
<b>Type of clinic</b>		
8 hour clinic	44.3 (34.2-54.9)	1
24 hour clinic	56.9 (44.5-68.5)	1.7, 0.124
Maternity	60.0 (33.8-81.5)	1.9, 0.27
<b>Ever research training</b>		
Yes	74.6 (61.2-84.4)	1
No	38.5 (29.8-48.1)	0.2, 0.0000
<b>Ever research experience</b>		
Yes	60.2 (49.2-70.3)	1
No	41.5 (31.2-52.5)	0.5, 0.02
<b>Research culture</b>		
Yes	46.5 (32.1-61.6)	1
No	55.5 (45.5-64.9)	1.43, 0.33

#### 4.4.1 Summary of factors influencing knowledge

Nurses with a degree were almost three times significantly more likely to get a satisfactory score compared to those with only a diploma (OR=2.8, p=0.02). The finding indicates that degree nurses in the study had a better understanding and knowledge of health research.

Respondents with a Master's degree were almost four times more likely than those with a diploma to have a satisfactory knowledge score, but this association was not statistically significant.

Mid-level management nurses were significantly twice more likely (OR=2.3, 0.05) than low-level management nurses to answer at least seven of the ten knowledge questions correctly.

In addition, nurses who reported having never received research training were less likely to score a satisfactory result in the knowledge assessment (OR=0.2, 0.00).

Similarly, those who also had no research experience were less likely to get a satisfactory knowledge score (OR=0.5, p=0.02).

Age was not significantly associated with knowledge performance of respondents. Additional factors that were explored for association with knowledge but did not demonstrate any statistically significant relationship include gender, possession of a post-basic qualification, type of clinic worked in or perception of good institutional research culture.

Some studies, however, gave contradicting results with regard to association of gender and knowledge. A study by Adeleke et al (2014:108) among health workers in a Nigerian federal medical centre found that male health workers had better research knowledge than their female counterparts, whereas another study by Memarpour, Fard and Ghasemi (2015:3) among medical science students found that female students had greater knowledge than males.

## 4.5 FACTORS INFLUENCING ATTITUDE

One of the objectives of the study was to identify any factors that were independently associated with a good attitude score. Chi-square tests were employed to determine which factor was associated with a good attitude score. This was determined by computing an odds ratio and a p-value. An odds ratio greater than one (1) with a p-value of less than 0.05 was statistically significant, and was then considered indicative of a factor associated with a good attitude towards health research. The larger the value of the odds ratio, the stronger the influence of that factor. An odds ratio of less than one (<1) with a p-value of less than 0.05 was statistically significant and was considered as a factor associated with a poor attitude towards health research. Any factors that did not yield a p-value of less than 0.05 were considered statistically insignificant and were identified as a factor that is not associated with a good attitude score.

**Table 4.7 Factors influencing attitude**

Characteristics	%, 95 CI	OR, p-value
<b>Age</b>		
18-24	60 (16.7-91.3)	1
25-34	62 (47.7-74.5)	1.1, 0.9
35-44	63.8 (50.6-75.2)	1.2, 0.9
45-54	75.0 (59.9-85.8)	2.0, 0.48
55+	63.6 (32.3-86.4)	1.2, 0.89
<b>Gender</b>		
Male	68.8 (50.6-82.5)	1
Female	65.4 (56.9-73.0)	0.89, 0.72
<b>Nursing qualification</b>		
Diploma	64.2 (55.8-71.9)	1
Degree	77.8 (57.9-89.9)	1.9, 0.18
Master's	50.0 (9.3-90.8)	0.56, 0.56
<b>Post-basic qualification</b>		
Yes	69.1 (58.3-78.1)	1
No	62.2 (51.1-72.1)	0.74, 0.353
<b>Nursing level</b>		
Low-level	46.9 (30.2-64.2)	1
Mid-level	70.2 (61.8-77.5)	2.7, 0.02
High-level	80 (25.3-97.9)	4.5, 0.19
<b>Length of service</b>		
0-5	46.9 (30.2-64.2)	1
6-10	70.8 (49.5-85.7)	2.8, 0.07
11-15	64.3 (44.9-79.9)	2.0, 0.18

<b>Characteristics</b>	<b>%, 95 CI</b>	<b>OR, p-value</b>
16-20	70.0 (51.2-83.5)	2.6, 0.07
21-25	76.2 (53.2-90.0)	3.6, 0.04
26-30	72.2 (47.2-88.3)	2.9, 0.09
31+	73.3 (45.5-90.0)	3.1, 0.09
<b>Type of clinic</b>		
8 hour clinic	62.5 (51.8-72.1)	1
24 hour clinic	69.2 (56.8-79.3)	1.4, 0.39
Maternity	73.3 (45.5-90.1)	1.7, 0.42
<b>Ever research training</b>		
Yes	76.4 (63.2-85.8)	1
No	60.6 (50.9-69.4)	0.48, 0.05
<b>Ever research experience</b>		
Yes	77.1 (66.7-84.9)	1
No	56.1 (45.1-66.5)	0.4, 0.005
<b>Research culture</b>		
Yes	69.8 (54.3-81.8)	1
No	65.4 (55.4-74.1)	0.82, 0.61

#### **4.5.1 Summary of factors influencing attitude**

Length of service was identified as a factor associated with a good attitude towards health research. Specifically, nurses in this study who have been working for 21-25 years were almost four times significantly more likely to have a good attitude towards research compared to those who worked for 0-5 years (OR=3.6, p=0.04). This means nurses who have worked more years and are likely to have interacted with research activities in their health facilities may be aware of health research and have a positive attitude towards research.

Research training was also associated with attitude towards health research. This analysis showed that nurses who reported having never received research training were less likely to have a good attitude towards research (OR=0.48, 0.05). This result could be an indicator that providing research training may improve nurses' attitude towards health research.

Similarly, research experience was a significantly associated with attitude towards health research. Those nurses who had no research experience were less likely to have a good attitude compared with those who had research experience (OR=0.4, p=0.005). This finding is in line with results from an attitude study by Browning et al (2016:126),

which showed that nurses with previous research experience tend to have positive attitude towards health research.

Nursing level was identified as a factor significantly associated with a good attitude score. Mid-level management nurses were significantly three times more likely (OR=2.7,  $p=0.02$ ) than low-level management nurses to have a good attitude about research. This could indicate that managers may have a higher appreciation for health research compared to those who are at lower level management.

## **4.6 OVERVIEW OF RESEARCH FINDINGS**

This section provide an overall summary of research finding in relation to the study objectives.

### **4.6.1 Health research knowledge**

The study results show that nurses surveyed have limited knowledge with regard to health research. Similar findings by Berthelsen and Hølge-Hazelton (2015) and Yanagawa et al (2014) suggested clinical nurses have limited theoretical and practical research knowledge. Despite the limited research knowledge nurses possessed, nurses with a degree qualification performed better than their diploma counterparts. The association of education and level of research knowledge is also alluded to by Lode et al (2015:672), that nurses with a graduate degree have a higher level of research knowledge. Limited knowledge among respondents was not associated to the age or gender of the respondent.

Limited health research knowledge is also reported by Kao et al (2019:495), where ward-based nurses had deficient knowledge of clinical research. In particular, in this study, knowledge deficiencies were found in questions that required substantive knowledge in health research terminology. In contrast, nurses performed exceptionally well in questions that asked about concepts related to nursing practice, such as informed consent and ethical conduct of research. This is congruent with what was reported in the study: informed consent was the most-reported topic by nurses (83%,  $n=66$ ) who reported research-related training. The same finding was reported in a study by Aksoy et al (2018:4), which found that, despite nurses having limited knowledge on

health research, they performed better on concepts or issues already among their responsibilities in their routine practice such as informed consent. A concept such as informed consent is part of nursing responsibilities and is well provided for in the nursing curriculum, as nurses are expected to obtain consent from patients for surgical interventions. Health research is a subject that nurses learn about during their careers after graduation, and not all nurses obtain the opportunity to receive formal or structured training or education on health research.

A good knowledge score was associated with the nursing qualification possessed by respondents. Degree holders performed better than diploma holders, and this is most likely because they receive research education during their nursing training. This training generally has a practical component, as students generally carry out a research study that requires involvement in proposal writing, literature review, and interaction with ethics committees, the collection and analysis of data, as well as report writing. This effort likely enables the degree nurse to have a better grasp of research, compared to the diploma nurse who may not have a similar opportunity.

In addition, nurses who had previous research experience or have had research education training performed better in knowledge assessment and possessed positive attitudes towards health research. Having research experience provides further opportunity for the nurses to apply the knowledge they acquired during training and could explain the improved knowledge score seen among those who reported having research experience.

#### **4.6.2 Attitude towards health research**

Generally, in this survey, a majority (66%) of respondents portrayed a positive attitude towards health research. Research experience and previous research training were associated with positive attitudes towards research among respondents. These results are in line with findings from previous studies by Caldwell et al (2017) and Kovačević et al (2017), which also confirm that generally, nurses have positive attitudes towards research.

One-third (34%, n=55) of the respondents in this study felt conducting research is difficult, while another third (34%, n=55) felt research is not difficult. Similarly, another

third (32%, n=52) were neutral about it. From the findings, it is evident that the opinion was equally balanced. However, there still remains a gap, as only one-third feel research is not difficult.

This study's results reveal that nurses who worked for a longer period of time (21-25 years) were significantly more likely to have a good attitude towards research compared to those who have worked for a shorter time (0-5 years). Similar results were found by Chang et al (2009), cited in Kao et al (2019:491), that nurses who worked for a longer period had more positive attitudes towards clinical trials because of their experience and better understanding of research.

It is important to highlight that, even though majority of nurses have not been researchers before (84%, n=136) and are not currently involved in research (96%, n=157), majority (69%, n=114) expressed interest in doing their own research. This is an important finding since attitude is an important factor that may motivate nurses to engage in research activities and contribute to evidence-based practice.

#### **4.6.3 Factors associated with knowledge and attitude towards health research**

It has been reported that the degree of educational preparation has an influence on nurses' knowledge of research and also on their attitudes (Asuquo et al 2013:44). This is also alluded to by Kao et al (2019:493), that nurses with advanced education better understand the fundamentals of health research, which contributes in turn to a better understanding of health research.

From this study, nurses who had a degree qualification had both satisfactory knowledge of health research and good attitude, in contrast to their diploma counterparts. Additionally, previous research experience and opportunity for health research training which most degree nurses reported are factors that positively influence the amount of research knowledge the nurse has and a good attitude.

#### **4.7 SUMMARY**

Chapter 4 presented the results of the data analysis using pie charts, bar charts and tables. The study aimed to describe knowledge and attitudes, as well as factors that

may influence these, among nurses in Gaborone, Botswana. One-hundred and sixty-eight nurses responded to the survey, and only 51% demonstrated satisfactory knowledge of health research. Despite this limited knowledge, the nurses had a good attitude towards health research. Degree nurses were more likely to have a satisfactory knowledge score, as were those who reported having research training and research experience. Additionally, research training and experience were also associated with a good attitude.

Chapter 5 presents the summary, conclusions, recommendations and limitations of the study and any proposals for further research based on the findings.

## **CHAPTER 5**

### **SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS**

#### **5.1 INTRODUCTION**

Chapter 5 concludes the study by presenting and discussing the findings in relation to the objectives. The researcher also provides the conclusions, limitations and recommendations for further research on the topic.

#### **5.2 RESEARCH DESIGN AND METHOD**

The researcher used a quantitative, non-experimental, descriptive, cross-sectional design to assess the knowledge and attitudes of nurses towards health research in Botswana. Data was collected using an anonymous self-administered questionnaire developed by the researcher after a literature review. Two hundred and eighteen questionnaires were distributed across all the sampled clinics, and 168 questionnaires were completed and returned, while 50 were returned uncompleted.

#### **5.3 SUMMARY AND INTERPRETATION OF THE RESEARCH FINDINGS**

##### **5.3.1 Demographic information of respondents**

This sample of nurses were mainly female and Botswana citizens. This result indicates that the nursing profession is still occupied by more females in Botswana and globally, as alluded to by Oluwatosin (2014:145). The distribution of nurses currently registered with the Nursing and Midwifery Council of Botswana confirms the finding. For 2019, a total of 12 179 nurses have been registered, of whom 72% (n=8801) are females while 28% (n=3378) are males (Kau-Kigo 2019). The gender distribution in this study did not have any significant association with the amount of knowledge respondents possessed or their attitude towards research.

Most of the respondents were aged between 25 and 44 years. The age distribution in this study did not have any significant association with the amount of knowledge respondents possessed or their attitude towards research.

The study found that most respondents were diploma holders. This may explain the limited amount of research knowledge found in this study, as nurses with a degree qualification were fewer in number but performed better than diploma nurses in knowledge scores.

The common post-basic qualification reported was midwifery at 79% (n=68). Currently, midwifery is the only post-basic qualification registered with the Nursing and Midwifery Council of Botswana. Of the 12 179 nurses registered to practice in 2019, 34% (n=4150) of them are midwives, practising across the whole country (Kau-Kigo 2019). The remainder are distributed across other post-basic qualifications that are not registrable with the Nursing and Midwifery Council of Botswana. The distribution of qualifications is similar to what is seen in public health facilities in Botswana. In this study, possession of a post-basic qualification did not have any significant association with the amount of knowledge respondents possessed or their attitude towards research.

The results also show that a little more than half of the respondents (52%, n=88) worked in an 8-hour integrated services clinic. This is because among the clinics that were sampled, 69% (n=18) of them were 8-hour integrated clinics. However, the place of work did not have any association with the results of the study.

### **5.3.2 Health research knowledge**

The study assessed nurses' knowledge of health research. Only half of the respondents (51%, n=85) portrayed satisfactory knowledge of health research, as they obtained a knowledge score of at least 70%. A conclusion that may be drawn is that nurses in this study generally had limited health research knowledge.

### **5.3.3 Attitudes towards health research**

Findings from this study suggest that generally nurses have positive attitudes towards health research and are interested in doing research themselves, as it is important for their nursing practice. This is a good finding, as nurses are willing to learn for their professional advancement, and most importantly contribute to evidence-based practice. A similar view is reported by nurses in a study by Evans et al (2014:229), who felt research increases their profession`s knowledge base and improves evidence-based practice. It can be concluded from the results of the study that nurses have a very good attitude towards health research.

### **5.3.4 Research experience**

The results show that most (50%, n=83) respondents acquired their research experience from research they did to fulfil requirements for their qualifications, compared to those (16%, n=26) who reported research experience after nursing school. The same finding was reported by Oluwatosin (2014:145) among Nigerian nurses, where most nurses reported the only experience they had for health research was for requirements for the award of a certificate. More nurses with nursing degrees (31%, n=8) reported engagement in research activities during their career, compared to (14%, n=18) of diploma holders. This highlights a training gap in the diploma curriculum, as it confirms findings from previous studies that a research culture is lacking among nurses outside academia (McKee et al 2017:2; Nkrumah et al 2018:2). The findings of the current study indicate that nurses with a degree are different from those with a diploma in terms of research training and experience, and this has an influence on health research knowledge as well as attitudes to health research. This gap needs to be addressed, as knowledge and attitudes towards health research may affect nursing practice.

It is of note that (60%, n=100) of respondents have been research participants before, and the majority continue to express their willingness to volunteer to take part in health research as research participants (84%, n=141). Willingness by respondents to volunteer for research is an encouraging finding, and confirms the positive attitude nurses portrayed towards health research in this study.

### **5.3.5 Research related training**

A majority (66%, n=109) of nurses reported that they have not received any health research-related training. Those who reported that they had received health research training obtained it through various platforms, for example at nursing school, through in-service training, at a research training workshop, and/or online trainings. However, training reported from nursing school was inconsistent, as some respondents reported to have been trained while others reported no training, even coming from the same nursing programme. In view of these findings, it can be concluded that nurses working in public health facilities such as those who took part in this study lacked health research training. The deficiency can be addressed by well-structured health research training with practical exposure during nursing school to form a strong foundation for health research in future as recommended by Halabi (2016:123), Leach et al (2016:194), and Roets & Lubbe (2016:9). In addition, continuous education, mentoring, coaching and practical experience should be provided to nurses who are in clinical practice to provide them with the confidence and necessary tools and skills to motivate them become interested in research (Black et al 2016:18; Caldwell et al 2017:10; Mutisya et al 2015:101).

### **5.3.6 Institutional factors**

The general perception by respondents in this study was that their workplace does not promote a health research culture. However, the indicators for a research culture that were reported by the few (30%, n=43) and that felt that a health research culture was promoted were interactions with local research organisations (33%, n=14) and provision of time off for nurses who have research projects to work on (30%, n=13). This minimal promotion of a research culture as reported by nurses may be an indication that the institutions they work for do not value research, or they work under supervision of managers who are not research-oriented (Al Khalaileh et al 2016:55). Research-literate and or oriented managers are likely to provide advocacy, support and mentoring to nurses within their institutions. Asuquo et al (2013:48) recommend that nursing leadership collaborate with other health professionals to support nurses to take an active role in research to improve health research knowledge.

## **5.4 CONCLUSIONS**

The results of the study show that nurses have limited knowledge of health research. It is, however, encouraging to learn that despite the limited knowledge they have about health research, they generally have a good attitude towards health research. The study also found that nurses' level of knowledge and attitude depended on previous research-related training, practical research experience and the nursing qualification possessed by the respondent. Degree holders performed better than diploma holders in both the knowledge score and the attitude score. Nurses also expressed the opinion that their institutions do not provide adequate support to cultivate a research culture. Continuing education and training on health research is necessary for nurses to improve both their theoretical and practical knowledge.

## **5.5 RECOMMENDATIONS**

In order to enhance research culture among nurses, the following recommendations are made:

### **5.5.1 Education and training**

Nurses should be provided with relevant training, both during nursing training and during the course of their working careers, to improve their knowledge of health research and embrace health research as part of nursing practice. This should include practicum by doing own research projects and or be part of research teams for research projects conducted by others. This could be implemented through attachments at research institutions as collaboration and partnerships between such institutions and nursing training schools.

Registered nurses should be trained in scientific writing skills in order to participate in research report writing and journal article writing. This could be achieved through continued partnerships with academic institutions, clinical research institutions or individual experts engaged through in-service trainings.

Training in presentation skills should be promoted in order to prepare registered nurses to participate actively in conferences and build their confidence in generation and provision of evidence-based knowledge and enhance a research culture.

### **5.5.2 Policy**

In order to enhance knowledge and practice of research among nurses, a deliberate policy change is required to include research experience as part of continuing education, which is a requirement for continued nursing licensure.

Policies should be revised to ensure that registered nurses have dedicated roles in research conducted in the institutions.

### **5.5.3 Practice**

Collaborations between employing institutions and research institutions should go beyond provision of participants for clinical research to include skilling up of nurses working in public health facilities in conducting research studies. Opportunities for mentorship should be provided in all areas of research from proposal development to manuscript writing. Wilkes (2015:1-2) recommends experiential learning model where nurses are seconded and conduct collaborative projects to help them conduct research projects through direct involvement in the whole research process and eventually publish a research paper from their projects.

Registered nurses should be given the opportunity to attend conferences and present on research projects they were involved in. This will require financial support from institutions.

Registered nurses should be involved in preparing research reports or journal articles as capacity building exercise.

### **5.5.4 Further research**

Further research needs to be conducted to explore current collaborations between nursing schools, public health facilities and research institutions in Botswana to

understand how these could be leveraged on to improve health research knowledge among nurses.

Research on the training needs in terms of research knowledge and experience of registered nurses could provide an institution with a guide for continuous professional development.

## **5.6 CONTRIBUTIONS OF THE STUDY**

The study was able to provide Botswana-specific information with regard to the amount of knowledge that nurses possess about health research and the attitudes they have towards it. The study has also provided information regarding institutional support gaps, as well as training gaps. The study confirmed similar results that have been observed in other parts of the world relating to knowledge and attitudes of nurses towards health research. The results of the study could serve as a baseline through which further research could be pursued.

## **5.7 LIMITATIONS OF THE STUDY**

The study was conducted in one health district in Botswana and only nurses working in local clinics within the Gaborone district were surveyed. Private health facilities and the government hospital within the Gaborone district were excluded and their inclusion may have an impact on, or change the outcome of the study. Since the study is contextual and conducted in a limited number of nurses, the results may not be generalisable to the whole population of nurses in Botswana.

## **5.8 CONCLUDING REMARKS**

This chapter has offered a summary of the study, including its limitations, and outlined recommendations that could be employed to improve on the outcomes of this study.

The study assessed and described the knowledge and attitudes of nurses towards health research. The study has revealed that nurses have limited health research knowledge, and noted the lack of research education training. Despite the limited health research knowledge, nurses generally have a positive attitude towards health research.

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**ANNEXURES**

## Annexure 1: Ethical Clearance from the Department of Health Studies



**RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES**  
**REC-012714-039 (NHERC)**

7 February 2018

Dear T Sekoto

**Decision: Ethics Approval**

**HS HDC/831/2018**

T Sekoto

Student No.3502-370-8

Supervisor: Prof GH van Rensburg

Qualification: D Litt et Phil

Joint Supervisor: -

**Name** T Sekoto

**Proposal:** Assessment of knowledge and attitudes towards health research among nurses working in public health facilities in Botswana

**Qualification:** **MPCHS94**

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted from 7 February 2018 to 7 February 2020.

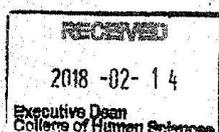
*The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 7 February 2018.*

*The proposed research may now commence with the proviso that:*

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee, Department of Health Studies. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*



Open Rubric



University of South Africa  
Preller Street, Muckleneuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
[www.unisa.ac.za](http://www.unisa.ac.za)

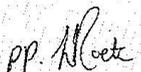
3) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

4) [Stipulate any reporting requirements if applicable].

Note:

The reference numbers [top middle and right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the Research Ethics Committee: Department of Health Studies.

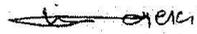
Kind regards,



Prof JE Maritz

CHAIRPERSON

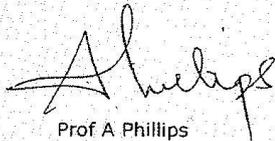
[maritje@unisa.ac.za](mailto:maritje@unisa.ac.za)



Prof MM Moleki

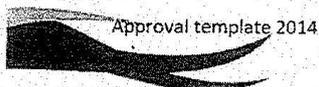
ACADEMIC CHAIRPERSON

[molekmm@unisa.ac.za](mailto:molekmm@unisa.ac.za)



Prof A Phillips

DEAN COLLEGE OF HUMAN SCIENCES



University of South Africa  
Pretorius Street, Muckleneuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
[www.unisa.ac.za](http://www.unisa.ac.za)

## Annexure 2a: Initial Ethical Clearance from Botswana Ethics Committee

PRIVATE BAG 0038  
GABORONE  
BOTSWANA  
REFERENCE:



REPUBLIC OF BOTSWANA

MINISTRY OF HEALTH AND WELLNESS

TEL: (+267) 363 2500  
FAX: (+267) 391 0647  
TELEGRAMS: RABONGAKA  
TELEX: 2818 CARE BD

REFERENCE NO: HPDME 13/18/1

18<sup>th</sup> April 2018

Health Research and Development Division

Notification of IRB Review: **New application**

Tumalano Sekoto  
University of South Africa (UNISA)  
Department of Health Sciences  
Pretoria  
South Africa

Dear Tumalano Sekoto

**Protocol Title:**     **ASSESSMENT OF KNOWLEDGE AND ATTITUDES  
TOWARDS HEALTH RESEARCH AMONG NURSES  
WORKING IN PUBLIC HEALTH FACILITIES IN  
BOTSWANA**

HRU Approval Date:             18 April 2018  
HRU Expiration Date:         17 April 2019  
HRU Review Determination:    Approved  
Risk Determination:            Minimal risk

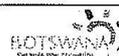
Thank you for submitting new application for the above referenced protocol. The permission is granted to conduct the study.

Attachments:

- HRDC application from
- Application form submitted and approved by UNISA ethics committee
- Study Proposal
- Participant Information Sheet
- Informed Consent form
- Study Questionnaire

This permit does not however give you authority to collect data from the selected sites without prior approval from the management. Consent from the identified individuals should be obtained at all times.

**Vision:** *A Healthy Nation by 2036.*  
**Values:** *Botho, Equity, Timeliness, Customer Focus, Teamwork, Accountability*



The research should be conducted as outlined in the approved proposal. Any changes to the approved proposal must be submitted to the Health Research and Development Division in the Ministry of Health for consideration and approval.

Furthermore, you are requested to submit at least one hardcopy and an electronic copy of the report to the Health Research, Ministry of Health and Wellness within 3 months of completion of the study. Approval is for academic fulfillment only. Copies should also be submitted to all other relevant authorities.

#### **Continuing Review**

In order to continue work on this study (including data analysis) beyond the expiry date, submit a Continuing Review Form for Approval at least three (3) months prior to the protocol's expiration date. The Continuing Review Form can be obtained from the Health Research Division Office (HRDD), Office No. 7A.7 or Ministry of Health website: [www.moh.gov.bw](http://www.moh.gov.bw) or can be requested via e-mail from Mr. Kgomoitso Motlhanka, e-mail address: [kgmmitlhanka@gov.bw](mailto:kgmmitlhanka@gov.bw) As a courtesy, the HRDD will send you a reminder email about eight (8) weeks before the lapse date, but failure to receive it does not affect your responsibility to submit a timely Continuing Report form

#### **Amendments**

During the approval period, if you propose any change to the protocol such as its funding source, recruiting materials, or consent documents, you must seek HRDC approval before implementing it. Please summarize the proposed change and the rationale for it in the amendment form available from the Health Research Division Office (HRDD), Office No. 7A7 or Ministry of Health website: [www.moh.gov.bw](http://www.moh.gov.bw) or can be requested via e-mail from Mr. Kgomoitso Motlhanka, e-mail address: [kgmotlhanka@gov.bw](mailto:kgmotlhanka@gov.bw) . In addition submit three copies of an updated version of your original protocol application showing all proposed changes in bold or "track changes".

#### **Reporting**

Other events which must be reported promptly in writing to the HRDC include:

- Suspension or termination of the protocol by you or the grantor
- Unexpected problems involving risk to subjects or others
- Adverse events, including unanticipated or anticipated but severe physical harm to subjects.

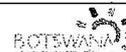
If you have any questions please do not hesitate to contact Ms S. Mosweunyane at [smosweunyane@gov.bw](mailto:smosweunyane@gov.bw) Tel: 3632018 and Mr Kgomoitso Motlhanka at [kgmotlhanka@gov.bw](mailto:kgmotlhanka@gov.bw) at 3632751. Thank you for your cooperation and your commitment to the protection of human subjects in research.

Yours faithfully

  
Ms S. Mosweunyane  
for **PERMANENT SECRETARY**



Vision: *A Healthy Nation by 2036.*  
Values: *Botho, Equity, Timeliness, Customer Focus, Teamwork, Accountability*



## Annexure 2b: Annual Ethical Clearance from Botswana Ethics Committee

PRIVATE BAG 0038  
GABORONE  
BOTSWANA  
REFERENCE:



REPUBLIC OF BOTSWANA  
MINISTRY OF HEALTH AND WELLNESS

TEL: (+267) 363 2500  
FAX: (+267) 391 9667  
TELEGRAMS: RABONGAKA  
TELEX: 2818 CARE BO

REFERENCE NO: HPDME 13/18/1

2<sup>nd</sup> April 2019

### Health Research Development Committee

Principal Investigator: Tumalano Sekoto  
Notification of IRB Review: **Continuing Review**

Protocol Title: **ASSESSMENT OF KNOWLEDGE AND ATTITUDES  
TOWARDS HEALTH RESEARCH AMONG NURSES  
WORKING IN PUBLIC HEALTH FACILITIES IN BOTSWANA**

**Review Type:** Health Research Unit/Expedited  
**Review Date:** 01 April 2019  
**Approved Date:** 01 April 2019  
**Effective Date:** 02 April 2019  
**Expiration Date:** 01 April 2020

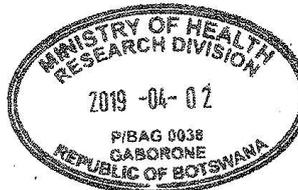
This certifies that the continuing review request for the protocol above was reviewed under review procedures. Approval is valid for a period of 1 year.

- Continuing  
 Accrual complete with treatment intervention and/or participant interviews/surveys continuing  
 Subject interventions/data collection ended on (date): \_\_\_\_\_  
 Open for analysis only. Expected end date: \_\_\_\_\_  
 Complete (including all analysis). Date completed: \_\_\_\_\_  
 Cooperative Review  
 Other, Please describe: \_\_\_\_\_  
 Study never activated, closure requested.

If you have any questions please do not hesitate to contact Mr. K. Motlhanka at [kemmotlhanka@gov.bw](mailto:kemmotlhanka@gov.bw), Tel +267-3632751. Thank you for your cooperation and your commitment to the protection of human subjects in research.

Yours sincerely

  
Ms S. Masweunyane  
for **/PERMANENT SECRETARY**



Vision: *A Healthy Nation by 2036.*  
Values: *Botho, Equity, Timeliness, Customer Focus, Teamwork, Accountability*

**Annexure 3: Request for permission to conduct research at Public Health Clinics within the Gaborone District Health Management Team (DHMT)**

Date: April 30, 2018

To: District Health Management Team  
Private Bag 0089  
Gaborone.

Attention: Senior District Health Management Officer

**REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT PUBLIC HEALTH CLINICS WITHIN THE GABORONE DISTRICT HEALTH MANAGEMENT TEAM**

**Title of the study: ASSESSING KNOWLEDGE AND ATTITUDES TOWARDS HEALTH RESEARCH AMONG NURSES WORKING IN PUBLIC HEALTH FACILITIES IN GABORONE BOTSWANA**

Dear Dr Simoonga

I, TUMALANO SEKOTO, am doing a study with Professor Gisela Van Rensburg (Supervisor) for a Master's in Public Health qualification through the University of South Africa (UNISA). I am writing this letter to request your permission to conduct a study among nurses working in the Greater Gaborone area (Gaborone, Tlokweng and Mogoditshane) clinics. The researcher, Ms Tumalano Sekoto, is a professional nurse working for Botswana Harvard AIDS Institute (BHP) based in Gaborone.

This study has received written approval from the Research Ethics Committee of the College of Human Sciences, UNISA and the Botswana Health Research and Development Committee (HRDC). Copies of approval letters are attached.

The study aims to assess the knowledge and attitudes of nurses towards health research.

The study will entail once off completion of an anonymous questionnaire.

After completion of the study, with data analysis complete, Gaborone District Management and nurses will be informed of the study outcome through a formal presentation. The researcher acknowledges that some nurses who would have participated may no longer be working for the Gaborone Health District.

For operational and logistical purposes, I would like the following information:

1. Name and number of clinics in the Greater Gaborone Health Management District
2. Number of nurses within the District

Yours sincerely

**Tumalano Sekoto**

Tel: 72158538/71802072

Email: [tsekoto@bhp.org.bw](mailto:tsekoto@bhp.org.bw); [tumalanosekoto@gmail.com](mailto:tumalanosekoto@gmail.com)

MPH Student Researcher

## Annexure 4: Authorisation letter from Gaborone DHMT

TELEPHONE: (267) 3904451  
FAX : (267) 3188012  
REFERENCE: DHMT



REPUBLIC OF BOTSWANA

Gaborone District Health Management  
PRIVATE BAG RW 004  
GABORONE  
BOTSWANA

Ref: GGDHMT 2/27 I

30<sup>th</sup> April, 2018

Tumalano Sekoto  
University Of South Africa  
Department of Health Sciences  
Pretoria  
South Africa

Dear Madam,

### **RE: PERMISSION TO CONDUCT RESEARCH**

This serves to let you know that permission is granted for you to conduct research titled "**assessment of knowledge and attitudes towards health research among nurses working in public health facilities in Botswana**".

This permits you to go into any public Clinic under Greater Gaborone District Management Team but you need to ask respondents for their participation. It should also not disturb provision of services or patient care in any manner during your course of visit.

By copy of this letter all Unit Managers are informed of your intentions and asked to provide you access and support during your research.

Yours faithfully,

  
Dr. G. M. Simoonga  
Coordinator DHMT



## **Annexure 5: Informed consent form**

### **Title of Study: ASSESSMENT OF KNOWLEDGE AND ATTITUDES TOWARDS HEALTH RESEARCH AMONG NURSES WORKING IN PUBLIC HEALTH FACILITIES IN BOTSWANA**

I confirm that I have been informed by the researcher about the nature of the study through the information sheet. I have read (it was read) the information sheet and I understood all the details about the study and have had the opportunity to ask questions. My questions have been answered to my satisfaction.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected. I have been provided with contact details should I wish to contact the researcher or any other responsible person.

I am aware that I will respond to a questionnaire where I will not write my name which will be analysed using a computerised system. Information from the study will be kept for at least five years, after which the information will be destroyed.

I agree to take part in the abovementioned study. I hereby give consent for my information to be used as per conditions described in the information sheet and for the purposes of research only.

Research participant's name: ..... (Please print)

Research participant's signature: .....

Date: .....

Researcher's name: ..... (Please print)

Researcher's signature: .....

Date: .....

## **Annexure 6: Participant information sheet**

**Title: ASSESSEMENT OF KNOWLEDGE AND ATTITUDES TOWARDS HEALTH RESEARCH AMONG NURSES WORKING IN PUBLIC HEALTH FACILITIES IN GABORONE BOTSWANA**

**Dear Prospective Participant**

My name is TUMALANO SEKOTO and I am doing research with Prof Gisela Van Rensburg from the Department of Health Studies, University of South Africa (UNISA). We are inviting you to participate in a study entitled: **ASSESSMENT OF KNOWLEDGE AND ATTITUDES TOWARDS HEALTH RESEARCH AMONG NURSES WORKING IN PUBLIC HEALTH FACILITIES IN BOTSWANA.**

The study aims to analyse the knowledge and attitudes of nurses working in public health facilities in Botswana towards health.

### **WHY AM I BEING INVITED TO PARTICIPATE?**

You are being invited to take part in this study because you are a nurse in a public health facility in the greater Gaborone area.

### **WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY / WHAT DOES THE RESEARCH INVOLVE?**

You are requested to complete a form (questionnaire) which is used to collect the information for this study. The form has a set of questions you are to respond to. You will complete the form on your own without writing your name on the form. The questionnaire is comprised of multiple choices and scaled questions. You are encouraged to respond to all the questions to the best of your ability. There is no right or wrong answer hence very important to give your honest opinion. It will take you approximately 40-60 minutes to complete the questionnaire.

### **CAN I WITHDRAW FROM THIS STUDY?**

Participation in this study is voluntary and that there is no penalty or loss of benefit for non-participation. Being in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information

sheet to keep. You are free to withdraw at any time and without giving a reason. Please note once you have responded and submitted the questionnaire it will be impossible for you to withdraw the questionnaire as it does not bear any names to be linked to anyone who has participated.

### **WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

There are no benefits for you by participating in this study. You may however have a sense of satisfaction by contributing to a study conducted by a colleague and may motivate or inspire you to conduct research in your area of operation.

### **WHAT IS THE ANTICIPATED INCONVENIENCE OF TAKING PART IN THIS STUDY?**

You may be inconvenienced by taking your time to complete the study questionnaire. You may also feel uncomfortable or anxious when completing the questionnaire. Feel free to respond to the questions the way you want as there is no right or wrong answer, all the answers are important for this study.

### **WILL WHAT I SAY BE KEPT CONFIDENTIAL?**

We sincerely respect your privacy and appreciate your honesty in completing the questionnaire and want you to be aware of some measures to ensure the confidentiality of your responses. Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a fictitious code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be reviewed by people responsible for making sure that research is done properly, for example members of the Research Ethics Committee. Otherwise, information will be available only to people working on the study, unless you give permission for other people to see the records.

The information that will be collected from you will be used for purposes like research report, journal articles, or conference presentations where information will be presented in aggregate not identifying participants by their places of work.

### **HOW WILL INFORMATION BE STORED AND ULTIMATELY DESTROYED?**

Hard copies of your answers will be stored by the researcher for a period of at least five years in a locked cupboard/filing cabinet at the researcher's place of work for academic purposes. Future use of the stored information will require further Research Ethics Review and approval if applicable. At the end of five years, the paper copies of your answers will be destroyed by shredding.

### **WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?**

Participation in this study is completely voluntary. You will not be paid anything for your participation.

### **HAS THE STUDY RECEIVED ETHICS APPROVAL**

This study has received written approval from the Research Ethics Committee of the Department of Health Studies, UNISA and the Botswana Health Research and Development Committee (HRDC). A copy of the approval letter can be obtained from the researcher if you so wish.

### **HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS?**

If you would like to be informed of the final research findings, please contact Ms Tumalano SEKOTO at 3902671 Mobile: 72158538; email: [tsekoto@bhp.org.bw](mailto:tsekoto@bhp.org.bw); [tumalanosekoto@gmail.com](mailto:tumalanosekoto@gmail.com).

Should you have concerns about the way in which the research has been conducted, you may contact: Professor Gisela Van Rensburg, Tel +27 124296514 email: [vrensg@unisa.ac.za](mailto:vrensg@unisa.ac.za) or Prof JE Maritz, Chairperson of the Research Ethics Committee of the Department of Health Studies at Unisa at [maritje@unisa.ac.za](mailto:maritje@unisa.ac.za). Alternatively, contact the Chief Research Officer at Health Research and Development Committee at Ministry of Health Botswana, Tel 3632775 or 3632018.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

**TUMALANO SEKOTO**

## Annexure 7: Questionnaire

### ASSESSMENT OF KNOWLEDGE AND ATTITUDES TOWARDS HEALTH RESEARCH AMONG NURSES WORKING IN PUBLIC HEALTH FACILITIES IN BOTSWANA

**PARTICIPANT ID:** \_\_\_\_\_ (to be completed by the researcher)

#### INSTRUCTIONS FOR PARTICIPANTS

**Fill in the clinic name and answer the questions as below:**

**CLINIC CODE:** \_\_\_\_\_

Answering the questionnaire should take you about 40-60 minutes

Do not write your name in the questionnaire

Complete the questionnaire by putting an "X" in the most appropriate response or selecting all that apply

There is no right or wrong answer; you are encouraged to give your honest response for each question.

Complete the questionnaire in black or blue pen.

The questionnaire consists of six (6) sections

SECTION 1: Demographic Information

SECTION 2: Knowledge questions

SECTION 3: Attitudes questions

SECTION 4: Research Experience

SECTION 5: Research Education Training

SECTION 6: Institutional Factors

NO	SECTION 1: DEMOGRAPHICS	
1	What is your age (years)	<input type="checkbox"/> 18-24 <input type="checkbox"/> 25-34 <input type="checkbox"/> 35-44 <input type="checkbox"/> 45-54 <input type="checkbox"/> 55 and above
2	What is your gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
3	Nationality	<input type="checkbox"/> Botswana citizen <input type="checkbox"/> Non-citizen

4	Nursing Qualifications	<input type="checkbox"/> Diploma <input type="checkbox"/> Degree <input type="checkbox"/> Master's Degree <input type="checkbox"/> Doctorate/PhD
5	Do you have a post-basic qualification?	<input type="checkbox"/> Yes <input type="checkbox"/> No If Yes Select all that apply <input type="checkbox"/> Family Nurse Practitioner <input type="checkbox"/> Midwifery <input type="checkbox"/> Mental Health <input type="checkbox"/> Community Health Nursing <input type="checkbox"/> Ophthalmic Nursing <input type="checkbox"/> Anaesthetic Nursing <input type="checkbox"/> Paediatric Nursing <input type="checkbox"/> Intensive Care Nursing <input type="checkbox"/> Emergency Care <input type="checkbox"/> Oncology Nursing <input type="checkbox"/> Public Health <input type="checkbox"/> Nursing Education <input type="checkbox"/> Nursing Management <input type="checkbox"/> Psychology <input type="checkbox"/> Theatre Nursing <input type="checkbox"/> Orthopaedic Nursing <input type="checkbox"/> ENT <input type="checkbox"/> Other: Specify
6	Current position	<input type="checkbox"/> Assistant Nursing Officer <input type="checkbox"/> Registered Nurse <input type="checkbox"/> Nursing Officer II <input type="checkbox"/> Senior Registered Nurse <input type="checkbox"/> Nursing Officer I <input type="checkbox"/> Principal Registered Nurse <input type="checkbox"/> Senior Nursing Officer <input type="checkbox"/> Chief Registered Nurse <input type="checkbox"/> Principal Nursing Officer II <input type="checkbox"/> Nursing Superintendent <input type="checkbox"/> Principal Nursing Officer I <input type="checkbox"/> Chief Nursing Officer <input type="checkbox"/> Other: Specify_____
7	Length of service since first appointment (in years)	<input type="checkbox"/> 0-5 <input type="checkbox"/> 6-10 <input type="checkbox"/> 11-15 <input type="checkbox"/> 16-20 <input type="checkbox"/> 21-25 <input type="checkbox"/> 26-30 <input type="checkbox"/> 31 and above

8	Type of clinic working in	<input type="checkbox"/> 8hour Integrated services clinic <input type="checkbox"/> 24hour Integrated services clinic <input type="checkbox"/> Maternity Clinic
<b>NO</b>	<b>SECTION 2: KNOWLEDGE QUESTIONS</b>	
9	In health research, ethical conduct refers to:	<input type="checkbox"/> Disclosing all the information about the research to all study participants <input type="checkbox"/> Giving study participants a placebo <input type="checkbox"/> Giving health facilities money to refer participants to take part in health research <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't Know
10	What do Ethics Committees (EC) or /Institutional Review Boards (IRB) do in health research?	<input type="checkbox"/> Review, approve and guide health research <input type="checkbox"/> Give researchers money to conduct health research <input type="checkbox"/> Help recruit research participants <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't Know
11	From whom do Researchers seek approval to conduct health research in Botswana	<input type="checkbox"/> South African Medicines Council <input type="checkbox"/> Health Research and Development Committee (HRDC) <input type="checkbox"/> Botswana Health Professionals Council <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't Know
12	In health research, representativeness is a key characteristic of a:	<input type="checkbox"/> Scientific paper <input type="checkbox"/> Sample <input type="checkbox"/> Population <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't Know

13	The following is a type of experimental health research	<input type="checkbox"/> Cross-sectional study <input type="checkbox"/> Clinical Trials <input type="checkbox"/> Case-control studies <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't know
14	MEDLINE is:	<input type="checkbox"/> International association of medical informaticians <input type="checkbox"/> Abbreviation(acronym) that lists the parts of the research article <input type="checkbox"/> Medical database <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't know
15	What is an abstract?	<input type="checkbox"/> Journal <input type="checkbox"/> Research proposal <input type="checkbox"/> A brief description of a completed study <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't know
16.	When should consent be obtained in health research?	<input type="checkbox"/> When the study is ending <input type="checkbox"/> Before participant enrolls in the study <input type="checkbox"/> Consent not required <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't know
17	A research report can also be referred to as?	<input type="checkbox"/> Research hypothesis <input type="checkbox"/> Journal Article <input type="checkbox"/> Research question <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't know

18	Health research results can be disseminated through	<input type="checkbox"/> Acknowledging study staff <input type="checkbox"/> Authors curriculum vitae <input type="checkbox"/> Kgotla meeting <input type="checkbox"/> Other: Specify: _____ <input type="checkbox"/> Don't know
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### SECTION 3: ATTITUDES

This section consists of a number of statements designed to determine attitudes related to health research. Read each item carefully and determine the extent to which you agree or disagree with the statement. Put an "X" on the one that indicates the degree to which you agree or disagree with that statement about health research. Mark **SA** if you STRONGLY AGREE, **A** if you AGREE, **N** if you are NEUTRAL (neither agree nor disagree), **D** if you DISAGREE, and **SD** if you STRONGLY DISAGREE.

Nurses attitude towards health research		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
19	I feel performing research is only relevant for nurses in leadership positions					
20	In my opinion, health research is important as it is necessary for nursing practice					
21	I feel nursing education does not promote health research in their teaching					
22	Education on research training should be offered to all nursing students					
23	Skills that I gain during research are not useful in my future work					
24	Research is important because it improves critical thinking					

<b>Nurses attitude towards health research</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
25	Research is beneficial because it helps improve health care					
26	Nurses are provided with regular educational programmes to improve their research knowledge					
27	I feel I am familiar with health research ethics terminology					
28	I don't trust the research results reported to the public					
29	I will be glad to participate in research education lessons					
30	I feel time spent giving patient care is more important than time spent for health research					
31	I am interested in conducting my research project and publish results					
32	I feel confident in my ability to interpret research findings					
33	I feel confident about my ability to design a research study					
34	I will fully support health research activities conducted by other researchers in my health facility					
35	It is unnecessary for junior nurses to conduct research					
36	Conducting research is difficult					
37	Research improves communication skills					
38	Nurses can carry out a research and write a paper					

Nurses attitude towards health research		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>NO.</b>	<b>SECTION 4: RESEARCH EXPERIENCE</b>					
39	Have you ever participated in health research as a researcher for your academic qualification?	<input type="checkbox"/> Yes <input type="checkbox"/> No				
40	Apart from your academic requirements, have you participated in health research as a researcher during your nursing career?	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, what was your role? <input type="checkbox"/> Principal Investigator <input type="checkbox"/> Research Assistant <input type="checkbox"/> Research/Study nurse <input type="checkbox"/> Other: Specify				
41	Are you currently involved in health research as a researcher?	<input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, select all that apply <input type="checkbox"/> Principal Investigator <input type="checkbox"/> Research Assistant <input type="checkbox"/> Research/Study nurse <input type="checkbox"/> For academic purposes <input type="checkbox"/> Other: Specify				
42	Have you ever participated in health research as a research participant?	<input type="checkbox"/> Yes <input type="checkbox"/> No				
43	Would you volunteer to take part in health research as a research participant?	<input type="checkbox"/> Yes <input type="checkbox"/> No				

Nurses attitude towards health research		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>NO</b>	<b>SECTION 5: RESEARCH EDUCATION TRAINING</b>					
44	Have you ever received health research-related training?	<input type="checkbox"/> Yes <input type="checkbox"/> No <b>If No skip to SECTION 6</b>				
45	Where did you receive the training? (Select all that apply)	<input type="checkbox"/> As part of my nursing education curriculum <input type="checkbox"/> In-service lecture/seminar <input type="checkbox"/> Workshop <input type="checkbox"/> Online training/course <input type="checkbox"/> Other(Specify)_____				
46	Indicate topics covered during the health research training you attended (Select All that Apply)	<input type="checkbox"/> Writing a research proposal <input type="checkbox"/> Study design <input type="checkbox"/> Ethical issues in health research <input type="checkbox"/> Statistical analysis <input type="checkbox"/> Report writing <input type="checkbox"/> Roles and responsibilities of investigator <input type="checkbox"/> Community engagement <input type="checkbox"/> Manuscript writing <input type="checkbox"/> Abstract <input type="checkbox"/> Institutional review boards/Ethics committees <input type="checkbox"/> Informed Consent <input type="checkbox"/> Other(Specify)_____				

Nurses attitude towards health research		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>NO</b>	<b>SECTION 6: INSTITUTIONAL FACTORS</b>					
47	Does your workplace promote health research culture	<input type="checkbox"/> Yes <input type="checkbox"/> NO <b>If No STOP</b> <b>If yes</b> (Select all that apply) <input type="checkbox"/> There are regular journal clubs or in-service trainings for nurses on health research related topics <input type="checkbox"/> Local research organizations engage with nurses during health research results dissemination activities <input type="checkbox"/> Provide financial support for nurses who have health research articles or abstracts to attend health related conferences <input type="checkbox"/> Nurses who engage in health research and produce evidence-based knowledge are rewarded in the form of further training for professional development, get promotion or recognition for excellence <input type="checkbox"/> Nurses having health research projects are allowed time off to work on their research				

**THANK YOU FOR YOUR TIME.**

## **Annexure 8: Letter from the statistician**

Lillian Aaca Okui  
Private Bag BO 320  
Gaborone, Botswana

Nov 23, 2018

### **TO WHOM IT MAY CONCERN**

Dear Sir/Madam

### **RE: STATISTICAL SERVICES FOR MRS TUMELANO SEKOTO**

I am writing to certify that I have provided statistical guidance for Mrs Sekoto in writing up the methodology section of her MPH proposal. I will continue to provide support during the data collection, analyses and writing phase.

I am a Medical doctor with postgraduate training in Public Health with a focus on Epidemiology and Biostatistics. Over the past eight years that I have worked in Botswana, I have had the privilege of designing and implementing multiple HIV research protocols and conducted data analysis for various projects.

I am happy to provide further documentation of my qualifications upon request.

Sincerely



**Dr Lillian Aaca Okui**

## Annexure 9: Letter from the editor

PO Box 1681  
Brooklyn Square  
0075 PRETORIA

19 December 2019

TO WHOM IT MAY CONCERN

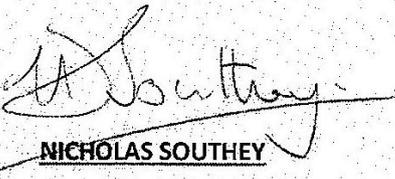
### CONFIRMATION OF EDITING OF MASTER'S THESIS

This letter serves to testify that I have edited the Master's thesis of Tumelano Sekoto, entitled "Knowledge and Attitudes of Health Research among Nurses in Public Health Facilities in Botswana", to conform to the language, stylistic and technical standards of a Master's thesis.

I undertook this work between 15 and 19 December 2019.

Please do not hesitate to contact me if you require further information.

Yours sincerely



**NICHOLAS SOUTHEY**

Email: [ndsouthey@mweb.co.za](mailto:ndsouthey@mweb.co.za)

Tel: 082 896 6478

# Annexure 10: Turnitin originality report

6/5/2020

Turnitin

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Turnitin Originality Report

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