STRATEGIES TO ENHANCE KNOWLEDGE OF TRIAGE AMONGST NURSES WORKING IN THE EMERGENCY DEPARTMENTS OF THE SEKHUKHUNE DISTRICT HOSPITALS, LIMPOPO PROVINCE, SOUTH AFRICA.

by

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Dissertation

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DECLARATION

I declare that STRATEGIES TO ENHANCE KNOWLEDGE OF TRIAGE AMONGST NURSES WORKING IN THE EMERGENCY DEPARTMENTS OF SEKHUKHUNE DISTRICT HOSPITALS, LIMPOPO PROVINCE, SOUTH AFRICA 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 and that this work has not been submitted before for any other degree at any other institution.

PHUKUBYE THABO ARTHUR **……**

Full names Date

DEDICATION

I dedicate this dissertation to:

• My wife; Makoma, and my daughter, Morongwa, for their support and encouragement.

• All nurses in the Emergency Departments of the Sekhukhune District who participated in the study by contributing invaluable information.

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ABSTRACT

Background: Many deaths in hospitals occur within 24 hours of admission. Some of these deaths could be prevented if the patients were effectively triaged, identified quickly and treatment initiated without delay. Triage and emergency care have always been weak and under-emphasized components of healthcare systems in Africa and yet, if well organized, could lead to saving many lives and reducing the ultimate costs of care.

Purpose: The purpose of this study is to develop strategies to enhance knowledge of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa.

Study method: By employing a quantitative, non-experimental research method, 84 nurses working in the Emergency Departments, completed and submitted structured questionnaires. Validity and reliability were insured by pre-testing the data collection instrument on respondents who were not part of the main study. Data were analyzed by using the SPSS and Excel computer programmes with the assistance of the University statistician.

Results: Findings indicated that there is an association between triage knowledge and Job title (p-value = 0.046). Registered nurses, specialty nurses and enrolled nurses were found to have more knowledge than auxiliary nurses. However, from those nurses with the knowledge, the study discovered that most of the respondents (61%) exercised poor triage practice compared with those nurses (30%) exercising good practice.

Conclusion: The results of this study show that having triage knowledge does not automatically equate with good triage practice. Therefore, it is recommended to integrate knowledge with experience and continued professional development to yield good triage practice.

Key concepts: Strategies, enhance, knowledge, triage, emergency department

LIST OF ABBREVIATIONS

ATS: Australian Triage System

AVPU: Alert, Verbal/Pain /Unresponsive

CTAS: Canadian Triage and Acuity Scale

CTG: Cape Triage Group

ED: Emergency Department

ESI: Emergency Severity Index

KTS: Kampala Triage Score

MEWS: Medical Early Warning Signs

MTS: Manchester Triage System

NDoH: National Department of Health

SANC: South African Nursing Council

SATS: South African Triage Score

TEWS: Triage Early Warning Sign

TREC: Turfloop Research Ethics Committee

VIEWS: Vital Pac Early Warning Score

WHO: World Health Organisation

DEFINITION OF CONCEPTS

Auxiliary Nurse

An auxiliary nurse is any person registered as such in terms of section 31(SANC Act 33 of 2005). In this study, it applies to a nurse working in the emergency department, who has undergone one year of training and is eligible to triage under the supervision of the staff nurse and professional nurse.

Emergency Department

The Emergency Department is the part of the hospital where people who need urgent treatment are taken care of (Deuter, Bradley & Turnbull, 2015). In this study, it refers to a department within the health care facility that triages patients according to the urgency of their illness and renders immediate medical intervention accordingly.

Enhance

Enhance means intensify, increase or further improve the quality or value (Deuter et al, 2015). In this study, enhance means to intensify the skills of triage among nurses working in the Emergency Department.

Knowledge

Knowledge refers to the sum of what is known and resides in intelligence and competence (Locke, 2015). In this study, knowledge refers to the sum of what is known pertaining to triage.

Professional Nurse

A professional nurse is any person registered as such in terms of section 31(1) (SANC Act 33, 2005). In this study, it means a nurse who has a diploma or degree in nursing and is responsible for sorting or triaging patients into priorities within the Emergency Department.

Staff Nurse

Staff nurses are persons registered as such in terms of section 31(SANC Act 33, 2005). In this study, a nurse refers to a person who has undergone two years of

training with distinguished white epaulets and is responsible to triage under the supervision of a professional nurse in the Emergency Department

Strategies

Strategies refer to plans of action designed to achieve a long-term or overall aim (Deuter et al, 2015). In this study, strategies indicate approaches developed to increase triage knowledge amongst nurses in the Emergency Department.

Triage

Triage is the system in the Emergency Department necessary to prioritize and assign relatively scarce resources to the medical needs of patients for efficient and timeous treatment according to the severity or acuity of their condition (Goldstein, Morrow, Sallie, Gathoo, Alli, Mothopeng & Samodien, 2017). In the study, triage specifies the initial attendance of patients according to the severity and urgency of their illness or injuries in the Emergency Department within the Sekhukhune District hospitals.

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1 INTRODUCTION AND BACKGROUND

Many deaths in hospitals occur within 24 hours of admission. Some of these deaths could be prevented if these patients were identified quickly and treatment was initiated without delay (WHO, 2005). Patients lose their lives in Emergency Departments due to ineffective triaging. This statement results from a concern about a number of deaths and leads to questioning the knowledge of emergency staff members. According to Kenneth, Iserson, John, and Moskop (2007), the effectiveness of triage is embedded in the knowledge and skills of the emergency staff members. Triage is an important element of supervision in the Emergency Department if it is not carried out at a standard level; the outcomes of clinical care of patients and the efficiency of emergency departments become compromised.

According to Goldstein, Morrow, Sallie, Gathoo, Alli, Mothopeng and Samodien (2017), triage is the system in the Emergency Department that is necessary to prioritize and assign relatively scarce resources to the medical needs of patients for efficient and timeous treatment, according to the severity or acuity of their condition. This system dates back to the 18th century in World War 1 when military surgeons developed and implemented triage rules to promptly evaluate and categorize wounded soldiers (Mulindwa & Blitz, 2016). Triage aims at bringing the greatest benefits to the highest possible number of patients by prioritizing them so that patients with the greatest and most immediate needs are assisted first (Mulindwa & Blitz, 2016).

Emergency Departments around the world use different triage systems to assess the severity and urgency of incoming patients' conditions and to assign treatment priorities. Some triage instruments are the Australian Triage Scale (ATS), the Canadian Triage and Acuity Scale (CTAS), the Manchester Triage system (MTS), the Emergency Severity Index (ESI) (Christ, Grossman, Winter, Bingiseer & Platz, 2010). These triage systems, the CTAS, MTS, and ATS, although used widely in European countries, each require extensive training to implement, making their

widespread adoption in African settings challenging. Furthermore, the time taken to triage each patient is too long for most Emergency Departments in African settings like South Africa, where the case-load presenting to many of our Emergency Departments is so large that a rapid system is required (Gottschalk, 2006). Many developing countries in Africa have not had any formal triage system to categorize incoming patients in their Emergency Departments, In South Africa, the Cape Triage Group (CTG) developed and validated a triage scale known as the South African Triage Scale (SATS) in 2007 (Augstyn, 2011). The SATS proved to be very effective in the sorting and categorizing of patients in the Emergency Departments and some African countries, like Botswana, have adopted the system; foreign countries, like Pakistan, have also favored the system (Augustyn, 2011).

Unfortunately, in the SA environment, human resource constraints do not readily allow for a physician-led triage system or for the most-qualified nurses always to be available to perform triage. To compensate for this, the SATS was designed to be used by enrolled nursing assistants. A high staff turnover sometimes results in expertise being lost, so training of new staff needs to occur on a regular basis (Goldstein et al*,* 2017). Triaging, using the SATS, involves asking for the presenting complaints, looking for clinical signs and measuring vital signs which are then used in calculating the Triage Early Warning Score (TEWS) (Augustyn, 2011).

The study, conducted by Ali, Bernice, Taverner, Ghani, Kussor and Naz (2013) on the assessment of knowledge of triage, on nurses in three teaching hospitals of Pakistan reveals that sixty-nine percent (69%) of nurses attained poor scores. In Tanzania, Dar es Salaam, the study conducted by Aloyce, Leshabari, and Brysiewicz (2014) indicates that thirty-three percent (33%) of nurses were not knowledgeable about triage, fifty-two percent (52%) were unable to allocate an appropriate triage category, while fifty-eight percent (58%) had no knowledge of the waiting time in the Emergency Department. In South Africa, Limpopo Province, in the Sekhukhune District, in the study conducted by Cimona-Malua (2010), it was found out that the triage system was inefficient and needed improvement and that patients waited too long to be triaged. The low percentage of nurse knowledge regarding triage in the Emergency Departments suggests a gap that can be enhanced through capacity building in the emergency staff personnel.

Triage and emergency care have always been weak and least under-emphasized components of the health care systems in Africa and yet, if well organized, could lead to saving many lives and reducing the ultimate cost of care. Many developing countries are grappling with ever-increasing emergency and trauma cases in settings of limited and dwindling resources for such care (Aloyce et al, 2014). The researcher believes that enriching nurses with triage knowledge will improve emergency care services in the emergency departments. Hence, the need to develop strategies for enhancing knowledge of triage amongst nurses. This study was conducted in the emergency departments of the Sekhukhune District Hospitals, Limpopo Province, South Africa.

1.2 PROBLEM STATEMENT

Many deaths in hospitals occur within 24 hours of admission, some of the deaths could have been prevented if these patients were identified quickly and treatment initiated without delay (WHO, 2005). According to Augustyn (2011), in 2007, the South African Triage Scale (SATS) was adopted as a triage tool to be used nation-wide. The tool yielded many positives results in the sorting of patients. Despite the positive results and benefits yielded by this triage tool, there are still many Emergency Departments which still see patients on a first come, first serve basis, regardless of the severity or urgency of patients' conditions. It would seem that there is a lack of knowledge regarding the use of triage amongst nurses in the Emergency Departments. This study, therefore, seeks to develop strategies for enhancing knowledge of triage amongst nurses in the Emergency Departments.

1.3 PURPOSE OF THE STUDY

The purpose of this study is to develop strategies to enhance the knowledge of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa.

1.4 OBJECTIVES OF THE STUDY

Objectives of this study were:

- To assess the level of knowledge and practices of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa;
- To describe the level of knowledge and practices of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa;
- To develop strategies enhancing knowledge of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa.

1.5 RESEARCH QUESTIONS

The following research questions guided the researcher throughout the study:

- What are the levels of knowledge and practice of triage amongst nurses in the Emergency Departments of the Sekhukhune District Hospitals?
- What strategies can be developed to enhance the knowledge of triage amongst nurses in the Emergency Departments of the Sekhukhune District Hospitals, Limpopo Province, South Africa?

1.6 OVERVIEW OF THE RESEARCH METHODOLOGY

The quantitative approach was followed to conduct this study. A quantitative research study is a formal systematic process in which numerical data are used to obtain information about the world (Burns & Groove, 2011). The study was conducted in the Sekhukhune District in the Dilokong Hospital, the Mecklenburg Hospital, the Jane Furse Hospital, the Groblersdal Hospital, and the Matlala Hospital. A cross-sectional descriptive design was used to attain numerical data about a broad range of triage knowledge and practice in the Emergency Departments of the Sekhukhune District Hospitals. This was used to describe the knowledge and

practices of triage, as well as the strategies for enhancing knowledge of triage amongst nurses in the Emergency Departments of the Sekhukhune District. The population for this study consists of 105 nurses (Professional nurses, Staff nurses and auxiliary nurses) from the five district hospitals of Sekhukhune.

Simple random sampling was used to select a sample size of 84 from the total population of 105, as guided by the table of Krejcie & Morgan (1970). Since the objectives of this study were to assess, describe knowledge and practices of triage and to formulate strategies enhancing knowledge of triage amongst nurses, structured questionnaires were used to enable the researcher to gather data about the knowledge and practices of triage amongst nurses. The Statistical Package for the Social Sciences (SPSS) version 24 was used to analyze data, with the help of a statistician. The research methodology is discussed in detail in Chapter 3.

1.7 RELIABILITY AND VALIDITY OF THE STUDY

In this study, validity was ensured by conducting a review of the literature on the research topic. This is discussed in chapter 2. The questionnaire was analyzed by a panel of lecturers in the Nursing Department, Senior Degrees' Committee and Turfloop Research Ethics Committee (TREC) and changes were effected as suggested. Pre-testing of the instrument was carried out at the FW Knobel Hospital.

1.8 ETHICAL CONSIDERATIONS

According to De Vos, Strydom, Fouche and Delport (2011), ethics is well-described as a set of moral values that are suggested by an individual or a group which propose rules or behavioral expectations. The following ethical standards were adhered to while conducting the study: permission to conduct the study with ethical clearance, informed consent, and voluntary participation. Ethical principles, including the principle of autonomy, the principle of confidentiality and anonymity, the principle of justice, the principle of beneficence and non-maleficence, were adhered to in the study. More details on ethical considerations are discussed in chapter 3.

1.9 SIGNIFICANCE OF THE STUDY

The results will inform the Department of Health and Emergency Departments about the challenges that lead to ineffective Triage Systems. The Emergency Departments

will further benefit by implementing the strategies to enhance triage knowledge and practice for effective Triage Systems which will result in many positives in the rendering of emergency care services.

1.10 CONCLUSION

In this chapter, a brief outline of the steps taken to conduct this study is presented. An introduction and background to the research problem, in relation to the knowledge and practices of triage amongst nurses in the Emergency Departments, is described. The purpose of this study is to develop strategies to enhance knowledge of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa. In order to achieve the purpose, a quantitative research approach with a non-experimental design was used. The chapter also explains the ethical standards and principles adhered to in the study. The next chapter discusses the literature reviewed.

1.11 OUTLINE OF THE STUDY

Chapter 1: Overview of the study

Chapter 2: Literature review and theoretical framework

Chapter 3: Research methodology and design

Chapter 4: Results and discussions

Chapter 5: Strategies and theory integration

Chapter 6: Summary, limitations, and recommendations

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

A literature review is a process involving finding, reading, understanding and forming conclusions about the published research and theories on specific topics (Brink, Van der Walt & Van Rensburg, 2012). This chapter discusses the research findings of other researchers concerning triage knowledge and practices, as well as the theory grounding the study as it aims to enhance triage knowledge and practices amongst nurses working in the Emergency Departments of the Sekhukhune District hospitals, Limpopo Province, South Africa. In addition, it considers the theory adopted to guide the study in light of the literature available.

2.2 TRIAGE SYSTEMS IN EMERGENCY DEPARTMENTS

According to Ali, Bernice, Taverner, Ghani, Kussor, and Naz (2013), triage is a process used to determine the severity of illness or injury and to prioritize patients according to their needs for medical care, irrespective of their order of influx or other factors including gender, age, and socioeconomic status. Many hospitals in low-income countries lack a formal triage system and this has led to dangerous, yet avoidable, delays in the management of critically ill patients (Mulindwa & Blitz, 2016). Emergency Departments throughout the world have triage systems in place, the Manchester Triage Scale (MTS), the Australian Triage Score, (ATS), the Canadian Triage Assessment Score (CTAS) and the Emergency Severity Index (ESI). The basic rationale of all the systems is to ensure that patients are seen in order of clinical need rather than in order of attendance (Gottschalk, 2006).

2.3 MANCHESTER TRIAGE SCALE (MTS)

Accurate initial patient triage in the Emergency Department is pivotal in reducing time to effect treatment by medical teams and for expediting patient flow. The Manchester Triage System (MTS) is widely implemented for this purpose, yet the overall effectiveness of its performance remains unclear. It was developed in the United Kingdom by the Manchester Triage Group in 1994/1995 and it is most widely

used in European and North American health care settings (Steiner, Renetseder, Kutz, Haubitz & Faesler et al, 2015).

The MTS has a list of 52 pre-determined conditions or presentation flowcharts that are combined with the main complaint reported by the patient and a record form by a triage nurse. Classification is divided into five colors: red (immediate), Orange (very urgent), yellow (urgent), green (standard) and blue (non-urgent) (Azeredo, Guedez, Rebelo de Almeida, Chianca & Martins, 2015). General discriminators appear throughout the different charts while specific discriminators apply to small groups' presentations. The triage nurse selects for each patient the most appropriate flowchart and consequently gathers information on the discriminators from top to bottom. Selection of a discriminator allocates a patient to the related urgency category, ranging from "immediate' (0 minutes maximum waiting time) to "no urgent" (240 minutes waiting time). A discriminator leads to the same urgency level regardless of the flowchart used, increasing the ease of use and inter-rater reliability (Zachariasse, Seiger, Rood, Alves, Freitas, Smit & Moll, 2017).

2.3.1 Validity of the Manchester Triage Scale (MTS)

The sensitivity of the MTS to identify patients who died in the Emergency Departments, or who needed Intensive Care Unit (ICU) admission, ranged from 0.80 to 0.86 and 0.66 to 0.91. Performance of MTS in different age groups showed a large variation between settings. Overall, the diagnostic odds ratio was lower in elderly patients, aged 65 or older compared with the group of adults aged 16 to 65. Children had lower diagnostic odds ratios than adults. The validity of MTS, according to the study conducted, is moderate to good (Zachariasse et al, 2017).

2.4 AUSTRALIAN TRIAGE SCORE (ATS)

The Australian Triage Scale (ATS) is a five-level Emergency Department triage algorithm that has been continuously developed in Australia and subjected to several studies. The ATS, is a five-point triage scale, was endorsed by the Australian College for Emergency Medicine in 1993. It is based on adult physiological predictors (airway, breathing, circulation, and disability) (Ebrahimi, Heydari, Mazlom, & Mirhaghi, 2015).

The validity and reliability of the ATS in adult and pediatric population has been investigated but it is still unclear to what extent the ATS supports consistency in triage nurses' decision making in Australia compared with other countries. However, some studies have reported moderate consistency for the ATS, but it needs to be extensively studied in terms of participants, statistics, instruments and other influencing criteria, as well as mis-triage (Ebrahimi et al, 2015).

2.4.1 Factors that influence triage decision-making using the ATS (Department of Health, 2009).

- A number of non-clinical influences are known to threaten the reliability and utility of five-tier triage scales;
- These factors relate to patient and environmental influences;
- Environmental factors such as staffing, skill-mix and ED activity levels must not influence urgency allocation;
- The potential for a person to leave the ED without medical treatment is not considered a valid reason for upgrading a triage code. Additionally, caution must be exercised when a person has had multiple presentations to the ED with the same or similar complaints. In such situations, it is essential that each presentation be assessed and triaged as a new episode;
- Frequency of presentations to the ED must not influence the allocation of a code.

2.4.2 Time-to-treatment

The time-to-treatment criteria attached to the ATS categories designate the ideal maximum time a patient can carefully wait for medical assessment and treatment. The degree to which these criteria can be met is routinely assessed against nationally recommended performance standards for each of the five.

Table 2.1 indicates ATS categories for treatment acuity and performance threshold, by the Department of Health, Australia (2009).

Table 2.1: Australian Triage Scale Categories

ATS category	Treatment acuity (maximum waiting time)	Performance indicator %
1	immediate	100%
2	10 minutes	80%
3	30 minutes	75%
4	60 minutes	70%
5	120 minutes	70%

2.5 CANADIAN TRIAGE ASSESSMENT SCORE (CTAS)

According to Canadian Department of Health and Ageing (2009), the Canadian Triage and Acuity Scale (CTAS) was officially included in policy throughout Canada in 1997 and has been endorsed by the Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation of Canada. This scale is very similar to the ATS in terms of time-to-treatment objectives, except for category 2, which is less than 15 minutes compared with less than 10 minutes in the ATS triage category.

2.6 EMERGENCY SEVERITY INDEX

The Emergency Severity Index (ESI) is a five-triage scale which was developed by the American physicians, Richard Wuers and David Eitel in 1998 in the US. The two believed that a principal role for an Emergency Department triage instrument is to facilitate prioritization of patients, based on the urgency of treatment for the patient's condition. The triage nurse determines priority by posing the question, "Who should be seen first?" However, Wuers and Eitel realized that when more than one top priority patient present at the same time, the operating question becomes "How long can each patient safely wait?" (Gilboy, Tanabe, Travers, & Rosenau, 2012).

The ESI is unique in that it also, for less acute patients, requires the triage nurse to anticipate the expected resource needs (e.g. diagnostic tests and procedures) in addition to assessing acuity (Gilboy et al, 2012). The ESI has been refined on a number of occasions and it has been found to be reliable when tested using case

scenarios. It is currently being considered for use across the United States of America (Department of Health, Australia, 2009).

2.6.1 Triage in the Emergency Department using the Emergency Severity Index (ESI) 5- levels by Gilboy et al, (2012)

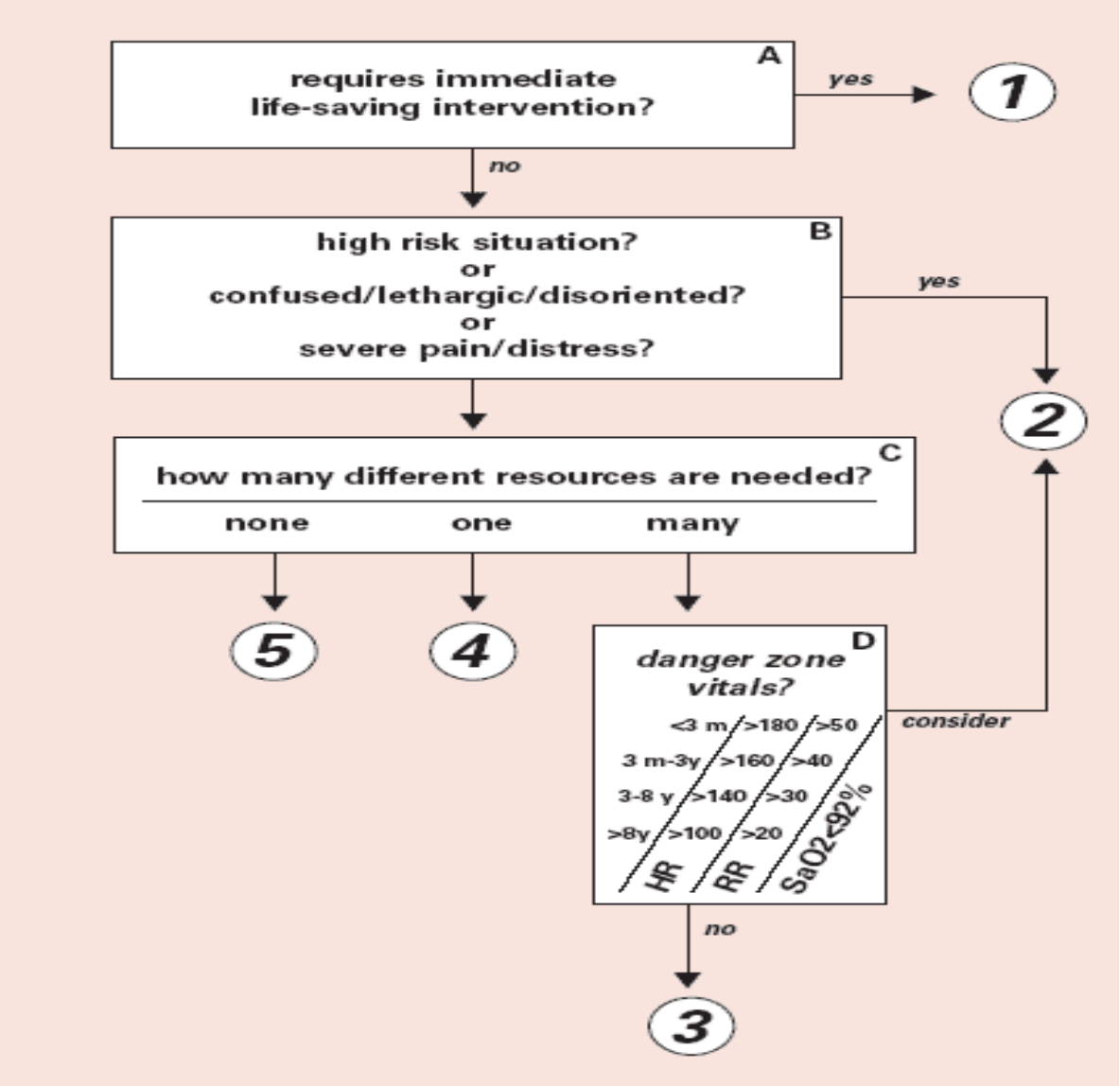

Figure 2.1: Emergency Severity Index

2.7 SOUTH AFRICAN TRIAGE SYSTEM

The South African Triage Scale (SATS) was developed by the Cape Triage Group (CTG) in 2004. The system was intended to be used for both pre- and in-hospital triage; the system uses color codes or categories which are: 1.red = immediate

priority (resuscitation cases), 2.Orange = very urgent priority, to be seen in less than 10 minutes (potentially life/limb threatening pathology), 3.yellow =urgent priority (significant pathology) to be seen in less than 60 minutes, 4. Green = delayed priority (minor injuries /illness) to be seen in less than 240 minutes and 5.blue = dead (Wallis, Gottschalk, Wood, Bruijns, Vries & Balfour, 2006).

There are three versions of the SATS, the adult (over 12 years), the child version (3-12 years) and the infant versions (less than 3 years of age). The physiological assessment was chosen as a major component of the system as it is a core element of triage. The Medical Early Warning Sign (MEWS) utilizes systolic blood pressure, heart rate, temperature, respiratory rate and AVPU which is a measure of the level of consciousness, Alert, /Verbal, Pain, Unresponsive (Wallis et al, 2006).

The MEWS has limitations with regard to triage as it is medically biased because trauma patients are generally healthy and have good physiological reserves, so injuries may be severe with apparent normal physiological markers, adding to the mobility score. This led to the development of the Trauma Early Warning Score (TEWS). Further, the Cape Triage Score (CTS) used discriminators that allow appropriate triage in cases of patients with normal physiology (Rosedale, Smith, Davies & Wood, 2011).

The South African Triage Scale (SATS) is user-friendly and more suitable for use in developing countries, following successful use in Southern Africa. Triaging with the SATS involves asking for presenting complaints, looking for clinical signs and measuring vital signs. These are then used in calculating the Triage Early Warning Score (TEWS), (Augustyn, 2011).

2.7.1 The Triage process in Emergency Departments

The following stepwise process to determine a patient's triage code or category has been suggested by Augustyn, (2011):

STEP 1: Obtain a brief history and document
STEP 2: Measure vital signs and document
STEP 3: Calculate the TEWS

STEP 4: Match the TEWS score to the discriminator list and search for any other discriminators

STEP 5: Determine the actual triage color code according to the discriminator list

STEP 6: Utilize triage aids if required and document findings and intervene.

2.7.2 Triage requirements

According to the SATS Manual (2012), triage is simple to perform but in order to standardize the process and comprehensively implement the system as a validated tool, certain requirements need to be met. The following table indicates the triage requirements needed for implementation.

Table 2.2: Triage requirements

Location	Equipment	Additional equipment
Privacy: Screen, partition or separate room.	Gloves, face masks & other barrier protective devices	Pulse, oximeter with pediatric probes
Safety: Security/protected	Wall clock	ECG
Size of area: pushchairs, wheelchairs, stretchers	Low reading electronic/ mercury thermometer	Finger prick machine, hemoglobin and glucometer measurement
Accessibility	Vital signs monitor OR baumanometer with pediatric cuffs	Urine collection containers, urine dipsticks & urine pregnancy tests
Baby-changing facilities	Dry dressings/ bandages	

2.8 KNOWLEDGE AND PRACTICES OF TRIAGE IN THE EMERGENCY DEPARTMENTS

Triage knowledge amongst nurses is one of the key elements of supervision in emergency departments. If it is not carried out at a standard level, the outcomes of the clinical care of patients in the Emergency Department will be compromised (Ali, Bernice, Ghani, Kussor & Naz, 2013). The study conducted by Ali et al, (2013) of the knowledge of triage among nurses in emergency centers of Pakistan, found that a high number of nurses attained poor scores on triage knowledge (69%). Another study, conducted in Dar es Salaam, Tanzania, assessing knowledge among nurses, indicates that nurses had poor knowledge of triaging (33%) and that 52% of the nurses involved in the study, failed to allocate proper patient triage categories or coding. Approximately 67 % of the respondents knew what triage was all about. Another study conducted in three the hospitals, Mazandaran University of Medical Sciences, Sari, Iran; shows that only 20.1% of study participants had triage knowledge (Tilahun, 2016). Triage nurses must have appropriate training and experience in Emergency Departments, according to Rahmati, Azmoon, Meibodi, and Zare (2013), although there are few studies regarding this subject. In 2005 triage knowledge and performance was found to be low the hospital of the Kerman University of Medical Science, and the study found that knowledge of triage amongst nurses in hospitals of Sistani Baluchistan was inadequate. A study carried out in Australia reported that 42% of nurses had not received triage training and 14% said that they were not sufficiently prepared to triage, despite attending triage classes. Generally, these studies show that, unfortunately, there are still serious concerns over-triage nurses' knowledge (Rahmati et al, 2013).

2.9 WAITING TIMES IN THE EMERGENCY DEPARTMENTS

South African public hospitals are poorly resourced, overcrowded, understaffed and underfunded. All this contributes to the pressure under which emergency departments operate, the trauma load is one of the highest in the world (Rosendale, Smith, Davies & Wood, 2011). This results in prolonged ED waiting time. Therefore, an effective triage system to ensure early recognition of sick patients and prioritization for treatment is essential (Rosendale et al, 2011).

The National Department of Health (NDoH), (2011), led by Dr. Aron Motswaledi, points out areas of concern or critical areas that must be improved by South African health facilities for the betterment of patient care under the national core standards. Six ministerial priorities were identified and waiting-time listed number three. Under waiting time, a proper and working triage system must be implemented for effective streaming of patients to reduce this time (Department of Health, 2011).

The study conducted by Aloyce et al, (2013) assessing knowledge of triage amongst nurses in the emergency centers of Dar es Salaam, 58% of the respondents attained poor results on the knowledge of waiting-time. The study conducted by Cimona-Malua (2010) in St Rita's hospital in Limpopo Province, South Africa on waiting-time in the Emergency Department indicates that patients waited for about two hours to be seen, 60 minutes for registration, 3 minutes interaction at registration and 57 minutes waiting for vital signs. All this potentially delays treatment intervention.

2.10 CHALLENGES OF TRIAGE IN EMERGENCY DEPARTMENTS

Triage tools established in developed countries are not suitable for use in developing countries like South Africa and many other African countries because of their complexity and the fact that they require extensive training. However, the SATS was designed to be used by a wide range of health practitioners including auxiliary nurses (Agustyn, 2011). According to Wolf, Brysiewicz, LoBue, Heyns and Bell et al, (2012) when studying developing a framework for emergency nursing practice in Africa, one of the challenges that emergency nurses face in their practice is a lack of triage protocols in the Emergency Departments, or protocols not being followed. Again, another challenge which makes it difficult for emergency nurses to triage effectively is the lack of permanent staff in triage areas where the staff is being changed on a daily basis to go and work in triage and this creates a situation wherein inexperienced staff are allocated to triage without any opportunity to master the skill. This is because of inconsistent allocation of triage nurses and once again, there is a lack of workshops or any update in triage training to those who might have attended the training (Cimona- Malua, 2010).

2.11 THEORETICAL FRAMEWORK

A theory is an organized, coherent and systematic articulation of a set of statements related to a significant question in a discipline that is communicated as a meaningful whole (Masters, 2012). This study is grounded in Patricia Benner's theory of clinical wisdom in nursing practice by using the listed domains below and the South African Triage Scale (SATS). The researcher was guided by the theory in describing the level of knowledge and practices of triage systems in emergency departments (Integration is presented in Chapter 4). Patricia Benner's theory of clinical wisdom in nursing practice drew the attention of the researcher because it focuses on the understanding of perceptual acuity, clinical judgment, skilled know-how, ethical components and ongoing experiential learning (Masters, 2012). Benner's original seven domains and thirty-one competencies of nursing practice were derived from clinical situations, interviews, and observation of nurses in actual practice.

2.11.1 The 7 main domains of Benner

- Helping role – it is the duty of nurses in the Emergency Departments to help patients who are anxious and in need of help;
- Teaching - coaching function- nurses who are trained on triage /experienced nurses and specialists have a duty to teach and coach novice nurses on triaging patients within the emergency departments;
- Diagnostic and patient monitoring function - with proper and well-functioning triage systems in emergency departments, nurses are able to accurately detect, diagnose and sort life-threatening emergencies by taking histories and monitoring vital data and so allocating a patient a relevant triage code;
- Effective management of rapidly changing situations - if nurses are knowledgeable about triage and have a system that is functional, they will be able to manage every situation within emergency departments, even in the face of mass casualties because they would have a system that has proved to sort emergencies of all kinds and to reduce overcrowding as well as patient waiting-time.

- Administering and monitoring therapeutic intervention regimen - after nurses have allocated a triage code to the patient, relevant treatment will then be implemented immediately, based on the category of patient.
- Monitoring and ensuring the quality of health care practice - a triage system within the emergency department is an effective tool to ensure the quality of emergency service rendered to the patients. This is important as it is a national priority for NDoH to reduce waiting-time, according to the sixth ministerial priority outlined by Dr. Aron Motswaledi.
- Organizational work role competencies - this theory domain advocates for the use of a triage system, because when the system will facilitate appropriate organization despite limited staff and resources available to provide quality care where due. Again, with the identification of competencies and domains of nursing, Benner identifies five stages of skills acquisition. These are important in this study in enhancing knowledge and practice of triage amongst nurses in the emergency departments to improve emergency departments that do not have a proper or functioning system or where nurses seem to be lacking knowledge or good practices of triage (Masters, 2012).

2.11.2 The five stages of skills acquisition in nursing care are (Dreyfus model - novice to expert):

- *Novice* – these are new nurses in emergency departments without triage skills and experience. According to Benner (1984), novices have no experience in the situation where they are expected to perform, they lack the confidence to demonstrate safe practices and require continual verbal and physical cues. Practice takes time which means that they need guidance and support from the experienced nurse practitioners to teach them how to triage to become confident and to practice safe triage within Emergency Departments.
- *Advanced beginner*-advanced beginners are represented by nurses with knowledge but little triage skill in the Emergency Department. Advanced beginners perform marginally acceptably because they have prior experience in actual situations; they are efficient and skillful in parts of the practice, requiring occasional supportive cues when triaging from competent triage nurses.

- *Competent* – This category is represented by nurses who have been on the job in the same or similar situations for two or three years, working in triage areas within Emergency Departments. They can demonstrate efficiency, are coordinated and are confident in their actions and care. This results in triaging being completed within a suitable time frame without supporting cues.
- *Proficient* - Proficiency is represented by experienced nurses with experience working in Emergency Departments and triaging patients. A proficient nurse can perceive the situation as a whole rather than in terms of chopped up parts or aspects. Proficient nurses learn from experience what typical events to expect in any given situation and how plans can be modified in response to certain events. They use the experience to allocate a certain triage category despite the vital signs or clinical signs of the patient
- *Expert* - Nurse specialists in the field of emergency and trauma who have a teaching-coaching role in the work-life of novices and advanced beginners and other categories of nurses. Experts operate from a deep understanding of the total situation. Their performance becomes fluid, flexible and highly proficient.

Benner, (1999) later identifies nine domains of critical care nursing, of which seven are relevant to this study:

- *Diagnosing and managing life-sustaining physiological functions in unstable patients.* It is important for emergency nurses to triage patients to manage life threatening conditions and to stabilize them immediately so as to revive physiologic functions
- *Using skilled know - how to manage a crisis.* Emergency nurses must have triage skills to be able to intervene appropriately in crisis situations
- *Providing comfort measures for the critically ill*. Triage nurses in the Emergency Departments should be able to provide comfort and to see that patients who are critical will not wait too long to be treated and relieved of their pain, because the triage system would have detected them as critical for immediate intervention.
- *Caring for patients' families.* A triage system will provide for this theory domain because during triage a family will know what to expect, based on

the triage code allocated. They will know how long they will have to wait and this should prevent aggression from family members.

- *Preventing hazard in a technological environment.* Through working knowledge, triage hazards can be minimized because patients with infectious diseases will be sorted out immediately on arrival to prevent spread.
- *Communicating and negotiating from multiple perspectives.* - Triage assists in predicting possible admissions in the Emergency Departments so after a triage code, a triage nurse can negotiate with a doctor, who will take the final decision, to refer a patient to a relevant place to avoid unnecessary delays
- *Using skilled know-how.* Clinical leadership and the coaching and mentoring of others implies that proficient and expert nurses in the Emergency Department should support other nurses in decision-making in triage, as the opinion of senior or expert practitioners is valuable in triaging.

The study has developed strategies to enhance knowledge and practices of triage amongst nurses in the Emergency Departments. The Dreyfus model of skill acquisition through Benner's theory has been used as a guide in developing strategies to help nurses to enhance triage knowledge and practice to render effective emergency services within the Emergency Departments.

2.12 CONCLUSION

Chapter 2 discusses triage systems, the South Africa Triage Scale, triage processes and equipment, triage knowledge, waiting-times in Emergency Departments, challenges of triage and a theoretical framework. The framework provides a guide to address the identified challenges in the practice of triage and to enhance the knowledge and practice of triage by nurses in the Emergency Departments. Chapter 3 discusses the research methodology used in the research.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes in detail the research methodology used in this study. A quantitative research approach was used in this study to enable the researcher to obtain numerical data related to knowledge of triage amongst nurses working in the Emergency Departments of Sekhukhune District hospitals, Limpopo Province, South Africa. The study used a quantitative research approach with a cross-sectional descriptive design to achieve the aim of the study. The population of all nurses working in the Emergency Departments was randomly selected using the fishbowl technique. Data collected through questionnaires were analyzed using SPSS version 25 and Microsoft Excel computer program. The study site was at Sekhukhune District hospitals, Limpopo Province, South Africa.

3.2 QUANTITATIVE RESEARCH APPROACH

The quantitative research approach is a formal systematic process in which numerical data are used to obtain information about the world (Burns & Groove, 2011). The approach is essential to develop the body of knowledge needed for evidence-based practice, hence the use of the approach in the development of strategies to enhance knowledge of triage in Emergency Departments. Quantitative research is used to quantify the problem by way of producing numerical data or data that can be converted into usable statistics. This research approach is further used to generalize results from the larger sample population in the study (DeFranzo, 2011). Therefore, the researcher used the approach to generalize results regarding nurses' knowledge and practices of triage in Emergency Departments of the Sekhukhune District hospitals.

3.3 STUDY SITE

The study was conducted in the Sekhukhune District which has 5 District Hospitals, all of which provide 24-hour emergency services to patients in their Emergency Departments. Dilokong and Mecklenburg Hospitals, with 34 nurses, represent the

Greater Tubatse Municipality. The Jane Furse Hospital in the Makhuduthamaga Municipality participated in the study, with 17 nurses and the Groblersdal Hospital with 17 nurses represented Elias Motswaledi Municipality. Lastly, the Matlala Hospital, with 17 nurses, represented the Greater Marble Hall Municipality.

Figure 3.1 is a map of the Sekhukhune District.

Figure 3.1: Sekhukhune district map

3.4 RESEARCH DESIGN

The study design chosen for this study was a cross-sectional descriptive design. A cross-sectional survey is a design in which a study is conducted at a specific point in time and information is collected from all respondents simultaneously (Brink, van der Walt & van Rensburg, 2012). A cross-sectional design was used to obtain numerical data about a broad range of triage systems in emergency departments of the Sekhukhune District Hospitals. A cross-sectional study was chosen as it is a quantitative design, more manageable, time-saving, cost-effective and the best technique to be used by health professionals (Brink et al, 2012).

A descriptive study is designed to gain more information about characteristics in a particular field of study and there is no manipulation of variables (Burns, Grove & Gray, 2015). These studies are used to develop theories, identify problems with current practices and make judgments about practice (Burns et al, 2015). Hence, the descriptive research design was chosen to describe the knowledge and practices of

triage amongst nurses in the Emergency Departments of the Sekhukhune District hospitals.

3.5 POPULATION

Population is a complete set of persons that possess some common characteristics of interest to the researcher (Brink, Van der Walt & Van Ransburg, 2012). The population was made up of 105 nurses from (registered nurses, enrolled nurses and auxiliary nurses) the Emergency Departments of the Sekhukhune District hospitals. All the district hospitals of Sekhukhune were included.

The Dilokong Hospital falls under the Greater Tubatse Municipality and the total number of nurses in the Emergency Department was 18, the Mecklenburg Hospital 21, the Jane Furse Hospital from the Makhuduthamaga Municipality had 25, from the Elias Motswaledi Municipality, the Groblersdal Hospital with 19 and, lastly, from the Greater Marble Hall Municipality was the Matlala Hospital with 22 nurses in their Emergency Department.

3.6 SAMPLING

Sampling is the method of picking a sample from a variety of people, objects, textual materials and audio-visual and electronic materials (Leedy & Ormrod, 2010). The following elements were used in choosing the nurses who participated in the study:

3.6.1 Sample size and sampling technique

Simple random sampling was supported by a table from Krejcie and Morgan (1970) to determine a sample size of 85 from the total population of 105 nurses in this study. The sample size (85) was then divided by five, which is the total number of all district hospitals of Sekhukhune as they all had an almost equal number of staff members in their Emergency Departments.

The fishbowl technique was used to select respondents randomly. Each number assigned to a respondent was written on a piece of paper and then placed in a container. The researcher then drew a piece of paper, noted the number and replaced the piece of paper to shake again and selected the second and third and so on until the required number of 17 respondents per hospital was met.

3.6.2 Inclusion criteria

All nurses working in the Emergency Departments of the Sekhukhune District hospitals who were on duty during the day or night of the data collection and had consented to participate in the study were eligible for selection. These nurses were appropriate as they triage on a daily basis in their emergency departments.

3.6.3 Exclusion criteria

Nurses not attached to the Emergency Department were excluded, as they do not triage incoming patients on a daily basis. Nurses attached to Emergency Departments, but on leave during the data collection process, were excluded from the study as they could not be recalled from their scheduled annual leave. Nurses who were not willing to participate were also excluded.

3.7 DATA COLLECTION

Data collection is defined as the gathering of information to address a research problem (Polit & Beck, 2012). Data was collected through structured questionnaires from nurses working in the Emergency Departments of the five hospitals of the Sekhukhune District. The researcher took a month to collect data, from 23 July to 24 August 2018. The questionnaire consists of 3 sections: Section A - Demographic data, B - Triage knowledge and C – Triage practice and waiting-time. The questionnaire was only available in English. Structured questionnaires consist of pre-determined questions that are verbally or non-verbally administered (Supino & Borer, 2012; Jacobsen, 2012). The instrument was developed from the literature review as published and tested instruments on the topic were not available for this study. The duration for completion of the questionnaire ranged from 45 to 60 0 minutes in private rooms in the five Emergency Departments of the five hospitals in the Sekhukhune District.

3.8. PILOT STUDY

A pilot study is a smaller scale version of a proposed study conducted to develop or refine the methodology such as the treatment, the instrument or the data collection process (Burns & Groove, 2013). De Vos et al*,* (2011) state that the aim of the pilot

study is to improve the success and effectiveness of the main investigation. In the current investigation, the researcher piloted the research instrument. The purpose of the pre-testing of the research instrument was to enable the researcher to modify or adjust it should that be necessary, before embarking on the actual data collection.

Pre-testing was done with 17 nurses from the Emergency Department of FW Knobel Hospital in order to evaluate whether the answers to the questions would yield the appropriate responses to achieve the objective of the research project. The results of the pilot study assisted the researcher in modifying the research instrument and did not form part of the main study. These results are presented below with the reasons for modifying the instrument.

3.8.1 Results of the pre-test

Seventeen (17) participants formed part of the pilot study. These were different categories of nurses from the emergency department, who had signed consent and were eligible to form part of the study. The demographic data of the group indicate that of the 17 participants, 2 (11.8%) were male and 15 (88.2%) were female.

Most of the participants were registered nurses 9(53%), followed by the enrolled nursing category with 5 (29.4%), auxiliary nurses 2 (12 %) and lastly, specialty nurses with only 1 (6%). Most of the participants had not had much experience in the Emergency Department, as 9 (53%) had had 1-2 years of experience and only 1 (5.9%) had had more than 5 years of experience in the Emergency Department. A crosstab analysis was carried out to check the relationship between the variables. The information from Section B and C that related to triage knowledge and waiting-time was used in the analysis.

Table 3.1 Crosstab analysis of experience versus nurse category versus having knowledge versus no knowledge

				Categories of Nurses				Total
Variables				Specialized nurses	Registered nurse	Enrolled nurse	Auxiliary nurse	
Nurses that had knowledge	experience	1-2years		1	8			9
		3-5years		0	1			1
	Total			1	9			10
Nurses with no knowledge	experience					0	0	0
		3-5years	0			5	1	6
		more than 5years	0			0	1	1
	Total					5	2	7
Total	experience			0	0	0	0	0
		1-2years	0	1	8	0	0	9
		3-5years	0	0	1	5	1	7
		more than 5years	0	0	0	0	1	1
	Total			**1**	**9**	**5**	**2**	**17**

Table 3.1 indicates that there is an association between job title and knowledge, as specialty nurses and registered nurses demonstrated having more knowledge than enrolled nurses and auxiliary nurses, despite the number of years of experience.

3.8.2 Nursing categories versus triage knowledge

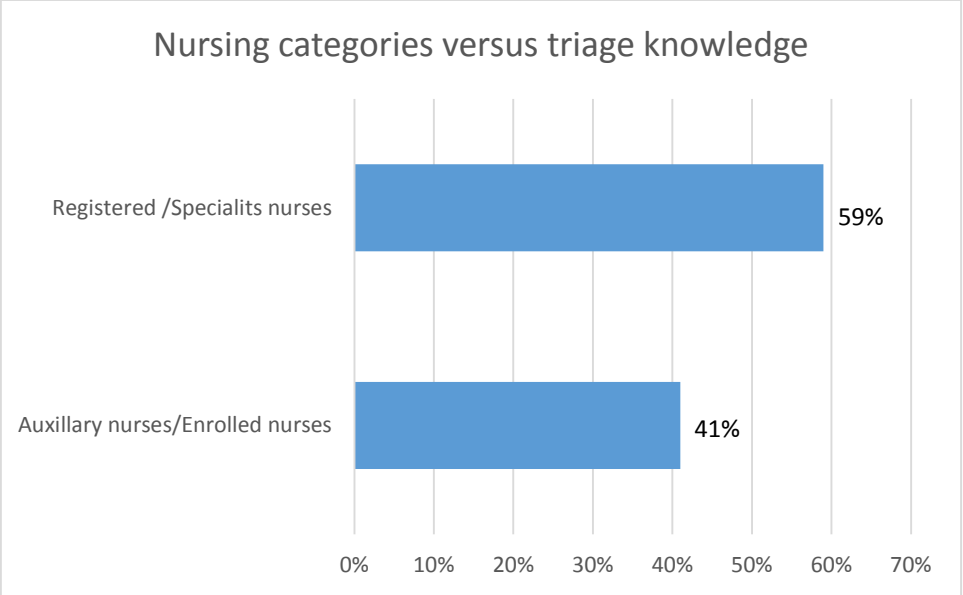

Figure 3.2: Nursing categories versus triage knowledge

Figure 3.1 indicates that registered nurses and specialty nurses have more knowledge about triage compared with enrolled nurses and auxiliary nurses.

3.8.3 Modification of the instrument after a pilot study

The instrument was modified after the pilot study. The changes were as follows: Section A on the demographic data: religion and marital status were excluded as they had no significance with regard to the knowledge and practice of triage amongst nurses; a question on additional qualifications in the Emergency Department was added as it was important to determine nurses' additional training in emergency nursing courses likely to affect triage knowledge. Section B on triage knowledge and training: the five-point Likert type scale questions were changed to two-point Likert scale. Section C: originally, there was only information regarding waiting-time. However, information regarding triage practices and steps was added, as the objective of the study was to assess and describe not only the level of knowledge, but also the practices of triage, so it was imperative to add this information in order to realize the objective.

3.9 PREPARATION FOR DATA COLLECTION

The researcher submitted a request to conduct the study the at Sekhukhune District, Department of Health, after obtaining permission from the province. Permission was granted by the district, following which an appointment was made with the Chief Executive Officers (CEO) of the five district hospitals under study, to ask permission to collect data about strategies to enhance knowledge of triage amongst nurses working in the Emergency Departments. Permission was also granted to collect data from the Emergency Departments after nurse managers and respective department managers/operational managers were informed. Communication about dates and times of data collection was then made with Emergency Department managers. Data collection dates were planned in line with the departments' ward meeting dates and changeover of shifts when most of the staff was available. The researcher introduced himself and a clear explanation about the study, its goal, objectives, purpose, and benefits was given. The participants were assembled in a vacant consultation room that was free from noise or other distracting external factors. Ethical issues, such as informed consent, confidentiality, anonymity, and respect were emphasized before the respondents started completing the questionnaires. Informed consent was obtained from the respondents before they completed the questionnaire.

3.9.1 Data collection process

The sample size for the population of 105 nurses in the Emergency departments was 85 according to the table of Krejcie and Morgan (1970), and then the sample size (85) was then divided into five to make 17 participants per hospital.

Participants were carefully selected via the fishbowl technique to make a total number of 17 per Emergency department. They were then provided with questionnaires to fill out. Participants were given 45 to 60 minutes to complete the questionnaire. The completed questionnaires were immediately collected after being completed. The researcher's role in the whole process was that of a researcher rather than a nurse and as such the researcher tried to minimize bias by positioning himself away from the participants while they were completing the questionnaires. However, he remained within reach in case he needed to clarify any uncertainties. Data were collected during the period from 23 July to 24 August 2018 on the agreed

dates of set ward meetings, changing of shifts where most of the staff were available to continue patient care if not amongst the selected 17 participants.

3.10 DATA ANALYSIS

According to Babbie and Mouton (2011), quantitative analysis is the numerical depiction and manipulation of observations for describing and explaining the phenomena that those observations reflect. Data were analyzed using the IBM Computer programme Statistical Package for the Social Sciences (SPSS version 25) with the help of the University of Limpopo statistician. Descriptive and inferential statistics were used to correlate the variables. Descriptive variables are often used to describe the average of a variable in a population (Jacobsen, 2012; Brian, 2006).Chi-square and crosstab analysis were carried out to calculate the relationship between demographic factors and the knowledge and practices of triage amongst nurses in the Emergency Departments. In order to describe the knowledge, the researcher used standard scores to assess the knowledge of nurses in the Emergency Department. The standard scores of triage knowledge were as follows: Good knowledge was rated 60% and above, where less than 60% was categorized as poor knowledge or/and practice. The questionnaire had 32 questions relating to triage knowledge and waiting-time with a total of 100%. Respondents who scored 18 out of 32 or less attained a rating of poor knowledge. The triage practice questionnaire had six fundamental steps in triaging according to SATS, and respondents who failed to allocate the first three important steps attained poor triage practice rating. This means that respondents who attained less than 3 out of 6 of those 6 fundamental steps in triaging, scored poor in practice. Data were presented using tables, graphs, and charts to illustrate responses.

3.11 RELIABILITY AND VALIDITY OF THE STUDY

3.11.1 Validity

Validity is the degree to which an instrument measures what it was intended to measure or the degree to which inferences made in a study were accurate and well-founded. Validity is also concerned with the integrity of whether the instrument was measuring what it was intended to measure (Creswell, 2013). Validity was safeguarded by grounding the questionnaire in existing scientific knowledge,

obtained from the literature review, in relation to the research theme. A panel of experts in the field was consulted and they validated the appropriateness and accuracy of the questionnaire.

3.11.2 Face validity

Face validity is the extent to which a test is subjectively viewed as covering the concept it purports to measure (Brink et al*,* 2012). Face validity was ensured by giving the questionnaire to the supervisor and co-supervisor to check its validity before it was administered.

3.11.3 Content validity

According to Brink et al*,* (2012), content validity refers to the precise way a measurement tool checks into various aspects of the specific construct in question. The content validity of the questionnaire was ensured through an extensive review of the literature to check that the content of the instrument could achieve the objectives of the study. The supervisor and co-supervisor in the Nursing Department, senior degrees' committee members of the university and the Turfloop Research Ethics Committee (TREC) reviewed the questionnaire to ensure content validity and changes were made in line with their recommendations.

3.11.4 Reliability

Reliability refers to the degree to which the instrument can be depended upon to yield consistent results if used repeatedly over time on the same person (Brink, Van der Walt & Van Rensburg, 2012). It is concerned with consistency, stability, and repeatability. Cronbach's alpha coefficient is the test most frequently used to establish internal consistency or reliability in highly structured quantitative data collection instruments (Polit & Beck, 2008). In this study, reliability was enhanced by checking and testing the questionnaires during the pre-testing. The main drive of the pilot study was to allow the researcher to amend or correct the research instrument tool before the actual data collection process.

3.12 ETHICAL CONSIDERATIONS

De Vos et al, (2011) describe ethics as a set of moral principles that are suggested by an individual or a group, which offers rules and behavioral expectations. The ethical considerations adhered to in this study are permission to collect data, ethical

clearance**,** informed consent and voluntary participation, confidentiality, privacy, the principle of autonomy and justice and beneficence.

3.12.1 Permission to conduct the study

Ethical clearance to conduct the study was given by the University of Limpopo Turfloop Research Ethics Committee, (TREC/372/2017: PG), (See Annexure A). After obtaining a clearance certificate from the TREC, a letter was submitted to the Limpopo Province Department of Health Research Ethics Committee seeking approval to conduct the study (See Annexure B). Permission to conduct the study at the respective district hospitals of Sekhukhune District was obtained from the Limpopo Department of Health research committee (See Annexure C) and, to distribute or administer the questionnaire (Annexure E) in the hospitals, permission was firstly granted by the District Executive Manager of the Sekhukhune District CEO's, nursing managers and respective operational managers of the Emergency Departments (See Annexure D).

3.12.2 Informed consent and voluntary participation

Informed consent means that the ethical principle of voluntary participation and protecting respondents from harm is formalized (Brink et al, 2012). Polit & Beck (2010) state that a vital process to safeguard respondents in the study is to acquire informed consent. Respondents were informed about the topic, purpose, and objectives of the study, of their rights to participate and/or withdraw from the study should they wish to do so without being victimized. They were also informed of the risks and benefits of the study. All respondents were made aware that should any emotional or psychological distress arises as a result of engaging in the study, they would be referred to a counselor. Respondents received all the information before they voluntarily signed a consent form.

3.12.3 Principle of autonomy

The principle of autonomy states that individuals have the right of self-determination (Brink et al, 2012). This implies that an individual has the right to decide whether or not to participate in the study without risk of penalty or prejudicial treatment. The study was explained to the respondents in brief and permission was asked, the

questionnaires were given to those who agreed to participate and no force was applied.

3.12.4 Principle of confidentiality and anonymity

The anonymity of the respondents was ensured by not including the respondents' names on the questionnaires (De Vos et al, 2011). This was done to make sure that the responses could not be linked with the identity of the respondents. Confidentiality of the respondents was ensured by not divulging information about the study to anyone not directly linked to the study. Respondents completed the questionnaire in a private room, signed consent forms were kept under lock and key in a safe place to be destroyed five years after completion of the study (De Vos et al, 2011).

3.12.5 Principle of justice

The respondents have a right to fair selection and treatment (Brink et al, 2012). The researcher treated respondents fairly by selecting them for reasons directly related to the study and using simple random sampling where everyone had an equal chance of being selected for the study. The researcher again respected their rights by letting them determine the degree to which their information could be shared or withheld from others (Brink, Van der Walt & Van Ransburg, 2009).

3.12.6 Principle of beneficence and non-maleficence

Polit and Beck (2010) indicate that the researcher has a duty to protect the respondents by conducting a risk-benefit assessment in order to determine the social, monetary, physical and emotional acceptability of the study. The respondents were informed about the potential benefits and risks that might be incurred through the study. De Vos et al, (2011) state that the researcher should make it a point that no harm happens to the respondents of a study. The researcher ensured that the respondents understood the impact of the study as it involved their daily work practices in the Emergency Departments. This was achieved by carefully structuring questions to minimize any form of harm that might arise from participating in the study. Such information offered respondents the opportunity to withdraw from the study if they so wished.

3.13 BIAS

According to Polit and Beck (2012), bias involves activities that produce errors in interpretation and it affects the quality of study results. Factors that need to be considered so as to guard against bias are a lack of openness and honesty, the researcher's subjectivity, sample imbalance, faulty methods of data collection and inadequate study design. All of these may affect the quality of evidence in a study.

According to Botma, Greef, Mulaudzi, and Wrights (2010), sources of bias in a study include the researcher, design, measuring tools, individual respondents, samples, data, and statistics. It is therefore imperative to recognize possible origins of bias and to prevent it when designing a study. In this study, elimination of bias and the strengthening of the precision of the study was ensured via research control and ensuring that the researcher's philosophies did not influence the results of the study.

3.14 CONCLUSION

Chapter 3 deals with research methodology and designs and discusses the measures and ethics that the researcher observed to carry out the study and to protect and fairly treat research participants. All the activities that might have produced errors in the research study were outlined, spanning from the data collection processes to analysis, to make the study valid. The next chapter discusses the results of the study.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

The focus of this chapter is to present and interpret the findings of the study. Data were analyzed with the assistance of the University statistician using SPSS version 25.0 and an Excel computer programme. The findings seek to answer the objectives of the study which are:

- To assess the level of knowledge and practice of triage amongst nurses in the Emergency Departments of the Sekhukhune District hospitals, Limpopo Province, South Africa.
- To describe the level of knowledge and practice of triage amongst nurses working in the Emergency Departments of the Sekhukhune district hospitals, Limpopo Province, South Africa.
- To develop the strategies for enhancing knowledge of triage amongst nurses working in the Emergency Departments of the Sekhukhune District hospitals, Limpopo Hospitals, Limpopo Province, South Africa

All eighty-five (85) sampled nurses in the Emergency Departments agreed to take part in the study. One returned the questionnaire uncompleted. Data was collected for about 30 days from 23 July to 24 August 2018. This chapter is subdivided into three subsections namely: (A) demographic profile of participants, (B) knowledge versus no knowledge of triage and (C) practice of triage.

4.2 PRESENTATION OF RESULTS

The results of section A, B, and C of the study questionnaire will be presented in the form of graphs and percentages.

4.2.1 Demographic profile of the participants

The demographic information and their relevance to the problem studied are charted in this section as follows:

Gender distribution

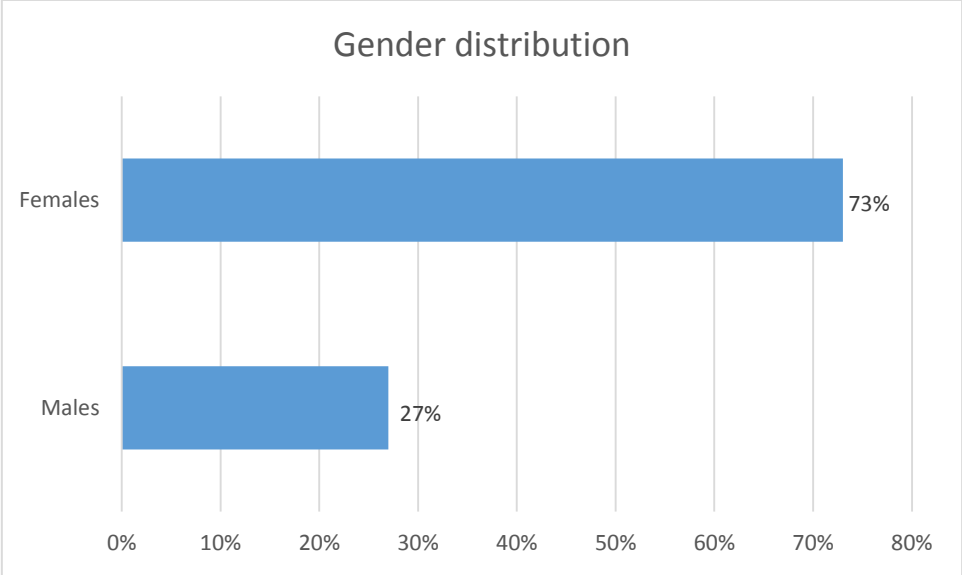

Figure 4.1**:** Gender distribution

Figure 1 represents the gender of the participants. The study indicates that most of the participants in this study are female, 73%, with males making up 27%. This indicates that the Emergency Departments where data was collected were dominated by females which might be because the nursing profession is predominantly female.

Age distribution

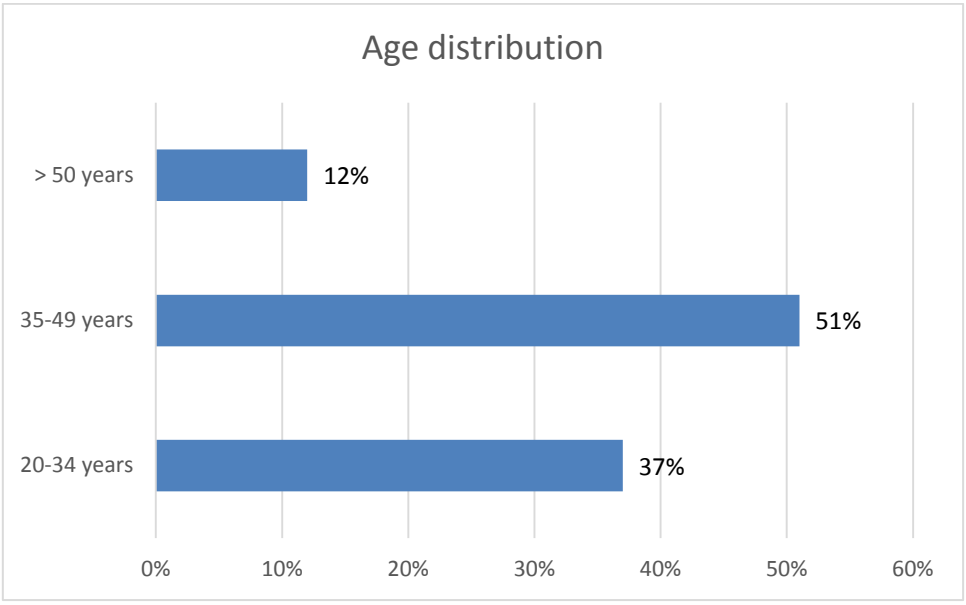

Figure 4.2**:** Age distribution

Most of the respondents in this study (51%) were between the ages of 35 and 49, followed by those in the age group of 20-35 (37%). This indicates that nurses in Emergency Departments represent the most active working group, as the oldest were the fewest with 12%.

Job titles of nurses

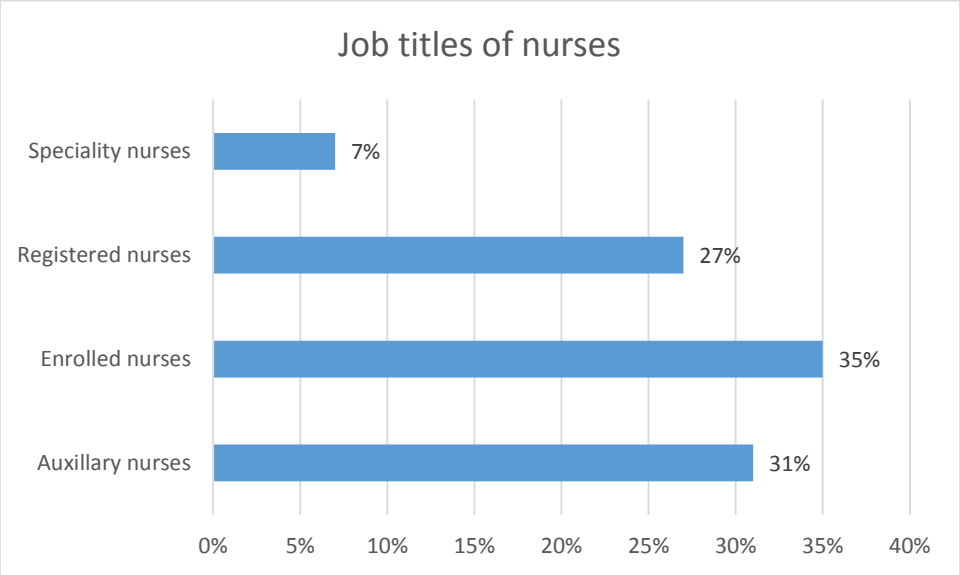

Figure 4.3: Job titles of nurses

Enrolled nurses formed the largest category of participants with 29 (35%), followed by auxiliary nurses with 26 (31%). This indicates that there is a shortage of registered nurses (27%) and specialty nurses (7%) in the Emergency Departments. These categories are the ones most needed in the Emergency Departments because of their knowledge, the scope of practice and to triage, as physician-led triage is difficult in South Africa because of the shortage of physicians.

All nursing personnel is eligible to triage in the Emergency Departments despite their job titles but in this study, auxiliary nurses are the second largest population with 31% after enrolled nurses with 35%. This is a concern as the auxiliary nurses are the group that is mostly delegated to triage due to a shortage of registered and specialist nurses meanwhile they have been shown in this study to be the group with deficient triage knowledge and practice.

Qualifications of nurses

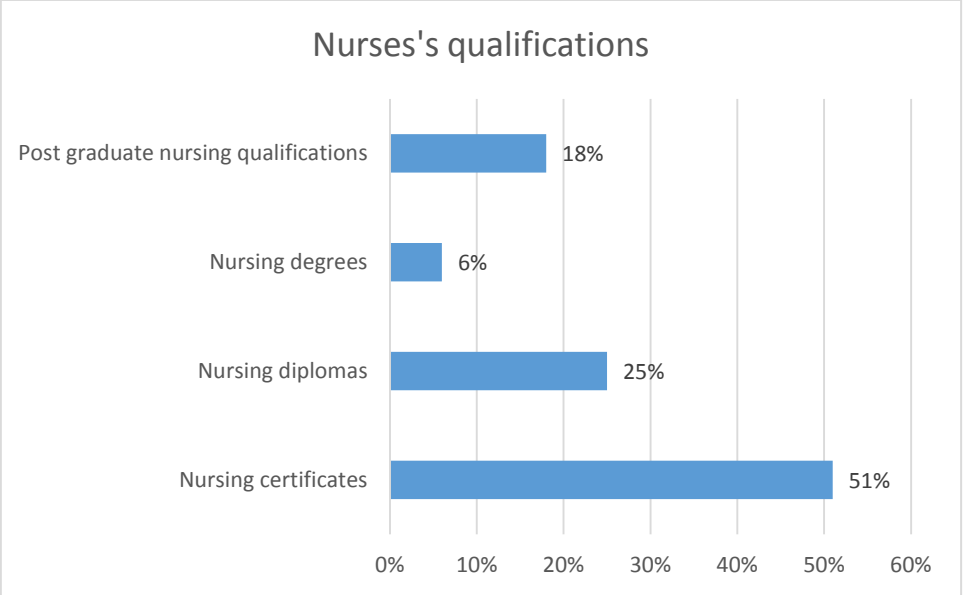

Figure 4.4**:** Qualifications

Most of the participants in this study have certificates (51%). This is because the majority of the respondents in this study were enrolled nurses (35%) and auxiliary nurses (31%) and these groups have one-year and two-year nursing certificates.

Nurses with diplomas made up 25% compared with 6% of those possessing degrees. This might be because nursing colleges have more intake and output of nursing graduates than universities do.

Years of experience

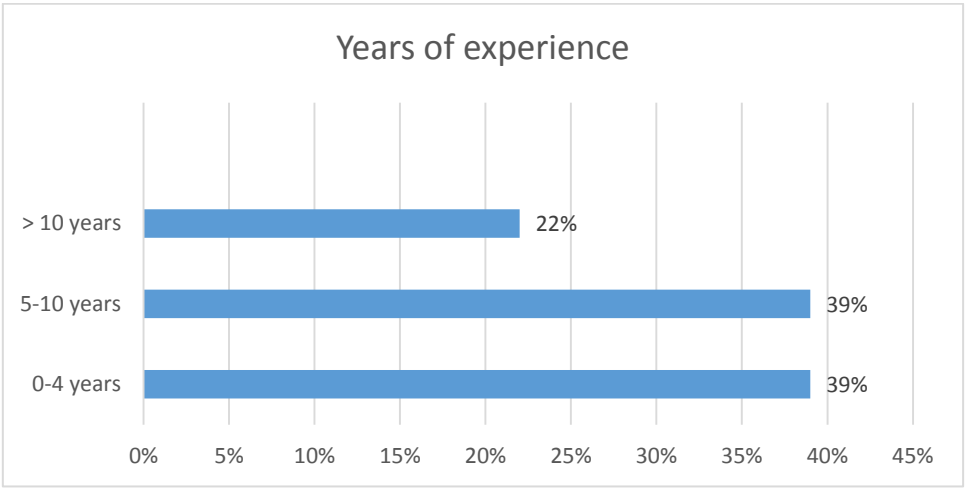

Figure 4.5**:** Years of experience

With regard to years of experience, the most experienced nurses with more than 10 years of working experience were the least with 22 % followed by 39% of ages 0-4 years and 5-10 years respectively.

Triage training

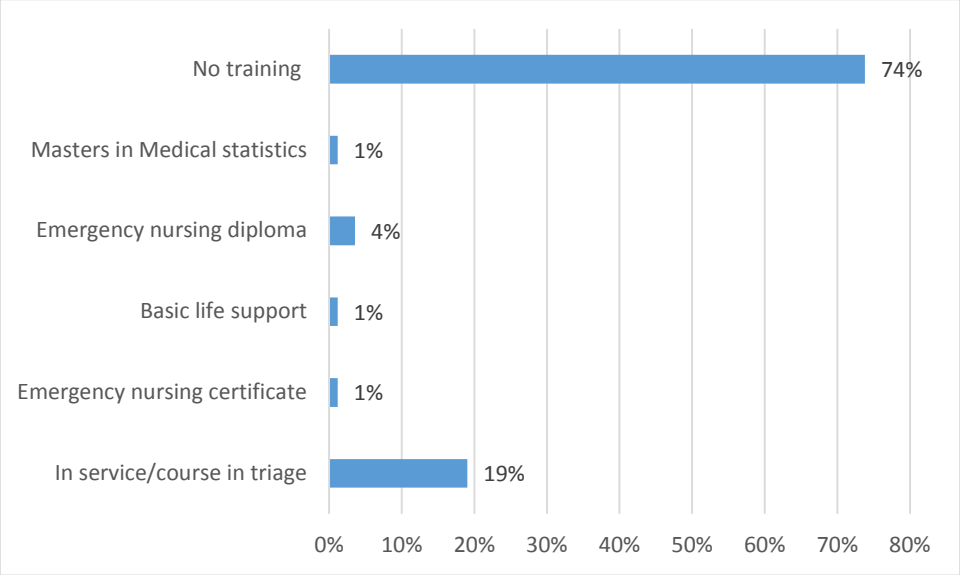

Figure 4.6**:** Triage training

The study reveals that most participants (74%) had neither formal nor in-service training in triage as compared to 19% with triage training or in-service. Only 1% had basic life support training and 5% had emergency nursing courses which are necessary for quality emergency care. One percent (1%) had Masters in medical statistics of which is irrelevant for emergency patient care.

4.2.2 Knowledge of nurses regarding triage

Table 4.1 presents the relationship between demographic variables and triage knowledge only, as one of the objectives of this study focused on the level of knowledge and practice of triage amongst nurses in the Emergency Departments.

Table 4.1: Knowledge versus no knowledge of triage

	Knowledge	No knowledge	P-value
Gender			
Female	34 (67%)	27 (82%)	0.128
Male	17 (33%)	6 (18%)	
Age Group			
20 - 34	19 (37%)	14 (42%)	
35 - 49	26 (51%)	18 (55%)	0.213
=>50	6 (12%)	1 (3%)	
Job title			
Auxiliary Nurse	11 (22%)	15 (45%)	
Enrolled Nurse	17 (33%)	12 (36%)	
Nurse specialty	5 (10%)	1 (3%)	
Registered Nurse	18 (35%)	5 (15%)	0.046*
Qualification			
Degree	3 (6%)	1 (3%)	
Certificate	26 (51%)	26 (79%)	
Diploma	13 (25%)	2 (6%)	0.098
Post-graduate	9 (18%)	4 (12%)	
Experience			
0 - 4	20 (39%)	14 (42%)	
5 - 10	17 (33%)	15 (45%)	0.465
>10	14 (27%)	4 (13%)	

N= 84

Gender and age

There was no statistical association between the variables, gender, and age, on triage knowledge, p-value =0.128 and 0.213 respectively, this means that both males and females had the same triage knowledge regardless of their gender or age. This is consistent with the study by Manoharan, Ravindran, Ranjini, Jacob, and Johnson (2018), where the gender and age variables had no statistical significance.

Job tittles and qualifications

The p-value for the relationship between knowledge and job title is 0.046. This tells us that there is a statistically significant association between job title and knowledge; that is, enrolled, specialty nurses and registered nurse have more knowledge versus no knowledge of auxiliary nurses. In nursing, job titles go hand in hand with qualifications. Auxiliary nurses have the lowest qualifications than professional nurses and specialty nurses who are in possession of diplomas and degrees. In this study, auxiliary nurses were seen to have poorer triage knowledge than the other nursing categories and this was also revealed in the results of the pilot study where auxiliary nurses demonstrated to have poor triage knowledge. However, the p-value for the association between triage knowledge and qualification is 0.098. A study by Kerie, Tilahun and Mandesh (2018) indicates that nurses with degrees have more knowledge than nurses with certificates

Experience

The p-value between the demographic variable experience and triage knowledge was 0.465, indicating no positive significance, this is consistent with the five studies reviewed by Considine et al, (2007) where there was no significant relationship between experience and improved triage decision-making in any of the five studies.

Triage knowledge

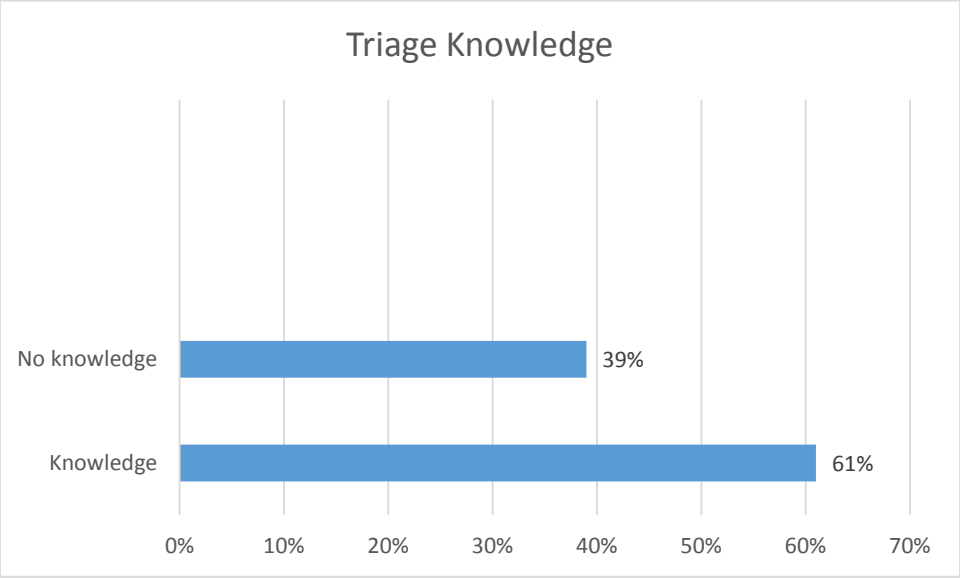

Figure 4.7: Triage knowledge

Sixty-one percent (61%) of the participants showed to be knowledgeable about triage, whereas 39% demonstrated insufficient or poor knowledge, the large portion of this 39% could be from the 31% of the auxiliary nurses who participated in and it was evident that they have insufficient triage knowledge as compared to other nursing categories.

4.2.3 Practice of nurses regarding triage (poor versus good practice)

Table 4.2 presents the relationship between demographic variables and triage practice, as one of the objectives of this study focuses on the level of knowledge and practice of triage. However, this table dwells more on triage practices in the Emergency Departments.

Table 4.2 Practice of triage

	Poor Practice	**Good Practice**	**P-value**
Gender			
Female	35 (69%)	18 (72%)	0.180
Male	16 (31%)	7 (28%)	
Age Group			
20 - 34	21 (41%)	8 (32%)	0.792
35 - 49	26 (51%)	14 (56%)	
=>50	4 (8%)	3 (12%)	
Job title			
Auxiliary Nurse	15 (29%)	6 (24%)	
Enrolled Nurse	21 (41%)	6 (24%)	0.120
Specialty Nurse	2 (4%)	4 (16%)	
Registered Nurse	13 (25%)	9 (36%)	
Qualification			
Degree	2 (4%)	2 (8%)	
Certificate	35 (69%)	11 (44%)	0.199
Diploma	7 (14%)	7 (28%)	
Post-graduate	7 (14%)	5 (20%)	
Experience			0.695

0 - 4	20 (39%)	9 (36%)	
5 - 10	20 (39%)	9 (36%)	
>10	11 (22%)	7 (28%)	

N= 84

Table 4.2 indicates that there is no statistically significant association between gender, age group, job title, qualification and work experience with triage practices. This is the same when comparing these demographic variables with triage knowledge. However, with the gender variable, males were seen to have better triage practices than females but more research is needed to further explore this revelation as there's no support of these findings to date.

Triage practice

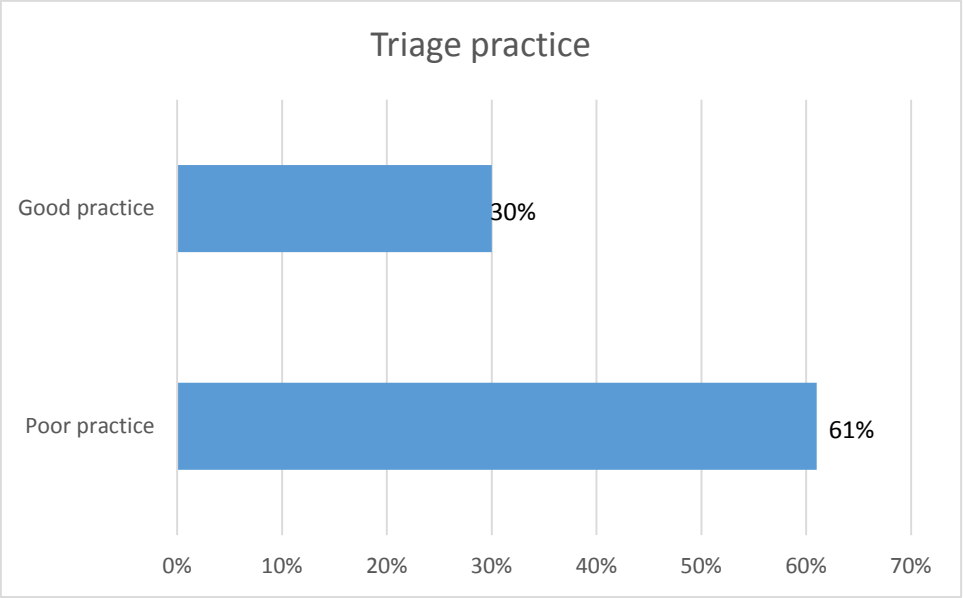

Figure 4.8: Triage practice

Sixty-one percent of the participants demonstrated to have bad triage practice despite showing good knowledge of triage. This might be because a significant portion of the participants (39%) had a few years of experience in the Emergency Department 74% of them were not trained in triage nor received in-service.

4.3 DISCUSSION OF RESULTS

Gender - This study reveals that 73% of the nurses were female. This is because the nursing profession is predominantly females.

Age distribution - Most of the nurses in this study (51%) were between the ages of 35 and 49, followed by 37% of ages between 20- and 34 years. These are active working groups as nurses work long hours which requires an active age group. These are nurses, who according to age, are expected to perform better in the Emergency Departments.

Job titles - Enrolled nurses were the largest category with 29 (35%), followed by auxiliary nurses with 26 (31%). This indicates that there is a shortage of registered nurses (27%) and specialty nurses (7%), not only within the Emergency Departments but in the nursing fraternity as a whole. Registered and nurse specialists are most needed in the Emergency Departments due to their knowledge, scope of practice and to triage, as physician-led triage is a challenge in South Africa health setting because of human and financial resource constraints.

According to Goldstein et al*,* (2017), to compensate for the lack of highly qualified and experienced nurse practitioners in triage, the SATS was designed to also be used by auxiliary and enrolled nurses. All nursing personnel is eligible to triage in the Emergency Departments, despite their job titles. In this study, auxiliary nurses are the second largest population with 31% after enrolled nurses with 35%. Auxiliary nurses are mostly delegated to triage rooms and this is a concern as this study has shown them to have poor triage knowledge.

There is a positive association between triage knowledge and job titles. Enrolled nurses, registered nurses and specialty nurses have more knowledge than auxiliary nurses, p-value (*P =0.046).* According to SATS, an auxiliary nurse still has to seek the advice of an experienced registered nurse in triage. For example, when triaging tiny babies and other complicated cases, so indicate the need to have more skillful nurses in triage rooms.

Nurses' qualifications - Most of the respondents in this study had certificates (51%), this is because the majority of the respondents were enrolled nurses (35%) and auxiliary nurses (31%). These groups have one-year and two-year nursing certificates respectively.

Eighteen percent of the nurses had diplomas, compared with the 6% possessing degrees. This might be because nursing colleges have more intake and output of nursing graduates than Universities.

A significant portion of the participants (39%) had less than 5 years of experience in the Emergency Departments as compared to the 22% of nurses with more than 10 years and 61% of them demonstrated knowledge but scored less in practice. According to Patricia Benner's theory on the five stages of skill acquisition, one needs to have at least three years of experience in the same job environment to be competent.

The job titles of nurses indicated poor triage skills which are consistent with the study conducted by Kerie et al, (2018) assessing levels of triage skills and associated factors among emergency nurses in Addis Ababa, Ethiopia, where nurses had moderate triage skills (52.9%). Triage training, knowledge about triage and educational levels had a significant relationship with triage practice (p=.002). This is consistent with the findings of this study where only enrolled nurses, registered nurses and specialty nurses demonstrated good triage knowledge than auxiliary nurses whose level of education is the lowest of the three nursing categories.

Triage knowledge, experience, and practice

Sixty-one percent (61%) of participants in this study demonstrated good triage knowledge as opposed to many previous studies where nurses scored less on triage knowledge. In the study of Ali et al, (2013) Sixty-nine percent (69%) of the participants in Pakistan had poor triage knowledge which is consistent with the study conducted by Aloyce et al*,* (2014) on the assessment of knowledge of triage amongst nurses working in the Emergency Departments of Dar es Salaam, Tanzania, where only 33% of the participants were not knowledgeable about triage. In addition, 13% of the participants reported that although they had attended workshops, there had been a lack of information and protocols on how to triage patients. Fifty-two percent (52%) demonstrated poor triage practice as they could not allocate appropriate triage categories. This is consistent with the findings of this study, where 61% of the participants demonstrated poor triage practice.

Interestingly, in this study, most of the participants (61%) had good knowledge of triage but scored poorly (61%) in the practice of triage skills. Only 30% scored good triage practice, the remaining 9% is for participants who did not participate on section C of the questionnaire which was about triage practice since they did not have a triage system in their Emergency departments and cannot answer about triage practices.

The study by Kerie et al, (2018) and many other previous studies reveal that there is a strong positive relationship between triage knowledge and practice; however, according to Considine, Botti and Thomas (2007), having knowledge alone about triage does not always yield good triage practice or skills because knowledge is factual, and acquisition of factual knowledge alone is not necessarily associated with behavior change in terms of practice and clinical decisions.

In this study, 74% of the participants had not attended triage training or in-service workshops, most of them (39%) had less than 5 years of working experience and 61% exhibited poor triage practice.

Findings by Fathoni, Sangchan & Songwathana, (2013) support the findings of this study, in that knowledge, experience or training alone is not enough to yield accurate clinical decisions. This is why 61% of the participants scored poorly on triage practice; they had not received training and 39 % had less than 4 years of working experience in the Emergency Departments. According to Benner's theory of five stages of skill acquisition, a significant portion of nurses in this study (39%) were at a competent level of skill acquisition in terms of years of experience and more proficient and expert nurses are needed for triage.

Integration of different types of knowledge results in knowledge that is applicable to a range of clinical situations and practice. A proficient nurse according to Benner's theory perceives situations as a whole, not in parts, whereas an expert nurse has a deep connection and understanding of the situation. Only one study to date disputes the notion that factual knowledge improves triage practice or decision-making (Fathoni et al*,* 2013).

4.4 CONCLUSION

This chapter presents the findings of the study aimed at defining triage knowledge and practice of nurses in the Emergency Departments. The results indicate that nurses do have knowledge regarding triage but have difficulty in converting factual knowledge into practice, as they scored poorly in practice. In addition, there was a significantly positive relationship between triage knowledge and job titles. Therefore, the Department of Health and hospitals should provide training and education on triage to nursing personnel in the Emergency Departments as most of the nursing personnel receive no training in triage. This would help to capacitate the auxiliary nursing personnel as they are mostly delegated to triage.

CHAPTER 5

STRATEGIES TO ENHANCE KNOWLEDGE OF NURSES REGARDING TRIAGE

5.1 INTRODUCTION

This chapter discusses the purpose and strategies enhancing triage knowledge amongst nurses working in the Emergency Departments. The strategies were developed, based on the findings of nurses regarding knowledge and practice and with reference to the literature reviewed.

5.2 TARGET

The targeted population for the following strategies is all nurses working in Emergency Departments, as they demonstrate poor triage practice (61%) in the study findings. It is important to note that triage is listed as a ministerial priority, according to the national core standards of the National Department of Health.

5.3 PURPOSE OF STRATEGIES

The purpose of these strategies is to enhance the level of knowledge and practice of triage amongst nurses working in the Emergency Departments.

5.4 STRATEGIES ENHANCING KNOWLEDGE OF TRIAGE AMONGST NURSES

The below strategies have been formulated to realize objective number three of this study after the performance analysis of nurses revealed poor triage practices in the Emergency Departments. Strategies were developed from an intense literature review and are supported by the theoretical framework of this study.

According to Kenneth, Iserson, John & Moskop (2007), the effectiveness of triage is embedded in the knowledge and skills of the emergency staff members. The development of triage decision-making skills and practices can be enhanced and addressed through the use of simulations, “thinking aloud’ techniques, reflection and the decision rules of the experienced emergency nurses. Clinical educators and experienced emergency nurses are required to recognize that skill acquisition in triage decision-making require practice before anyone can fully engage in the process of safely triaging. It is essential to experience the process of triage decision-making in order to develop an understanding of the clinical information, the

sequence in which information is processed and the rules used to combine information leading to a decision on the triage category of a patient (Cioffi, 2006).

5.4.1 Simulations and thinking aloud techniques

According to Bruce & Klopper (2017), simulation refers to an event or situation that resembles, as closely as possible, the real clinical setting. Clinical simulations can facilitate a learning process as they are active and mimic reality. Triage simulations could be developed from actual triage situations. According to Benner's theory (1984), novice nurses have no experience of the situation in which they are expected to perform. They lack the confidence to demonstrate safe practice and require continual verbal and physical cues. These can be achieved through simulations and thinking aloud techniques.

The thinking of the novice emergency nurse, the decision maker can be monitored during the simulation using concurrent thinking aloud technique. This technique requires the novice emergency nurse to think aloud while making a decision. The use of clinical simulation and thinking aloud provides a safe environment away from actual practice that is conducive to learning without the fear of personal failure or of endangering a patient's welfare. According to the study conducted by Rankin, Karen &Then (2013), on the effectiveness of online triage learning, 74% of the respondents reported that simulations improved their triage skills. Simulations encourage deep learning, help novice nurses to develop confidence and improve their clinical judgment. Teaching situations that incorporate simulations, thinking aloud and reflection result in opportunities for clinical reasoning to become an entity amenable to conscious awareness.

5.4.2 Reflective Practice

According to Benner's theory of skill acquisition, reflective practice is a tool that can be used to bridge the gap between theory and practice. This is a crucial strategy since while most nurses demonstrated good triage knowledge (61%), many failed to translate the knowledge into practice as they scored poorly in practice. Reflection can change conceptual perspectives. Improvement in nursing practice, education and leadership have been positive using reflective practice.

In nursing, reflective practice can be used to reexamine an experience to understand and plan how to act better in a similar situation in the future. Reflection is improved

through experience. It is the experienced practitioner that can facilitate reflection between professionals to enable the development of nursing skills (Benner, 1999).

Beam, O'Brien & Neal, (2010) found that debriefing through reflective practice helps nurses to manage stresses and emotions that are triggered by demanding situations, thus improving nursing practice. Reflection gives insight into practice, nurses can isolate areas of strength and areas that need further development in the Emergency Departments, like in triage. Self-assessment and reflection allow nurses to consider their practice within their own environment and can assist them to sustain and increase their practice. Reflective practice enhances a nurse's critical thinking and judgment based on experience and prior knowledge and eventually enhances patient care and practice.

5.4.3 Continued education and professional development

The study conducted by Rahmati et al, (2013) on the effects of triage education on knowledge, practice and qualitative index of emergency room staff indicates that triage nurses must have appropriate training and experience in emergency nursing triage, decision-making, and emergency care. According to Rahmati et al. (2013), various studies conducted indicate that generally there are still some serious concerns over-triage knowledge and practices amongst nurses in the Emergency Departments. Since triage is performed by nurses, employing experienced and skilled nurses for the triage and teaching them about triage could assist in addressing the problem.

Formal training in triage improves the effectiveness of triage nurses and, with improved confidence, they will be prepared to perform more efficiently. Another strategy is to train nurses in the field of triage on a continuous basis. The study by Rahmati et al, (2013) on the knowledge of triage indicates that most nurses scored poor marks on triage knowledge but that their marks improved marks after triage training. However, they scored poor marks again after six weeks of intervention. This indicates that continued education on triage is key to maintaining good and up to date triage skills.

The findings of the study conducted by Fathoni et al, (2013) provide a better understanding of triage skills among Emergency Department nurses and suggest that continuing education and training courses related to triage and advanced management of medical emergencies for Emergency Department nurses are

essential to increase and update triage skills to enhance the quality of emergency care of patients. Training experience has a positive relationship with triage skills. This suggests that the more training or drills attended, the higher the skills that nurses develop and the better their practice.

5.4.4 Rotation to emergency care centers

The study by Wolf et al, (2012) shows that there is little triage content presented as part of undergraduate or postgraduate nursing programmes, so rotation to emergency care centers, which are much better equipped and having proper protocols, will assist in enhancing nurses' knowledge and assist them to practice effectively within Emergency Departments

5.4.5 Use of experienced nurses in triage

According to Rahmati et al, (2013), it is better to use experienced nurses in the Emergency Departments for the triage of patients than inexperienced emergency nurses. This is supported by the study conducted in which experienced nurses with more than three years' experience scored higher marks on knowledge of triage than nurses with less experience. It was concluded that there is a relationship between work experience and the performance of Emergency Department triage.

5.4.5 Online learning

The use of modern technology in teaching and learning has proved to be effective. According to Rankin et al, (2013), triage knowledge and skills can be enhanced using modern technology, like online learning. Nurses can be recommended to enroll for such training. Web learning can help nurses improve and maintain their competency and it can support professional practice. Findings of the study indicate that 60% of respondents reported having enjoyed online triage learning, 74% had convenient computer access compared with 41% without computer access. Ninety-two percent thought group enrolment for online triage learning was a good idea. The overall results were that 78% of the respondents noted improved triage knowledge from web learning. In South Africa, web learning is a possible strategy despite the challenges of material resources like computers and access to the internet. Mandatory online tutorials, discussions and workplace projects were successful in transferring triage learning to practice (Rankin et al, 2013).

Most nurses are young and use smartphones which they can use to enroll in online triage courses to up their knowledge and practices. However, further research is needed to provide evidence of best teaching and learning practice in triage via web learning.

5.5 INTEGRATION OF DREYFUS MODEL OF BENNER'S THEORY WITH THE STUDY RESULTS AND STRATEGIES.

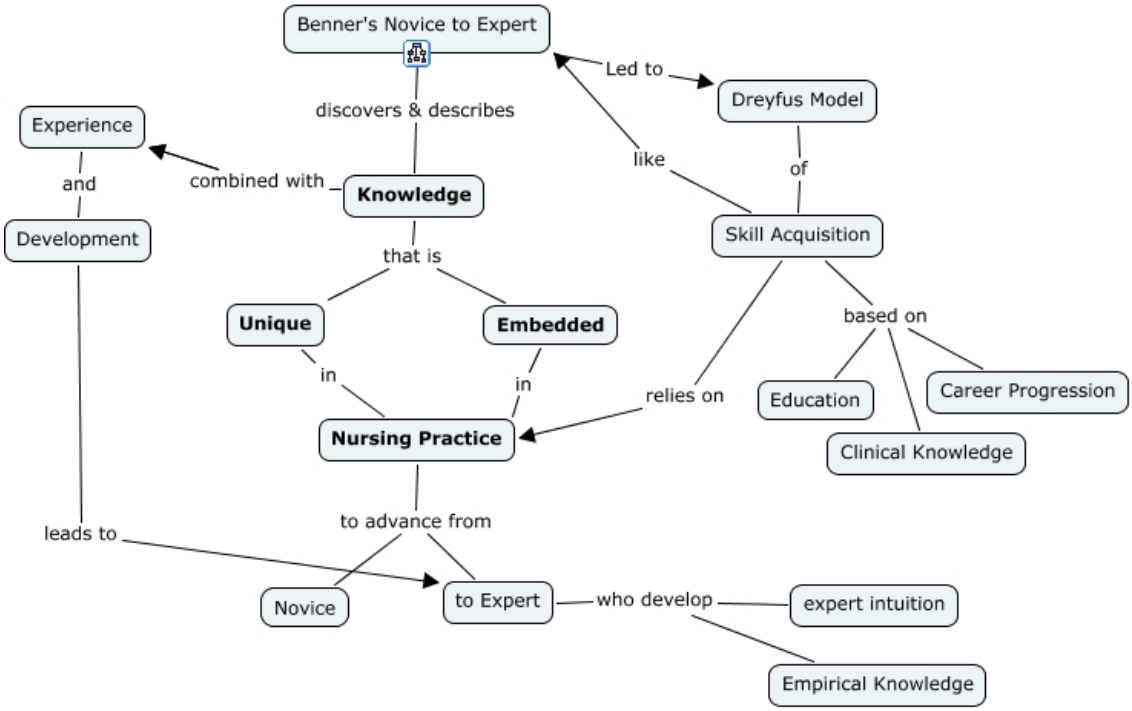

Figure 5.1**:** Model of skill acquisition (novice to expert)

Figure 5.1 illustrates the development pathway from novice to expert. Based on the results of this study, wherein triage practice was poor (61%), this model will assist in ensuring ongoing competence in nurses in the Emergency Departments.

Seventy- four percent (74%) of nurses had never received triage training and to advance from novice to expert, according to this theory, they need education, clinical knowledge, and career progression.

Auxiliary nurses are delegated to triage daily in the Emergency Departments because of a shortage of highly qualified experienced nurses. However, the auxiliary nurses demonstrated poor knowledge in this study. Knowledge alone is not enough

to become a proficient or an expert nurse practitioner. This is evident in this study as the majority of nurses demonstrated triage knowledge (61%) but scored poorly in triage practice.

This theoretical framework suggests that knowledge needs to be combined with experience and development. This can be achieved via triage training and continued education, refresher courses on emergency nursing skills, rotation to well-resourced emergency care centers, simulations and reflection on clinical skills experiences. All these factors combined will effectively advance a novice nurse to become an expert in the unique field of care. A proficient and expert nurse practitioner has empirical knowledge and expert intuition which should assist him/her mentor, support and coach the rest of the emergency nurses to help them progress successfully through all the five stages of skill acquisition and to maintain the skills.

5.5 CONCLUSION

Chapter 5 deals with strategies aimed at enhancing both knowledge and practice of triage amongst nurses working in the Emergency Departments. Findings by Considine et al, (2007) reveal that knowledge alone may not yield good clinical decisions and practice as knowledge is factual. The strategies discussed encourage the integration of different types of knowledge applicable to a range of clinical decisions, including improved triage practice within Emergency Departments.

CHAPTER 6

SUMMARY, LIMITATIONS, RECOMMENDATIONS, AND CONCLUSION

6.1 INTRODUCTION

The results of chapter 4 point out a combination of factors that might have contributed to poor triage practice within Emergency Departments. This chapter presents a summary of the research report, limitations of the study; recommendations and a conclusion drawn from the research findings. Recommendations are made to assist the Department of Health and Emergency Departments to revise the training and education of triage nurses and protocols to address triage systems within Emergency Departments.

6.2 SUMMARY

6.2.1 The aim of the study

The purpose of this study is to develop strategies to enhance knowledge of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa.

6.2.2 Objectives of the study

Objectives of this study are:

- To assess the level of knowledge and practices of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa.
- To describe the level of knowledge and practices of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa.
- To develop strategies enhancing knowledge of triage amongst nurses working in the Emergency Departments of the Sekhukhune District, Limpopo Province, South Africa.

6.3 SUMMARY OF MAJOR FINDINGS

Triage knowledge and practices

The study identified a gap between theory and practice amongst nurses within the Emergency Departments of the Sekhukhune District hospitals.

With regard to triage knowledge, the study revealed that 61% of nurses in the Emergency Departments have triage knowledge, despite 74% of the participants not having had formal or in-service training in triage. However, the practice of triage was found to be poor amongst the same nurses (61%). Insufficient or lack of triage training impacts on the proper practice of triage. A study conducted by Hammad, Peng, Anikeeva, Arbon, Du, and Li, (2017) reveals that just over half (50.8%) of participants from 13 tertiary hospitals in Changsha, China, reported receiving dedicated triage training provided by their employers (38.6%), an education organisation (30.7%) or at a conference (26.1%). Approximately half (53.2%) reported using formal triage scales. It is a huge concern within the nursing profession that the level of care in the Emergency Departments is deteriorating due to ineffective triaging. Immediate intervention is required to resuscitate the situation. The findings of this study indicate that there is a positive significant relationship between triage knowledge and job titles of nurses - auxiliary nurses are the nursing category without triage knowledge.

Fathoni et al, (2013) support the findings of this study in that knowledge, experience or training alone is not enough to yield accurate clinical decisions. In this study, nurses had triage knowledge (61%) but triage practice remained poor (61%). All this indicates a need to utilize the strategies formulated to immediately resuscitate and standardize triage systems to improve practices and to facilitate transferability of triage skills. Findings of the study by Hammad et al, (2017) highlight the variability in the triage practices and training of emergency nurses in Changsha, China, and the implications for the comparability of triage data and transferability of triage skills across hospitals.

Job titles

There is a positive correlation between triage knowledge and job titles; enrolled nurses, registered nurses and specialty nurses have more knowledge than auxiliary

nurses, p-value (*P =0.046).* According to SATS, an auxiliary nurse still has to seek approval of an experienced registered nurse in triage. For example, when triaging tiny babies and other complicated cases. In nursing, job titles are directly linked with nursing qualifications, the lowest categories are auxiliary nurses with the lowest qualifications of having a one-year certificate. In this study, auxiliary nurses displayed insufficient triage knowledge, a critical component of care in the Emergency Department. This directly tells the Department of Health to review the staff allocation of auxiliary nurses to the Emergency Departments or to capacitate them before allocating them to critical units like Emergency Departments.

Gender and triage practices

The was no statistical relationship between the demographic variable, gender, and triage knowledge but with regard to triage practice, males were seen to have better practices than females. More research is needed to explore this revelation as there is no support in the literature for this finding.

Triage training

Most of the nurses had not received triage training (74%). In this study, nurses demonstrated triage knowledge but knowledge alone is not enough, as knowledge is factual and not necessarily practical. Triage practice was poor and this is a major concern which the Department of Health must address to bridge the gap between triage knowledge and practice.

6.4 LIMITATIONS OF THE STUDY

The study was only conducted in the Sekhukhune District hospitals and therefore the results cannot be generalized to other hospitals outside the Sekhukhune district of the Limpopo Province.

6.5 RECOMMENDATIONS

The following recommendations are intended to form a basis for future studies, and they provide a platform for evidence-based planning for effective emergency service delivery and health system improvement by the Department of Health.

6.5.1 Department of Health

- Emergency Department nurses should be trained in triage. If all cannot be trained a few experienced nurses or specialists should be so that they can train the rest of the staff;
- There is need to capacitate emergency nursing personnel with emergency nursing courses like Basic Life Support and Advanced Trauma Life Support as these courses provide Emergency staff members with skills to intervene effectively after allocating triage codes;
- There is a need to train more specialty nurses as they are experts in the field of Emergency Departments and trauma;
- Clear and standardized triage protocols and guidelines should be issued to all Emergency Departments.
- There should be mandatory regular in-service training and workshops on triage to enhance nurses' skills. This will result in effective and efficient service delivery within Emergency Departments.

6.5.2 Emergency Departments

- Frequent rotation of nursing personnel in the Emergency Departments should be avoided, to allow the staff time to learn and gain more experience in working with emergencies and triaging.
- Nursing personnel should be seconded to other hospitals which are doing well in rendering emergency services and triaging, especially to tertiary teaching hospitals which deal with many complicated emergency cases for good exposure and experience.
- Standard operating procedures and checklists for triage should be developed to monitor compliance.

6.6 CONCLUSION

This chapter concludes the study, describes its limitations and makes recommendations for improving triage practice. The data obtained reveal the knowledge and practice of triage amongst nurses in the Emergency Departments of the Sekhukhune Hospitals. Nurses in the Emergency Departments of Sekhukhune demonstrate knowledge of triage (61%), despite the fact that 74% of them have not received formal training in triage nor attended in-service workshops. Despite triage knowledge, nurses failed to translate their factual knowledge into practice as 61% of them scored poorly in triage practice. Using simulations, reflective practice and rotation to well-equipped emergency centers, the gap between theory and practice can be bridged. The strategies and recommendations are useful to the Department of Health in realizing its ministerial priority of waiting-time and triage in the Emergency Departments and to improve emergency service delivery of health care facilities.

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6.8 LIST OF ANNEXURES

Annexure A: Approval from University

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 4029, Fax: (015) 268 2306, Email:Abdul.Maluleke@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE CLEARANCE CERTIFICATE

MEETING:	02 November 2017
PROJECT NUMBER:	TREC/372/2017: PG
PROJECT:	
Title:	Strategies to enhance knowledge of triage amongst nurses working in the emergency department of Sekhukhune District Hospitals, Limpopo Province South Africa
Researcher:	TA Phukubye
Supervisor:	Mr MO Mbombi
Co-Supervisor:	Prof TM Mothiba
School:	School of Health Care Sciences
Degree:	Masters in Nursing Science

PROF TAB MASHEGO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:
i) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.**
ii) **The budget for the research will be considered separately from the protocol.**
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

Finding solutions for Africa

Annexure B: Letter Requesting Permission to Conduct Research

University of Limpopo

Department of Nursing

Private Bag X 1106

Sovenga

0727

Department of Health (Limpopo Province)

Private Bag X 9302

POLOKWANE

0700

Request for Permission to Conduct Research Study on strategies to enhance knowledge of triage amongst nurses working in the Emergency Departments of Sekhukhune District hospitals, Limpopo Province. South Africa.

Dear Madam/Sir

I **Phukubye, Thabo Arthur** request to conduct a study at Sekhukhune District Hospitals. I am currently studying research in Masters of Nursing Science in the University of Limpopo and my performance task is to conduct a study on “strategies to enhance knowledge of triage amongst nurses working in the Emergency Departments of Sekhukhune District Hospitals, Limpopo Province South Africa”.

The study has been ethically approved by the University of Limpopo Turfloop Research Ethics Committee. The target group of the study is nurses in the Emergency Departments. Participation in the study will be voluntary. If the approval is granted, the study will not take longer than 2 years. The data/ results of the study will remain confidential and be used for educational purposes.

Your approval to conduct this study will be greatly appreciated

The researcher: Mr. TA Phukubye,

Contact Details:

Cell: 076 511 8204

Tell: 015 268 4316

E-mail: arthur.phukubye @ul, ac.za

Approved by:

_____

Date: _____

Annexure C: Letter of approval from Department of Health

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

Enquiries: Stols M.L (015 293 6169) Ref:4/2/2

Phukubye TA (LP_201712_002)
Department of Nursing
University of Limpopo
Private Bag X1106
Sovenga
0727

Greetings,

RE: Strategies to enhance Knowledge of Triage amongst Nurses working in the Emergency Departments of Sekhukune District Hospitals, Limpopo Province, South Africa

The above matter refers.

1. Permission to conduct the above mentioned study is hereby granted.
2. Kindly be informed that:-
   - Research must be loaded on the NHRD site (http://nhrd.hst.org.za) by the researcher.
   - Further arrangement should be made with the targeted institutions, after consultation with the District Executive Manager.
   - In the course of your study there should be no action that disrupts the services.
   - After completion of the study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   - The above approval is valid for a 3 year period.
   - If the proposal has been amended, a new approval should be sought from the Department of Health.
   - Kindly note, that the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated.

Head of Department

24/01/2018
Date

18 College Street, Polokwane, 0700, Private Bag x9302, POLOLKWANE, 0700
Tel: (015) 293 6000, Fax: (015) 293 6211/20 Website: http/www.limpopo.gov.za

Annexure D: Approval letters from Sekhukhune District Office and (5) Hospitals

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH
SEKHUKHUNE DISTRICT

Ref: 5/3/1
Enq: Mashiane PN
Tel: 0156332352 / 078 126 5414
E-mail: Philistus.Mashiane@dhsd.limpopo.gov.za

Date: 02 July 2018

To: Phukubje Thabo Arthur
University of Limpopo
Faculty of Health Sciences, Department of Nursing
Private Bag X 1106
Sovenga, 0727

From: Human Resource Utilization and Capacity Development.

Approval for permission to collect data: Yourself

1. The above matter bears reference.
2. Based on the approval granted by the Head of Department of Health, Limpopo Province regarding your request to conduct research in our institution, the District Executive Manager for Sekhukhune District is hereby permitting you to visit the institutions as indicated in your application letter where you will be undertaking your research.
3. Please take note that the approval for the research is valid for a period of 3 years. You are also reminded that the collected findings from our facilities should be kept confidential and should not be made available for public use but be shared with the Department to serve as a resource.
4. **During assumption of data collection, you will present yourself, your scope of work and your schedule to the Chief Executive Officer for the institutions you intend to visit.**
5. Hope the matter is found to be clear and understandable.

District Executive Manager
Mrs Maepa ML

08/07/2018
Date

Matlala Hospital approval

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH
SEKHUKHUNE DISTRICT

Ref: 5/3/1
Enq: Mashiane PN
Tel: 0156332352 / 078 126 5414
E-mail: Philistus.Mashiane@dhsd.limpopo.gov.za

Date: 03 July 2018

To: Director: Hospital Services
Chief Executive Officer: Matlala Hospital

From: Human Resource Utilization and Capacity Development.

Approval for permission to collect data: Phukubje TA (University of Limpopo)

1. The above matter bears reference.
2. The Head of Department of Health, Limpopo Province has approved a request to conduct research in our institution in respect of **Mr. Phukubje**; therefore the District Manager for Sekhukhune District give permission to the applicant to visit your institution as he has specified in his individual application letter to collect data.
3. Please take note that the approval for the research is valid for a period of 3 years. Also be informed that the collected findings from our institutions should be kept confidential and should not be made available for public use.
4. **During assumption of data collection, Mr Phukubje Thabo Arthur will present himself to your offices, his scope of work and schedule on how he will be visiting your institution. The researcher's visits should not in any way disrupt the rendering of services during collection of data.**
5. Hope the matter is found to be clear and understandable.

03/07/2018

District Executive Manager
Mrs Maepa ML

Date

Groblersdal Hospital approval

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH
SEKHUKHUNE DISTRICT

Ref: 5/3/1
Enq: Mashiane PN
Tel: 0156332352 / 078 126 5414
E-mail: Philistus.Mashiane@dhsd.limpopo.gov.za

Date: 03 July 2018

To: Director: Hospital Services
Chief Executive Officer: Groblersdal Hospital

From: Human Resource Utilization and Capacity Development.

Approval for permission to collect data: Phukubje TA (University of Limpopo)

1. The above matter bears reference.
2. The Head of Department of Health, Limpopo Province has approved a request to conduct research in our institution in respect of **Mr. Phukubje**; therefore the District Manager for Sekhukhune District gives permission to the applicant to visit your institution as he has specified in his individual application letter to collect data.
3. Please take note that the approval for the research is valid for a period of 3 years. Also be informed that the collected findings from our institutions should be kept confidential and should not be made available for public use.
4. **During assumption of data collection, Mr Phukubje Thabo Arthur will present himself to your offices, his scope of work and schedule on how he will be visiting your institution. The researcher's visits should not in any way disrupt the rendering of services during collection of data.**
5. Hope the matter is found to be clear and understandable.

District Executive Manager
Mrs Maepa ML

03/07/2018
Date

Jane Furse Hospital approval

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH
SEKHUKHUNE DISTRICT

Ref: 5/3/1
Enq: Mashiane PN
Tel: 0156332352 / 078 126 5414
E-mail: Philistus.Mashiane@dhsd.limpopo.gov.za

Date: 03 July 2018

To: Director: Hospital Services
Chief Executive Officer: Jane Furse Hospital

From: Human Resource Utilization and Capacity Development.

Approval for permission to collect data: Phukubje TA (University of Limpopo)

1. The above matter bears reference.
2. The Head of Department of Health, Limpopo Province has approved a request to conduct research in our institution in respect of **Mr. Phukubje**; therefore the District Manager for Sekhukhune District gives permission to the applicant to visit your institution as he has specified in his individual application letter to collect data.
3. Please take note that the approval for the research is valid for a period of 3 years. Also be informed that the collected findings from our institutions should be kept confidential and should not be made available for public use.
4. **During assumption of data collection, Mr Phukubje Thabo Arthur will present himself to your offices, his scope of work and schedule on how he will be visiting your institution. The researcher's visits should not in any way disrupt the rendering of services during collection of data.**
5. Hope the matter is found to be clear and understandable.

03/07/2018

District Executive Manager
Mrs Maepa ML

Date

Mecklenburg Hospital approval

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH
SEKHUKHUNE DISTRICT

Ref: 5/3/1
Enq: Mashiane PN
Tel: 0156332352 / 078 126 5414
E-mail: Philistus.Mashiane@dhsd.limpopo.gov.za

Date: 03 July 2018

To: Director: Hospital Services
Chief Executive Officer: Mecklenburg Hospital

From: Human Resource Utilization and Capacity Development.

Approval for permission to collect data: Phukubje TA (University of Limpopo)

1. The above matter bears reference.
2. The Head of Department of Health, Limpopo Province has approved a request to conduct research in our institution in respect of **Mr. Phukubje**; therefore the District Manager for Sekhukhune District give permission to the applicant to visit your institution as he has specified in his individual application letter to collect data.
3. Please take note that the approval for the research is valid for a period of 3 years. Also be informed that the collected findings from our institutions should be kept confidential and should not be made available for public use.
4. **During assumption of data collection, Mr Phukubje Thabo Arthur will present himself to your offices, his scope of work and schedule on how he will be visiting your institution. The researcher's visits should not in any way disrupt the rendering of services during collection of data.**
5. Hope the matter is found to be clear and understandable.

03/07/2018

District Executive Manager
Mrs Maepa ML

Date

Dilokong Hospital approval

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH
SEKHUKHUNE DISTRICT

Ref: 5/3/1
Enq: Mashiane PN
Tel: 0156332352 / 078 126 5414
E-mail: Philistus.Mashiane@dhsd.limpopo.gov.za

Date: 03 July 2018

To: Director: Hospital Services
Chief Executive Officer: Dilokong Hospital

From: Human Resource Utilization and Capacity Development.

Approval for permission to collect data: Phukubje TA (University of Limpopo)

1. The above matter bears reference.
2. The Head of Department of Health, Limpopo Province has approved a request to conduct research in our institution in respect of **Mr. Phukubje**; therefore the District Manager for Sekhukhune District gives permission to the applicant to visit your institution as he has specified in his individual application letter to collect data.
3. Please take note that the approval for the research is valid for a period of 3 years. Also be informed that the collected findings from our institutions should be kept confidential and should not be made available for public use.
4. **During assumption of data collection, Mr Phukubje Thabo Arthur will present himself to your offices, his scope of work and schedule on how he will be visiting your institution. The researcher's visits should not in any way disrupt the rendering of services during collection of data.**
5. Hope the matter is found to be clear and understandable.

District Executive Manager
Mrs Maepa ML

03/07/2018
Date

Annexure E: QUESTIONNAIRE

STRATEGIES TO ENHANCE KNOWLEDGE OF TRIAGE AMONGST NURSES WORKING IN THE EMERGENCY DEPARTMENTS OF THE SEKHUKHUNE DISTRICT HOSPITALS, LIMPOPO PROVINCE.SOUTH AFRICA

The purpose of this study is to develop strategies to enhance knowledge of triage amongst nurses working in the Emergency Departments of the Sekhukhune District Hospitals. Limpopo Province.South Africa

SECTION A: DEMOGRAPHIC DETAILS

Please provide the following information by marking with an "X" in the appropriate block.

1**.** Are you a nurse?

Yes	1
No	2

2**.** What is your gender?

Male	1
Female	2

3. What is your age group?

19 or less	1
20-24	2
25-29	3
30-34	4
35-39	5
40-44	6
45-49	7
50-54	8
55 or more	9

4. What is your Post/Job title?

Nurse specialty	1
Registered Nurse	2
Enrolled Nurse	3
Auxiliary Nurse	4

5. What is your highest qualification?

Postgraduate degree	1
Postgraduate diploma	2
Bachelor’s degree	3
Diploma	4
Certificate	5

6. Years of experience in the Emergency Department

0-1 yrs.	1
2-4yrs	2
3-4yrs	3
5-6 yrs.	4
7-8 yrs.	5
9-10 yrs.	6
10 or more	7

7. Indicate the additional training or courses you have received in emergency nursing courses

Nil	1
Emergency nursing certificate	2
Emergency nursing diploma	3
In service/course in triage	4

Other……. ……..	5

SECTION B: TRAINING IN TRIAGE PART 1

Please provide the following information by marking with an "X" in the appropriate block.

8. Have you ever received training in triage?

Yes	1
No	2

9. How would you rate the training?

Bad ⟶ Excellent

1	2	3	4	5	6	7	8	9	10

10. How much would you rate your triage knowledge on a scale from 1-10?

1	2	3	4	5	6	7	8	9	10

Please answer the following question by marking an "x" in the appropriate block

Keywords: 1. = Agree **A**

2. = Disagree **D**

	TRIAGE KNOWLEDGE	**A**	**D**
11	Triage is the sorting of patients into the priority of injuries or illness	1	2
12	The purpose of triage is to prevent deterioration or death of a patient while waiting in the queue for their turn	1	2
13	TEWS is short for Triage Early Warning Signs	1	2

14	There are three SATS charts, one for each infant, children, and adults	1	2
15	If an emergency sign is identified in the first step is to take the patients' vital signs	1	2
16	If no emergency signs are identified in step 1, but an urgent sign is identified in step 2, the patient is immediately triaged yellow and asked to wait	1	2
17	SATS priority level Orange should be referred to a designated area for non-urgent cases	1	2
18	Patients triaged color RED should wait for 10 minutes before being attended	1	2
19	Auxiliary nurses are not allowed to triage?	1	2
20	AVPU is short for **A**lert, **V**erbal, **P**ulse, **U**nresponsive	1	2
21	Adult TEWS consists of the following parameters, Mobility, Respiratory rate, Heart rate, Diastolic blood pressure, Temperature and AVPU	1	2
22	A tiny baby, under two months, should always be referred to the senior health care practitioner once they have been comprehensively triaged	1	2
23	Patients color-coded blue or P4 should be attended first when triaging	1	2
24	SATS has 4 color-coding or priorities	1	2
25	Triage is difficult and costly to implement in district emergency departments	1	2
26	Patients with high social status e.g., town mayor, school principals, politicians, etc. should be treated as Very Urgent even if triaged as color green	1	2
27	Discriminator list is not important for triage purposes	1	2
28	Triage knowledge is not important	1	2

SECTION C: TRIAGE PRACTICES AND WAITING-TIME

Please answer the following question by marking an "X" in the appropriate block

Keywords: 1. = Agree

2. = Disagree

	TRIAGE PRACTICES & WAITING TIME	**Agree**	**Disagree**
29	Triage process should be practiced by professional nurses only	1	2
30	The practice of triage starts with the taking of vital signs of the patient	1	2
31	Allocating a triage code is the last step in the triage process	1	2
32	Calculation of TEWS (Triage Early Warning Signs) is done after allocating a triage code	1	2
33	Comparing of discriminator list and TEWS score is done before allocating a triage code	1	2
34	Triage reduces waiting-time of patients in emergency departments	1	2
35	Waiting-time should not be considered when rendering emergency care	1	2
36	Waiting-time is one of the six ministerial priorities in South Africa	1	2
37	Patients triaged as Yellow should wait for 10 minutes to be seen	1	2
38	Patients triaged as Green should wait for 1 hour or less	1	2
39	Delays in waiting-time can impact negatively on the outcome of the patient's condition	1	2

40	Waiting time can never be improved in rural hospitals due to a shortage of human resources	1	2
41	Short-waiting time in emergency departments reduces overcrowding and the results in patient satisfaction	1	2
42	It is illegal to delay triage in patients within Emergency Departments	1	2

Please answer the following question by marking an "x" in the appropriate block

43. Do you have access to the triage system in the hospital where you work? *

Yes	1
No	2

44. How often do you practice TRIAGE in the hospital where you work? *

When necessary, according to patients' needs	1
Daily	2
Sometimes	3
Never	4

45. How does practicing triage in the hospital where you work function? *

When the department/ward is full	1
According to the age	2
According to the political status	3
According to profession	4
According to patient needs	5
If the person is family/relative	6

46. Who triages in the hospital where you work?

Only doctors	1
Professional nurses	2
Enrolled nurses	3
Auxiliary nurses	4
All staff	5
No triage system/ None	6

47. Where do you practice TRIAGE System in the hospital where you work? *

Consultation room	1
Waiting area/sorting area	2

48. Can you please indicate how you practice TRIAGE in the department by indicating which step comes first and subsequent steps? ***Write only the number (1-6) of the steps in the table provided***

	1	2	3	4	5	6
STEP? = Measure vital signs and document						
STEP? = Calculate the TEWS						
STEP? = Obtain a brief history and document						
STEP? = Determine the actual triage color-code according to the discriminator list						
STEP? = Match the TEWS score to discriminator list and search for any other discriminator						
STEP? = Utilise triage aids if required and document findings and intervene.						

***Points > 3 = 1**

<3 = 0

Annexure F: Letter from the editor

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TO WHOM IT MAY CONCERN

This serves as confirmation that I have proofread and language edited the treatise :

STRATEGIES TO ENHANCE KNOWLEDGE OF TRIAGE AMONGST NURSES WORKING IN THE EMERGENCY DEPARTMENTS OF THE SEKHUKHUNE DISTRICT HOSPITALS, LIMPOPO PROVINCE, SOUTH AFRICA.

submitted by

PHUKUBYE, THABO ARTHUR.

S E Matthis
18 January 2019