# NURSES' KNOWLEDGE, ATTITUDES AND PRACTICES OF LOGROLLING PATIENTS WITH A SPINAL CORD INJURY IN THE WESTERN CAPE METROPOLE

**HUMERI VORSTER**

Thesis presented in (partial)* fulfilment of the requirements

for the degree of Master of Nursing Science

in the Faculty of Medicine and Health Sciences

Stellenbosch University

**Supervisor: Mrs. Ramona Anthonie**

**Co-supervisor: Prof. Talitha Crowley**

**March 2023**

# DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Name: Humeri Vorster

Date: March 2023

# ABSTRACT

**Background**

A spinal cord injury (SCI) is potentially a life-threatening crisis. In South African healthcare facilities, the logrolling technique is used throughout the hospitalisation of patients suffering a SCI. Unfortunately, there are inconsistencies in logrolling practices, techniques and nursing practice as well as a lack of standard operating procedures (SOP), staff shortages and differences in nurses' attitudes towards SCIs; all of these issues are of global concern.

The aim of this study was to investigate the knowledge, attitudes, and practices (KAP) of nurses regarding logrolling SCI patients. The study took place in two tertiary hospitals in the Western Cape Metropole. The objectives of the study were to determine the knowledge and attitudes of nurses towards SCI patients and the logrolling of SCI patients; to determine the practices of nurses when logrolling SCI patients; to determine the management strategies influencing logrolling of SCI patients and to identify factors associated with nurses' logrolling knowledge, attitudes, and practices.

**Method**

A non-experimental, descriptive research approach was employed. A total of 304 nurses (all registered and enrolled nurses, enrolled nursing assistants) employed in two tertiary hospitals in the Western Cape Metropole formed the study sample. The data was collected between April and July 2021 by means of a structured self-administered questionnaire. The main study had been preceded by a pre-test which involved seven participants, but these results were excluded from the final data analyses. The Health Research Ethics Committee (HREC) of Stellenbosch University granted approval for the study. Descriptive and inferential statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 27.

**Results**

The results indicated that nurses generally had good KAP scores: thus, 88.5% of the participants had good knowledge, 93.1% had positive attitudes and 81.9% good practices. However, only 23% of participants reported good management strategies as evidenced by low levels of training (41.1%), the availability of SOPs (35.6%) and lack of sufficient staff (48.4%). Registered nurses and those with more nursing experience were more likely to be knowledgeable ($p<0.01$ and $p=0.01$). Participants with positive attitudes were more likely to be knowledgeable ($p<0.01$), have positive practices ($p<0.01$) and report good management

strategies ($p<0.01$). There was no association between knowledge and practices ($p=0.21$). Management strategies were not associated with knowledge ($p=0.98$) or practices ($p=0.19$).

**Conclusion**

The results indicated that most participants had good KAP but good management strategies were lacking. Insufficient training, the lack of SOPs and staff shortages may lead to inconsistent practices. Recommendations to address gaps included the development and implementation of a mentorship and training programme and competency tools in logrolling and managing SCI patients. Evidenced-based SOPs and logrolling teams are needed to assist with consistent and safe logrolling especially when there are staff shortages. Finally, frequent evaluation and health checks are needed to address the issue of back injuries suffered by nurses working in SCI units, as this could influence their attitudes and practices.

**Key words**: Attitudes, knowledge, logrolling, nurses, patients, practices, spinal cord injury.

# OPSOMMING


**Agtergrond**

'n Rugmurgbesering (RB) is 'n moontlik lewensbedreigende krisis. In Suid-Afrikaanse gesondheidsorgfasiliteite word die logrol (logrolling) gebruik tydens die hospitalisasie van pasiënte wat aan 'n rugmurgbesering ly. Ongelukkig is daar teenstrydighede in logrol- en verpleegpraktyke, sowel as 'n gebrek aan standaardbedryfsprosedures (SBP), personeeltekorte en verskille in verpleegkundiges se houding teenoor RB's. Al hierdie kwessies is wêreldwyd van belang.

Die doel van hierdie studie was om die kennis, houdings en praktyke (KHP) van verpleegkundiges te ondersoek wat logrol van RB-pasiënte betref. Die studie het in twee tersiêre hospitale in die Wes-Kaapse Metropool plaasgevind. Die doelwitte van hierdie studie was om die kennis en houdings van verpleegkundiges teenoor SB-pasiënte en die logrol van hierdie pasiënte te bepaal; om die logrol praktyke van verpleegkundiges te bepaal; om die bestuurstrategieë wat die logrol van pasiënte beïnvloed, te bepaal; en om faktore te identifiseer wat verband hou met verpleegkundiges se logrol kennis, houdings en praktyke.

**Metode**

'n Nie-eksperimentele, beskrywende navorsingsbenadering is gebruik. Altesaam is 304 verpleegkundiges (almal geregistreerde en ingeskrewe verpleegkundiges, of ingeskrewe verpleegassistente) wat in twee tersiêre hospitale in die Wes-Kaapse Metropool werk, het die steekproef gevorm. Die data is tussen April en Julie 2021 met behulp van 'n gestruktureerde, selfgeadministreerde vraelys ingesamel. 'n Voortoets, waarby sewe deelnemers betrokke was, het die hoofstudie voorafgegaan, en die resultate daarvan is nie by die finale data-ontledings ingesluit nie. Die Gesondheidsnavorsingsetiekkomitee (HREK) van die Universiteit Stellenbosch het goedkeuring vir die studie verleen. Beskrywende en inferensiële statistiese ontledings is met behulp van die Statistiese Pakket vir die Sosiale Wetenskappe (SPSS), weergawe 27, uitgevoer.

**Resultate**

Die resultate het aangetoon dat verpleegkundiges oor die algemeen goeie KHP-tellings gehad het: dus het 88,5% van die deelnemers goeie kennis gehad, 93,1% het positiewe houdings en 81,9% goeie praktyke gehad. Slegs 23% van die deelnemers het egter goeie bestuurstrategieë gerapporteer, soos blyk uit lae vlakke van opleiding (41,1%), die beskikbaarheid van standaardbedryfsprosedures (35,6%) en 'n gebrek aan voldoende personeel (48,4%). Geregistreerde verpleegkundiges en diegene met meer verpleegervaring

was meer geneig om kundig te wees ($p<0.01$ en $p = 0.01$) en deelnemers met positiewe houdings was meer geneig om kundig te wees ($p<0.01$), positiewe praktyke te hê ($p<0.01$) en goeie bestuurstrategieë te rapporteer ($p<0.01$). Daar was geen verband tussen kennis en praktyke nie ($p=0.21$). Bestuurstrategieë is nie met kennis ($p = 0,98$) of praktyke ($p = 0,19$) geassosieer nie.

**Gevolgtrekking**

Die resultate het aangetoon dat die meeste deelnemers goeie KHP's gehad het, maar goeie bestuurstrategieë het ontbreek. Onvoldoende opleiding, die gebrek aan SBP's en personeeltekorte kan lei tot strydige praktyke. Aanbevelings om leemtes aan te spreek, sluit die ontwikkeling en implementering van 'n mentorskap- en opleidingsprogram en bevoegdheidsinstrumente in die logrol en bestuur van SB-pasiënte in. Bewysgebaseerde SBP's en logrol is nodig om te help met konsekwente en veilige logrol, veral as daar personeeltekorte is. Laastens is gereelde evaluering en gesondheidsondersoeke nodig om die kwessie van rugbeserings wat verpleegkundiges in SB-eenhede opgedoen het, aan te spreek, aangesien dit hulle houdings en praktyke kan beinvloed.

**Sleutelwoorde**: Houdings, kennis, logrol, pasiënte, praktyke, rugmurg, verpleegsters.

# ACKNOWLEDGEMENTS

I would like to express my sincere thanks to:

- I would like to express my sincere thanks, gratitude and appreciation to:
- ABBA FATHER without whom this study would not have been possible, for His love, grace and giving me the ability to complete my study.
- Prof. Jordan, whose encouraging words I will always remember.
- Mrs. R. Anthonie, my supervisor, for your support and encouragement during this difficult journey.
- My co-supervisor, Prof. T. Crowley, for your extreme patience, guidance and significant advice; without you this would not have been possible.
- My mother for being my inspiration and role model, thank you for all your prayers, encouragement and always believing in me.
- My father, who encouraged and believed in me. I have fond memories of you and wish you were here to share this moment with me. I kept my promise and I know you would have been so proud. I would like to dedicate this study to you and mum.
- My brothers: thank you for caring, and for your love, prayers, encouragement, motivation and support. Without you, this difficult time would have been even more difficult.
- My dear friends Driekie and oupa Hannes, thank you for your prayers, encouragement, support and always being there for me.
- Evalo, for always believing in me, your encouragement and support, without you this journey would have been even more challenging.
- The rest of my friends, auntie Winnie, Cecelia, Michelle, Veronica, Anneke, Willem and Rene, as well as Charlotte and Pierre, I am grateful for every prayer, word of encouragement and motivation.
- Auntie Martie and auntie Joan, for all the phone calls, messages of encouragement and believing in me.
- Dr. J. Stander, Dr. N. Kruger, Me. N. Vajat, Mr. Y. Ras and the experts for their advice.
- The late Dr. Ayele, my original statistician, for his humility, wisdom and significant guidance.
- Ms. T. Esterhuizen, my statistician, for your significant support and guidance on short notice.

- Mr. P. Murton (language editor) and Ms. L. Vorster (translator and technical editor), thank you for your excellent guidance and support.
- The late Dr. A. Kotze who shared this dream with me. I wish you could have shared this significant moment with me.
- I would like to acknowledge all the nursing managers, clinical facilitators and operational managers at the participating hospitals without whom this study would not have been possible. Thank you for all your support. To every participant, thank you for your enthusiasm about the study, sharing your expertise and support during challenging times of the pandemic. You made data collection such a joy, especially during the early hours of the morning. I am so proud of each and every one of you, and immensely honoured to be one of you.

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# LIST OF APPENDICES

# LIST OF ABBREVIATIONS

| | |
|---|---|
| ASCI | Acute Spinal Cord Injury |
| ASIA | American Spinal Injury Association |
| COVID-19 | Coronavirus disease of 2019 |
| ENA | Enrolled nurse auxiliary |
| EN | Enrolled nurse |
| HREC | Health Research Ethics Committee |
| IMU | Inertial Measurement Units |
| IQR | Interquartile range |
| KAP | Knowledge, attitude and practices |
| MeSH | Medical subject headings |
| MRC | Medical Research Council |
| NHRD | National Health Research Department |
| NSCISC | National Spinal Cord Injury Statistical Center |
| POPIA | Protection of Personal Information Act |
| PPE | Personal Protective Equipment |
| RN | Registered Nurse |
| SANC | South African Nursing Council |
| SC | Spinal cord |
| SCI | Spinal cord injury |
| SI | Spinal injury |
| SOP | Standard operating procedure |
| SPSS | Statistical Package for the Social Sciences |
| WHO | World Health Organization |

# CHAPTER 1:
# FOUNDATION OF THE STUDY

## 1.1 INTRODUCTION AND BACKGROUND

A spinal injury (SI) is defined as damage caused to the spinal vertebrae that can lead to damage of the spinal cord (SC) (Clarke & Santy-Tomlinson, 2014:251). An injury to the SC is known as a spinal cord injury (SCI), which will result in either partial or complete paralysis or neurological loss of the limbs below the level of the SI (Clarke & Santy-Tomlinson, 2014:251). Globally, about 250 000 and 500 000 people suffer from SCIs annually, and it is estimated that because of their SCI, they are between two and five times more likely to die prematurely (World Health Organization (WHO), 2013:3). There is a lack of studies regarding SCI patient statistics. Joseph, Delcarme, Vlok, Wahman, Phillips and Wikmar (2015:692) postulate that no SCI patient register, or database was kept in South Africa and therefore little is known regarding the SCI profile; in Cape Town, South Africa the SCI profile was high in comparison to previous suggested figures. This shortcoming might be because of a lack of improved medical care in low-income countries such as Sierra Leone, where a traumatic SCI still remains a fatal condition, and patients die within a few years after sustaining a SCI (WHO, 2013:3).

Studies published locally and internationally conclude that a SI or SCI can be a potential life-threatening crisis and is a traumatic and devastating experience for patients. See, for example: South Africa (Stanton, Hardcastle, Muhlbauer & van Zyl, 2017:1); India (Khan, Phadke, Singh & Jain, 2017:1); and the United Kingdom (Clarke & Santy-Tomlinson, 2014:251). The WHO conducted studies of the Netherlands, France, Spain, Canada, Australia and Finland (WHO, 2013:3). Sothmann (2015:9) indicated that mortality rates of SCI patients in the first year range from 4% in North America to 84% in West Africa. Clarke and Santy-Tomlinson (2014:251) reported that when SCI patients' spinal motion is inaccurately restricted, then this could result in neurological damage.

Hospital A is a tertiary hospital in the Western Cape and is one of the key role players in the management of acute SCI patients. This hospital admitted 2 042 patients in the Acute Spinal Cord Injury Unit (ASCI) between 1 April 2003 and 14 March 2014, with an average of 185 admissions per year (Sothmann, Stander, Kruger & Dunn, 2015:835). Joseph *et al*. (2015:692) reported a remarkable rate of traumatic SCIs of 75.6 per million persons in the City of Cape Town alone. Joseph *et al*. (2015:692) indicated that 59.3% of traumatic SCIs in South Africa are as a result of assault, followed by 26.3% attributable to vehicle-related

incidents, and 11.7% caused by falls. In the United States, motor vehicle accidents (37.3%) are the main cause of SCIs, followed by falls (31.4%), then violence gunshots (15.3%). The third and fourth causes are sports and recreation activities (8.3%) (National Spinal Cord Injury Statistical Center (NSCISC), 2022:1). Consequently, it is crucial for SCI patients in orthopedic units to be correctly immobilized, in order to prevent further complications, which can affect them for the rest of their lives (Kariem, in Stander 2015:162).

The term 'spinal motion restriction' is defined as the process of attempting to maintain the spine in an anatomic alignment to minimize gross movement, irrespective of adjuncts or devices (National Registry of Emergency Medical Technicians, 2022:1) This is done to prevent compromise of the spine or SC. In order to ensure adequate restriction of spinal motion, logrolling is utilized; this entails turning of a patient in a unit at the same time (Canberra Hospital & Health Services Clinical Procedure, 2018:4-5, Sydney Children's Hospital, 2019:1,4). Restriction of motion of the cervical spine and spine, during logrolling, maintains spinal alignment while turning and moving a patient who has had spinal surgery or a spinal disorder, or who has sustained a suspected or confirmed spinal injury (SI) or spinal cord injury (SCI) (Kariem, in Stander 2015:162, Canberra Hospital & Health Services Clinical Procedure, 2018:4-5, Sydney Children's Hospital, 2019:1). The registered nurse (RN) who acts as a team leader during logrolling must give accurate instructions to the rest of the team to ensure proper motion restriction practices (Harrison, 2015:6, 22, Sydney Children's Hospital, 2019:7-8, Greaves, Porter & Garner, 2022:237). Nurses therefore require the necessary knowledge, attitudes and practices (KAP) to provide safe patient care. This will prevent harm to SCI patients who are already vulnerable and dependent on the healthcare team (Clarke & Santy-Tomlinson, 2014:256).

Researchers have highlighted inconsistencies in the logrolling practices applied to SCI patients (Groeneveld, McKenzie & Williams, 2001:45; Conrad, Rossi, Horodyski, Prasarn, Alemi & Rechtine, 2012:S190-S195; Harrison 2015:5, 24 and Kornhall, Jørgensen, Brommeland, Hyldmo. Asbjørnsen, Dolven, Hansen & Jeppesen 2017:4-11). This inconsistency could reflect a lack of knowledge in the safe management of SCIs (Thumbikat, Marshall & Moslavac, 2015:3-4). It could also indicate incorrect logrolling technique (Joseph *et al.*, 2015:692), inconsistent nursing practice (Clarke & Santy-Tomlinson, 2014:256), a lack of standard operating procedures (SOPs) (Todd, Skinner & Wilson-MacDonald, 2015:1), as well as staff shortages (Furlan, Craven, Ritchie, Coukos & Fehlings, 2009:674). Furlan *et al*. (2009:674) concurred that nurses' attitudes towards SCIs further compound the problem. Kwan, Bunn and Roberts (2009:1) warn that a lack of knowledge, poor attitudes and

inconsistent practices could possibly result in further damage to the spinal vertebrae, which could lead to litigation by patients.

To date there has been no exploration, in South Africa, of the knowledge, attitude and practices (KAP) of nurses involved in the logrolling technique used to ensure motion restriction in SCI patients. Any such exploration would need to include, among other issues, a review of management strategies (training and lack of staff) and biographic/ demographic characteristics (e.g., age, gender, professional qualifications). If nursing staff are to understand the importance of logrolling SCI patients, then they will be expected to have good background knowledge regarding the anatomy, physiology, etiology, mechanism of injury and pathophysiology of the spine and spinal cord. The findings of this study may assist in identifying the gaps in the nurses' KAP of logrolling patients with a SCI in tertiary hospitals in the Western Cape Metropole.

## 1.2 RATIONALE

While teaching post-basic orthopaedic nursing students, in Cape Town, the researcher frequently observed nursing staff using variations of the logrolling technique with SCI patients. Logrolling was performed from admission, and throughout the patient's hospitalisation. Although physiotherapists and medical doctors were also involved, the nursing staff (registered (RN), enrolled (EN) and auxiliary nurses (ENA) were mainly responsible for logrolling SCI patients and therefore required the necessary KAP to logroll those patients. This study therefore focuses on nursing staff.

Nursing SCI patients is a specialist skill which entails alerting nurses to the potential vulnerability of SCI patients (Khan *et al.*, 2017:2). For this reason, a spinal education programme was developed in Canada, to ensure that nursing staff have the required knowledge and practical skills to make sure that SCI patients are cared for in an inclusive and consistent manner (Tze, Robinson & Juneau, 2004:26). Although logrolling is a specialist skill, there is a lack of research needed to ensure consistency in logrolling practice; the technique currently being used is more practice orientated than research based (Tze *et al.*, 2004:25-26). Minimizing further injuries and complications, reducing the length of stay in hospital, and establishing effective and current methods of caring for SCI patients, are not only challenging but also essential to ensure positive patient outcomes (Tze *et al.*, 2004:25-26). Consequently, training is vital for making sure that nursing staff have the knowledge needed to provide consistent SCI care and logrolling practices across patient care settings; this is vital for patient safety and satisfaction (Groeneveld *et al.*, 2001:45; Tze *et al.*, 2004:30). In addition to the nurses' knowledge and practices, their attitude and views

regarding SCI patients' quality of life may affect the care they provide to SCI patients (Sothmann, in Stander, 2015:135).

An improved understanding of the KAP of nursing staff might therefore assist with the development of standardised practices and training programmes for logrolling SCI patients. Spinal cord injuries are mostly managed in two tertiary hospitals in the Western Cape Metropole. The researcher has endeavoured to explore the KAP of nursing staff involved in logrolling SCI patients and has attempted to define the managerial strategies in tertiary hospitals in the Western Cape Metropole; this work was prompted because no such studies have been conducted in the past.

## 1.3 PROBLEM STATEMENT

SI or SCI can potentially be a life-threatening crisis. To avoid harming a patient the logrolling technique is used throughout the patient's hospitalisation in the South African health care facilities. Therefore, it is imperative that staff responsible for logrolling SCI patients know about the correct logrolling technique to prevent compromising a patient (Clarke & Santy-Tomlinson, 2014:256). The researcher, who is an orthopaedic lecturer, accompanied students in public health care facilities, and observed and experienced various barriers that might affect nurses responsible for logrolling patients; those barriers had the potential to hinder nurses in executing their role properly. These barriers included the nurses' attitudes towards logrolling SCI patients, a lack of knowledge and training, shortages of nursing staff, a lack of practical skills and competencies, and a lack of SOPs or guidelines.

Various authors outside South Africa concluded that more research is needed to investigate the factors that influence the logrolling of SCI patients (Slaar, Fockens, Wang, Maas, Wilson, Goslings, Schep & van Rijn, 2017:2; Reynolds, Murray, McLennon, Ebright & Bakas, 2018:60-61; Lebel, Chenel, Boulay & Boissy, 2018:1; Abd-Elhameeda & Sayed, 2018:28). However, the researcher has been unable to find any South African-based research that examined nurses' KAP applicable to logrolling patients with a SCI. Therefore, the researcher endeavoured to investigate the KAP of nurses logrolling SCI patients in two tertiary hospitals in the Western Cape Metropole. This study adds to the body of knowledge of logrolling SCI patients in Cape Town, South Africa. This in turn can assist people responsible for writing SOPs which ultimately might improve patient outcomes.

## 1.4 RESEARCH QUESTION

This study was guided by the following research question: “What are the knowledge, attitudes, and practices of nurses who perform logrolling of SCI patients in tertiary hospitals in the Western Cape Metropole?”

## 1.5 RESEARCH AIM

The aim of this study was to investigate the knowledge, attitudes, and practices of nurses involved in logrolling SCI patients in tertiary hospitals in the Western Cape Metropole.

## 1.6 RESEARCH OBJECTIVES

The objectives of the study were to:

- Determine the knowledge of nurses concerning SCI patients and the logrolling of those patients.
- Determine the attitudes of nurses towards SCI patients and the logrolling of those patients.
- Determine the practices of nurses when logrolling SCI patients.
- Determine management strategies influencing logrolling of SCI patients.
- Identify factors associated with nurses’ logrolling knowledge, attitudes, and practices.

## 1.7. CONCEPTUAL FRAMEWORK

The term ‘conceptual framework’ is defined as a synthesis of relevant concepts to give a broader understanding of the phenomenon of interest (Imenda, 2014:189). The process of arriving at a conceptual framework had much in common with an inductive course, whereby different concepts were joined together, arriving at a bigger plan of possible relationships between these concepts pertaining to SCI patients (Imenda, 2014:189). A conceptual framework was developed by the researcher since no existing conceptual framework could not be traced that would fit the study.

## 1.8. RESEARCH METHODOLOGY

A concise overview of the research methodology is provided below. That methodology will be elaborated upon in Chapter 3.

### 1.8.1 Research design

A non-experimental, descriptive design with a quantitative approach, using a self-administered questionnaire (see Appendix 11), was applied to determine the KAP of nurses

in logrolling patients with a SCI in the selected tertiary hospitals in the Western Cape Metropole.

### 1.8.2 Study setting

The study was conducted at two selected tertiary hospitals in the Cape Town Metropole, Western Cape. These two tertiary hospitals were managing most SCI patients in that Metropole.

### 1.8.3 Population and sampling

The target population for this study included all nursing categories caring for SCI patients in the two selected tertiary hospitals in the Western Cape. A census sampling technique was used to select the study participants, with the final sample size being 304 participants.

#### *1.8.3.1 Inclusion and exclusion criteria*

All categories of nursing staff working in units where SCI patients are logrolled for at least 6 months were included, except for all nursing staff on leave.

### 1.8.4 Instrumentation

A structured self-administered questionnaire (see Appendix 11), developed by the researcher, was used to investigate the KAP of nurses responsible for logrolling patients with a SCI, in tertiary hospitals in the Western Cape Metropole.

### 1.8.5 Pilot test

A pilot test (see Appendix 6.1 and 6.2) was conducted, using a convenience sample, in a tertiary hospital with seven participants who met the inclusion criteria. The questionnaire was subsequently adapted, based on the feedback obtained from those seven participants. The data obtained from the pilot test was not included in the main study.

### 1.8.6 Reliability and validity

No previous questionnaires were available to use as a template. Because of this, validity was supported by developing the questionnaire according to guidelines in the relevant literature, bearing in mind the research objectives and the clinical knowledge and experience of the researcher. An expert in the field was also consulted. Guidance was received from the supervisor as well as the co-supervisor. The pilot test was conducted prior to the main study to confirm the level of reliability of the instrument.

### 1.8.7 Data collection

The researcher distributed and collected all the data for the study at the same time; this was in accordance with requests by the operational managers, against the background of staff shortages. Data collection for the main study took place from 14 April 2021 to 3 July 2021 at Hospital B, and from 6 June 2021 until 28 June 2021 at Hospital A, and the return rate was 95. %. An in-depth discussion of the findings is presented in Chapter 3.

### 1.8.8 Data analysis

The researcher used a Microsoft Excel worksheet to capture the data from the paper-based questionnaires. The Statistics Package for the Social Sciences (SPSS) version 27 was used to analyse the data with the assistance of a qualified biostatistician from the Division of Epidemiology and Biostatistics unit of Stellenbosch University. An in-depth discussion of findings is provided in Chapter 3.

## 1.9 ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Health Research Ethics Committee (HREC) of Stellenbosch University (HREC Reference number: S20/10/267) (see Appendix 2). Permission was also obtained from the National Health Research Department (NHRD) [Reference number: WC_202011_026] (see Appendix 5), as well as from the appropriate medical superintendents and nursing management (see Appendix 6.1 & 6.2, 7.1 & 7.2 and 8.1, 8.2, 8.3 & 8.4). The ethical principles as stipulated by the Declaration of Helsinki (Brink, van der Walt & van Rensburg, 2018:27-37) as well as those stipulated by Department of Health (2015:14-15) were diligently applied throughout the study. A detailed discussion follows in Chapter 3.

## 1.10 OPERATIONAL DEFINITIONS

Attitudes: Although attitudes are not directly observable as practices, Kaliyaperumal (2004:8) stated that attitudes measured in the knowledge, attitudes and practices model could gauge the prevalent attitudes, beliefs and misconceptions in a population, regarding a disorder such as SCIs. In addition, Bhattacherjee (2012:11) defined attitude as a disposition, feeling or an affect, inclusive of an individual's positive or negative state of mind performing the behaviour in question. This may be assessed as a summation of one's beliefs regarding the different consequences of that behaviour, weighted by the desirability of those consequences (Bhattacherjee, 2012:31). In this study, the term 'attitudes' refers to the attitudes of nursing staff towards the logrolling procedure and the management of SCI patients.

**Immobilisation:** Immobilisation is performed whenever a patient is suspected of having a SCI. Thus, the head, neck, and rest of the spine are kept in a neutral position and are immobilized (Smeltzer, Bare, Hinkle & Cheever, 2008:2252, Hinkle & Cheever, 2018:2050). This is done to avert any further compromise to the patient's spinal cord.

**Knowledge:** For the purpose of this study, the term 'knowledge' is referred to as a set of understandings, knowledge and of "science", as described by Médecins du Monde (2015:4).

**Logrolling:** Sydney Children's Hospital (2019:1, 4) regard the term 'logrolling' as being the turning of a patient in a unit at the same time, with the spine, head, shoulders, knees and hips being kept in anatomical aligned to prevent any twisting of the spine or any possible further neurological compromise. To ensure the aforesaid, the patient's arms are crossed over the chest while the patient's head, shoulders, knees, and hips are all turned at the same time.

**Nurse:** A person registered in a category in the South African Nursing Council (SANC) under section 31(1) of the Nursing Act, No. 33 of 2005, in order to practise nursing or midwifery. In this study, the term 'nurse' is used as a general term and includes professional, enrolled as well as auxiliary nurses (SANC, 2006:6).

**Management strategies**: For the purpose of this study, management strategies focus on the following three issues: the training of nursing staff regarding the logrolling technique; a shortage of nursing staff during logrolling of a SCI patient, and the availability of SOPs.

**Practices:** Rav-Marathe, Wan and Marathe (2016:5) regard practice as the realisation of knowledge (enhanced understanding of a problem/disorder) and any modification in attitude, produced by the exclusion of misconstructions about a problem/disorder, which then translates into preventative behaviours. Practice might therefore reflect a reciprocal relationship between knowledge and attitude, where the actions could deter a disorder or postpone the evolution thereof. For the purpose of this study, practices or behaviours are regarded as the observable actions of nursing staff in response to a stimulus, as explained by Médecins du Monde (2015:5).

**Spinal injury (SI):** Clarke and Santy-Tomlinson (2014:251) define a SI as damage to the spinal vertebrae which can lead to damage to the spinal cord, thus becoming a SCI.

**Spinal cord injury (SCI):** Clarke and Santy-Tomlinson (2014:251) define a SCI as damage to the spinal cord, resulting in either partial or complete paralysis or neurological loss. This

affects the limbs and autonomic nervous system, leading to loss of function such as motion or sensation.

**Tertiary hospital:** A hospital where highly complex and specialised nursing care is provided by nursing staff and where technical equipment is used; this would include, for example, a critical care unit under the supervision of a specialist or specialist intensivist, specialised imaging units and clinical services highly differentiated by function. These healthcare facilities also provide specialist-level services provided by regional hospitals and they accept referrals from regional hospitals not limited to provincial borders. Such a hospital may provide training to healthcare service providers and the bed sizes range from 400 to 800 beds (Republic of South Africa, 2012:5).

## 1.11 CHAPTER OUTLINE

This thesis is structured according to the following chapters:

- Chapter 1: Foundation of the study
- Chapter 2: Literature review
- Chapter 3: Research methodology
- Chapter 4: Results
- Chapter 5: Discussion, conclusions and recommendations

## 1.12 SIGNIFICANCE OF THE STUDY

Because of a lack of studies conducted in South Africa, and particularly in Cape Town, the researcher expects the outcome of this study to identify any potential gaps in the KAP of nurses responsible for logrolling patients with a SCI, in two tertiary hospitals in the Western Cape Metropole. The findings of this study might also assist healthcare providers to adjust existing training programmes to ensure training which would address a possible lack of the KAP applicable to logrolling patients with a SCI; the findings could also be used to develop SOPs or guidelines. Those findings may assist policy makers to design appropriate interventions to ensure the long-term success of appropriate immobilisation of the spine; these interventions could include logrolling SOPs, guidelines and standard training programmes. This will ensure that safe and standardised practice and care are delivered by nursing staff, and that a patient's SC is not being neurologically compromised; undue expenses should be reduced and there should be less litigation arising from allegations of unsafe practice.

The findings of this study may also alert tertiary hospitals to various issues arising from managing SCI patients; those issues include addressing staff shortages in units, decreasing

liability towards SCI patients being logrolled, improving governance, increasing the number of favourable neurological outcomes and enforcing standardised logrolling care and management. An investigation into this phenomenon has therefore become imperative so that nurses can understand the importance of the correct application of the logroll procedure.

## 1.13 SUMMARY

This chapter has introduced and described the background to the study. Thus, it provided the rationale, problem statement, research question, aim of the study, research objectives, conceptual framework, research methodology, ethical considerations, and operational definitions. Finally, the significance of the study was described. In chapter 2 an in-depth discussion of the literature review will be provided.

# CHAPTER 2:
# LITERATURE REVIEW

## 2.1 INTRODUCTION

Chapter 1 provided the foundation of the study. This chapter provides an exploration and discussion of the literature related to the knowledge, attitude and practice (KAP) of nurses with regard to logrolling patients with a spinal cord injury (SCI). Thus, local and international nature of relevance to the topic under investigation is discussed; such literature is consistent with the study's conceptual framework, aim, purpose and objectives.

The aim of the literature review is to locate and discuss other sources, especially research studies, that are relevant to the phenomena of interest (Gray, Grove & Sutherland, 2017:120-121; Cresswell & Cresswell, 2018:20). The literature review helped the researcher to identify studies that included a specific connection to this present study. The researcher then critically appraised the value and then synthesised the studies; some of the literature drew conclusions regarding the efficacy of specific connections (Grove *et al*., 2015:177; Gray *et al*., 2017:120-121; Cresswell & Cresswell, 2018: 26-29). Relatively few studies were found that specifically addressed the following: nurses' knowledge; pathophysiology of SCIs; the anatomy of the SC; knowledge of the correct logrolling technique; and attitudes, practices, and competencies of nurses when logrolling SCI patients. Also included in the literature review was the aspect of management issues that could influence the KAP of nurses logrolling SCI patients; these issues include training and shortages of nursing staff, SOPs or logrolling guidelines.

## 2.2 SELECTING AND REVIEWING THE LITERATURE

Various online databases were searched for studies which examined the KAP of nurses when logrolling patients with a SCI; the databases included Cochrane, CINAHL, Google Scholar, PubMed, ResearchGate, Scopus and Science Direct.

The mapped key words and their MeSH terms were as follows: nurses' KAP, immobilisation, SI, SCI, logrolling, logrolling spinal cord injured patients, management of SCI patients, KAP studies, management strategies, SOPs, guidelines, training of nurses and shortage of nurses. Both quantitative and qualitative published studies, as well as systematic reviews published in English between 1977 and 2022 were reviewed. Because of the limited number of studies, nationally and internationally, literature older than 10 years was included if it was of seminal value to the phenomena of interest. In addition, the following were reviewed:

relevant mini symposia, conference abstracts and reports; theses, dissertations, journals, and grey literature; Acts and Regulations in accordance with the South African Nursing Council; textbooks; and, international and national guidelines as well as protocols. This review continued throughout the research process.

It was noted that the terms SI and SCI are frequently used interchangeably in the literature. However, in this study, these terms were separated because the focus was on nurses' KAP of logrolling patients with a SCI.

## 2.3 FINDINGS OF THE LITERATURE REVIEW

The findings of the literature review are presented under the following headings.

- Anatomy, physiology and pathophysiology
- Correct logrolling technique
- Conceptual Framework
    - Knowledge of nursing staff
    - Attitudes of nursing staff towards logrolling of spinal injured patients
    - Practice
    - Management strategies

### 2.3.1 Anatomy, physiology and pathophysiology

During trauma, the anatomical structures of the spine are strained and often disturbed, resulting in an instability of the spine; in other words, the spine is unable to withstand normal physiological forces, which places the SC at further risk of injury (Dunn, in Stander 2015:27). This increases the risk of secondary injury in a neurologically intact SI patient, which needs to be prevented at all costs. In a South African study, Pilusa, Myezwa and Potterton (2021:1) investigated the impact that environmental factors have on the prevention of secondary health conditions, regarding people with a SCI. The factors revealed in their study included a lack of healthcare workers and their dearth of knowledge regarding the deterrence of secondary health conditions, and an inadequate care approach for SCI patients.

The American Spinal Injury Association (ASIA) Impairment Scale is a standarised neurological classification tool utilised to assess the grade of motor and sensory functions that are still intact after a SCI, and level of neurological injury (Hinkle & Cheever, 2018:2054, Stander, 2015:18, Blom, Warwick & Whitehouse, 2018:838-839). Blom *et al*. (2018:839) indicate that the lowest level at which sensory and motor functions are present is referred to as the "neurologic level." This classification scale is also utilised in an ASCI unit at a healthcare facility in Cape Town, where most SI and SCI patients are managed. In this

classification scale, different steps are used to determine the patients classification of the neurological status. Steps one and two for classification of the SCI is to grade the sensory and motor function level of the right and left side of the extremities still intact. The third step is to determine the exact neurological level of injury on both sides of the sensory and motor function. Step four determines whether the patient has sustained a complete or incomplete SCI, and if incomplete to signpost which one of the five, as indicated in the American Spinal Injury Association Impairment grading scale. As far as step 5 is concerned, that scale is divided as follows:

- A: Complete SCI, where no motor or sensory function is intact in sacral segments S4-S5.
- B: Incomplete SCI: the sensory function is preserved but not the motor function beneath the neurological level which comprises the sacral segments S4-S5.
- C: Incomplete grading: the motor function is intact below the neurological level and more than half of the key muscles beneath the neurological levels muscle grading is less than three on the muscle grading scale.
- D: Incomplete grading, where the motor function is intact beneath the neurological level, and no less than half of the significant muscles below the neurological level are graded three or more.
- E: Normal grading where both sensory and motor function are intact (Blom, Warwick & Whitehouse, 2018:839).

Regardless of whether the patient is presenting with a suspected or confirmed SCI, it is essential to avoid any further neurologic injury and to prevent pressure injuries; therefore, the objective remains to logroll these patients and maintain correct anatomical alignment (Sydney Children's Hospital, 2019:4). To ensure a safe logrolling technique, it is vital that nurses should know the difference between a complete and incomplete SCI. The extremely delicate spinal cord weighs approximately 35 grams, and is on average 45 cm long in men and 43 cm long in women (Disabled World, 2017:1).

### 2.3.2 Correct logrolling technique

Ropper, Neal and Theodore (2015:266-267) state that between 3% and to 25% of SCIs happen after the initial trauma and occur during transfer from the trauma scene or early during management. Nursing staff should also be knowledgeable regarding the effect of a SCI on systems, especially the respiratory and cardiac system; they should be fully aware of the safe moving and handling of patients including motion restriction and the logrolling technique (Thumbikat *et al.*, 2015:4-5). Kariem in Stander (2015:162) emphasises that logrolling plays a vital role during the acute phase of SCIs. All nursing and medical staff

involved in patient care are responsible for maintaining spinal precautions, irrespective whether the patient presents with a suspected or confirmed SCI (Sydney Children's Hospital, 2019:5). The logrolling procedure promotes safe and consistent techniques to prevent any further neurologic damages of an existing SI, during the essential movement of the patients (Sydney Children's Hospital, 2019:1). Tze *et al.* (2004:25) also confirms that in order to minimise any further injury and complications in patients with potential or confirmed SIs, the correct logrolling technique will ensure a positive outcome for the patient and reduce the length of stay. In contrast Conrad *et al*. (2012: S188) suggested the elimination of logrolling as a spine trauma order as logrolling produced more motion than placing or removing a patient onto, or from, a spine board. These authors also proposed the continuous lateral treatment and positioning of a patient prone for surgery with positions that caused less movement than logrolling. They cautioned that there are supplementary techniques that cause far less motion, and should be considered instead; for example, six plus lift and slide, mechanical kinetic therapy, scoop stretchers, using a rotating operating theatre bed to rotate the patient into a prone position to stabilise the patient and, mechanical transfers.

All SI and SCI patients should be logrolled within three hours of admission, regardless of the logrolling technique used, and should be logrolled at least every 2 – 3 hours (Harrison, 2010:14). The author also iterated the correct application of moving and handling, to prevent a secondary SCI and skin breakdown caused by mechanical forces. Stander (2015:120-129) proposes a minimum of three and a maximum of four staff members, but Conrad *et al.* (2012:S190) express the opinion that a minimum of four nurses are required to logroll a patient.

There are many variations in the specific techniques used in logrolling and these include differences in immobilisation of the head, cervical spine and shoulders; there are also variations regarding the number of staff used to perform the logroll technique (Tze *et al*., 2004:25; Stander, 2015:120-129; Harrison, 2015:18; Canberra Hospital & Health Services Clinical Procedure, 2018:4-7; Mittermayr & Hunt, 2018:1-5). Harrison (2015:14) recommend that during logrolling SCI patients, the head and vertebral column should be aligned when the patient is in a supine (back) or in a lateral position (lying on the side). The team leader is responsible for aligning the head and ensuring the correct alignment by the rest of the team of the vertebral column, and body (Harrison, 2015:6, 22). Logrolling of SCI patients occurs frequently in units; thus, it is compulsory during medical inspection, while it is used for the release of pressure on the skin, postural chest drainage, physiotherapy, routine hygiene and bowel care (Harrison, 2015:14; Stander, 2015:120; Kariem, in Stander 2015:161-162). In the case of acute paraplegic patients, four nurses are required to logroll the patient, as the

patient can support and control their own head movements whereas five nurses are required to logroll an acute tetraplegic patient (Harrison, 2015:14-15). Moreover, the dangerous cervical flexion or sudden rotation of the head is to be discouraged to prevent pain at the injured site in patients with upper thoracic injuries (Harrison, 2015:15).

## 2.4 CONCEPTUAL FRAMEWORK

In this study, the conceptual framework was developed by the researcher, based on the literature indicating the relationship between the KAP, management strategies, biographical characteristics of nurses logrolling SCI patients and the patient outcomes (Stander, 2015:38-39; Chaghari, Saffari, Ebadi & Ameryoun, 2017:26; Joseph *et al*., 2015:692; Khan *et al*., 2017:1; Reynolds *et al.*, 2018:60-61). In this study, knowledge and attitudes were treated as independent variables while the practices (behaviours) were the dependent variable. The biographical characteristics and management practices could be controlling or mediating variables as these might influence KAP directly or indirectly. See Figure 2.1 below.

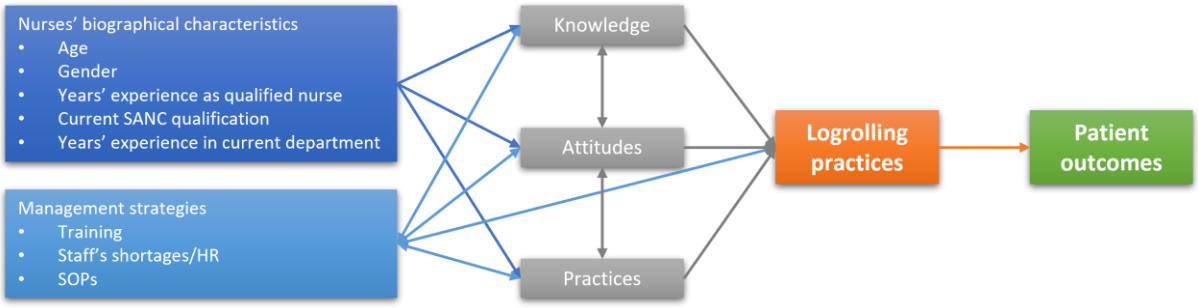



**Figure 2.1: Conceptual framework of the knowledge, attitudes, practices, and management strategies of nurses involved in logrolling spinal cord injured patients.**

### 2.4.1 Knowledge of nursing staff

Knowledge, including theoretical and practical knowledge, is needed to perform, safely, the practice of SCI management, which includes the full spectrum of medical care and practice (motion restriction and logrolling) of SCI patients (Thumbikat *et al*., 2015:3-4). Therefore, knowledge should not only pertain to logrolling but should also include the management of the SCI patient and the logrolling technique, bearing in mind the inter-relationship between the two. Nursing staff, especially RNs, are part of the interdisciplinary team and therefore need to have knowledge of logrolling and management of SCI patients (Thumbikat *et al.,* 2015: 45).

A good level of knowledge is needed to manage, effectively a SCI patient and to understand the importance of logrolling that patient; that knowledge should incorporate the anatomy, physiology and pathophysiology of the spine and spinal cord, mechanisms of injury, sensory,

motor as well as neurologic changes. Without the necessary knowledge, nursing staff may cause a patient to be compromised and affected on an emotional, physical, psycho-social and a financial level, for the rest of their life, and the patient can pursue litigation (Stander, 2015:38, 52). Gumucio, Merica, Luhmann, Fauvel, Zompi, Ronsse, Courcaud, Bouchon, Trehin, Schapman, Cheminat, Ranchal, Simon and du Monde (2011:4), define knowledge as thought processes. These will include knowledge of science, which lends itself to the capacity of foreknowing and identifying ideas as explained by Gumucio *et al*. (2011:4). For the purpose of this this study, the term 'knowledge' will refer to a set of understandings, knowledge and of "science." It also includes one's capacity for imagining and one's way of perceiving. Knowledge of a specific health behaviour may be beneficial, but it does not automatically mean that this behaviour will be followed (Médecins du Monde, 2015:4). In order to understand logrolling and to apply the correct technique, nursing staff need to have the necessary knowledge regarding spinal cord injuries.

### 2.4.2 Attitudes of nursing staff towards logrolling of spinal injured patients

Pera, van Tonder and van der Walt (2018:12) define the term 'attitude' as either positive or negative feelings or outlook towards a person, an entity or idea; it comprises cognitive, affective and behavioural components. Another definition of attitude was given by Médecins du Monde (2015:4) as a way of being, a position where leanings or "tendencies" define one's behaviour. Attitude is an intermediate variable between the situation and the response to that situation (Médecins du Monde, 2015:4). The literature provides conflicting evidence regarding nurses' attitudes towards SCI patients. This statement is supported by the research findings of McRae, Smith, Immanuel and Beeke (2020:7-8) who demonstrated the importance of nurses having a positive attitude and showing kindness and good communication during general care for SCI patients. Although McRae *et al*. (2020:7) are not referring to specific procedures, the researcher is of the opinion that this may also be applicable to logrolling SCI patients. In this study, the term 'attitude' referred to a disposition, feeling or an affect, inclusive of an individual's positive or negative state of mind performing the behaviour in question, as explained by Bhattacherjee (2012:11). Attitude will also refer to the attitude of nursing staff towards logrolling SCI patients, and the logrolling of SCI patients and communication with SCI patients. Since nurses are mainly responsible for motion restriction of SI patients in the healthcare facility, it is crucial that they display a positive attitude.

One of the six priorities for the application of the South African National Core Standards of healthcare includes improvements to meet patients' expectations; these expectations also cover the values and attitudes of staff (National Department of Health, 2011:15). Here, the

aims are to ensure that patients are managed fairly and without prejudice, irrespective of their age or injury, and in this study, may refer to the type or level of SCI that a particular patient sustained. Negative attitudes towards SCI patients, and poor communication by nurses, can unquestionably affect the quality of nursing care (Khan *et al*., 2017:1) and can ultimately delay patient recovery in the acute spinal trauma unit (Furlan *et al*., 2009:674). In addition, Sothmann in Stander (2015:134-135) cautioned that the attitudes of multidisciplinary team members may affect the quality of care they provide to SCI patients, and may have an effect on the patient's outcome and quality of life after their injury. The author also suggests that all staff caring for SCI patients, including nurses, should remain subjective during individual bedside assessments of SCI patients and decision-making regarding resource allocation (Sothmann in Stander, 2015:135). Gerhart, Koziol-McLain, Loewenstein and Whiteneck (1994:811) report that SCI survivors who rate their quality of life more favourably, have greater self-esteem.

Arif (2015:94-102) found that nurses did not show discrimination against SCI patients in comparison to the rest of the patient population; however, they seemed to have greater empathy towards younger patients than older ones, which may affect their attitudes associated with these patients' lives and their sense of urgency regarding nursing care. This finding was concerning, as the nurse-patient bond is vital and may even influence the jointly established goals for the patient's improvement (Arif, 2015:99). In a Canadian study by Furlan *et al*. (2009:674) the attitudes of RNs were found to be much more negative towards older patients with a SCI in an acute spinal trauma unit; however, they were less negative in a tertiary rehabilitation centre in Canada. Surprisingly, nurses were more concerned about caring for the psychological rather than the physical needs of patients (Arif, 2015:105). Another positive tendency was the fact that older RNs tended to be much more positive towards older SCI patients (Furlan *et al*., 2009:674). McRae *et al*. (2020:783) reported both positive and negative attitudes by nursing staff, towards patients with a SCI.

### 2.4.3 Practices of nursing staff

Practical skills and competencies are the proficiencies that a learner will develop by gaining experience, aided by the acquisition of knowledge (Thumbikat *et al*., 2015:3-4). Practices or behaviours are the observable actions of an individual in response to a stimulus (Médecins du Monde, 2015:5). Logrolling is the technique employed in the acute phase of SCI management to stabilise and assess the spine and SC; this technique requires enough nursing staff to control the head, cervical spine, pelvis and legs (Smeltzer *et al*., 2008:2252). The logrolling technique is however used throughout the patient's hospitalisation process,

and which is vital for the prevention of further possible compromise to the spine and spinal cord.

Staff responsible for logrolling SCI patients should follow the correct logrolling technique to prevent compromising a patient (Clarke & Santy-Tomlinson, 2014:256). A study in Baltimore, Maryland, revealed vast differences in the practices of paramedics and emergency services staff regarding immobilisation of SCI patients; these differences were irrespective of a healthcare professional's years of experience. This finding shows that training and the need to develop a SOP cannot be emphasised enough (Bouland, Jenkins & Levy, 2013: e122). AlMarhoon, Alhabib and Alshaalan (2018:6734) examined the KAP of medical students concerning first aid in the pre-hospital setting amongst SCI patients in Saudi-Arabia; it was found that they have adequate knowledge, but they lack the practical skills to avoid further SCI compromise.

McCarthy, Cornally, O'Mahoney, White and Weathers (2013:51-54) conducted a study in response to a lack of evidence regarding the competencies of emergency nurses in clinical skills, and in the practice of skills that they have or are assumed to have; the study focused on performing logrolling, measurement and application of cervical collars, assessment and initial management of the multiple traumas. These authors found that there was a statistically positive relationship between a nurse's perceived level of competence and how often they practiced or performed these skills ($p < 0.01$) (McCarthy *et al*., 2013:51). In addition, McCarthy *et al*. (2013:51) found that activities linked to diagnostic function were conducted most often, followed by organisation and work role competencies.

Coggins, Ebrahimi, Kemp, O'Shea, Fusi and Murphy (2019:69) conducted a study in Sydney, Australia, in a tertiary emergency department. The study examined nurses, doctors and paramedics in order to investigate current practices and to measure concordance rates with recognised international guidelines in cervical spine immobilisation in low-risk trauma patients (Coggins *et al*., 2019:69). The authors concluded that the implementation and enforcement of a specific SOP would be likely to improve the care of those patients whose cervical spines are being motion-restricted (Coggins *et al*., 2019:74). No studies specifically investigated nurses' KAP regarding logrolling SCI patients. There are several factors that may influence the KAP of nursing staff towards logrolling. It is important to investigate these factors, for example, management strategies.

### 2.4.4 Management strategies

The factors that may influence the KAP of nurses logrolling SCI patients include management strategies, for example, training and shortages of nursing staff, and SOPs or

guidelines. Bouland *et al.* (2013:e122) indicate that the KAP of nurses responsible for logrolling SCI patients depends on the following: the training that they received regarding the logrolling technique, the amount of nursing staff to logroll a patient, as well as the availability of SOPs.

#### *2.4.4.1 Training*

Joseph *et al.* (2015:692) reported that inadequate training of staff in logrolling SCI patients is a worldwide problem. The United Spinal Association Resource Centre (2012:1) acknowledged that nursing staff assigned to work with SCI patients might not be competent to care for these patients. The Centre also reported that once the required knowledge and understanding of SCI is obtained, in the necessary detail, it will be possible to develop best practice care which will improve patient care outcomes. Similarly, the National Health Service Clinical Advisory Group on Trauma (2010:58-77), in the United Kingdom, advocated that training in spinal management is essential in various departments; however, because of rare encounters with this type of injury, staff do not always have the compulsory knowledge and skills in trauma management of multi trauma patients. This is confirmed by Armstrong, Crouch, Read and Palfrey (2013:16) who suggest that emergency nurses in emergency department trauma and major trauma centres should attend an introductory course in trauma management; moreover, managers should attend an advanced trauma life support course to acquire knowledge and skills in trauma management.

Khan *et al*. (2017:1) also found a lack of specialised spine nursing care courses being presented in India. Chaghari *et al*. (2017:26) suggested a new model for in-service training for nurses in Iran, including a practical component. This was intended to assist nursing staff in updating their professional knowledge and practical skills and improving best practices for attaining numerous responsibilities and duties. Consequently, this model contributed to the improved efficiency of nurses and organisations and an enhanced quality of care. Tze *et al*. (2004:25) implemented a "Spinal Education Program" with the aim of teaching health care professionals, working in Canada in a Level 1 trauma centre, how to manage patients with potential or confirmed SIs in a holistic and consistent manner. This training programme ensures standardisation of care in C-spine clearance practice guidelines, skin and collar care and orientation of new staff; it was repeated to ensure that staff members on both day and night shift were able to attend the training (Tze *et al*., 2004:30,32).

The recommendations for practice deal with the training and preparation of nurses, and are also in the form of guidelines to ensure that professional as well as therapeutic boundaries are kept (Arif, 2015:104). A study of nursing students was conducted at the University de Sherbrooke in Canada to assess their competency in immobilising the head and spine in

patients with SI (Lavoie, Boissy, Lebel, Marceau & Bouchard, 2013:1). As a result, recommendations were made for training in immobilisation techniques to be included in the trauma course which forms part of the Bachelor of Nursing programme. In order to ensure that staff are trained to manage and logroll SCI patients, a three-month ASCI course is presented locally in Cape Town, South Africa, at an ASCI unit. This ASCI unit is the only specialised one in South Africa (Joseph & Wikmar, 2016:535). Arif (2015:104) emphasised that in order to prepare nurses for practice in logrolling, they must be educated accordingly and the guidelines for the management and logrolling of SCI and SI should be available. There is a minimal amount of literature on the training of nurses in logrolling; however, there was agreement in that literature that because of the complexity of the speciality field, ongoing training in management of SI and SCI should take place.

#### *2.4.4.2 Shortage of nursing staff*

In South Africa, it is well known that there is a shortage of nursing staff (Health Systems Trust, 2017:1). Furlan *et al*. (2009:674) identified that staff shortages may lead to a variation in the number of nurses used during logrolling. Despite different opinions regarding the number of staff to be in a logrolling team, Harrison (2015:6) indicates that as many as six staff members are required to logroll a patient safely and correctly. According to O'Keeffe (2016:1) nurse staffing ratios entail matching the "right nurse to the right patient, at the right time," Furthermore, each patient's requirement for care differs, and there are differences in the nurses' characteristics, workflows, the setting of care, and the healthcare facilities' culture and access to resources. In Queensland (Australia) and California (United States of America), legislation has been passed and enforced to guarantee a minimum nurse-to patient ratio: general medical-surgical ward 1:5, emergency 1:4 and critical care units 1:2 (Sharma & Rani, 2020:2631). These authors affirm that an adequate nurse-to-patient ratio benefits both the nurses and patients, ensuring patient safety and quality of care (Sharma & Rani, 2020:2631; Strydom, 2021:1). According to the South African Nursing Council, there was one nurse for every 213 patients in the country in 2020, in both the private and public sectors; by the end of 2020 South Africa had a total of 280 231 nurses (Strydom, 2021:1). McHugh, Aiken, Sloane, Windsor, Douglas and Yates (2020:1) confirmed that patient outcomes are improved in hospitals with higher staffing levels.

The standardisation of logrolling of SI and SCI patients means that it is imperative to guide the healthcare facility concerning the staff-to patient ratio in units that are managing and logrolling those patients. The standardisation of logrolling of SI and SCI patients may also reduce the extent of back injuries sustained by nursing staff; such back injuries can cause them to stay off work for long periods of time, or even worse, can cause them to be declared

unfit to work as a nurse (Joseph *et al*., 2015:692). The authors explained the significant impact that back injuries have on the already financially burdened healthcare facilities. Back injuries may affect the care of SI and SCI patients and may result in the loss of experienced and knowledgeable nurses needed for managing, immobilising and logrolling SI and SCI patients (Joseph *et al*., 2015:692). Furthermore, patients with a SCI are often more obese than patients in general settings, which implies that nurses working in SCI rehabilitation units, who are caring for (moving and lifting) SCI patients, are more exposed to disorders such as lower back and cervical spine injuries; these are followed by shoulder, knee, ankle and foot injuries (Brien, Lukhele, Nhlapo, Pieterse, Swanepoel, Wagener & Mashola, 2018:111). In addition, those nurses working in short staffed units are typically working over and above their physical capacity, which will inevitably increase their risk of neuromuscular injuries (Brien *et al*., 2018:111). These risk factors should therefore be considered when allocating nurses in the management of SCI patients.

The shortage of nursing staff has financial implications for the healthcare facility. Dr Aaron Motsoaledi, Minister of Health, expressed concern about the surge in medico-legal claims against the already-strained budget of the Department of Health in South Africa (Dhai, 2015:2). Staff shortages contributed to the fact that care and management of SI and SCI patients could lead to mistakes and possible litigation. Litigation then may impose an additional financial burden; this may lead to a freeze on hiring replacement staff when there is a shortage of staff at the healthcare facilities and this will exacerbate the shortage of nursing staff (Mbombi, Mothiba, Malema & Malatji, 2018:1-5).

Globally the COVID-19 pandemic has caused suffering and devastation and has exposed the critical shortage of nursing staff, especially in low-income countries such as South Africa. Santy-Tomlinson, Jester, McLiesh, Mackintosh-Franklin, Mori and Brent (2020:1) expressed concern regarding the significant burden and anxiety that the COVID-19 pandemic has placed on nurses. Substantial deviations had to be made to modify present systems and to develop new guidelines and SOPs as well as to re-assign nurses. Other factors that increased the stress levels of nurses included the burden of staff shortages and the need to meet patient expectations for their level of care. Superimposed on the staffing shortages is the COVID-19 pandemic that has impacted nursing practice. Coping with day-to-day practice in this critical and exhausting period of activity has required great resilience as nurses had to prepare for the unfamiliar, and for what might and might come, not knowing when this will pass (Santy-Tomlinson *et al*., 2020:2-3). Moreover, orthopaedic nurses were simply expected to adapt treatment pathways; for example, the screening of patients for COVID-19

(see Appendix 4), changing operating theatre preparations, issuing regulations and defining new pathways according to COVID-19 regulations.

Redeployment of nurses was common, especially in the orthopaedic units, allowing healthcare facilities to focus their resources on managing COVID-19 demands. Because of redeployment, some orthopaedic nurses had to learn on the job as demands changed frequently. Some nurses were redeployed to an area where they are not experts; for example, experienced orthopaedic nurses working in a COVID-19 unit. This also added to their stress levels. Orthopaedic nurses should work within their scope of practice, and professional knowledge and skills, and therefore had to admit any shortfalls that required training, induction, and mentoring (Santy-Tomlinson *et al.,* 2020: 1-2; SANC, 2020:1-3). This not only required caring but robust nursing leadership within the working culture and environment (Santy-Tomlinson *et al*., 2020:2).

Other challenges included concerns regarding nursing education, staffing and retaining of orthopaedic nurses, all of which is generally challenging. Santy-Tomlinson *et al*. (2020:2-3) were concerned that orthopaedic nurses were expected just to carry on with their responsibilities of orthopaedic nursing care due to trauma admissions. These resilient nurses simply had to prepare and care for COVID-19 patients and ensure adherence to COVID-19 guidelines; all of this was a mammoth duty and was impossible for the public to comprehend. Nevertheless, trauma admissions continued although electives mostly stopped (Santy-Tomlinson *et al*., 2020:2-3). The postponement of orthopaedic surgery requires healthcare facilities to initiate a "catch-up process," leading to very high amounts of rescheduling of orthopaedic patients and extensive planning.

#### *2.4.4.3 Standard operating procedure or guidelines*

Todd *et al*. (2015:1) emphasised that if SOPs or guidelines, and management of actual or potential SCI had been followed, then neurological deterioration would have been prevented in 25 of the 27 patients (93%) experiencing neurological deterioration. Blaauw, Ditlopo and Rispel (2014:1-6) expressed concern about the general lack of SOPs in hospitals, and referred to liability for leadership, and governance of nursing in South Africa. Stander (2015:39) agreed that guidelines or SOPs for SCIs would ensure standardisation in the management of cases, and would enhance neurological and functional outcomes, and would reduce preventable expenses in SCIs; it should be borne in mind that these are among the most expensive conditions managed in hospitals. Fransen, Hosman, Van Middendorp, Edwards, van Grunsven & van de Meent (2016:34) indicated that there is a lack of studies of standardisation of health service delivery to SCI patients, including the acute setting; they suggested developing SOPs. This suggestion is congruent with Coggins *et al*. (2019:69) who

also investigated the SCI SOPs and guidelines relevant to emergency department nurses. These authors also suggested that the application and implementation of a practice guideline would probably improve the care of patients receiving cervical spine immobilisation. Reynolds *et al*. (2018:60) studied implementation strategies aimed at improving the knowledge of, and adherence to SCI guidelines by, neuro-critical nurses. They suggested the need for nursing guidelines to be interpreted into practice to ensure that patients receive optimum care.

Sharwood, Dhaliwal, Ball, Burns, Flower, Joseph, Stanford and Middleton (2018:8) indicated that the lack of policies and evidence-based practice guidelines does not only adversely affect neurological outcomes and recovery of traumatic SCI patients; it also increases individual and economic costs for the patient and healthcare facility. These authors added that policies and guidelines will not only safeguard the SC, as a specialist field being addressed in clinical care guidelines but will also enhance patient outcomes in healthcare facilities. Coggins *et al*. (2019:74) suggest that the implementation and enforcement of a specific SOP would improve the care of patients whose cervical spine is being motion-restricted.

## 2.5 SUMMARY

There is only a limited amount of literature which specifically addresses the KAP of nurses regarding logrolling; nevertheless, that literature has highlighted gaps in the way logrolling techniques are applied. Likewise, there are only a few previous studies addressing the KAP of healthcare professionals regarding logrolling, internationally as well as nationally; the findings are often contradictory. There are several reasons for the inconsistencies, and these relate to the lack of SOPs, education, training, staff shortages, and the KAP of nursing staff which all influence how they logroll SCI and SI patients. To date, no studies have been conducted in South Africa or in the sub-Saharan continent, on the KAP of nurses regarding logrolling SI and SCI patients.

One priority for future intervention programmes should be to enhance awareness of the importance of developing SOPs for all team members logrolling SI and SCI patients. These are essential for ensuring consistency during logrolling of those patients and are also needed to facilitate the provision of adequate knowledge, to improve attitudes and ensure training and safe practice of nurses within the established boundaries of practice.

The methodology of the study will be discussed in Chapter 3.

# CHAPTER 3:
# RESEARCH METHODOLOGY

## 3.1 INTRODUCTION

Chapter 2 provided a comprehensive analysis of the literature pertaining to logrolling patients with a spinal cord injury (SCI). Chapter 3 will now discuss the research methodology applied in the study and will describe the aim and objectives of the work, research design, research setting, population, data collection instrument, pilot test, data collection and data analysis. Finally, ethical considerations are described.

## 3.2 AIM AND OBJECTIVES

The aim of the study was to investigate the knowledge, attitudes and practices (KAP) of nurses with regard to logrolling SCI patients in two tertiary hospitals in the Western Cape Metropole.

**The objectives were to:**

- Determine the knowledge of nurses concerning SCI patients and the logrolling of those patients.
- Determine the attitudes of nurses towards SCI patients and the logrolling of those patients.
- Determine the practices of nurses when logrolling SCI patients.
- Determine management strategies influencing logrolling of SCI patients.
- Identify factors associated with nurses' logrolling knowledge, attitudes, and practices.

## 3.3 STUDY SETTING

The data collection for the main study was conducted at two selected tertiary healthcare facilities: Hospital A, which consists of 10 wards, and Hospital B which consists of seven wards; both hospitals are in the Cape Town Metropole, in the Western Cape. These hospitals include trauma and emergency departments, critical care and high care units as well as orthopaedic wards in which SCI patients are managed. The pilot test was conducted in a secondary healthcare facility (Hospital C), which consists of three wards, with a similar setting.

Although Hospitals A and B both have spinal orthopaedic wards, Hospital A has an established specialised, acute SCI unit (ASCI), where the multi-disciplinary team manages acute SCI patients, on a referral basis, because of a limited number of beds. Hospital A also presents an ASCI course to their healthcare staff managing SCI patients. Although Hospital B admits SCI patients to their trauma unit, they transfer all those patients to Hospital A for speciality management in the ASCI unit. Sothmann *et al*. (2015:835) refer to the ASCI unit in Hospital A, as a fundamental role-player in the acute management of SCIs in South Africa. Patients with less severe SI are also managed in Hospital B, in the orthopaedic units. Hospital A and B are classified as Level 3 academic hospitals which delivers the majority of specialised services and presents two of the three Level 3 academic hospitals in the Western Cape Metropole (2022a:n.p.). Because of this, the study was conducted in these two tertiary hospitals.

The pilot test was conducted in Hospital C; in the Cape Town Central Health District of the Metro Region (Western Cape Government, 2021a), and has 334 beds (Western Cape Government, 2022c). Hospital C has three Community Health Centres, ten clinics in its catchment area and two district hospitals (Western Cape Government, 2022c). Hospital C for example is the referral regional healthcare facility for public healthcare facilities in the areas of Langa, Bonteheuwel, Vanguard, Du Noon, Milnerton and Blouberg (Western Cape Government, 2022c).

Hospital A (Figure 2.1) is positioned in the city centre of Cape Town, South Africa and was officially opened in 1938 (Western Cape Government, 2022b). This tertiary hospital has a capacity of 893 beds (Navsaria, Nicol, Parry & Matzopoulos, Maqungo & Gaudin, 2020:111), and serves the Cape Town Central Health District of the Metro Region (Western Cape Government, 2022b:1). As the principal academic hospital in Cape Town, it is well-known locally as a training hospital for some of South Africa’s finest nurses, doctors, and surgeons.

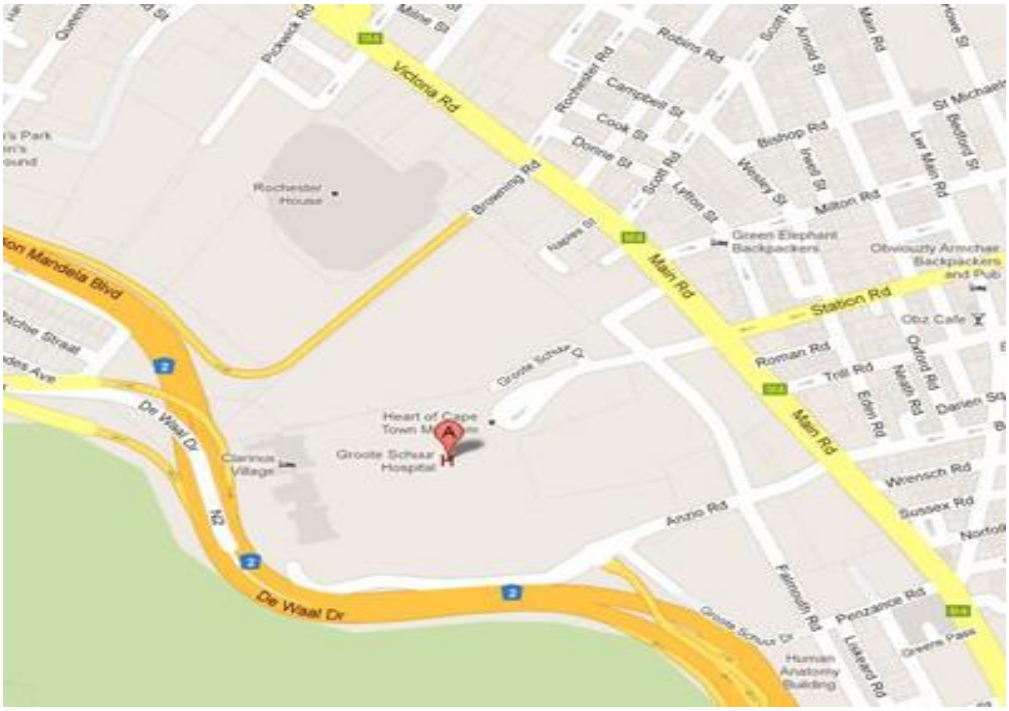



**Figure 3.1: Geographical map of [Hospital A]**

*(Source: Western Cape Government, 2013)*

Hospital B (Figure 3.2) is situated in Parow, Cape Town and officially opened in 1976 (Western Cape Government, 2016a). It serves the Tygerberg Eastern Health District and serves the Overberg rural district, West Coast, Cape Winelands, Northern Metro sub-districts, Khayelitsha north of Spine Road and Eastern Tygerberg (Western Cape Government, 2016b). Hospital B is a tertiary training hospital and is the second-largest healthcare facility in South Africa and the largest hospital in the Western Cape (Western Cape Government, 2016a). It opened its doors for the first time in 1976 (Western Cape Government, 2016a). This hospital provided 1 899 beds but only 1 384 of these were utilised, with 331 beds allocated to the Hospital B Children's Hospital (Western Cape Government, 2016b). The hospital infrastructure consists of 67 wards, 29 theatres, 10 intensive care units, with 164 intensive care and high-care unit beds (Western Cape Government, 2016a:1).

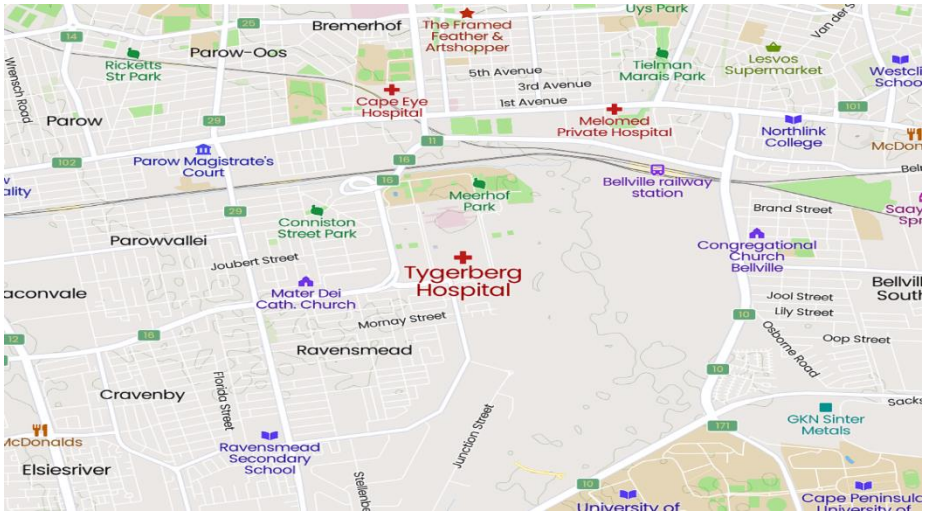



**Figure 3.2: Geographical map of [Hospital B]**

*(Source: Mapcarta, [n.d.]).*

## 3.4 RESEARCH METHODOLOGY AND DESIGN

### 3.4.1 Research methodology

Cresswell and Cresswell (2018:11) and Burns and Grove (2021:235) classify the type of research methodology chosen by the researcher as being the explicit research type; thus, in this study, a quantitative methodology is applied in order to answer the research question. The aim of the study was to test nurses' KAP, therefore numerical data was collected and variables were measured, which is impossible with qualitative methods. Furthermore, a quantitative research design allowed the researcher to draw general conclusions from the study predict outcomes (Cresswell & Cresswell 2018:11; Burns & Grove 2021:235). Moreover, with a KAP survey, the objective of a quantitative approach is to quantify and measure a phenomenon by using questionnaires and statistical processing of the data collected (Médecins du Monde, 2015:5).

### 3.4.2 Research design

The research design is the study's "blueprint or framework" as well as the general plan for the study's implementation. It is designed with the aim of answering the research question (Gray *et al*., 2017:683; Brink *et al*., 2018, 203). The research design enables the researcher to adhere to multiple specifics of the research process: for example, the number of participants and assignment to groups; the sample method and size; study setting; duration of the research process; and method of data collection and analysis (Gray *et al*., 2017:683).

A non-experimental, descriptive design with a quantitative approach made use of a self-administered questionnaire (see Appendix 11) to determine the KAP of nurses with regard to logrolling patients with a SCI, in the selected tertiary hospitals in the Western Cape Metropole. McCombes (2019:1) states that descriptive research can answer the "what, where, when and how questions, but not the why questions." Descriptive designs are valuable when little is known about a topic or problem, as in this study. This design was deemed to be the most appropriate, as the aim was to identify and describe the KAP of nurses and to explore relationships between variables, without any interference from the researcher or manipulation of variables (Price, Jhangiani & Chiang, 2015:125).

#### *3.4.2.1 Dependent variable*

This term 'dependent variable' refers to the outcome variable since it reflects the response to the independent variable (Brink *et al.,* 2018:75). In this study, practices (behaviours) are the dependent variable.

#### *3.4.2.2 Independent variable*

The independent variable influences others, which means that it is an agent for change (Brink *et al.,* 2018:75). In this study, knowledge and attitude are independent variables.

#### *3.4.2.3 Mediating variables*

Mediating variables are those which arise as "intermediate links between independent and dependent variables." Occasionally, the mediating variables offer an enhanced understanding of the anticipated relationship between cause and change (Cresswell & Cresswell, 2018:94, 330). The biographical characteristics of the respondents and management strategies could be controlling or mediating variables knowledge, attitudes and practices either directly or indirectly.

## 3.5 POPULATION AND SAMPLING

The target population is defined as the entire group of individuals who meet the sampling criteria (LoBiondo-Wood & Haber, 2018:213). The target population of the tertiary hospitals selected for this study is described in Table 3.1.

**Table 3.1: Study population for the main study**

| Tertiary Hospitals | Category of nursing staff | | | | | | |
|---|---|---|---|---|---|---|---|
| | Registered Professional Nurses | | Enrolled Nurses | | Enrolled Nursing Assistants | | Total number of nurses |
| Two shifts per week | Day shifts | Night shifts | Day shifts | Night shifts | Day shifts | Night shifts | |
| **Hospital A (10 x Wards)** | 121 | 83 | 52 | 43 | 98 | 85 | 482 |
| **Hospital B (7 x Wards)** | 60 | 26 | 34 | 26 | 68 | 54 | 268 |
| **Total Population:** | **181** | **109** | **86** | **69** | **166** | **139** | **750** |

**Table 3.2: Study population for pilot test**

| Tertiary Hospitals | Category of nursing staff | | | | | | |
|---|---|---|---|---|---|---|---|
| | Registered Professional Nurses | | Enrolled Nurses | | Enrolled Nursing Assistants | | Total number of nurses |
| Two shifts per week | Day shifts | Night shifts | Day shifts | Night shifts | Day shifts | Night shifts | |
| **Hospital C (Will be used for pilot test) (3 x Wards)** | 12 | 10 | 10 | 8 | 12 | 14 | 66 |

Sampling involves selecting a representative sample from a population group (Gray & Grove, 2021:60). The participants in this study were initially selected by means of a simple random sampling technique. This is a sampling strategy in which every individual in the study population, who meets the inclusion criteria, has an equal opportunity of being selected (Cresswell & Cresswell, 2018:334). This eliminates the possibility of sample selection bias (Brink, van der Walt & van Rensburg, 2018:118-119).

A single population proportion was used to determine the sample size, using 50% prevalence of knowledge, margin of error of 5%, 95% confidence interval and a 25% non-responsive rate. Adjusting for the finite population of 750, the proposed sample size was 320; this was proportionally allocated to the two hospitals. Thus, the sample comprised 205 and 115 participants from Hospitals A and B, respectively.

A computer program SPSS Statistics Version 27 was used to select the study participants randomly. Thus, they were randomly selected from a staff list at Hospital B, and a census sampling method applied at Hospital A due to the reasons mentioned in section 3.5 (see below). Staff lists were obtained from the operational managers. Furthermore, an Excel spreadsheet was used, which included the names of all the nursing staff, with each staff member's nursing category, at the different hospitals and units; a code number was allocated to each staff member. In the event of a participant being absent, the same process was used to select a replacement from those who did not participate. This process took place in collaboration with the biostatistician.

Regrettably, the impact of the COVID-19 pandemic confronted the researcher with multiple challenges. One such challenge was that hospital A was forced to implement restructuring of units to accommodate the COVID-19 patients during the second wave. Several orthopaedic wards were reorganised, and the staff component was absorbed in other units. The COVID-19 pandemic also affected the 2020 annual leave schedule for nursing staff. To avoid losing their leave, nursing staff were forced to use their previous cycle's leave credits. Moreover, because of the impact of COVID-19 and extreme stress caused by the pandemic, some of the nursing staff passed away and others decided either to resign or to take early retirement; some staff also retired at normal retirement age. Another factor contributing to staff shortages during the sampling process was that nursing staff were sent on annual leave to ensure that adequate nurses would be available during the predicted third wave; that is, the peak of infections during the pandemic. A combination of all these issues resulted in the number of available participants being fewer than planned, and so the census method had to be used. This was to ensure that the original calculated minimum sample size (n=320) was obtained. Here, the term 'census sampling method' refers to the utilisation of all nursing staff. In this study, census sampling was applied insofar as all the available nurses were requested to participate (Census and Sample Survey, 2020:1). Owing to the COVID-19 pandemic, it was not possible to recruit the proposed sample of 320. This was even though the researcher made several efforts to recruit the required number of participants such as going back fourteen times to Hospital B, and seventeen times to Hospital A to continue with sampling. The final sample was as follows: Hospital A had a sample size of 194, and Hospital B had a sample size of 110 (N=304). The biostatistician confirmed that the sample size was sufficient for the purpose of this study.

### 3.5.1 Inclusion criteria

The term 'inclusion criteria' refers to those specific criteria or characteristics that are prerequisites for candidates if they are to participate in a study (Creswell & Creswell, 2018: 224). To be eligible to take part in this study the following criteria applied:

- All categories of permanent and agency nursing staff responsible for the immobilisation of SCI patients. Agency staff were included as they are sometimes working on a long-term basis in wards. Hospitals also tend to request those agency staff who are already known to them.
- Working in orthopaedic units, trauma- and emergency, critical care and high care wards.
- Both permanent and agency staff should have been working for at least 6 months in the wards to ensure that they have the necessary experience in logrolling SCI patients.

### 3.5.2 Exclusion criteria

The nursing staff on leave at the time of the study were excluded.

## 3.6 DATA COLLECTION INSTRUMENT

A self-administered questionnaire (see Appendix 11), as described by Brink *et al*. (2018:136,138), was used. Since no validated questionnaire could be found, the researcher developed the questionnaire by means of a literature review and consultation with Stander (2017), a medical doctor responsible for managing SCI patients. Further consultation took place with Schroeder (2019 & 2020) (see Appendix 1a), who was previously responsible for presenting the post-basic R212: Medical and Surgical Nursing Science, Orthopaedic Nursing course in Gauteng. Consultation then took place with Kotze (2020) (see Appendix 1a), who is an expert working in a spinal rehabilitation unit at a private hospital in the Western Cape; afterwards, the researcher reviewed the questionnaire. However, it should be noted that neither Schroeder (see Appendix 1a) nor Kotze (see Appendix 1b) requested corrections to the questionnaire. The relevant literature (see chapter 2) was consulted to ensure that the questions in the self-administered questionnaire (see Appendix 11) were suitable for answering the research question and objectives. The questionnaire took approximately 20-30 minutes to complete and comprised five sections (see Appendix 11).

### 3.6.1 Section A: Biographical data (questions 1 - 5).

Questions 1 – 2 related to the participant's age and gender, while questions 3 - 5 obtained information on the professional profile of the participants, for example, years of experience as a qualified nurse and highest current qualification in nursing. Biographical data is

statistical data relating to the characteristics of the participants (Lapum, St-Amant, Hughes, Petrie, Morell & Mistry, 2019: 27); this would include age and gender. This biographical information was collected to compare the profile of the sample with that of the SANC demographical statistics. Other demographical characteristics may influence the KAP of nursing staff responsible for the logrolling of SCI patients; for example, current SANC qualification, years of experience as a qualified nurse and years of experience in the participant's current department.

In order for nursing staff to understand the importance of logrolling SCI patients, it was vital to include questions pertaining to the anatomy, physiology, aetiology, mechanism of injury and pathophysiology of the spine and SC. This issue was covered in Section B of the questionnaire.

### 3.6.2 Section B: Knowledge (questions 6 - 17)

Questions 6 – 13 were general knowledge-based questions about SCIs and the care of SCI patients.

Questions 14 - 17 addressed the level of knowledge of nursing staff regarding the logrolling technique in SCI patients.

Knowledge was captured on a four-point Likert scale, and the researcher dichotomised the responses, indicating the correct and incorrect responses, and then calculated the percentage of correct responses. In the case of KAP, in general, Blooms cut off points were used; this was based on previous research where knowledge levels were associated with competence (Glass, 1978:1). For this study, it was decided to use a cut-off point of ≥75%. As suggested by Tiruneh, Ayele and Beyene (2019:3), for the knowledge section, participants who scored ≥75% on the knowledge-based questions were deemed knowledgeable while those who scored <75% were described as not knowledgeable.

### 3.6.3 Section C: Attitudes of nursing staff (questions 18 - 26)

This section addressed the participant's attitude towards logrolling and towards SCI patients; responses were also measured on a four-point Likert scale. Those responses were dichotomised to indicate positive and negative attitudes, and the percentage of positive responses was calculated. Participants with a score of ≥75% - 100% on the attitude-based questions were categorised as having a positive attitude, and those with a score of <75% were classified as having a negative attitude (Tiruneh *et al*., 2019:3).

### 3.6.4 Section D: Practice (questions 27 – 38)

This section focused on addressing the participants' actual practices during the three most recent times that they were involved in logrolling SCI patients; responses were also measured in the form of a four-point Likert scale. These responses were dichotomised, and the percentage was calculated. As suggested by Tiruneh *et al*. (2019:3), practices were measured by means of the following two indicators; participants who scored ≥75% on the practice-based questions were deemed as having good practices while in contrast, participants who scored <75% were regarded as having poor practices.

### 3.6.5 Section E: Management strategies (questions 39 - 45)

This section focused on three issues: training, shortages of nursing staff performing logrolling of SCI patients and the availability of guidelines and/ or SOPs in the unit; responses were measured in the form of a three-point scale with categories for 'yes', 'no' and' unsure.' Management strategy items were dichotomised, and the percentage was calculated. Management strategies were measured using the following two indicators; participants who scored ≥75% on the management strategies-based questions were deemed as indicating the presence of good management strategies; scores <75% were indicative of poor management strategies. This was in accordance with the suggestion of Tiruneh *et a*l., (2019:3).

The questionnaire was available in English, since English is the language of choice used in both selected hospitals (Erasmus & Volmink, 2019; De Kock, 2020).

## 3.7 PILOT TEST

De Vos *et al*. (2018:195) propose that a pilot test of a questionnaire should take place prior to the main study. The rationale for pilot testing is to ensure validity and reliability of the questionnaire so that it can be revised if needed. Pilot testing should assess for probable weaknesses, ensure clarity and relevance of questions, avoid misinterpretations, and ensure that the intended meaning is clear (Brink *et al.,* 2018: 161; Creswell & Creswell, 2018:216). Pilot testing of a questionnaire is conducted with a small sample of participants, in a manner similar to the one used in the main study (Brink *et al.,* 2018:161).

A pilot test was conducted between 10-11 March 2021, using a convenience sample at Hospital C, which is a secondary provincial hospital. This hospital has a setting similar to that of the two recruitment sites used for the main data collection. Seven participants took part in the pilot test and their feedback was duly used to adapt the questionnaire. Thus, a document was compiled which asked for feedback from the participants in the pilot test, after they had

completed the questionnaire; by using this feedback, revisions were made to questions that were unclear, misunderstood or misinterpreted.

For example, the feedback and participant responses showed that question five appeared to be too close to question four and the heading of section B, as it was left incomplete by some participants. Consequently, more space was created between question five and section B of the questionnaire. Secondly, question 43 requested two responses from the participants and was separated out in two separate questions (Appendix 5). These two corrections were made after consultation with the supervisors to discuss the feedback and outcomes after data collection.

The researcher captured the data using an SPSS 27 program to ensure that the data capturing document and coding were correct. The data obtained from the pilot test was not included in the data analysis.

## 3.8 VALIDITY AND RELIABILITY

As mentioned previously at the start of 3.6, no validated questionnaire appropriate for this study could be found. Therefore, it was necessary to develop the questionnaire according to guidelines in the relevant literature, taking into account the research objectives and the clinical knowledge and experience of the researcher. Moreover, experts in the field were consulted, and input obtained from the supervisor as well as co-supervisor. As a result of this process the researcher is satisfied that validity was ensured by means of content and face validity.

### 3.8.1 Content validity

The concept of ‘content validity’ implies that a questionnaire measures what it is supposed to measure (Gray & Grove, 2021:807), essentially based on the judgement made by experts (Fernández-Gómez, Martín-Salvador, Luque-Vara, Sánchez-Ojeda, Navarro-Prado & Enrique-Mirón, 2020:1). To ensure content validity, an extensive literature review in conjunction with the objectives took place. In addition, the self-administered questionnaire (see Appendix 11) was reviewed by two experts, as well as by a lecturer who presented the post-basic Orthopaedic course. No changes to the questionnaire were proposed.

### 3.8.2 Face validity

LoBiondo-Wood and Haber (2014: 266) view face validity as the least scientific concept to measure validity, and that it narrates to the appearance of a measurement technique utilised. Gray and Grove (2021:465) stated that face validity is a form of verifying that the

measuring instrument, which for purpose of this study was a self-administered questionnaire (see Appendix 11), measures the construct that it was anticipated to measure. Face validity and readability were assessed during the pilot test. To ensure face validity, feedback was obtained from internal reviewers within the Department of Nursing and Midwifery as well as from the participants during the pilot test to ensure that they understood the questions. The researcher and the supervisors checked for unanswered questions because these might indicate that some participants did not understand the questions; alternatively, some questions might have been contradictory. The necessary changes were duly made.

### 3.8.3 Reliability

Creswell and Creswell (2018:215) stated that reliability is achieved by means of the conceptualisation of constructs in the questionnaire as well as by increasing the levels of measurement, through the consistency or repeatability of an instrument. The internal consistency of the KAP scales within the instrument was calculated using the Cronbach's alpha coefficient. Cronbach's values of 0.70 and above are considered to be good, with 0.80 and above being even better, and 0.90 and above as being the best (Pallant, 2011:100). Table 3.3 provides the Cronbach alpha values of the Likert-scale items in the present sample. Although the Cronbach alpha value for the practices scale was good, the values for the knowledge and attitudes scales were below 0.70. This suggests that the results of these scales should be interpreted with caution.

**Table 3.3: Cronbach alpha values of the scales**

| Scale | Cronbach alpha |
|---|---|
| Knowledge (12 items) | 0.65 |
| Attitudes (9 items) | 0.61 |
| Practices (12 items) | 0.76 |

## 3.9 DATA COLLECTION

Data collection began after ethical clearance had been granted, as well as provincial approval from the National Health Research Database (2021). Also, permission was first obtained from the secondary hospital (pilot test) (see Appendix 6.1 & 6.2) and from the two selected tertiary hospitals (main data collection) (see Appendix 7.1 & 7.2, 8.1, 8.2, 8.3 & 8.4). Data for the main study was collected at Hospital B from 14th April 2021 to 3 July 2021, and at Hospital A, from 6th June 2021 until 28th June 2021.

The researcher is a post-basic orthopaedic nursing lecturer responsible for clinical facilitation of students at the participating hospitals and is not employed by any of these healthcare

facilities. The researcher is responsible for lecturing and clinical practice accompaniment of students in the clinical field and is not personally known to the participants.

A COVID-19 risk mitigation plan in the form of an SOP (see Appendix 3) was developed after discussions with the gatekeepers at the three recruitment sites. This was to prevent possible risks to the participants and the researcher regarding the COVID-19 pandemic during information sessions, the pilot test and data collection. In order to ensure compliance with the COVID-19 guidelines and to make sure that the researcher and participants avoided any close contact with COVID-19 patients, the researcher requested a venue away from these wards.

### 3.9.1 Recruitment

The researcher emailed the OMs of each unit at the two participating hospitals and requested a staff list, a convenient date, time and venue. After receiving positive replies from the OMs, the researcher requested that all potential participants who met the inclusion criteria should attend an information session. At this session, potential participants received all information pertaining to the study; for example, a participant information leaflet (see Appendix 9). Potential participants then had an opportunity to ask the researcher questions, so that they could make an informed decision about whether they wanted to participate in the study (see Appendix 9). In total, 307 potential participants were approached and 304 of them agreed to participate.

### 3.9.2 Data collection process

The researcher adhered to all Department of Health Infection Control Policies, and therefore wore a mask and sprayed hands with hand sanitizer upon entering and exiting the research site; the same precautions were also taken at the venues used for information and data collection sessions. The researcher wore an identification badge and was screened at the entrance of the recruitment sites; she then reported to the specific persons indicated in the risk mitigation plan attached (see Appendix 3). The researcher was responsible for preparing the venue at the recruitment site. She provided her own personal protective equipment (PPE) but PPE for the participants was arranged in advance with the recruitment sites. In accordance with the requirements of the Stellenbosch University (2020b:1-2) and Stellenbosch University (2020a:2-3), the venues had a basin with running water, soap, paper towels and hand sanitiser to wash hands before and after completion of the questionnaire. If venues did not have a basin with running water, then the recruitment sites ensured the availability of hand sanitizer. A thermometer and paper towels were in the venues along with colour-coded waste bins according to Infection Control Policy for disposal of PPE and

screening registers (see Appendix 4). The researcher ensured that potential and actual participants adhered strictly to the policies of the Stellenbosch University (2020a:1-3) Infection Control during the research process. In particular, the researcher also ensured all potential or actual participants were wearing a mask. Before entering the venue, the researcher screened all potential and actual participants, took their temperature, and completed the information in the screening register (see Appendix 4), ensured social distancing and ensured that everybody adhered to the cough etiquette. To ensure social distancing in the venue, tables were placed at least 1.5 metres apart and were sanitised afterwards by the researcher (see Appendix 3).

The screening registers were in the form of an “in the time of COVID-19 template register;” (see Appendix 4) they included personal and identifiable information of participants and are kept on the researcher’s personal computer that is password-protected (Stellenbosch University, 2020b:2-3 & Stellenbosch University, 2020:2). These registers were handed to the relevant parties as was agreed with the various gatekeepers at the recruitment sites.

The researcher did not need to report any COVID-19 positive cases to the recruitment sites because none of the participants was identified or reported as being COVID-19 positive; the same applied to the researcher (Stellenbosch University, 2020b:2-3 & Stellenbosch University, 2020:2).

Once permission was granted for the researcher to collect data, the OMs of the units at the three hospitals (one for the pilot test and two for the main data collection) (see Appendix 6.2, 7.2 and 8.4) were contacted to request a convenient time and a venue to conduct an information session with the potential participants regarding the study and to obtain staff lists. An invitation to that information session was duly extended to the randomly selected participants at Hospital B, and to the census-selected participants at Hospital A; this was in accordance with the Excel spread sheet, as indicated (see section 3.9.1). Initially, the researcher asked for separate information and data collection sessions but after discussions with the OMs, it was agreed that these sessions should be combined; the main reason for this was staff shortages (see, also, section 3.9.1). At these sessions, the potential participants were informed of the date, venue and time. They also received further information about the study in the form of a participant information leaflet (see Appendix 9); in addition, they received a voluntary informed consent form to complete, COVID-19 regulations from the Department of Health, and information regarding the completion of an anonymous questionnaire.

Data collection and information sessions were conducted on the same day. Upon entering the venue, each potential participant received a pen to prevent possible contamination, two envelopes, a consent form and an anonymous self-administered questionnaire (see Appendix 11) to complete. The researcher explained the data collection process with reference to the completion of consent forms, questionnaires, and collection of completed questionnaires. They then had an opportunity to ask the researcher questions to clarify uncertainties. The participants were informed that the questionnaire would take approximately 20 – 30 minutes to complete. Additionally, participants were asked to inform the researcher if they experienced any emotional distress, so that the researcher could arrange the necessary counselling. They were informed that they were free to withdraw from the study at any point, even if they initially agreed to take part in it. This allowed them to make an informed decision about whether they wanted to participate voluntarily in the study. None of the participants reported any distress or withdrew during the process of data collection.

After completing the voluntary consent and the self-administered questionnaire (see Appendix 11), the participants were requested to place these documents in two separate envelopes, which were then placed in clearly marked and separate sealed boxes in the venue.

Although participants were present in the same venue, social distancing was maintained, which helped to ensure confidentiality and privacy. A study number instead of a name was recorded on all relevant documents used for data collection. The completed consent forms were collected by the researcher and ticked off against the staff spread sheet, to ensure that each participant's consent form was received. The researcher kept the completed questionnaires and consent forms in sealed boxes in a locked cupboard in the researcher's office, until the data was analysed. The written consent forms and completed questionnaires will be kept for five years in a locked cupboard by the researcher (Buys, 2017:955). This is in accordance with the Protection of Personal Information Act (POPIA) (Act No. 4 of 2013) (Republic of South Africa, 2013:25). Only the researcher had access to these questionnaires.

## 3.10 DATA ANALYSIS

According to Brink *et al*. (2018:166) quantitative data analysis is the process by which data are converted into numerical form then subjected to statistical analysis. The data analysis was performed with the assistance of a biostatistician from the Division of Epidemiology and Biostatistics and the researcher's co-supervisor. SPPS version 27 was used for the analysis.

### 3.10.1 Steps of the analysis

The data collected from the questionnaires was captured into the SPSS 27 program after the researcher had first allocated a study number to each questionnaire and had pre-coded all variables: these variables were logrolling and patient outcomes, KAP management strategies, and biographical characteristics. Coding was performed using a zero and a one to code variables with binary response categories. For example: Sex: Male = 0 Female = 1. In Sections B, C, D and E, questions were pre-coded by means of a Likert scale and then dichotomised. For example, in Section B: indicating a correct = 1 or incorrect response = 0. In Sections C to E, responses were first captured according to the Likert scale codes and then the scale scores were dichotomised. Thus: in Section C, indicating a positive attitude = 1 or negative attitude = 0; in Section D, having good practice skills = 1 or having poor practice skills = 0; and Section E, the presence of good management strategies = 1 and poor management strategies = 0.

The researcher verified the questionnaires, which entailed checking for any incomplete data or errors even though questionnaires with missing information were also included during data analysis. Descriptive statistics were then performed. Frequency tables and percentages were used to summarise categorical variables such as gender and nurse category. Means and standard deviations or the median and interquartile range (IQR) were used to describe continuous variables such as age and years of experience.

In the analysis, ‘knowledge’ was categorised as either knowledgeable or not knowledgeable, while ‘attitude’ was categorised as either positive or negative. Likewise, ‘practice’ was either good or poor while ‘management strategies’ were rated either good or poor.

Associations between biographical characteristics, management strategies and logrolling KAP were assessed by using the appropriate statistical tests.

The purposes of the **Chi-square** test of independence are to establish if an association exists between two categorical variables and to determine whether the variables are independent or related. The **Chi-square** test is a non-parametric test. It uses a contingency table which then analyses the data (Kent State University, 2021: np.). The contingency table, commonly known as a cross-tabulation, crosstab, or two-way table is a preparation which then classifies the data conferring to two categorical variables. The one category of a variable appears in rows, whereas the second category of the second variable appears in columns. Of note is that each variable must have two or more categories. In addition, every cell imitates the total count of cases for a specific pair of categories (Kent State University,

2021). For example, in this study, the Chi-square test was used to test for association between gender and the KAP categories.

Either the **independent samples t-test** or **Mann-Whitney U** tests could have been used to test for mean differences between groups. As the data was normally distributed, the **t-test** was used. This **t-test** is described as a "common parametric analysis technique used in nursing studies to test for significant differences between two groups unrelated to each other" (Gray *et al*., 2018:695). In this study, the **t-test** was used to test for the difference in mean age between the dichotomous KAP categorical dependent variables, which were normally distributed.

Thus, the **t-test** for age in the practice category variable, for poor practices due to age in years were as follows, N = 244, **Mean =** 43.56 and **Std. Dev**.= 9.637. Therefore, for poor practices, the results were N = 244, the **Mean** = 43.56 and **Std. Dev.** = 8.600. The t-test results for age as an attitude categorial dependent variable for negative attitudes were as follows, **Mean** = 42.85, **Std Deviation** = 10.479 and N = 20. The results for age groups attitude, such as positive attitude was N = 278, **Mean** = 43.28, meaning that there was a normal distribution for the attitude categorical variable. The **t-test** was therefore used, as indicated above since age was normally distributed.

The **independent samples tests** for the practice categorical variable, results indicated in an equal variance assumed as the t-test was -1.189, the **Mean Difference** = -1.691 and Std. Error Difference 1.423. For the equal variance not assumed t-test -1.278, the **Mean difference** = -1. 691, and the **Std Error Difference** =1.323.

## 3.11 ETHICAL CONSIDERATIONS

### 3.11.1 Justice

The researcher ensured that the participants' right to fair treatment and right to privacy were upheld. The right to fair treatment was also applied to nursing staff who declined to participate in the study, as they did not suffer any prejudice. All potential participants who met the inclusion criteria had an equal opportunity to be selected to take part in the study (Brink *et al*., 2018:30). In this study, distributive justice was ensured by informing the participants that although the findings of the study would not immediately benefit them, their contribution was appreciated (Department of Health, 2015:14-15). Thus, the findings could have an impact on future hospital policies which would enable nursing staff to apply the correct method of logrolling patients with SCIs (Department of Health, 2015:14-15).

### 3.11.2. Right to confidentiality and anonymity

According to the research principle of privacy, participants in research studies have the right to confidentiality and anonymity (Brink *et al*., 2018:30-31). This principle was adhered to throughout the study. Thus, steps were taken to ensure that there was no linkage to the participants' personal information on the questionnaire or as indicated in the demographic section; that information included, for instance, the hospital or ward that they are working in, their names, persal number or contact details. The researcher numbered and coded the questionnaires once collected, and these are being kept on a password-protected electronic Excel spreadsheet. Anonymised data captured on a SPSS 27 program from the original questionnaires is being kept on the researcher's personal computer which is password protected. A backup on an external device is being kept in a secure filing cabinet in the researcher's office. The anonymised electronic database was shared with the biostatistician and study supervisors.

In order to ensure confidentiality, participants were requested to place the completed questionnaire in the envelope provided, then put this in a sealed box, which was kept in the venue during the data collection period. On completion of data collection, the sealed boxes were locked in the researcher's office. Confidentiality and privacy were maintained because only the researcher has access to the original data; in other words, the paper-based questionnaires. The data collected into the biostatistician's electronic database at the University of Stellenbosch was also protected by the University's security system, and password-protected: only the biostatistician, researcher, supervisor and co-supervisor have access to the information. Buys (2017:955) noted that the Protection of Personal Information POPI Act (Act No. 4 of 2013) (South Africa) stipulates that storing of data, irrespective whether it is on paper or in electronic format, for longer than 5 years would be considered illegal processing of information unless the data had some expected research value. Therefore, all information obtained from the study was used only for the purpose of the study.

### 3.11.3. Right to autonomy

In order to ensure autonomy, each participant was given crucial information pertaining to the study. Since participation was voluntary, participants could withdraw at any time without any consequences or any need to give an explanation, as recommended in Brink *et al.* (2018:29). After these ethical considerations had been explained to the prospective participants and after they agreed to participate, they were requested to sign a voluntary consent form.

### 3.11.4 Right to beneficence and non-maleficence

In accordance with the principle of beneficence and non-maleficence during recruitment, the researcher emphasised the aim of the study and the possible benefits that may accrue from it; in particular, the generation of new knowledge against the background of a lack of previous research on this particular topic. In addition, the researcher reiterated that participation was voluntary, and participants may withdraw at any time without any consequences. No money or incentives were given for participation, as participants did not incur any costs since they were on duty. Refreshments were however provided while participants were completing the questionnaire. They experienced a minimal risk of discomfort, as the questionnaires were completed at their workplace at a convenient time. As the study was low risk, it was unlikely that participants would become emotional and require referral to a counsellor. However, if a participant had become emotional at any point, then they would have been referred for counselling with Metropolitan or a counsellor of their choice. None of the participants reported any emotional distress or requested counselling.

## 3.12 SUMMARY

In this chapter, the research methodology, as well as the steps followed in the research process were discussed. Reference was made to the research design, population and sampling, instrumentation, data collection and analysis as well as ethical considerations. In the next chapter, the results and their interpretation will be discussed.

# CHAPTER 4:
# RESULTS

## 4.1 INTRODUCTION

Chapter 3 provided a description of the research methodology, design, data collection and analysis processes. The data obtained from the 304 participants in the study were analysed. Here, the term "*data analysis*" refers to the process of organising, reducing and giving meaning to the data (Gray *et al*., 2017:675). In this current chapter, chapter 4, descriptive and inferential statistics are performed on the collected data.

Descriptive statistics allow researchers to describe the variables of the study. The descriptive statistics used in this study included frequency tables for nominal and ordinal level variables and measures of central tendency (mean, median, mode) and variability (standard deviation, interquartile range) for continuous variables (Lobiondo-Wood & Haber, 2018:282). Inferential statistics were used to explore the associations between knowledge, attitudes and practices, using appropriate statistical tests as described in chapter 3.

Only valid percentages are reported. A p-value of $p \leq 0.05$ was regarded as being significant in the study. Decimals were rounded to the first decimal. These approaches were supported by the supervisors and had the assistance of the biostatistician. The results are organised and presented according to the sections of the questionnaire and the research study objectives.

## 4.2 SECTION A: BIOGRAPHICAL DATA

Five questions in the questionnaire related to biographical data: this will be discussed separately.

### 4.2.1 Gender (n=303)

Most participants (82.8%; n=251) were female as illustrated in Figure 4.1. Although there were only 52 males (17.2%), the demographic profile of the participants in this study is similar to the statistics of the two hospitals (Lees, 2015: 40; Mahlathi & Dlamini, 2017:18-19). One participant did not indicate their gender.

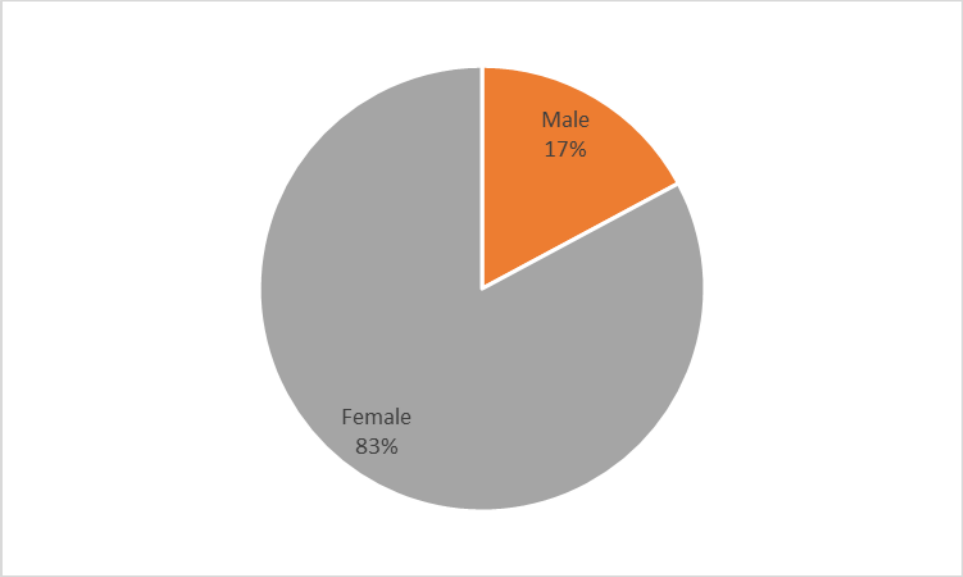



**Figure 4.1: Gender of participants**

### 4.2.2 Age (n=298)

Age was recorded as a continuous variable. Six participants did not indicate their age. The mean age was 43.3 (Standard deviation (SD) 9.5; median 44. Interquartile range (IQR) 15. The minimum age was 23 and the maximum 61. The histogram had an almost normal distribution (Figure 4.2).

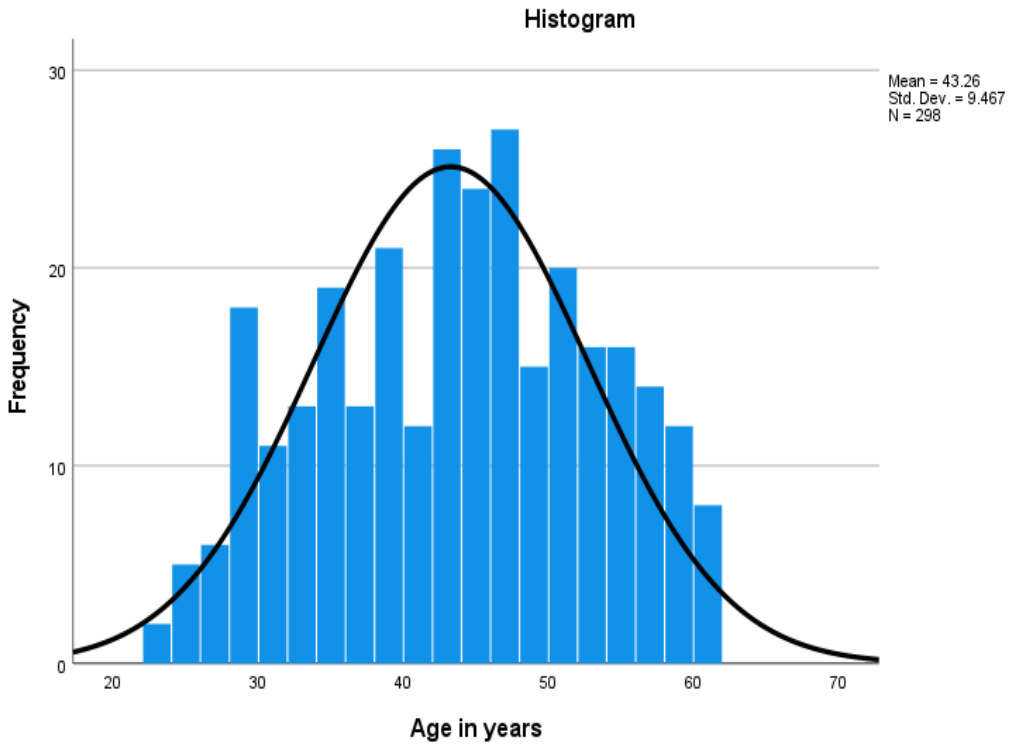



**Figure 4.2: Histogram of age distribution**

### 4.2.3 Experience as a nurse (n=304) and experience in department (n=301)

Table 4.1 presents data relating to the respondents' years of experience as a nurse and the number of years working in the current department. The frequency distributions were not normal. The median years of experience as a nurse was 10 (IQR 14) and the median years of experience in the current department was 6 (IQR 8).

**Table 4.1: Descriptive statistics of experience**

| Variable | N | Min | Max | Mean | SD | Median | IQR |
|---|---|---|---|---|---|---|---|
| Indicate your number of years' experience as a qualified nurse. | 304 | 1 | 40 | 13.7 | 10.2 | 10 | 14 |
| Indicate the number of years you are working in the current department: | 301 | 1 | 34 | 7.8 | 7.1 | 6 | 8 |

### 4.2.4 Qualification (n=300)

Figure 4.3 shows the qualification distribution of the participants. Most participants were registered nurses (42.7%; n=128), followed by auxiliary nurses (33.7%; n=101) and lastly enrolled nurses (23.7%; n=71). Four participants did not indicate their qualification.

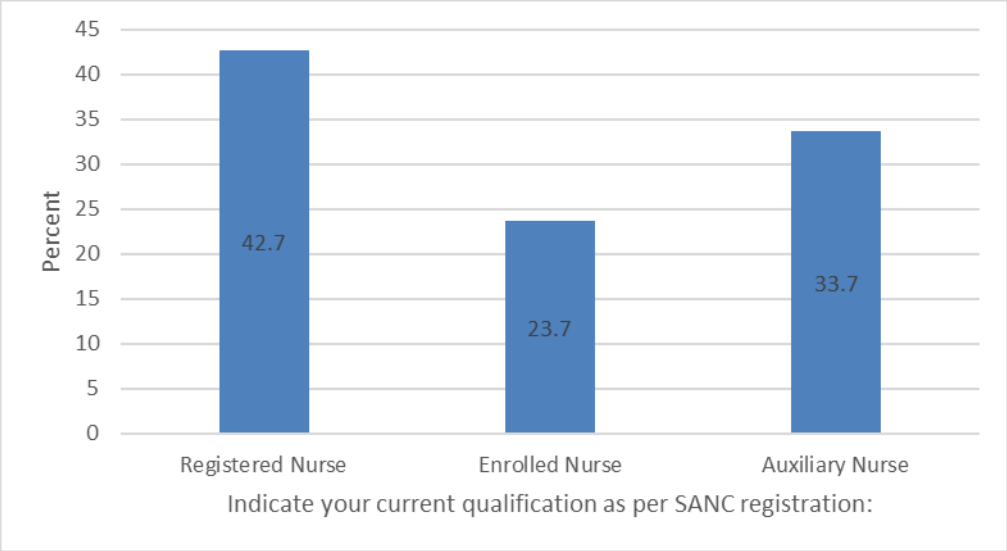



**Figure 4.3: Bar chart of qualification distribution**

## 4.3 SECTION B: KNOWLEDGE

Section B of the questionnaire used in the survey consisted of twelve questions on the knowledge of nurses of SCIs and the care of SCI patients. The frequency of correct responses is indicated in Table 4.2.

**Table 4.2: Frequency of correct knowledge responses**

| Variable / question | n | Correct (n) | Percentage |
|---|---|---|---|
| Spinal cord injuries can be sustained due to motor vehicle accidents, pedestrian vehicle accidents, violence, falling from a height, diving or sport injuries | 304 | 296 | 97.4% |
| A spinal cord injury leads to the disruption of sensory, motor (movement) and autonomic functions below the level of injury to the spinal cord. | 304 | 300 | 98.7% |
| A spinal cord injury affects the spinal cord's ability to send and receive messages to, and from the brain. | 303 | 274 | 90.4% |
| All patients that have sustained trauma to their head or spine and are conscious or unconscious should be treated as if they have a possible spinal cord injury until proven otherwise. | 304 | 289 | 95.1% |
| Severity of a spinal cord injury disability depends on the level that the spinal cord injury is damaged. | 304 | 295 | 97.0% |
| All patients with a suspected spinal cord injury should be logrolled, irrespective whether they have a complete or incomplete spinal cord injury. | 304 | 290 | 95.4% |
| A final diagnosis of a complete or incomplete spinal cord injury can only be made in the absence of spinal shock. | 302 | 194 | 64.2% |
| A secondary injury can be caused if an incorrect spinal immobilisation technique is applied. | 303 | 274 | 90.4% |
| Any nurse, (irrespective of registration of nurse) can stabilise the head and cervical spine and act as team leader. | 304 | 172 | 56.6% |
| Any nurse, (irrespective of registration of nurse) should be positioned at the patient's head and cervical spine, and two nurses on each side of the patients' upper trunk/body. | 304 | 119 | 39.1% |
| A fourth team member should always assist with the repositioning of a patient by supporting the patient's back. | 302 | 258 | 85.4% |
| There are times where more than four nurses are required to perform a safe logroll. | 304 | 262 | 86.2% |

Seven out of the 12 knowledge items had a frequency of correct responses of above 90%. These 12 questions related to the anatomy and pathophysiology of an SC and SCI. For example, 304 participants (97.4%) agreed that motor vehicle accidents, pedestrian vehicle accidents, violence, falling from a height, diving or sport injuries may cause of SCIs. Similarly, 274 participants (90.4%) agreed that a SCI injury negatively affects the SCs ability to send and receive messages to and from the brain. A large majority of participates (n=289; 95.1%) agreed that irrespective of whether they are conscious or unconscious, patients with trauma to their head or spine should be treated as if they have sustained a SCI, until this possibility has been formally excluded.

Three out of the 12 knowledge questions had a frequency of correct responses below 70%. These questions related to the diagnosis of a complete or incomplete SCI, and the roles of

the team members when positioning a patient with a SCI. For example, only 39.1% of participants (n=119) disagreed that not any nurse category can be positioned at the patient's head and cervical spine, with two nurses on each side of the patient's upper trunk/body, which is standard practice. Similarly, only 172 participants (56.6%) agreed that not all categories of nurses should be allowed to stabilise the head and cervical spine, and act as team leader. Lastly, only 194 participants (64.2%) agreed that only when spinal shock is absent can a diagnosis be made of either having a complete or incomplete SCI.

A knowledge score was created in the manner described in chapter 3. The mean knowledge score was 82.9 (SD 11.5) with a median of 83.3 (IQR 16.7); the minimum score was 25 and the maximum was 100. When the knowledge score was categorised, 88.5% of participants (n=269) had a knowledge score of ≥ 75% and 11.5% (n=35) had a knowledge score below 75% (Figure 4.4).

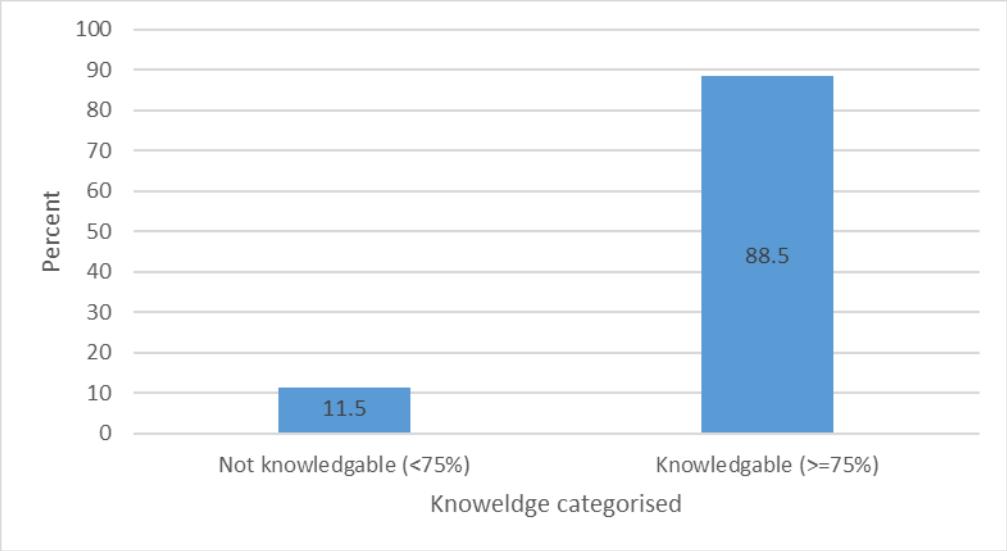



**Figure 4.4: Bar chart of knowledge categories**

## 4.4 SECTION C: ATTITUDES

Section C of the questionnaire used in the survey comprised nine questions relating to attitudes. The responses of participants are indicated in Table 4.3.

**Table 4.3: Attitudes**

| Variable / question | n | Strongly disagree n (%) | Disagree n (%) | Agree n (%) | Strongly agree n (%) |
|---|---|---|---|---|---|
| I am always willing to assist when a patient needs to be logrolled. | 304 | 4 (1.3) | 4 (1.3) | 87 (28.6) | 209 (68.8) |
| The last time I had to logroll a spinal cord injured patient, I felt confident. | 303 | 6 (2.0) | 17 (5.6) | 129 (42.6) | 151 (49.8) |
| I am concerned about sustaining a back injury when performing the logrolling technique. (Reverse scored) | 304 | 13 (4.3) | 45 (14.8) | 146 (48.0) | 100 (32.9) |
| I did not want to assist with logrolling, as I did not feel confident to perform a safe logroll. (Reverse scored) | 303 | 85 (28.1) | 155 (51.2) | 40 (13.2) | 23 (7.6) |
| In my opinion all nurses should be trained in logrolling. | 304 | 1 (0.3) | 3 (1.0) | 51 (16.8) | 249 (81.9) |
| Do you think it is important to explain to a spinal injured patient what to expect and do during logrolling? | 303 | 2 (0.7) | 1 (0.3) | 40 (13.2) | 260 (85.8) |
| There are consequences for the patient, nursing staff and hospital if a spinal cord injured patient is logrolled incorrectly. | 304 | 10(3.3) | 16(5.3) | 110 (36.2) | 168 (55.3) |
| I always have a positive attitude when working with spinal cord injured patients. | 304 | 4(1.3) | 22(7.2) | 129 (42.4) | 149 (49.0) |
| It is important to have good communication amongst team members and spinal cord injured patients while doing logrolling. | 304 | 2(0.7) | 1(0.3) | 47 (15.5) | 254 (83.6) |

Participants generally had positive attitudes. For example, more than 90% of participants agreed or strongly agreed that they are willing to assist with logrolling (item 1) and that they felt confident the last time they performed logrolling (item 2). Furthermore, 98.7% of participants (n=300) agreed or strongly agreed that all nurses should be trained in logrolling.

The highest number of participants, (85.8%; n=260), strongly agreed that it was important to explain to a spinal injured patient what to expect and do during logrolling. In this study of a total of 304 participants, only two participants (0.7%) strongly disagreed that it is important to have good communication between team members and spinal cord injured patients while doing logrolling.

It should be noted that 80.9% of participants (n=246) were concerned about sustaining a back injury during logrolling and that 20.8% of participants (n=63) agreed or strongly agreed that they did not feel comfortable in performing a safe logroll. Furthermore, 8.6% of

participants (n=26) did not believe that there are consequences for the patient and nursing staff when a SCI patient is logrolled incorrectly.

As described in chapter 3, an attitude score was created. The mean attitude score was 85.2 (SD 9.9). The median was 88.9 (IQR 11.1), with a minimum score of 22.2 and a maximum of 100. When the attitude score was categorised, 93.1% of participants (n=283) had positive attitudes and 6.9% (n=21) had negative attitudes (Figure 4.5).

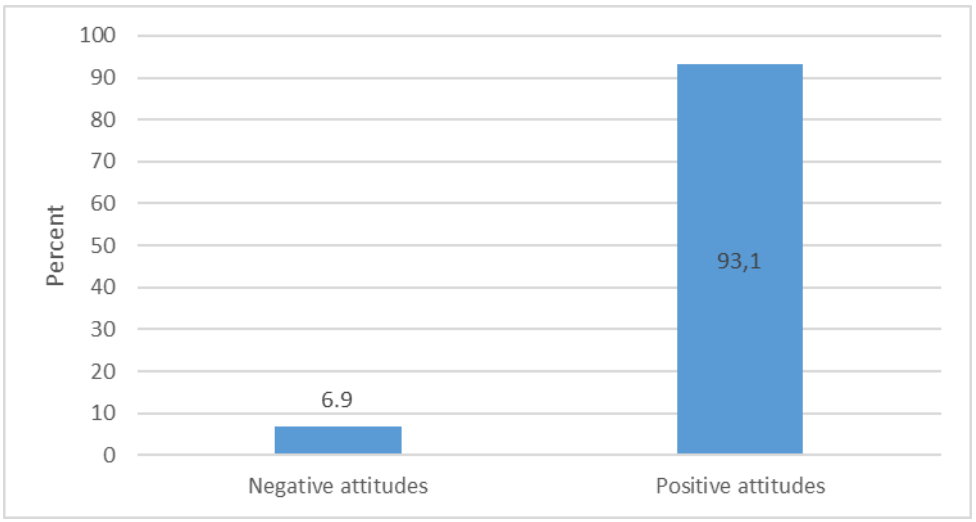



**Figure 4.5: Bar chart of attitude categories**

## 4.5 SECTION D: PRACTICES

Section D of the questionnaire used in this survey consisted of 12 questions related to SCI practices. The responses of the participants are indicated in Table 4.4.

**Table 4.4: Practices**

| Variable / question | n | Never n (%) | Seldom n (%) | Often n (%) | Always n (%) |
|---|---|---|---|---|---|
| The registered nurse took the lead as the team leader during logrolling a spinal injured patient, to stabilise/ align the head and cervical spine. | 304 | 11 (3.6) | 23 (7.6) | 101 (33.2) | 169 (55.6) |
| The registered nurse took the lead as the team leader and made sure that the patient was turned on the count of three. | 303 | 7 (2.3) | 17 (5.6) | 88 (29.0) | 191 (63.0) |
| At times, an enrolled nurse or auxiliary nurse acted as the team leader due to staff shortages. (Reverse scored) | 303 | 41 (13.5) | 58 (19.1) | 128 (42.1) | 76 (25.1) |
| The team leaders appeared confident during logrolling, when stabilising the patient's head and cervical spine. | 304 | 4 (1.3) | 8 (2.6) | 73 (24.0) | 219 (72.0) |

| Variable / question | n | Never n (%) | Seldom n (%) | Often n (%) | Always n (%) |
|---|---|---|---|---|---|
| The team performs the logroll in the same way for every patient. | 301 | 12 (4.0) | 25 (8.3) | 85 (28.2) | 179 (59.5) |
| There were at least four nurses involved in the logroll. | 301 | 14 (4.7) | 57 (18.0) | 99 (32.9) | 131 (43.5) |
| A registered nurse was positioned at the patient's head and cervical spine, and one nurse at each side of the patient's upper trunk. | 304 | 39 (12.8) | 33 (10.9) | 84 (27.6) | 148 (48.7) |
| A registered nurse aligned the head and cervical spine, and two nurses were on each side of the trunk/ body of a patient during logrolling. | 304 | 23 (7.6) | 30 (9.9) | 102 (33.6) | 149 (49.0) |
| Depending on the patient's weight, length or type of injury/injuries, a fifth team member may be required to assist with logrolling the patient. | 303 | 21 (6.9) | 44 (14.5) | 89 (29.4) | 149 (49.2) |
| I have taught other people on the team how to logroll patients with spinal cord injuries. | 303 | 24 (7.9) | 34 (11.2) | 119 (39.3) | 126 (41.6) |
| There was good communication between the team leader, the rest of the team members and patients during logrolling, to ensure effective logrolling. | 304 | 4 (1.3) | 4 (1.3) | 65 (21.4) | 231 (76.0) |
| During logrolling the patient was educated regarding the procedure. | 304 | 8 (2.6) | 12 (3.9) | 57 (18.8) | 227 (74.7) |

In general, participants reported good practices. For example, 88.8% of participants (n=270) reported that the RN often or always takes the lead as the team leader to stabilise the head and cervical spine, and 91.7% (n=279) reported that the RN often or always takes the lead to make sure the patient is turned on the count of three.

The highest number of participants, (76%; n=231) reported that there is always good communication during logrolling with the team leader, the rest of the staff and patients.

Only 1.3% (n=4) of the participants indicated that team leaders never appeared confident during logrolling, when stabilising the patient's head and cervical spine.

However, it should be noted that only 76.4% of participants (n=230) reported that there were either often or always at least four nurses involved in the logroll. Related to this, 67.2% (n=204) of the participants reported that an enrolled/auxiliary nurse often or always acted as the team leader.

As described in chapter 3, a practices score was created. The mean practices score was 81.7 (SD 15.9). The median was 83.3 (IQR 16.7), with a minimum score of 8.3 and a

maximum of 100. When the practices score was categorised, 81.9% of participants (n=249) were found to have good practices while 18.1% (n=55) had poor practices (Figure 4.6).

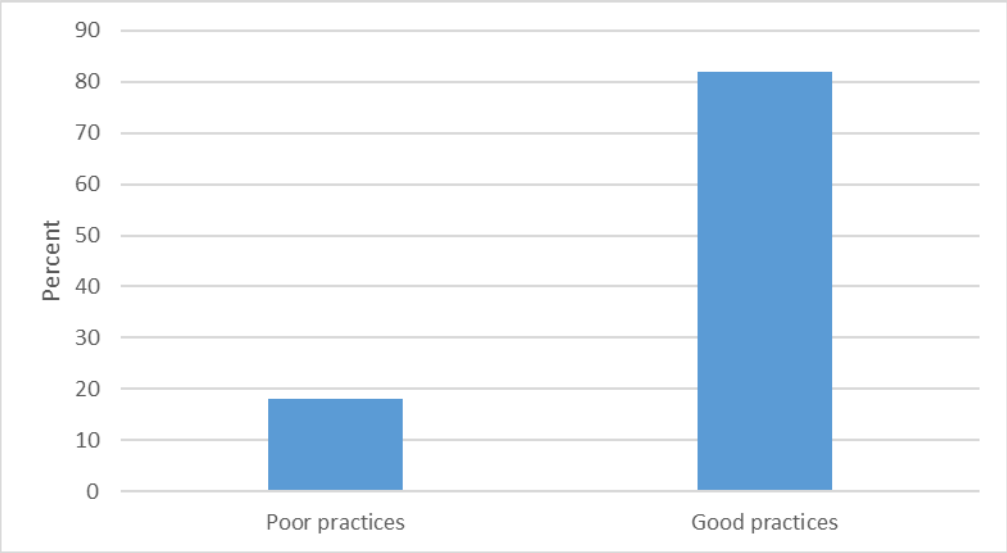



**Figure 4.6: Bar chart of practices categories**

## 4.6 SECTION E: MANAGEMENT STRATEGIES

Six questions related to management strategies. Table 4.5 indicates the responses to the questions.

**Table 4.5: Management strategies**

| Variable / question | n | Yes n (%) | No n (%) | Unsure n (%) |
|---|---|---|---|---|
| There is a logroll (immobilisation) guideline / standard operating procedure available in my unit. | 303 | 108 (35.6) | 107 (35.3) | 88 (29.0) |
| We have sufficient nursing staff on-duty to logroll spinal injured patients. | 304 | 147 (48.4) | 142 (46.7) | 15 (4.9) |
| Have you sustained a back injury due to shortage of staff when logrolling spinal injured patients. | 304 | 88 (28.9) | 199 (65.5) | 17 (5.6) |
| I have received training to prevent injuries to myself when logrolling patients. | 303 | 140 (46.2) | 156 (51.5) | 7 (2.3) |

Only 35.6% (n=108) participants were sure that they had an SOP on logrolling in the unit. Less than half of the participants (48.4%, n=147) indicated that there were sufficient staff to logroll patients and 28.9% (n=88) reported sustaining a back injury due to shortage of staff. Further, less than half of the participants (46.2%, n=140) had received training to prevent injuries when logrolling patients.

### 4.6.1 Training on logrolling (n=304)

Figure 4.7 indicates that 126 participants (41.1%) received training on how to perform the logrolling technique.

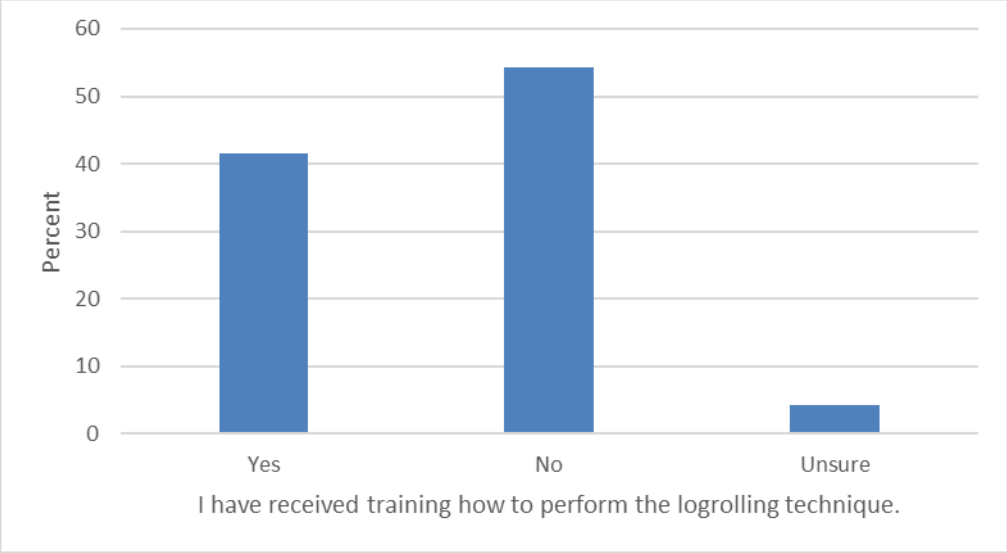



**Figure 4.7: Bar chart of training**

Of the participants who received training (40.5%; n=123), the most frequent reported type of training was in-service training (45.5%; n=56), followed by a post-basic course (23.6%; n=29), ACSI (19.5%; n=24), BLS/ACLS (3.3%, n=4) and other (8.1%, n=10).

The majority of participants received the training more than 2 years ago (58.1%; n=72), followed by 1–2 years ago (19.4%; n=24).

As described in chapter 3, a management strategies score was created. The mean knowledge score was 47.4 (SD 26.9). The median was 40.0 (IQR 40.0), with a minimum score of 0 and a maximum of 100. When the management strategies score was categorised, 23.0% of participants (n=70) of participants reported good management strategies and 77.0% (n=234) had poor management strategies (Figure 4.8).


**Figure 4.8: Management strategies**

## 4.7 FACTORS ASSOCIATED WITH KNOWLEDGE, ATTITUDES AND PRACTICES

### 4.7.1 Knowledge

Table 4.6 indicates the associations between categorical demographic variables and knowledge of participants. There was no association between knowledge and gender (Pearson Chi-square, p=0.38), but a significant association between nurse category and knowledge (Pearson Chi-square, p=0.005). Registered nurses were the most likely to be knowledgeable (95.3%) compared to the other nursing categories (83.1%, n=59) and 83.2%, n=84 respectively).

**Table 4.6: Associations between categorical demographic variables and knowledge**

| | Not knowledgeable n (%) | Knowledgeable n (%) | Total n (%) | Chi-square p-value |
|---|---|---|---|---|
| **Gender** | | | | |
| Sex: male | 4 (7.7) | 48 (92.3) | 52 (100) | 0.38 |
| Sex: female | 30 (12.0) | 221 (88.0) | 251 (100) | |
| **Category** | | | | |
| Registered nurse | 6 (4.7) | 122 (95.3) | 128 (100) | 0.005 |
| Enrolled nurse | 12 (16.9) | 59 (83.1) | 71 (100) | |
| Auxiliary nurse | 17 (16.8) | 84 (83.2) | 101 (100) | |

There was no difference between the mean age of participants across categories of knowledge (Independent samples T-test, p=0.23) or years working in the current department (**Mann-Whitney U test, p=0.12**). However, the mean years of experience of participants as a professional nurse differed across categories of knowledge score (**Mann-Whitney U test,**

**p=0.01**). Nurses with knowledge scores ≥ 75% had more years of experience (mean 14.2) than nurses with knowledge scores below <75% (mean 9.7).

**Table 4.7** provides data on the association between knowledge category and attitudes and practices. Thus, a significant association was found between knowledge and attitudes (**Pearson Chi-square, p<0.01**) with a higher percentage of knowledgeable participants having a positive attitude (90.5%; n=256) compared to a negative attitude (61.9%; n=13). As shown also in **Table 4.7**, there was no significant association between knowledge and practices (**Pearson Chi-square, p=0.21**). However, the percentage of participants who were knowledgeable in the good practices' category was higher than in the poor practices category (89.6%; n=223 vs 83.6%; n=46).

With regards to knowledge and management strategies, there were no associations between the individual management strategies questions and knowledge questions (**Pearson Chi-square, p=0.98**).

**Table 4.7: Cross-tabulations of knowledge categories according to attitudes, practices and management strategies**

| | Not knowledgeable n (%) | Knowledgeable n (%) | Total n (%) | Chi-square p-value |
|---|---|---|---|---|
| **Attitude** | | | | |
| Positive | 27 (9.5) | 256 (90.5) | 283 (100) | 0.00 |
| Negative | 8 (38.1) | 13 (61.9) | 21 (100) | |
| **Practices** | | | | |
| Good | 26 (10.4) | 22 (89.6) | 249 (100) | 0.21 |
| Poor | 9 (16.4) | 46 (83.6) | 55 (100) | |
| **Management strategies** | | | | |
| Good | 8 (11.4) | 62 (88.6) | 70 (100) | 0.98 |
| Poor | 27 (11.5) | 207 (88.5) | 234 (100) | |

### 4.7.2 Attitudes

No association was found between attitude categories and gender (**Pearson Chi-square, p=0.35**) or nurse category (**Pearson Chi-square, p=0.25**). There was also no mean difference in age across categories of attitude (**Independent samples T-test, p=0.84**) (values not shown on Table 4.7). Furthermore, a nurse's years of experience or time on the ward did not differ across categories of positive or negative attitude (**Mann-Whitney U test, p=0.67 and p=0.49**).

As seen in **Table 4.8,** there was a significant association between attitudes and knowledge categories (**Pearson Chi-square, p<0.01**). A lower percentage of participants with a knowledge score greater than 75% had a negative attitude (4.8%; n=13), compared to a knowledge score of below 75% (22.9%; n=8).

With regards to the association between attitude category and practices, a significant association was found between attitude and knowledge (**Pearson Chi-square, p<0.01**). A higher percentage of participants with a positive attitude demonstrated good practices (96.0%; n=239) compared to poor practices (80.0%; n=44).

There was a significant association between knowledge and management strategies **(Pearson Chi-square, p<0.01**). All the participants who reported good management strategies had a positive attitude (100%; n=70), compared to (91%; n=213) participants who reported poor management strategies.

When investigating the individual management strategies questions, the specific management strategy (item) associated with attitudes was receiving training. A higher percentage of participants who received training to prevent injuries had positive attitudes compared to those who did not receive training or were unsure (97.9%; n=137 vs 89.7%; n=140 vs 71.4%; n=5) (not shown on a table). The other management strategy questions were not specifically associated with attitudes.

These findings all demonstrate the effect that a positive attitude has on knowledge and practices. Furthermore, the findings demonstrate the association between management strategies and attitudes.

**Table 4.8: Cross-tabulations of attitude categories according to knowledge, practices and management strategies**

| | Positive attitude n (%) | Negative attitude n (%) | Total n (%) | Chi-square p-value |
|---|---|---|---|---|
| **Knowledge** | | | | |
| More than 75% | 256 (95.2) | 13 (4.8) | 269 (100) | 0.000 |
| Less than 75% | 27 (77.1) | 8 (22.9) | 35 (100) | |
| **Practices** | | | | |
| Good | 239 (96.0) | 10 (4.0) | 249 (100) | 0.000 |
| Poor | 44 (80.0) | 11 (20.0) | 55 (100) | |
| **Management strategies** | | | | |
| Good | 70 (100) | 0 (0.0) | 70 (100) | 0.009 |
| Poor | 213 (91.0) | 21 (9.0) | 234 (100) | |

### 4.7.3 Practices

No associations were found between practices and gender (Pearson Chi-square, p=0.079) or nurse category (Pearson Chi-square, p=0.550). The age of participants did not differ across categories of poor or good practices (Independent samples T-test, p=0.236). Furthermore, the distribution of years of experience as a qualified nurse and years working in the current department did not differ across categories of good or poor practices (Mann-Whitney U test, p=0.665 and p=0.870).

As indicated in **Table 4.9**, the level of knowledge was not associated with either good or poor practice (Pearson Chi-square, p=0.213). However, there was a significant association between attitude and practices (Pearson Chi-square, p<0.01). Thus, a higher percentage (84.5%; n=239) of participants who had good attitudes also had positive practices when compared to those with poor attitudes (47.6%; n=10).

There was no association between management strategies and practices (Pearson Chi-Square, p=0.195).

**Table 4.9: Cross-tabulations of practice categories according to knowledge, attitude and management strategies.**

| | Positive practices n (%) | Negative practices n (%) | Total n (%) | Chi-square p-value |
|---|---|---|---|---|
| **Knowledge** | | | | |
| More than 75% | 223 (82.9) | 46 (17.1) | 269 (100) | 0.213 |
| Less than 75% | 26 (74.3) | 9 (25.7) | 35 (100) | |
| **Attitudes** | | | | |
| Good | 239 (84.5) | 44 (15.5) | 283 (100) | 0.000 |
| Poor | 10 (47.6) | 11 (52.4) | 21 (100) | |
| **Management strategies** | | | | |
| Good | 61 (87.1) | 9 (12.9) | 70 (100) | 0.195 |
| Poor | 188 (80.3) | 46 (19.7) | 234 (100) | |

## 4.8 SUMMARY

This chapter presented the results of the study aimed at determining the KAP of nurses logrolling SCI patients. Data were analysed using a SPSS 27 package and were displayed in the form of pie and bar charts, histograms and tables. This was in accordance with the study objectives. The results indicated that nurses generally had good KAP scores: thus, 88.5% of the participants had good knowledge, 93.1% had positive attitudes and 81.9% good practices. There were significant associations between attitudes and knowledge, as well as

between attitudes and practices. There was no association between knowledge and practices. Management strategies were associated with attitudes, but not with knowledge or practices.

In the following chapter five, the findings of the study will be elaborated upon, and where appropriate, recommendations will be made.

# CHAPTER 5:
# DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 INTRODUCTION

In chapter one, the background was discussed, the rationale specified, and the aims and objectives delineated. Chapter two included an-in depth literature review related to the KAP of nurses logrolling SCI patients. In chapter three and four the research methodology, data analysis, interpretation and results were unpacked. In this chapter, an overall discussion of the study results is provided, and conclusions are drawn. Recommendations based on the results of this study are made. Limitations of the study are also presented.

## 5.2 DISCUSSION

The aim of the study was to investigate nurses' KAP of logrolling patients with a SCI in two tertiary hospitals in the Western Cape Metropole. The key results are discussed according to the research objectives and current literature:

### 5.2.1 Objective 1: Determine the knowledge of nurses concerning SCI and the logrolling of SCI patients.

Overall, participants in this study had a high level of knowledge as 88.5% had a knowledge score of >75%. The majority of the participants demonstrated good knowledge scores regarding the aetiology, anatomy, pathophysiology of the SC and SCIs, logrolling as well as managing SCI patients, as expected of nurses managing SCI patients. No studies which investigated nurses' knowledge on logrolling SCIs were found. Ahmed, AbdElsatar and Khalil (2021:844, 849) conducted a study that was not specifically about logrolling, but it assessed the nurses' level of knowledge and practice regarding care for patients with SCI in two critical care units in Ain Shams University Hospital (Cairo, Egypt). The authors defined the nurses' knowledge as satisfactory if it was equal to or >70%, and unsatisfactory if it was 70%. The aforesaid authors also reported that 54% of participants had a satisfactory knowledge score for caring for SCI patients, despite majority of participants being newly graduates. These questions also referred to knowledge of the anatomy, physiology, aetiology and definition of SCIs, clinical manifestations, and complications of SCIs. The knowledge scores in the present study were therefore higher than the knowledge scores in Egypt.

The knowledge questions in which participants in the present study had poor knowledge scores (<75%) were about the roles of the team leader and team during logrolling, and a

final diagnosis of complete and incomplete SCI during spinal shock. Studies on the logrolling of adult patients were conducted in United Kingdom and Ireland (Harrison, 2015:6-22), in Regina, Canada (Mittermayr & Hunt, 2018:2) and Saudi Arabia (Basindwah, Alhazmi, Shodari, Almaghrabi & Fallatah, 2021:014-016). In Australia (Sydney Children's hospital and Canberra hospital), the team leader roles were outlined in logroll policies of children. Although the Logrolling Policy from Sydney Children's Hospital (2019:1-12) in Critical Intensive Care Unit with suspected/ confirmed SCI applies to children and intensive care units, the procedure used for adults and patients logrolled in other units is similar. Only the number of staff required will differ e.g., according to the child's weight. According to the same policies, only RNs that are competent is allowed to act as team leader to give instructions for the logrolling procedure, which unfortunately, in the experience of the researcher is not the case in Cape Town. The instructions from the team leader involves: 1) stabilising the head and cervical spine of a SCI patient when logrolling, 2) giving clear and accurate instructions to the rest of the team, 3) patient's extremities are positioned correctly, 4) team members two to four are appropriately positioned and is ready to logroll in synchrony on the count of three, 5) explaining the procedure to the patient on an appropriate level regardless of the patient's conscious state, 6) and after the logroll ensure patient is in the correct anatomical position. Team members of two to four are responsible for stabilising the patient's body and extremities (Harrison, 2015:14-15, Sydney Children's Hospital, 2019:2-8). Mittermayr and Hunt (2018:2) indicated that up to six nurses may be required to logroll in patients with confirmed cervical SCIs. The Canberra Hospital and Health Services Clinical Procedure (2018:4) in Australia specifies the clinical procedure for the SI management of an adult with a potential SI and that the trauma team leader will direct the number of staff required to logroll. In contrast, if a SCI has been confirmed, the number of staff required and procedure will be reliant on the level of the SCI injury (Harrison, 2015:14-15, Canberra Hospital and Health Services Clinical Procedure, 2018:4).

The lack of knowledge regarding the roles of the team leader and team is concerning as logrolling team members should only be allowed to act according to their specific scope of practice (Canberra Hospital and Health Services Clinical Procedure, 2018:3). Canberra Hospital and Health Services Clinical Procedure (2018:3) however stipulated that RNs are only allowed to act as team leader in logrolling once they successfully completed the applicable training. The other categories of the nurses can assist with logrolling under the rigorous supervision and direction of these RNs. The Canberra Hospital and Health Services Clinical Procedure (2018:3) specifically refers to only ENs that can assist RNs during logrolling. Although there are no specific guidelines in South Africa regarding these roles, the Nursing Act 33 of 2005 (Republic of South Africa, 2005:25) implies that RNs is responsible

for the co-ordination and direct or indirect supervision of all health care regimens provided to a patient by ENs and ENAs as part of planned or initiated nursing regimens by the RN (SANC, 2021:25). This is since ENs only receive education to practice basic nursing and ENAs education to practice elementary nursing in the way and level set according to their specific scope of practices (SANC, 2021:25).

The lack of knowledge regarding the diagnostic criteria of a complete or incomplete SCI is a major concern. Registered nurses are expected to use a diagnostic tool to assess and be aware whether the period of spinal shock may take time to be resolved, normally within 24 – 72 hours after the injury (Eckert & Martin, 2017:1035). It is important to be aware that because of cord oedema, spinal shock may not be completely resolved for a period of up to six to 12 months (Hills, 2020:35). Although only RNs are expected to perform assessments of a SCI, all category of nurses are expected to care for these patients in the current study context. Because of bed shortages, the patient may have to be nursed in an orthopaedic unit rather than a critical care unit, as there is only one acute SCI unit available in Cape Town where the majority of these patients are managed.

### 5.2.2 Objective 2: Determine the attitudes of nurses towards SCI patients and the logrolling of SCI patients.

More than 90% participants reported a positive attitude towards SCI patients and the logrolling of SCI patients. McRae *et al*. (2020:7-8) emphasised the importance of nurses displaying a positive attitude, kindness and open communication while caring for these patients.

Although the participants generally had positive attitudes, a large majority (>80%) had concerns about back injuries. This is consistent with the study results of Li, Zhang, Yang, Chen, Hou, Ning and Li (2019:218) who investigated low back pain amongst orthopaedic nurses working at least one year in an orthopaedic unit in China. The authors found that 66.8% (n=523) of participants experienced low back pain in the previous 12 months and 51.3% (n=402) participants experienced back pain within the last week. Similarly, Brien *et al*. (2018:107) in the City of Tshwane metropolitan area, South Africa reported that nurses working with SCIs are more vulnerable to injuries due to the extreme physical work required since SCI patients are often heavier than typical patients and necessitates lifting and logrolling. Another factor posing a risk of injury was the flexion or twisting of nurses' backs in awkward positions frequently done during patient management (Brien *et al*., 2018:111). As a result, these nurses are more likely than other nurses to develop abrupt, acute, or slow developing, along with chronic occupational-related musculoskeletal disorders. Of interest

was that the highest job-related musculoskeletal disorders in a 12-month period were firstly lower back pain (73.53%), which was even higher than in the study conducted by Li *et al.* (2019:218). Brien *et al*. (2018:110) accredited the high incidence rate of lower back pain in nurses working with SCIs in Tshwane due to a high workload and repetitive patient handling responsibilities essential of this specialty field. The authors also noted that two thirds (61%; n = 36) of participants reported a job-related injury or discomfort, aches, or pain that lasted more than three days and had not occurred in the last 12 months (Brien *et al*., 2018:110). In the previous 12 months, the remaining 57.6% (n = 34) participants reported a job-related injury, discomfort, aches, or pain lasting longer than three days. Brien *et al.* (2018:110) expressed their concern that these job-related musculoskeletal disorders are not only being an extreme healthcare staff concern, but one which healthcare organizations are unable to afford should they lose nurses as a consequence of prolonged absenteeism, early retirement or other employment.

In the present study, just over a fifth of participants (20.8%) lacked confidence to logroll due to insufficient training. In contrast, most participants indicated they felt confident during their last logroll and that they were also willing to assist with logrolling. Of concern is that 8.6% either disagreed or strongly disagreed that there are consequences if a SCI patient is logrolled incorrectly. Consistent logrolling is important to ensure safe patient care by ensuring and safeguarding the precise anatomical position in patients with assumed or established SCIs (Sydney Children's Hospital, 2019:4). Furthermore, practicing consistent logrolling avert the likelihood of sustaining supplementary neurologic injury or further neurological compromise of the SI. Nurses should offer clear explanations and reassurance before and throughout logrolling, by asking the patient to remain still, cross their arms across their chest to avoid any rotational movement and abstain from wanting to assist, should the patient be able to move any / some or parts of their extremities (Canberra Hospital and Health Services Clinical Procedure, 2018:4).

No studies were found that explored nurses' attitudes towards logrolling or logrolling of SCI patients.

### 5.2.3 Objective 3: Determine the practices of nurses when logrolling SCI patients.

In the present study the practices mean score was >80%. Ahmed *et al*. (2021:840) reported that 58% of participants had a satisfactory practice score of >70%. This poor level of practice score in caring for SCI patients was attributed to the fact that more than a third of the participants were technical institute nurses who did not have a degree in the speciality field of critical care nursing (Ahmed *et al*., 2021:840-849). Furthermore, the participants were

newly graduated and thus lacked experience, thus, more than a third of the participating nurses had only between one and five years of experience. In the current study, the median years of experience as a nurse was 10 years, which indicates much more experience as a professional nurse. The median years of experience in the current department was six years, and this was also higher than in the study by Ahmed *et al.* (2021:840); this experience factor might explain why the current study's good practices scores were much higher in this specialty field. Finally, Ahmed *et al.* (2021:840) revealed that prior to working in the critical care unit, the participants did not receive any training to prepare them to care for SCI patients, which was a disadvantage. In the current study, more than 40% (41.1%) of the participants received training on how to perform the logrolling technique in the management strategies component, specifically the training component.

Most participants (88.8%) reported that RNs often or always act as team leader to ensure stabilisation/ alignment of the head and cervical spine. More than 90% (91.7%) of participants reported that RNs act as team leader by ensuring that patients are often or always turned on the count of three, which is considered good practice (Canberra Hospital and Health Services Clinical Procedure, 2018:5, Sydney Children's Hospital, 2019:2) and as such, should be included in logrolling guidelines or SOPs. The current study highlights that all categories of nurses are aware that only RNs should act as team leader and know what the responsibilities of a team leader are during logrolling, to ensure safe, consistent, and good practice. This is consistent with the Sydney Children's Hospital (2019:2) as well as the Canberra Hospital and Health Services Clinical Procedure (2018:3-4). Contrary to the aforesaid study findings, 67.3% of participants reported that ENs/ ENAs often or always acted as the team leader and assumed the team leaders' role and responsibilities, such as stabilising the patients' head and cervical spine. This finding is concerning because acting as team leader is the responsibility of a RN, moreover that RN should have been declared competent to act as team leader and perform logrolling (Canberra Hospital and Health Services Clinical Procedure, 2018:3, 4). This is consistent with the Sydney Children's Hospital (2019:2) practice that the team leader, who could be an RN or clinical nurse specialist, should have been declared competent by means of a specific competency tool to act as team leader and to logroll patients with a confirmed or suspected SI. This practice, of acting as a team leader during logrolling, is not encouraged as ENs and ENAs lack the required level of training and knowledge. Moreover, these categories of nurses did not receive in-depth training during their courses or in a speciality field such as SI and SCI and their limited scope of practice. The SANC (2020:24-26) clearly states that RNs are responsible for the management and delegation of nursing care tasks, as well as for the coordination and supervision of healthcare regimes provided to patients by nurses in lower

Reolvedcategories, knowing they lack the necessary knowledge to act as team leader during logrolling.

Consequently, the RN will be held accountable, regardless of staff shortages, if the patient is compromised because he/ she delegated the task knowing they lack the necessary knowledge to act as team leader during logrolling.

Another major concern is the fact that more than eighty percent (80.9%) of participants indicated that they always or often taught other people on the team how to logroll SCI patients. Although the study findings did not specify the category of nurse referred to, it should be noted that most participants were ENAs (33.7%) and ENs (23.7%). This could imply that most of the training in logrolling was provided by those ENAs and ENs, which is not considered to be good logrolling practices.

Most participants (76%) reported that there is always good communication between the team leader, the patient and the rest of the team members during logrolling, one would expect this from a safe logrolling team (Sydney Children's Hospital, 2019:6-8, Basindwah *et al*., 2021:014-016). Good communication is an important factor because clear and concise instructions (Sydney Children's Hospital, 2019,6-8, Canberra Hospital and Health Services Clinical Procedure, 2018:3-4, Basindwah *et al*., 2021:014-016) will not only instill trust in the team leader, team and patient, but will also reduce the patient's anxiety (Khan *et al*., 2017:1-2). These patients are extremely vulnerable, especially during the acute phase, as they might be concerned about the possibility of medical decline and might be suffering anxiety, and emotional exposure. Khan *et al.* (2017:1-2) emphasise the importance of effective communication, especially from the perspective of nurses, for the successful acute and rehabilitation care or SCI patients. When a patient knows what to expect, then this might also help them to feel safe if the nurse's care. A RN who does not act as a team leader. i.e., allowing another category nurse to act as team leader, might compromise effective communication and care during logrolling. Communication and confidence of team leaders are two important factors during logrolling, especially when stabilising the head and cervical spine, good communication ensures that all team members know what to do and it is seen as good practice (Harrison, 2015:6, Basindwah *et al*., 2021:012-016). It should be noted that several SOPs, guidelines, or protocols are available for the management and logrolling of SCI patients, but these do not give the complete context of the logrolling process. That context includes the specific category of nurse to act as team leader, the roles of each team member and the issue of which category of nurses are allowed to assist with logrolling. Other issues are the number of nurses to be included in logrolling and variations in the

procedure. Furthermore, some of these SOPs are more focused on the pre-hospital setting for paramedics or medical doctors.

One noteworthy finding from this study is that only 76.4% of participants reported that there were often or always at least four nurses involved in logrolling, which is seen as good practice. Standard guidelines however state that there should be at least four staff if patient's weighing more than 15 kg (Sydney Children's Hospital, 2019:6-8,12) moreover, there should be up to five nurses in the case of an acute tetraplegic patient (Harrison, 2015:14). Additional staff may be required for various roles, for example:

- to ensure external devices remain intact including intravenous lines, monitors, drains, external fixation devices or tubes of a ventilator, casts or
- if a patient should be agitated, perhaps because of the mechanism of injury (Sydney Children's Hospital, 2019:6-8,12).

Mittermayr and Hunt (2018:1) stated that in the case of patients with a possible or confirmed cervical SI, as many as to six nurses may be required to logroll and position that patient. This might not always be possible because of staff shortages, as worldwide there is a lack of nursing staff, and Cape Town is no different.

### 5.2.4 Objective 4: Determine management strategies influencing logrolling of SCI patients.

The aim of the fourth objective was to determine management strategies influencing logrolling of SCI patients. The mean management strategies score was 47.4 (SD 26.9), and median score 40.0 (IQR 40.0).

Nearly 80% (77%) participants reported poor management strategies, which would impact the holistic management of SCI patients. However, good management strategies are vital and should be guaranteed by the nursing management of healthcare facilities. During the literature review, no study was found that addressed management strategies influencing nurses' logrolling of SCI patients. Several factors contributing to poor management strategies will be discussed below.

#### *5.2.4.1 Training*

Although more than half (51.9%) did not receive training in logrolling, most of them (81.9%) acknowledged the importance of such training. Two possible reasons for not receiving training might be a heavy workload and staff shortages. Ahmed *et al.* (2021:848) confirmed that staff shortages are a possible reason why the participants in that study did not attend training. A further concern in this present study is that most of the participants who actually

received training, had it more than 2 years ago. That training may no longer be longer relevant, or outdated, or might not adhere to the latest evidenced-based practice, this could result in some nurses not being competent in logrolling. It could also lead to inconsistency during logrolling practice. Consequently, the patient can be seriously compromised, and in addition nurses could be injured when logrolling, for example, by sustaining a back injury.

#### *5.2.4.2 Staff shortages*

Less than half (48.4%) of the participants reported that sufficient staff were usually available for logrolling. If there are insufficient staff available for this procedure, then the workload increases, which can lead to an incorrect logrolling technique being performed, this may compromise patients or cause injuries to staff. The study by Brien *et al*. (2018:109) in a SCI rehabilitation center, reported that 64.4% participants indicated not having enough staff in their unit. Furthermore, the results of that study revealed that nurses had high workloads as a result of staff shortages, causing disproportionate nurse to patient ratios and longer work hours. This situation increased the danger of worsening current injuries or developing a musculoskeletal disorder such as a back injury. Work related musculoskeletal disorders pose a serious threat to healthcare staff, and the healthcare system simply cannot afford as this, after all, such injuries may result in the loss of more nurses as a result of premature retirement, searching for other employment or lengthy absenteeism (Brien *et al*., 2018:110). A study was conducted in the United Kingdom by Thomas-Davies (2018) and focused on nurses' perceptions of a Safer Nursing Care Tool in SCI, with a view to establishing safe nurse staffing levels. That study found proof that the current method of establishing staffing levels was inadequate for SCI patient care. The study also reported that there was no adequate method for establishing safe staffing levels in SCI centers. Moreover, if safe staffing levels are not met, this can seriously impact the number of nurses logrolling SCI patients. Given the nursing shortages in South Africa, the lack of a reliable method to ensure safe staffing levels in a first-world country such as the United Kingdom is of some concern.

#### *5.2.4.3 Standard operating procedures*

Less than 40% (35.6%) of participants indicated that a logroll guideline/ SOP was available. In the absence of logrolling SOPs, logrolling can become inconsistent and can potentially compromise patient care and safety. The literature survey did not find any study that specifically address nurses' logrolling SOPs for SCIs, nevertheless, Coggins *et al.* (2019:74) stated that guidelines are essential to reduce dissimilarities for low-risk SI patients. Guidelines can improve the patient's pathway experience and can lessen their risk of extended immobilisation.

### 5.2.5 Objective 5: Identify factors associated with nurses' logrolling knowledge, attitudes, and practices.

#### *5.2.5.1 Factors associated with knowledge*

The demographic variables associated with knowledge included category of nurse, and years of experience as a nurse. Registered nurses were the most likely to be knowledgeable. This is to be expected, given the more in-depth nature of RNs course content and their scope of practice (SANC, 2021, SANC, 2020:24-26). The knowledge scores of nurses with more years' experience as professional nurses where higher, which is in line with the conceptual framework**.** Ahmed *et al*. (2021:850) similarly indicated a significant positive association between nurses' knowledge and their years of experience.

There was no association between knowledge and management strategies. During the literature review, no study was found that addressed associations between the individual management strategies questions and knowledge of nurses logrolling and managing SCIs. However, according to the conceptual framework there should be an alignment between knowledge and management strategies. For example, because management strategies include training and knowledge of SOPs, then those strategies should be related to knowledge.

Knowledge was positively associated with attitudes in the current study, which is in line with the conceptual framework, and corresponds to the findings by Tharu, Alam, Bajracharya and Kabir (2022:2). That KAP study took place in Bangladesh, in a SCI rehabilitation centre and the participants were caregivers, although not nurses, the focus was on pressure ulcers in SCI patients and not logrolling (Tharu *et al*., 2022:2). Based on the KAP model used, the authors found that high levels of knowledge of their participants demonstrated a positive attitude, this clearly indicated that knowledge itself was related to the caregiver's development of attitude (Tharu *et al*., 2022:17). Thus, the factor identified as affecting the attitude of caregivers in that study was knowledge, there was a positive relationship between the knowledge and attitude of caregivers identified. The findings of that study support this current study's finding that knowledge can positively influence attitude (Tharu *et al*., 2022:17).

One unexpected finding in the current study was that no association was evident between knowledge and practices, which is not in line with the conceptual framework. Of note, however, was that the percentage of participants who were knowledgeable in the good practices category (89.6%) was slightly higher than in the poor practices' category (83.6%). It is possible that this could be because most of the participants were RNs (95.3%). Ahmed *et al*. (2021:850-851) reported a significant association between knowledge and practices in

the case of nurses caring for SCI patients in the critical care unit. The authors' findings were supported by associations between the variables such as participants' level of education, years of experience and training courses in both the knowledge and practice components.

#### *5.2.5.2 Factors associated with attitudes*

No associations were found between the demographic variables and attitudes. However, associations were found between the management strategies and attitudes variables. It was evident that those participants who received training to prevent injuries had a more positive attitude score than those who did not receive training or were unsure whether they had received training.

#### *5.2.5.3 Factors associated with practices*

No associations were found between the demographic variables and practices and likewise there was no association between management strategies and practices or between knowledge and practices.

There was, however, an association between the variables of attitude and practices. This association is in line with the conceptual framework, as participants with a positive attitude were more likely to demonstrate good practices. The current study findings corresponded with the above. The participants who received training to prevent injuries proved to have a more positive attitude than those who did not receive training. This also applies to RNs who must act as team leaders, they display a more positive attitude toward logrolling and caring for SCI patients. Furthermore, this finding may be interpreted to suggest that if nurses have a positive attitude when caring for and managing their patients, then they may be more empathic and understanding of the needs of SCI patients. On the contrary, if nurses' display a poor attitude, then this might affect their practice, for example, they may become more careless and make gross mistakes that may compromise the safety of patients.

During the literature review, no study was found that addressed associations between the attitude and practices of nurses logrolling and managing SCIs. A study by Adolfo, Albougami, Roque and Almazan (2021:206) examined nurses' attitudes toward quality improvement and implications for nursing management systems; the study found that positive attitudes were associated with good practice.

## 5.3 LIMITATIONS OF THE STUDY

One limitation of the study was that it was conducted in the Western Cape Metropole only, at two public tertiary hospitals managing SCI patients. Private healthcare facilities were excluded, and this exclusion may limit generalisation of the research finding to other

hospitals. A second limitation was that the researcher was unable to recruit enough participants to meet the minimum required sample size, because of staff shortages caused by the COVID-19 pandemic; therefore, different sampling approaches were applied in the two hospitals (see section 3.5). However, this may not be a limitation because the sample size was sufficient to detect significant associations between variables.

## 5.4 CONCLUSIONS

In this chapter, the researcher discussed the nurses' KAP of logrolling patients with a SCI in the Western Cape Metropole. The results of the study revealed that most participants had good KAP, whilst good management strategies were lacking. Factors such as insufficient training, the lack of SOPs and staff shortages might lead to inconsistent practices in logrolling, this could result in further damage to the patient's spine or SC or could lead to nurses suffering musculoskeletal injuries.

The research question, "What are the nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in the Western Cape Metropole?'' was answered.

It was the first study that assessed the KAP of nurses logrolling and caring for SCI patients globally, the Sub-Saharan and in the South African context. The factors associated with nurses' logrolling KAP is in line with the conceptual framework of the current study.

## 5.5 RECOMMENDATIONS

The recommendations discussed below are based on the scientific evidence gathered during this study. Figure 5.1 demonstrates a summary of the recommendations.

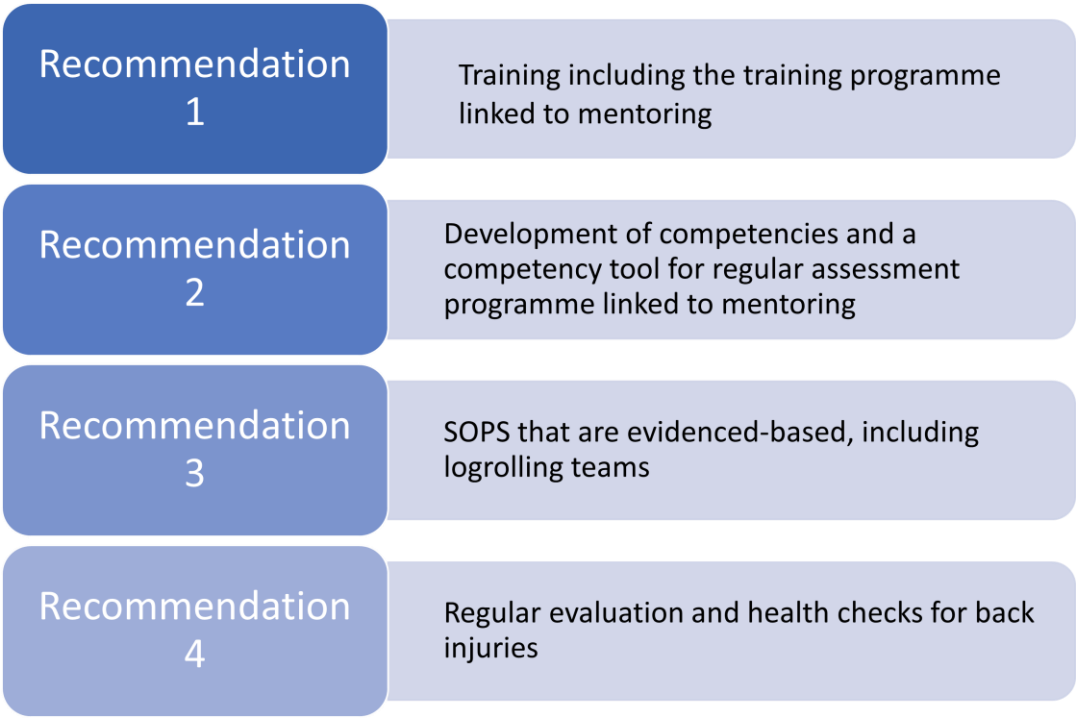



**Figure 5.1: Summary of recommendations**

### 5.5.1 Training including the training programme linked to mentoring

The development and implementation of an in-service training program for nurses involved in logrolling and managing SCIs is recommended. This type of programme should improve and ensure consistent practice and should ensure that compulsory knowledge and skills are attained by all nursing categories, relevant to their specific scope of practices. Thumbikat *et al*. (2015:4) recommend that the knowledge domain in such a program should include background theoretical knowledge of anatomy, physiology, aetiology, mechanism of injury and pathophysiology of the spine, SC and SCIs. Those authors also advocate for the inclusion of spinal stabilization, safe moving and handling techniques, such as logrolling of SI and SCI patients, and the prevention of potential secondary injuries and complications. The aim of the programme is to ensure competent and consistent practice and to improve relevant skills adapted to nursing categories' scope of practice. Moreover, if not all nursing categories have this knowledge, then the nurses will be unable to manage the following as discussed in this section 5.2.1:

- care for and recognise the differences between an incomplete and complete SCI;
- monitor, assess, record or report the clinical manifestations, neurological improvement or deterioration; and
- notice if a logroll procedure potentially compromise a patient's SC, or neurological status.

The findings revealed that years of nursing experience may have a positive influence on the KAP of nurses logrolling and managing SCI patients. According to Clarke and Santy-Tomlinson (2014:256), nursing experience will ensure safe care and preventing harm to SCI patients. To achieve this, it will be critical to involve experienced RNs in the development and presentation of the in-service training program as part of mentoring. That training program consists of a theoretical and practical component and should be reviewed every two years. Similarly, nurses' competencies could be assessed every two years. The training programme could also help nurses to develop an improved aptitude in all aspects of managing SCI patients, and therefore enable them to deliver holistic, patient-centered care.

Liebenberg (2018:11) reported that any experienced and competent RN, may act as mentor and as such, provide guidance nurses beginning their career. Similarly, that training programme could help less experienced nurses to manage SCI and SI patients who could then act as mentors in the training programme. The South African Nursing Council's age distribution (SANC, 2020) indicated at the end of 2019, slightly more than half of RNs, slightly more than 70% ENs and almost 80% ENAs were under the age of 60. The concerns of an ageing nursing population should be addressed, with their expertise being drawn on before it is lost. Moreover, successors should be trained and equipped to continue the training and mentoring process.

### 5.5.2 Development of competencies and a competency tool for regular assessment

A set of clinical competencies with criteria should be identified so that existing staff can be tested, and their competence assessed. This should be applied to new or newly appointed nurses in units caring for SI and SCI patients, for example, during their three-month probation period.

The competencies of nurses could be assessed every two years. The rationale is to determine whether nurses are competent and have retained the required knowledge and practice skills, any deficiencies can be identified and addressed. This assessment could also form part of an annual incentive system. This assessment especially applies to the RNs who will be expected to act as team leaders and as such, provide correct guidance to the other nursing categories during logrolling. It will be important to rely on the expertise of experienced RNs who successfully completed the in-service program, to assist with the support of new or newly appointed staff. They can assist those nurses whose competencies were inadequate and had to be repeated. These competent staff members can then be used as mentors in the units, and this could be the ideal opportunity to ensure succession plans are in place. Although having experienced staff in the unit is viewed positively, there is

concern that several nurses are nearing retirement age and will soon be leaving the service. Uthaman, Chua and Ang (2016;54) conducted a study in Singapore and found that the increased demands for healthcare services, coupled with an ageing nursing staff population meant that the retention of older, more senior nurses is critical in healthcare. This is supported by the findings of Davey, Jackson and Henshall (2020:1000) in the United Kingdom, who found a positive impact when more-experienced senior nurses took on the responsibility of mentoring junior nurses. These ageing senior RNs should therefore be used to act as team leaders and mentors as part of a succession plan to prepare the next generation in all aspects of SCI care.

A competency tool for assessing the competency of healthcare professionals in logrolling trauma patients was developed and was found to be not only reliable but valid (Basindwah *et al.,* 2021:012, 014-016). Those authors suggested that since the competency tool was used only on healthy candidates who volunteered in a skills laboratory, additional tools may be required to assess the logrolling technique in the clinical setting. This competency tool can be utilized for all nurses having to logroll SI and SCI patients in all units.

### 5.5.3 Development and implementation of an evidenced-based logrolling standard operating procedures (SOPs) and logrolling teams

The study findings revealed that nurses either lacked training in logrolling SCI patients or received logrolling training more than two years ago. In order to ensure that nurses are competent in the logrolling technique, it should be a critical aspect of the practical competency tool that is linked to the SOP as discussed in 5.2.4.3.

Participants were indifferent about the availability of SOPs in the units. These SOPs are a step-by-step logroll guideline to ensure consistent evidence- based logrolling. The SOP should clearly indicate the roles of nurses in the various nursing categories; this issue was addressed in the Canberra Hospital and Health Services Clinical Procedure (2018:3) in Australia. That Canberra study outlined the process for the optimal management and care of SI and disorders, and specifically indicated the scope of practice for specific members of the multi-disciplinary team involved in caring for a patient with a SI. According to their specific scope of practice, the authors specifically stated the inclusion of RNs and ENs as part of the multidisciplinary team caring for SI patients for example with specific reference to logrolling (Canberra Hospital and Health Services Clinical Procedure, 2018:3-4). Some of the recommendations of the Canberra study refer to the spinal precautions to be taken during logrolling, immobilisation of the head and presumably also the cervical spine; the study recommends that this should only be managed by a RN after appropriate training has been

completed, and student nurses should only be allowed to assist under strict guidance and supervision. Similarly, in South Africa, only RNs should act as team leaders and stabilise SCI patients' head and cervical spine, while other categories of nurses and students should logroll under the strict supervision of RNs.

A lack of SOPs may result in inconsistencies in logrolling and management of SCIs, potentially causing further neurological harm (Canberra Hospital and Health Services Clinical Procedure, 2018:3-4). This could lead to litigation, and compromise nurses if use of the wrong technique should lead to back injuries. Not using the correct number of staff to logroll can also cause harm to the patient and nurses. The authors of the Canberra study recommended that an evidence based/ best practice SOP be used for managing and logrolling SCI patients; this may warrant the standardisation of logrolling practices by means of continuous, best practice care to ensure best patient care outcomes. Management of the healthcare facilities should ensure that nurses are aware of the SOP, by making it available to all nurses (Canberra Hospital and Health Services Clinical Procedure, 2018:3) and including in the in-service programme. A SOP will exclude all inconsistencies since there are various techniques used in logrolling practices (Groeneveld *et al*., 2001:45; Canberra Hospital and Health Services Clinical Procedure, 2018:3-4; Sydney Children's Hospital, 2019:1-4).

There is a need for SOPs for logrolling teams that are contextualized for the South African context. The logrolling team can rotate through all units where logrolling is done, on a roster, and they can also assist with basic nursing care tasks as defined in their scope of practice (SANC, 2020:29-30). This team may be less expensive than appointing more nurses per unit, but they will not replace the RN as team leader during logrolling and will still perform logrolling under the direct supervision of a RN (Canberra Hospital and Health Services Clinical Procedure, 2018:3,7; Sydney Children's Hospital, 2019:3,7-8). A job description for the logrolling team members can be developed with the assistance of the team responsible for developing the in-service training programme.

### 5.5.4 Regular evaluation and health checks for back injuries

The study found that back injuries are a major concern. Therefore, training to prevent back injuries when logrolling should be included in the in-service programme. Back injuries can be treated in a variety of ways. One method of addressing back injuries is through a health training programme and the development of a simple, comprehensive booklet with guidelines to ensure correct body mechanics for a healthy nursing career; policies for safe patient handling are needed (Mohamed, El-Tahry, Ibrahim & Mostafa, 2022:138).

Li *et al*. (2019:219) proposed involving occupational health nurses in the development and implementation of an educational and patient-handling programme for nurses working in the orthopaedic departments. According to those authors the aim is not only to improve the work environment but also to reduce occupational risks and to encourage orthopaedic nurses to use correct techniques which will avoid and manage lower back pain when logrolling. The programme content can then be included in the aforementioned booklet. Immediate reporting of injuries to OM and occupational health department should take place. There should be regular injury checks and evaluation for back injuries which should be encouraged, irrespective of whether orthopaedic nurses have sustained a back injury. This is all part of the recommended preventive strategies and treatment to improve occupational health and safety and ensure better medical treatment (Li *et al*., 2019:228). Those authors found that, despite reporting lower back pain, half of the participating orthopaedic nurses did not receive medical treatment, while only a small percentage (4.4%) frequently or always received treatment (Li *et al*., 2019:119).

In **section 5.2.3**, the findings of this study suggested that lower categories of nurse, other than RNs, are taking the responsibility as team leaders when logrolling, because of staff shortages. The high number of staff members who sustained musculoskeletal disorders, especially back injuries, may contribute to staff shortages (Brien *et al*., 2018:110). These authors also recommended the implementation of logrolling teams to assist with logrolling in the units on all shifts, which would alleviate the burden on the already overburdened and understaffed nurses. This logrolling team may assist with reducing back injuries sustained by nurses performing logrolling, especially during staff shortages. It is therefore critical to ensure that all team members have received training in back injury prevention and that they are competent in knowing and ensuring that the correct number of team members logroll during different scenarios.

All these issues must be addressed to ensure consistency in the logrolling technique. Such consistency may assist in avoiding secondary injuries to patients as well as back injuries sustained by nurses.

## 5.6 FUTURE RESEARCH

The following areas for further research are proposed:

- An intervention study is proposed which will determine evidenced-based practice of logrolling. Thus, a framework can be developed with specific interventions to ensure consistent logrolling and management of SI and SCI patients.

- Longitudinal studies to be conducted over a period to explore how nurses retain their KAP regarding the logrolling of SCI patients after training.
- A qualitative study is suggested to explore patients' lived experience of nurses KAP of logrolling and management of SCI patients.
- A study to determine nurses' adherence to the logrolling and management guideline.

## 5.7 DISSEMINATION

The findings of this study will first be published as a thesis, by the University of Stellenbosch. The results of the study as well as the recommendations will be made available to the management of all the participating hospitals. The study findings will also be presented at conferences and published in an accredited journal.

## 5.8 CONCLUSION

The participants in the study demonstrated good median and mean KAP. Management strategies can however be improved by considering the development and implementation of an in-service training programme for nurses involved in logrolling and managing SCI patients. Improving logrolling and spinal care management through training in the logrolling procedure, the role of the logrolling team members and caring for SCI patients; the development and implementation of an evidenced-based logrolling SOP as well as competency tool and lastly, addressing staff shortages to prevent back injuries amongst nurses working with SCI patients, to prevent some category of nurses' working outside of their scope of practice and the implementation of a training program as part of preventative measures for back injuries.

There was no specific scientific evidence arising from the literature survey that addressed nurses' KAP of logrolling SCI patients either in South Africa or internationally. This study was therefore necessary to determine the KAP of nurses in order to form the basis for further research to address possible gaps or paucity. The study may also benefit SI and SCI patients, healthcare organizations, healthcare providers, training facilities, and healthcare professionals and policy makers nationally and internationally. This study will not only assist to improve the health outcome of SCI and SI patients, but also to plan, implement and evaluate current practices of logrolling. Further studies are recommended to investigate and address the areas identified in the nurses' KAP of logrolling SCIs in the Western Cape Metropole.

# REFERENCES

Abd-Elhameed, F.K. & Sayed, M.A. 2018. Training of nurses on rehabilitation of patient with spinal cord injuries. *Egyptian Journal of Health Care* [Online]. 9(4):28-44. Available: http://www.ejhc.journals.ekb.eg/jufile?ar_sfile=38533 [2020, May 5].

Adolfo, C., Albougami, A., Roque, M. & Almazan, J. 2021. Nurses' attitudes toward quality improvement in hospitals: Implications for nursing management systems. *Nursing Practice Today* [Online]. 8(3):206-215, doi:org/10.18502/npt.v8i3.5935

Agency for Healthcare Research and Quality, 2012. *CUSP toolkit, the role of the nurse manager: Facilitator notes* [Online]. Available: http://www.ahrq.gov/hai/cusp/modules/nursing/nursing-notes.html [2020, May 5].

AlMarhoon, E.A., Alhabib, R.A. & Alshaalan, A.A. 2018. Evaluation of knowledge, attitude, and practice about first aid of spinal injury among medical students in Saudi Arabia, 2018. *The Egyptian Journal of Hospital Medicine* [Online]. 73(5):6734-6737. Available: http://ejhm.journals.ekb.eg/article_16175_4634727587d093ba9c03fc91dcefef64.pdf [2020, May 5].

Ahmed, S. H., AbdElsatar, M & Khalil, M.B. 2021. Assessment of nurses' knowledge and practice regarding care for patients with spinal cord injury in the Critical Care Unit. *Egyptian Journal of Health Care* [Online]. 12(4), 840-852, doi:10.21608/ejhc.2021.204466

Arif, S.B.M. 2015. Nurses' experience in caring for patients with traumatic spinal cord injury. Unpublished thesis. Adelaide: Adelaide University [Online]. Available: http://digital.library.adelaide.edu.au/dspace/bitstream/2440/99854/1/01front.pdf [2020, March 5].

Armstrong, B., Crouch, R., Read, C. & Palfrey, R. 2013. Training nurses in trauma management. *Emergency Nurse* [Electronic], 21(4):14-18, doi:10.7748/en2013.07.21.4.14.e1137

Basindwah, S.A., Alhazmi, B.F., Shodari, A.F., Almaghrabi, M.A. & Fallatah, S.M. 2021. Development and validation of a new method for evaluating the log-roll technique in

trauma patients. *Saudi Journal of Emergency Medicine* [Electronic], 2(1):012–017, doi.org/10.24911/SJEMed/72-1600578121

Bhattacherjee, A. 2012. *Social science research: Principles, methods and practices.* 2nd edition. Florida: University of South Florida [Electronic], Available: http://www.scholarcommons.usf.edu/oa_textbooks/3 [2020, May 2].

Blaauw, D., Ditlopo, P. & Rispel, L.C. 2014. Nursing education reform in South Africa – lessons from a policy analysis study. *Global Health Action* [Electronic], 7(26401):1-12, doi:org/10.3402/gha.v7.26401

Blom, A., Warwick, D. & Whitehouse, M.R. (eds.) 2018. *Apley and Solomon's system of orthopaedics and trauma*. 10th edition. New York: CRC Press.

Bouland, A.J., Jenkins, J.L. & Levy, M.J. 2013. Assessing attitudes towards spinal immobilization. *The Journal of Emergency Medicine* [Electronic], 45(4):e177-e125, doi:org/10.1016/j.jemermed.2013.03.046

Brien, K., Lukhele, Z., Nhlapo, J.M., Pieterse, A., Swanepoel, A., Wagener, L. & Mashola, M.K. 2018. Work-related musculoskeletal disorders in nurses working in South African spinal cord rehabilitation units. *International Journal of Africa Nursing Sciences* [Electronic], 8:107-111, doi.org/10.1016/j.ijans.2018.04.004

Brink, H., Van der Walt, C. & Van Rensburg, G.H. 2018. *Fundamentals of research methodology for health care professionals*. 4th edition. Cape Town: Juta.

Buys, M. 2017. Medicine and the law. Protecting personal information: Implications of the Protection of Personal Information (POPI) Act No. 4 of 2013 for healthcare professionals. *South African Medical Journal* [Electronic], 107(11):954-956, doi:org/10.7196/SAMJ.2017.v107i11.12542

Canberra Hospital and Health Services Clinical Procedure. 2018. *Spinal injury management of the adult – ACT Health* [Online]. Available: http://www.health.act.gov.au/sites/default/files/2018-09/Spinal%20Injury%20Management%20of%20the%20Adult.docx [2018, June 10].

*Census and sample survey.* 2020. [Online]. [2022] Available: http://byjus.com/commerce/census-and-sample-survey/ [2021, August 3].

Chaghari, M., Saffari, M., Ebadi, A. & Ameryoun, A. 2017. Empowering education: A new model for in-service training of nursing staff. *Journal of Advances in Medical Education & Professionalism* [Online], 5(1):26–32. Available: http://www.researchgate.net/publication/313611705 [2020, May 10].

Clarke, S. & Santy-Tomlinson, J. (eds.). 2014. *Orthopaedic and trauma nursing: An evidence-based approach to musculoskeletal care*. Sussex: Wiley-Blackwell.

Coggins, A., Ebrahimi, N., Kemp, U., O'Shea, K., Fusi, M. & Murphy, M. 2019. A prospective evaluation of cervical spine immobilisation in low-risk trauma patients at a tertiary Emergency Department. *Australian Emergency Nursing Journal* [Online]. 22(2):69-75, doi:org/10.1016/j.auec.2019.04.001

Conrad, B.P., Rossi, G.D., Horodyski, M. B., Prasarn, M.L., Alemi, Y. & Rechtine, G.R. 2012. Eliminating log rolling as a spine trauma order. *Surgical Neurological International* [Online]. 3(3):S188-S197. Available: http://www.researchgate.net/profile/Bryan-Conrad/publication/230700064_Eliminating_log_rolling_as_a_spine_trauma_order/links/02e7e51bf2ce912f43000000/Eliminating-log-rolling-as-a-spine-trauma-order.pdf [2018, February 24].

Cresswell. J.W. & Cresswell, J.D. 2018. *Research design: Qualitative, quantitative, and mixed methods approaches*. 5th edition. Los Angeles: SAGE.

Davey, Z., Jackson, D. & Henshall, C. 2020. The value of nurse mentoring relationships: Lessons learnt from a work-based resilience enhancement programme for nurses working in the forensic setting. *International Journal of Mental Health Nursing* [Online]. 29:992-1001, doi: 10.1111/inm.12739

De Kock, D. 2020. Policy of language to be used in Groote Schuur Hospital, e-mail to H. Vorster [Online], 14 May. Available email:Deidre.DeKock@westerncape.gov.za.

Department of Health, South Africa. 2015. *Ethics in health research principles, processes and structures* [Online]. Available: http://www.ul.ac.za/research/application/downloads/DoH%202015%20Ethics%20in%20Health%20Research%20Guidelines.pdf [2021, May 13].

Dhai, A. 2015. Medico-legal litigation: Balancing spiralling costs with fair compensation. *South African Journal of Bioethics and Law* [Online]. 8(1):1-3, doi:10.7196/sajbl.407

Disabled World. Dec 21, 2017. *Human brain facts and answers* [Online]. Available: http://www.disabled-world.com/health/neurology/brain/bfa.php [2018, September 17].

Dunn, R.N. 2015. Role of spine surgery in the SCI patient, in J.M. Stander (ed.). *The ASCI Handbook.* 4th edition. Cape Town: ASCI Unit. 27-29.

Eckert, M.J. & Martin, M.J. 2017. Trauma: Spinal cord injury. *Surgical Clinics of North America* [Electronic], 97. 1031–1045, doi:org/10.1016/j.suc.2017.06.008

Erasmus, D.S. & Volmink, J. 2019. Personal correspondence. 23 April, Stellenbosch.

Fernández-Gómez, E., Martín-Salvador, A., Luque-Vara, T., Sánchez-Ojeda, M.A., Navarro-Prado, S. & Enrique-Mirón, C. 2020. Content validation through expert judgement of an instrument on the nutritional knowledge, beliefs, and habits of pregnant women. *Nutrients* [Online]. 12(4):1-13, dx.doi.org/10.3390/nu12041136

Fransen, B.L., Hosman, A.J., van Middendorp, J.J., Edwards, M., van Grunsven, P.M. & van de Meent, H. 2016. Pre-hospital and acute management of traumatic spinal cord injury in the Netherlands: Survey results urge the need for standardisation. *Spinal Cord* [Online]. 54(1):34-38, doi:10.1038/sc.2015.111

Furlan, J.C., Craven, B.C., Ritchie, R., Coukos, L. & Fehlings, M.G. 2009. Attitudes towards the older patients and spinal cord injury amongst registered nurses: A cross-sectional observational study. *Spinal Cord* [Electronic], 47:674– 680. Available: http://www.journalofnursingstudies.com/article/S0020-7489 (12)00423-3/r… [2018, May 1].

Gerhart, K.A., Koziol-McLain, J., Lowenstein, S.R. & Whiteneck, G.G. 1994. Quality of life following spinal cord injury: Knowledge and attitudes of emergency care providers [Electronic], *Annals of Emergency Medicine*, (4):807-812, doi:10.1016/S0196-0644(94)70318-3

Glass, G.V. 1978. Standards and criteria. *Occasional Paper Series,* 10:1-39.

Gray, J.R., Grove, S.K. & Sutherland, S. 2017. *The practice of nursing research*. 8th edition. St. Louis: Elsevier.

Gray, J.R. & Grove, S.K. 2021. *Burns & Grove's the practice of nursing research*. 9th edition. St. Louis: Elsevier.

Greaves, I., Porter, K. & Garner, J. (eds.). 2022. *Trauma care manual.* 3rd edition. London: CRC Press.

Groeneveld, A., McKenzie, M.L. & Williams, D. 2001. Logrolling: establishing consistent practice. *Orthopaedic Nursing* [Electronic], 20(2): 45-49. Available: http://www.ncbi.nlm.nih.gov/pubmed/12024634 [2018, April 23].

Gumucio, S., Merica, M., Luhmann, N., Fauvel, G., Zompi, Ronsse, A., Courcaud, A., Bouchon, M., Trehin, C., Schapman, S., Cheminat, O., Ranchal, H., Simon, S., & du Monde, M. 2011. *The KAP survey model (Knowledge, attitude & practice* [Online]. 1-38, Available: http://www.issuu.com/medecinsdumonde/docs/mdm_guide_kap. [2017, May 27].

Harrison, P. 2010. Spinal injuries best practice. *North Wales Critical Care Network* [Online]. Available: http://www.wales.nhs.uk/sites3/Documents/753/FORMATTED%20spinal [2017, May 27].

Harrison, P. (ed.). 2015. *Moving and handling patients with actual or suspected spinal cord injuries (SCI)* [Online]. Available: http://www.mascip.co.uk/wp-content/uploads/2015/02/MASCIP-SIA-Guidelines-for-MH-Trainers.pdf [2017, April17].

Health Systems Trust. 2017. *Nursing shortage* [Online]. Available: http://www.hst.org.za/publications/South%20African%20Health%20Reviews/HST%20SAHR%202017%20Web%20Version.pdf [2017, April 17].

Hills, T.E. 2020. Caring for patients with a traumatic spinal cord injury [Abstract]. *Nursing 2020* [Electronic], 50(12):30-40, doi: 10.1097/01.NURSE.0000721724.96678.5a

Hinkle, J.L. & Cheever, K.H. 2018. *Brunner & Suddarth's textbook of medical-surgical nursing*. 14th edition. Philadelphia: Wolters Kluwer.

Imenda, S.N. 2014. Is there a conceptual difference between theoretical and conceptual frameworks? *Journal of Social Science* [Electronic], 38(2):185-195, doi:10.1080/09718923.2014.11893249

Joseph, C., Delcarme, A., Vlok, I., Wahman, K., Phillips, J. & Wikmar, L.N. 2015. Incidence and aetiology of traumatic spinal cord injury in Cape Town, South Africa: A prospective, population-based study. *Spinal Cord* [Online]. 53:692-696, doi:10.1038/se.2015.51

Joseph, C. & Wikmar, N. 2016. Prevalence of secondary medical complications and risk factors for pressure ulcers after traumatic spinal cord injury during acute care in South Africa. *Spinal Cord* [Electronic], 54(7):535-539, doi:10.1038/sc.2015.189

Kaliyaperumal, K. 2004. Guideline for conducting a knowledge, attitude and practice (KAP) study. *AECS Illumination* [Electronic], 4(1): 7-9. Available: http://v2020eresource.org/content/files/guideline_kap_Jan_mar04.pdf [2017, July 1].

Kariem, H. 2015. Physiotherapy in the ASCI Unit, in J.M. Stander (ed.). *The ASCI Handbook.* 4th edition. Western Cape Province: ASCI Unit. 160-165.

Kent State University. 2021. *SPSS Tutorials: Chi-square test of independence* [Online]. Available: http://libguides.library.kent.edu/spss/chisquarehttp://libguides.library.kent.edu/spss/chisquare [2021, July 2].

Khan, S.M., Phadke, K., Singh, P.K. & Jain, S. 2017. The role of nursing staff in spinal cord injured patients. *Journal of Perioperative and Critical Intensive Care Nursing* [Electronic], 3(1):1-2, doi:10.4172/2471-9870.1000137

Kornhall, D.K., Jørgensen, J.J., Brommeland, T., Hyldmo, P.K., Asbjørnsen, H., Dolven, T., Hansen, T. & Jeppesen, E. 2017. The Norwegian guidelines for the prehospital management of adult trauma patients with potential spinal injury. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* [Electronic], 25(2), doi: 10.1186/s13049-016-0345-x

Kotze, E. 2020. Correspondence. 3 October, Cape Town.

Kotze, E. 2020. Expert advice regarding content of self-administered questionnaire, e-mail to H. Vorster [Online]. 13 October. Available e-mail: Humeri.Vorster@westerncape.gov.za.

Kwan, I., Bunn, F. & Roberts, I.G. 2009. *Spinal Immobilisation for Trauma Patients* [Electronic], 2:1-2, doi:org/10.1002/14651858.CD002803

Lapum, L., St-Amant, O., Hughes, M., Petrie, P., Morrell, S. & Mistry, S. 2019. *The complete subjective health Assessment* [Online]. Available: http://ecampusontario.pressbooks.pub/healthassessment/ [2021, August 1].

Lavoie, S., Boissy, P., Lebel, K., Marceau, M. & Bouchard, D. 2013. Board 189 – Program innovations abstract teaching nursing students how to securely mobilize traumatized patients with Inertial Measurement Units (IMUs) and high-fidelity manikin: An innovative curriculum approach (Submission #89). *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare* [Abstract] [Online]. 8(6):454, doi:10.1097/01.SIH.0000441454.12424.88

Lebel, K., Chenel, V., Boulay, J. & Boissy, P. 2018. Quantitative approach based on wearable inertial sensors to assess and identify motion and errors in techniques used during training of transfers of simulated c-spine-injured patients. *Journal of Healthcare Engineering* [Electronic], 67(5):1-9, doi:org/10.1155/2018/5190693

Lees, S.C. 2015. Assessing sick leave absenteeism among public sector workers: A case study of nurses at Groote Schuur Hospital:2012 and 2013. Unpublished master's thesis. Cape Town: University of the Western Cape [Online]. Available: http://hdl.handle.net/11394/4723 [2020, July 2].

Li, L., Deng, X., Zhang, H., Yang, H., Chen, J., Hou, X., Ning, N. & Li, J. 2019. A cross-sectional survey of low back pain in nurses working in orthopedic departments. *Workplace Health & Safety* [Online]. 67(5):218-230, doi:10.1177/2165079918807231

Liebenberg, M. 2018. Professional nurses' perceptions of their role as mentors for novice nurses in the operating room. Unpublished master's thesis. Stellenbosch: Stellenbosch University [Online]. Available: http://hdl.handle.net/10019.1/103729 [2022, July 6].

LoBiondo-Wood, G. & Haber, J. 2014. *Nursing research: Methods and critical appraisal for evidence-based practice*. 8th edition. Missouri: Mosby Elsevier.

LoBiondo-Wood, G. & Haber, J. 2018. *Nursing research: Methods and critical appraisal for evidence-based practice*. 9th edition. Missouri: Mosby Elsevier.

Mahlathi, P. & Dlamini, J. 2017. *From brain drain to brain gain: nursing and midwifery migration trends in the South African heath system* [Online]. http://www.who.int/workforcealliance/brain-drain-brain-gain/17-449_South_Africa_Case_Study_Nursing_and_Midwifery-2017-12-06.pdf [2022, February 2].

Mapcarta. [n.d.]. Tygerberg Hospital Map - Western Cape, South Africa [Online]. Available: http://mapcarta.com/W714034606 [2020, October 15].

Mbombi, M.O., Mothiba, T.M., Malema, R.N. & Malatji, M. 2018. The effects of absenteeism on nurses remaining on duty at a tertiary hospital of Limpopo province. *Curationis* [Electronic], 41(1):1-5, doi:org/10.4102/curationis.v41i1.1924

McCarthy, G., Cornally, N., O'Mahoney, C., White, G. & Weathers, E. 2013. Emergency nurses: procedures performed and competence in practice [Abstract] *International Emergency Nursing* [Electronic], 21(1):50-57, doi: 10.1016/j.ienj.2012.01.003.

McCombes, S. 2019. *Descriptive research / Definition, Types, Methods & Examples* [Online]. Available: http://www.scribbr.com/methodology/descriptive-research/ [2020, November 14].

McHugh, M.D., Aiken, L.H., Windsor, C., Douglas, C. & Yates, P. 2020. Case for hospital nurse-to-patient ratio legislation in Queensland, Australia, hospitals: an observational study [Abstract]. *British Medical Journal Open* [Electronic], 10(9):e036264, doi: 10.1136/bmjopen-2019-036264

McRae, J., Smith, C., Immanuel, A. & Beeke, S. 2020. The experiences of individuals with cervical spinal cord injury and their family during post-injury care in non-specialised and specialised units in UK. *BMC Health Services Research* [Electronic], 20(783):1-11, doi:org/10.1186/s12913-020-05659-8

Médecins du Monde. 2015. *The Kap Survey model – Knowledge attitude and practices* [Online]. Available: http://issuu.com/medecinsdumonde/docs/47-the-kap-survey-model- knowledge-a [2016, September 14].

Mittermayr, S. & Hunt, K. (rev.). 2018. Cervical collar (Rigid) application, manual head stabilization and log roll for actual and potential cervical spinal injury. *Regina Qu'Apelle Health Region. Health Services* [Online]. Available: http://www.rqhealth.ca/service-lines/clinical-quality-professional-practice/files/C.8.pdf [2022, September 2].

Mohamed, M.A.E., El-Tahry, S.I., Ibrahim, N.M. & Mostafa, H.M. 2022. Relationship between back pain with nursing activities and the use of body mechanics among nurses working in general hospitals. *Port Said Scientific Journal of Nursing* [Electronic], 9(1):119-144. Available: http://pssjn.journals.ekb.eg/article_231411_d4c94c8e72ecd1329c0335de129f909a.pdf [2022, October 5].

National Department of Health. 2011. *National core standards for health establishments in South Africa* [Online]. Available: http://static.pmg.org.za/docs/120215abridge_0.pdf [2022, July 20]

National Health Service Clinical Advisory Group on Trauma 2010. *Regional Networks for Major Trauma* [Online]. Available: http://www.uhs.nhs.uk/Media/SUHTInternet/Services/Emergencymedicine/Regionalnetworksformajortrauma.pdf [2018, January 13].

National Registry of Emergency Medical Technicians. 2022. *National Registry of EMT's resource document on spinal motion restriction/immobilization* [Online]. Available: http://www.nremt.org/News/National-Registry-of-EMT-s-Resource-Document-on-Sp [2022, July 19].

National Spinal Cord Injury Statistical Center (NSCISC). 2022. *Traumatic spinal cord injury facts and figures at a glance* [Online]. Available: file:///C:/Users/14894343/Desktop/STUDIES%202022/References/Epdidemiology/SCI%20NEW%20STATS/NEW%20STATS!!!!/SCI-Facts-Figs-2022-Eng-508%20(1).pdf [2022, November 7].

Navsaria, P.H., Nicol, A.J., Parry, C.D.H., Matzopoulos, R., Maqungo, S. & Gaudin, R. 2020. The effect of lockdown on intentional and nonintentional injury during the COVID-19 pandemic in Cape Town, South Africa: A preliminary report. *South African Medical Journal* [Electronic], 13183, doi:org/10.7196/SAMJ.2021v111i2.15318

O'Keeffe, M. 2016. Acuity-adjusted staffing: A proven strategy to optimize patient care. *American Nurse Today* [Electronic], 11(3): 28-34. Available: http://www.myamericannurse.com/wp-content/uploads/2016/04/ant3-Special-Report-ACUITY-222.pdf [2020, December 19].

Pallant, J. 2011. *SPSS Survival Manual: A step-by-step guide to data analysis using SPSS*. 4th edition. Australia: Allen & Unwin.

Pera, S. & van Tonder, S. (eds.). 2018. *Ethics in Healthcare*. 4th edition. Cape Town: Juta.

Pilusa S, Myezwa H, Potterton J. 2021. Environmental factors influencing the prevention of secondary health conditions among people with spinal cord injury, South Africa. *Public Library of Science (PLOS) ONE* [Electronic], 16(6):e0252280, doi:org/10.1371/journal.pone.0252280

Price, P.C., JhangianI, R.S. & Chiang, I.A. 2015. *Research methods in psychology*. 2nd edition. Canada: Pressbooks.com.

Rav-Marathe, K., Wan, T.T.H. & Marathe, S. 2016. A systematic review on the KAP-O framework for diabetes education and research. *Medical Research Archives* [Electronic], 4(1):1-21. Available: http://www.journals.ke-i.org [2020, May 30].

Republic of South Africa. 2012. *National Health Act 61 of 2003: Regulations relating to categories of hospitals.* Government Gazette no. 35101, 12 March [Online]. Available: http://www.gov.za/documents/national-health-act-regulations-categories-hospitals [2020, August 8].

Republic of South Africa. 2013. *Protection of Personal Information (POPIA) Act 4 of 2013* [Online]. Government Gazette no. 37067, 26 November. Available: http://www.gov.za/documents/protection-personal-information-act [2022 July 20].

Republic of South Africa. Department of Health. 2015. *Ethics in health research - Principles, processes and structures* [Online]. 2nd edition. Available: http://www.sun.ac.za/english/faculty/healthsciences/rdsd/Documents/Ethics/DoH%202015%20Ethics%20in%20Health%20Research%20-%20Principles,%20Processes%20and%20Structures%202nd%20Ed.pdf [2020, January 2].

Republic of South Africa, 2020. *Nursing Act 33 of 2005: Regulations regarding the scope of practice for nurses and midwives* [Online]. Available: http://www.gov.za/sites/default/files/gcis_document/202007/43496rg11144gon744.pdf [2021, January 16].

Reynolds, S.S., Murray, L.L., McLennon, S.M., Ebright, P.R., & Bakas, T. 2018. Implementation strategies to improve knowledge and adherence to spinal cord injury guidelines, *Rehabilitation Nursing Journal* [Electronic], 43(1):52-61, doi:10.1002/rnj.304

Ropper, A.E., Neal, M.T. & Theodore, N. 2015. Acute management of traumatic cervical spinal cord injury [Abstract]. *Practical Neurology* [Electronic], 15(4):266-272, doi:10.1136/practneurol-2015-001094

Santy-Tomlinson, J. & Clarke, S. 2014. *Chapter 1: An introduction to orthopaedic and trauma care* [Electronic], Available: http://clinicalgate.com/an-introduction-to-orthopaedic-and-trauma-care/#box1_2 [2021, October 19].

Santy-Tomlinson, J., Jester, R., McLiesh, P., Mackintosh-Franklin, C., Mori, C. & Brent, L. 2020. Orthopaedic nursing and the COVID19 pandemic: the first few months. *International Journal of Orthopaedic Trauma Nursing* [Electronic], 38:100794, doi:10.1016/j.ijotn.2020.100794

Schroeder, R. 2019. Feedback on questionnaire for proposal, E-mail to H. Vorster [Online]. 27 May. Available E-mail: ronel.schroeder@lifehealthcare.co.za.

Schroeder, R. 2020. Feedback on questionnaire for proposal, E-mail to H. Vorster [Online]. 21 July. Available E-mail: ronel.schroeder@lifehealthcare.co.za.

Sharma, S.K. & Rani, R. 2020. Nurse-to-patient ratio and nurse staffing norms for hospitals in India: A critical analysis of national benchmarks. *Journal of Family Medicine and Primary Care* [Electronic], 9(6):2631-2637, doi:10.4103/jfmpc.jfmpc_248_20

Sharwood, L.N., Dhaliwal, S., Ball, J., Burns, B., Flower, O., Joseph, A., Stanford, R. & Middleton, J. 2018. Emergency and acute care management of traumatic spinal cord injury: A survey of current practice among senior clinicians across Australia. *BMC Emergency Medicine* [Electronic], 18(57):1-8, doi:org/10.1186/s12873-018-0207-0

Slaar, A., Fockens, M.M., Wang, J., Maas, M., Wilson, D.J., Goslings, J.C., Schep, N.W. & Van Rijn. R.R. 2017. *Triage tools for detecting cervical spine injury in pediatric trauma patients (Review)* [Online] 1-48, doi:10.1002/14651858.CD011686.pub2

Smeltzer, S.C., Bare, B.G., Hinkle, J.L. & Cheever, K.H. 2008. *Brunner & Suddarth's: Textbook of medical surgical nursing*. 11th edition. Philadelphia: Lippincott Williams & Wilkins.

Sothmann, P. J., Stander, J.M., Kruger, N. & Dunn, R. 2015. Epidemiology of acute spinal cord injuries in the Groote Schuur Hospital Acute Spinal Cord Injury (GSH ASCI) Unit, Cape Town, South Africa, over the past 11 years. *South African Medical Journal* [Electronic], 105(10):835-839, doi:10.7196/SAMJnew.8072

Sothmann, P. J. 2015. Aetiology and impact of spinal *cord injuries (SCI),* in J.M. Stander (ed.)*. The ASCI Handbook.* 4th edition. Cape Town: ASCI Unit. 6-9.

Sothmann, P. J. 2015. Quality of life and SCI, in J.M. Stander (ed.). *The ASCI Handbook.* 4th edition. Cape Town: ASCI Unit. 134-136.

South African Nursing Council. 2006. *Nursing Act, 2005 Act no. 33 of 2005* [Online]. Available: http://www.sanc.co.za/wp-content/uploads/2020/06/Nursing-Act-2005.pdf [2022, May 13].

South African Nursing Council. 2020. *Competencies - Orthopaedic nurse specialist - South African. Under the provisions of the Nursing Act, 2005.* Pretoria: [Online]. Available: http://www.sanc.co.za/wp-content/uploads/2020/06/SANC-Competencies-Orthopaedic-Nurse-Specialist.pdf [2021, October 19].

South African Nursing Council. 2020. *Regulations regarding the scope of practice for nurses and midwives. Nursing Act 33 of 2005* [Online]. Available: http://www.gov.za/sites/default/files/gcis_document/202007/43496rg11144gon744.pdf [2020, August 2].

South African Nursing Council. 2021. *Regulations relating to the scope of practice of persons who are registered or enrolled under the Nursing Act, 1978* [Online]. Available: http://www.sanc.co.za/r-2598/ [2022, May 13].

Stander, J. M. 2015. Acute SCI: Trauma department and ICU, in J.M. Stander. (ed.). *The acute spinal cord injuries* h*andbook.* 4th edition. Western Cape Province: ASCI Unit. 18-21.

Stander, J. M. 2015. Acute SCI: Trauma department and ICU, in J.M. Stander. (ed.). *The acute spinal cord injuries* h*andbook.* 4th edition. Western Cape Province: ASCI Unit. 37-38.

Stander, J. M. 2015. Acute SCI: Trauma department and ICU, in J.M. Stander. (ed.). *The acute spinal cord injuries* h*andbook.* 4th edition. Western Cape Province: ASCI Unit. : 39-52.

Stander, J. M. 2015. Acute SCI: Trauma department and ICU, in J.M. Stander. (ed.). *The acute spinal cord injuries* h*andbook.* 4th edition. Western Cape Province: ASCI Unit. 120-133.

Stander, J. M. (ed.). 2015. *The ASCI handbook*. 4th edition. Western Cape Province: ASCI Unit.

Stander, J.M. 2017. Correspondence. 13 October, Cape Town.

Stanton, D., Hardcastle, T., Muhlbauer, D. & Van Zyl, D. 2017. Cervical collars and immobilisation: A South African best practice recommendation. *African Journal of Emergency Medicine* [Electronic], 7:4-8, doi: dx.doi.org/10.1016/j.afjem.2017.01.007

Stellenbosch University, Faculty of Medicine and Health Sciences. 2020a. *Health Research Ethical Communique 1: Ethical research conduct in the time of the Covid-19 outbreak* [Online]. Available: http://www.sun.ac.za/english/faculty/healthsciences/rdsd/Documents/Ethics/2020-06-12%20HREC%20FMHS%20COMMUNIQUE%201%20TIME%20OF%20COVID-19.pdf [2020, June 23].

Stellenbosch University. 2020b. *Position statement of the Health Research Ethics Committees of Stellenbosch University on ethical research conduct in the time of COVID-19 outbreak* [Online]. Available: http://www.sun.ac.za/healthresearchethics [2020, April 20].

Strydom, N. 2021. *Study confirms necessity for minimum nurse-to patient ratio* [Online]. Available: http://gildes.solidariteit.co.za/en/study-confirms-necessity-for-minimum-nurse-to-patient-ratio/ [2022, July 19].

Sydney Children's Hospital. 2019. *Log rolling patients in CICU with suspected/confirmed spinal cord injury – SCH* [Online]. Available: http://www.schn.health.nsw.gov.au/_policies/pdf/2015-1026.pdf [2022, August 6].

Tharu, N.S., Alam, M., Bajracharya, S. & Kabir, M.A. 2021. *Knowledge, attitude and practice among caregivers towards pressure ulcer in spinal cord injury at rehabilitation center in Bangladesh* [Online]. 1-15, doi:org/10.21203/rs.3.rs-225668/v1

Thomas-Davies, E.J.G. 2018. *Establishing safe nurse staffing levels: a qualitative study focused on nurses' perceptions of the Safer Nursing Care Tool in Spinal Cord Injury Centres* [Abstract]. [Online]. Available http://www.hollister.co.uk/-/media/files/pdfs-for-download/hollistereducationalevents/sciconference/2018australia/plenarypresentations/establishing-safe-nurse-staffing-levels-a-qualitative-study-focused-on-nurses--lizzie.ashx [2022, April 6].

Thumbikat, P., Marshall, R. & Moslavac, S. 2015. *The International Spinal Cord Society*, *Recommended knowledge and skills framework for spinal cord medicine: Version* [Online]. *4:1-13*. Available:

http://www.iscos.org.uk/uploads/sitefiles/Knowledge%20and%20Skills%20Framework/ISCoS_Framework_SCI_Medicine_Dec.pdf [2019, December 20].

Tiruneh, M.A., Ayele, B.T. & Beyene, K.G.M. 2019. Knowledge of, and attitudes toward, codes of ethics and associated factors among medical doctors in Addis Ababa, Ethiopia. *Dove Press Journal: Medicolegal and Bioethics* [Electronic], 9:1-10, doi:org/10.2147/MB.S200096

Todd, N.V., Skinner, D. & Wilson-MacDonald, J. 2015. Secondary neurological deterioration in traumatic spinal injury: Data from medicolegal cases. *The Bone and Joint Journal* [Electronic], 97-B (4):527-531, doi:org/10.1302/0301-620X.97B4.34328

Tze, N., Robinson, C. & Juneau, M.F. 2004. Back breaking business: The implementation of a spinal education program. *Journal of Trauma Nursing* [Electronic], 11(1):25-33, doi: http://doi.org/10.1097/00043860-200411010-00005

United Spinal Association Resource Centre. 2012. *United Spinal Association Factsheet: Educating nursing staff about SCI* [Online]. Available: http://askus-resource center:unitedspinal.org/index.php?pg=kb.page&id=662 [2018, April 13].

Uthaman, T., Chua, T.L. & Ang, S.Y. 2016. Older nurses: A literature review on challenges, factors in early retirement and workforce retention. *Proceedings of Singapore Healthcare* [Online], 25(1):50-55, doi: 10.1177/2010105815610138

Western Cape Government. 2013. *Groote Schuur* [Online]. Available: http://www.westerncape.gov.za/image/2013/January/groote-schuur-map.jpg [2022, November 12].

Western Cape Government. 2022c. *Classifications, schedules and codes / Western Cape*. [Online]. Available: http://www.westerncape.gov.za/dept/health/documents/public_info/W/19578?toc_page=4 [2023, January 30].

Western Cape Government. 2022b. *Groote Schuur Hospital* [Online]. Available: http://www.westerncape.gov.za/facility/groote-schuur-hospital-0 [2020, October 15].

Western Cape Government. 2021a. *New Somerset Hospital* [Online]. Available: http://www.westerncape.gov.za [2021, October 15].

Western Cape Government. 2022c. *New Somerset Hospital opens new upgraded psychiatric unit* [Online]. Available: http://www.westerncape.gov.za/new-somerset-hospital-opens-new-upgraded-psychiatric-unit [2021, August 23].

Western Cape Government. 2016a. *Tygerberg Hospital: Overview* [Online]. Available: http://www.westerncape.gov.za/your_gov/153 [2022, October 15].

Western Cape Government. 2016b. *Tygerberg Hospital* [Online]. [Available]. http://www.westerncape.gov.za/assets/departments/health/tygerberg_hospital_information_pamphlet_2016.pdf. [2021, November 18].

Western Cape Government. 2019b. *Tygerberg Hospital / Western Cape Government* [Online]. Available: http://westerncape.gov.za [2020, October 13].

Western Cape Government. 2020. *Tygerberg Hospital: Overview / Western Cape Government* [Online]. Available: http://www.westerncape.gov.za [2020, October 15].

World Health Organization. 2013. *International perspectives on spinal cord injury* [Online]. Available: http://www.who.int./disabilities/policies/spinal_cord_injury/en/ [2018, March 28].

# APPENDICES

## APPENDIX 1: DEVELOPMENT OF SELF-ADMINISTERED QUESTIONNAIRE

### Appendix 1A: Development of self-administered questionnaire: Communication with expert

-----Original Message-----
From: Humeri Vorster [redacted]
Sent: Monday, 20 July 2020 15:29
To: [redacted]>
Subject: Emailing: Expert [redacted] input 20Jul2020
Importance: Low

Hallo [redacted],

Baie dankie weerens vir jou bereidwilligheid om vir my as Ortopediese kundige na die "Questionnaire" te kyk. Indien jy die hele proposal nodig het laat weet my en dan e-pos ek dit vir jou.

Nogmaals dankie.

Lekker dag.

Humeri
Your message is ready to be sent with the following file or link attachments:

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.
"All views or opinions expressed in this electronic message and its attachments are the view of the sender and do not necessarily reflect the views and opinions of the Western Cape Government (the WCG). No employee of the WCG is entitled to conclude a binding contract on behalf of the WCG unless he/she is an accounting officer of the WCG, or his or her authorised representative.
The information contained in this message and its attachments may be confidential or privileged and is for the use of the named recipient only, except where the sender specifically states otherwise.
If you are not the intended recipient you may not copy or deliver this message to anyone."

**From:** [redacted]
**Sent:** Wednesday, July 22, 2020 7:36 AM
**To:** Humeri Vorster <Humeri.Vorster@westerncape.gov.za>
**Subject:** RE: Emailing: Expert [redacted] input 20Jul2020

Humeri,

Dit lyk vir my baie volledige en goed

Groete & word gou gesond

[redacted]

Tel: [redacted]
Fax: [redacted]
Mobile: [redacted]
Email: [redacted]
Website: [redacted]

## Appendix 1B: Development of self-administered questionnaire: Communication with expert

**From:** [redacted]
**Sent:** Tuesday, October 13, 2020 2:49 PM
**To:** Humeri Vorster [redacted]
**Subject:** RE: Requesting advice from expert regarding self-administered questionnaire

Afternoon Humeri

Sorry for the late reply.

Very interesting read, as mentioned in our discussion.

One of the problems we experience with lock rolling, is the lack of training.

Training within the unit are mostly done by myself with assistance of the two (2) Dr's and occasionally the physiotherapist.

Spinal cord injuries, not part of the nursing curriculum and interesting enough not much in curriculum of the medical students either.

Handling and stabilising the neck, remain a focus within the unit. (Rolling happens with weights in position)

So called rolling team been allocated daily, experience proof that staff do not avail themselves to participate out of their own.

Minimum amount of staff performing the action: 3(three), if increase BMI, a fourth person might be used.

Pressure care to be done strictly 3(three) hourly.

Transporting patient in traction, R/n or En to accompanied patient to secure weights, prevent swinging and make sure weights remain in position.

Kind regards

[redacted]

**From:** Humeri Vorster [redacted]

**Sent:** 09 Oct 2020 04:54 PM

**To:** [redacted]

**Cc:** Anthonie, R, Mev [redacted]

**Subject:** FW: Requesting advice from expert regarding self-administered questionnaire

Dear [redacted],

I trust that you are well. In order to ensure validity of my questionnaire before ethical application I would appreciate your input as was discussed telephonically on Saturday, 3 October 2020. Just a gentle reminder that I have to make possible changes to my questionnaire before I can submit my proposal today or tomorrow on the latest.

Please can you kindly provide me with the written feedback as part of your advice as an expert.

Your soonest response will be appreciated.

Kind regards.

Humeri

**From:** Humeri Vorster

**Sent:** Wednesday, September 30, 2020 10:47 AM

**To:** [redacted]

**Cc:** Anthonie, R, Mev [redacted]

**Subject:** RE: Requesting advice from expert regarding self-administered questionnaire

Good Morning[redacted]

Thank you, that is wonderful. I really appreciate your valuable input.

Kind regards.

Humeri

Humeri Vorster

Directorate: [redacted]

[redacted]

[redacted]

**From:** [redacted]
**Sent:** Wednesday, September 30, 2020 7:00 AM
**To:** Humeri Vorster [redacted]
**Subject:** RE: Requesting advice from expert regarding self-administered questionnaire

Morning Humeri

Yes, I did look at it and Dr busy with it and we will have a chat this morning after ward round and will discuss it.

Thank you

[redacted]

Tel: [redacted]
Email: [redacted]
Website: www.[redacted]

**From:** Humeri Vorster [redacted]
**Sent:** 29 Sep 2020 04:36 PM
**To:** [redacted]
**Subject:** RE: Requesting advice from expert regarding self-administered questionnaire
**Importance:** High

Dear Ms. [redacted]

I trust that you are well. Please can I confirm if you had the opportunity to have look at my questionnaire? Should you have any concerns, you are welcome to contact me on my cell phone at any time.

Your input as expert is greatly appreciated.

Kind regards.

Humeri

**From:** Humeri Vorster
**Sent:** Friday, September 25, 2020 12:48 PM
**To:** [redacted]
**Subject:** Requesting advice from expert regarding self-administered questionnaire
**Importance:** High

Dear Ms. [redacted]

I trust this e-mail finds you well. Thank you for agreeing to give me advice in regard to my study. Please find attached my draft proposal as telephonically discussed on 22 September 2020. The title of the study is '' The knowledge, attitude and practice (KAP) of nurses logrolling spinal cord injured patients".

I will appreciate if you will be so kind, as an expert in the field of spinal injuries, to give me advise specifically in regard to the questionnaire. Since I have developed my own questionnaire as no previous study of this nature was found, it was quite challenging to ensure that I actually do measure what I am supposed to, according to my title and objectives. The measurement of attitude especially posed to be challenging to measure.

I appreciate your valuable input. Should you have any questions, please feel free to contact me at any time. My cell number: [redacted]

Kind regards.

Mrs. H. Vorster

[redacted]

[redacted]

Work tel no: [redacted]



**From:** Humeri Vorster [redacted]

**Sent:** 29 Sep 2020 04:36 PM

**To:** [redacted]

**Subject:** RE: Requesting advice from expert regarding self-administered questionnaire

**Importance:** High

Dear [redacted]

I trust that you are well. Please can I confirm if you had the opportunity to have look at my questionnaire? Should you have any concerns, you are welcome to contact me on my cell phone at any time.

Your input as expert is greatly appreciated.

Kind regards.

Humeri

**From:** Humeri Vorster

**Sent:** Friday, September 25, 2020 12:48 PM

**To:** [redacted]

**Subject:** Requesting advice from expert regarding self-administered questionnaire

**Importance:** High

Dear [redacted],

I trust this e-mail finds you well. Thank you for agreeing to give me advice in regard to my study. Please find attached my draft proposal as telephonically discussed on 22 September 2020. The title of the study is '' The knowledge, attitude and practice (KAP) of nurses logrolling spinal cord injured patients".

I will appreciate if you will be so kind, as an expert in the field of spinal injuries, to give me advise specifically in regard to the questionnaire. Since I have developed my own questionnaire as no previous study of this nature was found, it was quite challenging to ensure that I actually do measure what I am supposed to, according to my title and objectives. The measurement of attitude especially posed to be challenging to measure.

I appreciate your valuable input. Should you have any questions, please feel free to contact me at any time. My cell number: [redacted]

Kind regards.

Mrs. H. Vorster

[redacted]

Work tel no: [redacted]



"All views or opinions expressed in this electronic message and its attachments are the view of the sender and do not necessarily reflect the views and opinions of the Western Cape Government (the WCG). No employee of the WCG is entitled to conclude a binding contract on behalf of the WCG unless he/she is an accounting officer of the WCG, or his or her authorised representative.
The information contained in this message and its attachments may be confidential or privileged and is for the use

of the named recipient only, except where the sender specifically states otherwise.
If you are not the intended recipient you may not copy or deliver this message to anyone."



**From:** Humeri Vorster [redacted]

**Sent:** 09 Oct 2020 04:54 PM

**To:** [redacted]

**Cc:** Anthonie, R, Mev [redacted]

**Subject:** FW: Requesting advice from expert regarding self-administered questionnaire

Dear [redacted]

I trust that you are well. In order to ensure validity of my questionnaire before ethical application I would appreciate your input as was discussed telephonically on Saturday, 3 October 2020. Just a gentle reminder that I have to make possible changes to my questionnaire before I can submit my proposal today or tomorrow on the latest.

Please can you kindly provide me with the written feedback as part of your advice as an expert.

Your soonest response will be appreciated.

Kind regards.

Humeri

**From:** Humeri Vorster

**Sent:** Wednesday, September 30, 2020 10:47 AM

**To:** [redacted]

**Cc:** Anthonie, R, Mev [redacted]

**Subject:** RE: Requesting advice from expert regarding self-administered questionnaire

Good morning [redacted],

Thank you, that is wonderful. I really appreciate your valuable input.

Kind regards.

Humeri

Humeri Vorster

[redacted]

Post-basic R212: Orthopaedic Lecturer

Department of Health

Western Cape Government

Tel: [redacted]

E-mail: Humeri.Vorster[redacted]

Website: www.[redacted]

**From:** [redacted]

**Sent:** Wednesday, September 30, 2020 7:00 AM

**To:** Humeri Vorster <Humeri.Vorster[redacted]

**Subject:** RE: Requesting advice from expert regarding self-administered questionnaire

Morning Humeri

Yes I did look at it and Dr busy with it and we will have a chat this morning after ward round and will discuss it.

Thank you

[redacted]

[redacted]

Tel: [redacted]
Email: [redacted]
Website: www[redacted]

# APPENDIX 2: ETHICAL APPROVAL FROM STELLENBOSCH UNIVERSITY

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

**Approval Notice**

**New Application**

11/11/2020

**Project ID** :18867

**HREC Reference No:** S20/10/267

**Project Title:** Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole

Dear Mrs Humeri Vorster

The **New Application** received on 12/10/2020 was reviewed and **approved** by members of **Health Research Ethics Committee** via **expedited** review procedures on 11/11/2020.

Please note the following information about your approved research protocol:

**Protocol Approval Date: 11 November 2020**

**Protocol Expiry Date: 10 November 2021**

Please remember to use your Project ID 18867 and Ethics Reference Number S20/10/267 on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

**After Ethical Review**

Translation of the informed consent document(s) to the language(s) applicable to your study participants should now be submitted to the HREC.

Please note you can submit your progress report through the online ethics application process, available at: Links Application Form Direct Link and the application should be submitted to the HREC before the year has expired. Please see *Forms and Instructions* on our HREC website (www.sun.ac.za/healthresearchethics) for guidance on how to submit a progress report.

The HREC will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Please note that for studies involving the use of questionnaires, the final copy should be uploaded on Infonetica.

**Provincial and City of Cape Town Approval**

Please note that for research at a primary or secondary healthcare facility, permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Please consult the Western Cape Government website for access to the online Health Research Approval Process, see: https://www.westerncape.gov.za/general-publication/health-research-approval-process. Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and instructions, please visit: Forms and Instructions on our HREC website https://applyethics.sun.ac.za/ProjectView/Index/18867

If you have any questions or need further assistance, please contact the HREC office at [redacted]

Yours sincerely,

[redacted]

HREC1

*National Health Research Ethics Council (NHREC) Registration Number:*

*REC-130408-012 (HREC1)•REC-230208-010 (HREC2)*

*Federal Wide Assurance Number: 00001372*
*Office of Human Research Protections (OHRP) Institutional Review Board (IRB) Number:*
*IRB0005240 (HREC1)•IRB0005239 (HREC2)*

*The Health Research Ethics Committee (HREC) complies with the SA National Health Act No. 61 of 2003 as it pertains to health research. The HREC abides by the ethical norms and principles for research, established by theWorld Medical Association (2013). Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects;the South African Department of Health (2006). Guidelines for Good Practice in the Conduct of Clinical Trials with Human Participants in South Africa (2nd edition); as well as the Department of Health (2015). Ethics in Health Research: Principles, Processes andStructures (2nd edition).*

*The Health Research Ethics Committee reviews research involving human subjects conducted or supported by the Department of Health and Human Services, or other federal departments or agencies that apply the Federal Policy for the Protection of Human Subjects to such research (United States Code of Federal Regulations Title 45 Part 46); and/or clinical investigations regulated by the Food and Drug Administration (FDA) of the Department of Health and Human Services.*

## APPENDIX 3: RISK MITIGATION PLAN - STANDARD OPERATING PROCEDURE DURING COVID-19 PANDEMIC

| | |
|---|---|
| Compiled By: | Investigator information session and data collection, by means of quantitative research, using a self-administered questionnaire.<br>Signature: ……..…….<br>Print Name: ……..…… |
| Date: | 2020/2021 |
| Research Title: | Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole |
| Target Group: | All nursing staff logrolling spinal cord injured patients in the different departments at two tertiary hospitals and one secondary hospital, in the Western Cape Metropole. |
| Selected recruitment sites: | • Hospital C - Pilot Test<br>• Hospital A - Main study<br>• Hospital B - Main study |
| Purpose: | • To describe the role of the investigator during information sessions and quantitative data collection (self-administered questionnaires), with regard to adherence of Infection Control Policy of Department of Health COVID-19 and Infection Control Policy during the state of national disaster.<br>• To ensure the protection of nursing staff (potential and recruited participants) involved in the research study against COVID-19, through risk mitigation strategies.<br>• Screening of nursing staff (potential and recruited participants) before information and data collection sessions, and the completion of a screening register.<br>• To ensure adherence to Infection Control Policy of the Department of Health in relation to personal protective equipment, hand washing, wearing of masks, cough etiquette, and social distancing.<br>• To outline the management of participants at the recruitment sites, who are suspected of presenting with COVID-19 symptoms, cases and contacts during information and data collection sessions.<br>• To ensure appropriate management and reporting if suspected participant(s) or investigator is presenting with COVID-19 symptoms at the recruitment sites.<br>• On completion of information and data collection sessions, the screening registers will be sent to the Occupational Health and Safety Department, or according to the specific Infection Control Policy per recruitment site.<br>• To ensure adherence of the number of people allowed in a venue at a time, depending of the capacity of a venue as per Level 1, lockdown regulations, as stipulated in the South African Government, Disaster Management Act:<br>o Regulations" Alert level 1 during Coronavirus COVID-19 lockdown, as per<br>o Gazette 43727, of 20 September 2020. |
| Application: | This standard operating procedure is applicable to the investigator, as well as potential and actual participants involved in the research study. |
| Applicable policies and guidelines: | • Department of Employment and Labour – Workplace preparedness: COVID-19.<br>• Department of Health - Guide to management of staff in healthcare and laboratory settings with COVID-19 illness and exposure (V9. 31 March 2020).<br>• NICD – DOH COVID-19: Guidelines for case-finding, diagnosis, |

| | |
|---|---|
| | management and public health response Version 2.0 (10 March 2020).<br>• NICD – Clinical management of suspected or confirmed COVID-19 disease Version 3.<br>• Stellenbosch University. 2020. Position Statement of the Health Research Ethics Committees of Stellenbosch University on Ethical Research Conduct in the time of COVID-19 outbreak.<br>• Stellenbosch University, Faculty of Medicine and Health Sciences. 2020. Health Research Ethical Communique 1: Research guidance in the time of COVID-19 outbreak. |
| Legal Framework: | • Disaster Management Act, 57 of 2002.<br>• Occupational Health and Safety Act, 85 of 1993: sections 8 and 14 of Hazardous Biological Agents Regulations.<br>• South African Government, Disaster Management Act: Regulations" Alert level 1 during Coronavirus COVID-19 lockdown, as per Gazette 43727, of 20 September 2020. |

| Procedure at the three recruitment sites: | Hospital C | Hospital A | Hospital B |
|---|---|---|---|
| Is a Standard Operating Procedure received from the research site? | No, using latest national COVID-19 policies on Government website. | Yes, find as attached. | No, using latest national COVID-19 policies on Government website. Using same as Hospital B. |
| Did the recruitment sites indicate when a research study of a quantitative nature, using a self-administered questionnaire will be allowed? | Difficult to say due to the concern of a possible second wave of the COVID-19 pandemic. | Difficult to say due to the concern of a possible second wave of the COVID-19 pandemic. | Difficult to say due to the concern of a possible second wave of the COVID-19 pandemic. |
| Occupational Health and Safety as well as Infection Protection Control team conduct workplace health risk assessment screening for COVID-19 at all recruitment sites. | Yes | Yes | Yes |
| At all recruitment sites at hospital entrances and exits, as well as testing areas, nursing staff are being screened and a screen register completed. | Yes | Yes | Yes |
| According to Occupational Health and Safety policy of the recruitment site. The latter will allow for risk identification and inform control measures according to the hierarchy of controls and referral processes. | Yes | Yes | Yes |
| The investigator will be responsible for doing information sessions and data collection at the recruitment sites. | Yes | Yes | Yes |
| The investigator will adhere to | Yes | Yes | Yes |

| | | | |
|---|---|---|---|
| all Department of Health Infection Control Policies, as well as those of the different recruitment sites.<br>The investigator will therefore:<br>be wearing a mask, wash/ spray hands with hand sanitizer upon entering and exiting the research site, as well as at the venues to be used for information and data collection sessions. | | | |
| The investigator will also be wearing an identification badge. | Yes | Yes | Yes |
| The investigator will be screened according to Department of Health's Infection Control policy at the entrance of the recruitment sites. This will be done during information and data collection sessions. | Yes | Yes | Yes |
| A screening register with the investigator's information will be completed upon entering the recruitment site. | Yes, at the entrance and exit of the hospital. | Yes, at the Nurse Manager: Surgical office. | Yes, to complete at [redacted] at Training Unit |
| The investigator will be required to report first upon entering of the research site, and if so, specify who to report to. | Yes, to [redacted] Training Unit. | Yes, and screened once again at the office of the Nurse Manager: Surgical unit, where the investigator will also be required to complete an attendance register as per Hospital A Policy. | Yes, to [redacted] at Training Unit. |
| The investigator will arrange in advance with the Operational Managers, a date and time convenient for all involved, to conduct information and data collection sessions. | Yes | Yes | Yes |
| The investigator will arrange in advance a venue for conducting information and data collection sessions, which will be away from patients. See contact person. | Yes, with [redacted] (Training Unit). | Yes, with [redacted] (Training Unit). | Yes, with [redacted] (Training Unit). |
| The number of potential and actual participants allowed in the venue, will not exceed 50% of the capacity of the venue as determined by the South African Government. | Yes | Yes | Yes |
| The venue will be cleaned in | Yes | Yes | Yes |

| | | | |
|---|---|---|---|
| advance by the housekeeping staff of the research site. | | | |
| The investigator will be responsible for the preparation of the venue in advance, to ensure that social distancing is adhered to. | Yes | Yes | Yes |
| The venue should have a basin with running water, soap, paper towels and hand sanitiser (Stellenbosch University, Faculty of Medicine and Health Sciences, 2020:3 & Stellenbosch University, 2020:3) to wash hands before and after completion of questionnaire, as well as colour coded bins, according to Infection Control Policy for disposal of PPE afterwards. | Yes | Yes | Yes |
| If the venue does not have basins with running water, the recruitment site should provide the availability of hand sanitiser. | Yes | Yes | Yes |
| The recruitment site will provide a thermometer and screening registers, available to the investigator prior to information and data collection sessions. | Yes | Yes | Yes |
| To ensure that potential and actual participants strictly adhere to Department of Health Infection Control policy, and those of the recruitment site during the research process i.e., Investigator will ensure all potential and actual participants wear personal protective equipment as supplied by the recruitment site i.e. a mask, adhere to cough etiquette, handwashing/ hand sanitising, and social distancing. | Yes | Yes | Yes |
| The investigator will screen all potential and actual participants, take their temperature, complete the information in the screening register, ensure social distancing, wearing of masks, and apply cough etiquette. | Yes | Yes | Yes |
| The screening registers of potential and actual participants afterwards will be given to the identified personal at recruitment sites. | The Occupational Health and Safety Programme Coordinator. | The Area Managers of the different units, who will then send it to the Human Resource | The Training Unit, at [redacted] office. |

| | | | |
|---|---|---|---|
| | | Department. | |
| The ”in the time of COVID-19 template register” comprising of personal information of potential and actual participants will be kept on the investigator’s personal computer that is password-protected (Stellenbosch University, Faculty of Medicine and Health Sciences, 2020:3 & Stellenbosch University, 2020:1-4).<br>Should a nursing staff member or investigator afterwards be identified with COVID-19 symptoms. The information will be available as per instructed policies. | Yes | Yes | Yes |
| All participants will receive a pen form the investigator on the day of data collection to prevent contamination from using their own pen. | Yes | Yes | Yes |
| Should the investigator suspect a participant is presenting with possible COVID-19 symptoms. The prescribed processes will be followed. | To inform [redacted], to arrange referral to Occupational Health and Safety Clinic. | The process includes a referral to Occupational Health and Safety Clinic by the manager, if a member screen positive as per screening register, who will advise if further testing is required. | To inform - Awaiting feedback from IPC/Occupational Health department |
| In-between sessions the investigator will be sanitising the venue. | Yes | Yes | Yes |
| After information and data collection sessions, the venue will be cleaned by the recruitment site staff, as pre-arranged with training unit staff. | Yes | Yes | Yes |
| Participants will place their informed consent form and completed self-administered questionnaire in separate clearly marked sealed boxes that will be placed in the venue. | Yes | Yes | Yes |
| Abbreviations: | COVID-19: Coronavirus Disease 2019<br>IPC: Effective infection prevention and control programmes<br>NICD: National Institute for Communicable Diseases | | |

## APPENDIX 4: COVID-19 SCREENING TOOL

| HOSPITAL | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Surname** | | | **First Name** | | | **Title** | | **Month** | | | **SCREENING TOOL** |
| **Category of Essential Worker** | | | | | | **Job Title** | | | | | |
| Date: DD/MM | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | |
| Temperature (no meds) | I | I | I | I | I | I | I | I | I | I | |
| Symptoms (Circle Y or N) | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | |
| Fever/Chills | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| Cough | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| Sore throat | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| Shortness of breath | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| Loss of smell OR loss of taste | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| | | | | | | | | | | | |
| Date: DD/MM | 11th | 12th | 13th | 14th | 15th | 16th | 17th | 18th | 19th | 20th | |
| Temperature (no meds) | I | I | I | I | I | I | I | I | I | I | |
| Symptoms (Circle Y or N) | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | |
| Fever/Chills | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| Cough | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| Sore throat | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Shortness of breath | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| Loss of smell OR loss of taste | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | |
| | | | | | | | | | | | |
| Date: DD/MM | 21st | 22nd | 23rd | 24th | 25th | 26th | 27th | 28th | 29th | 30th | 31st |
| Temperature (no meds) | I | I | I | I | I | I | I | I | I | I | I |
| Symptoms (Circle Y or N) | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** | **Daily** |
| Fever/Chills | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| Cough | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| Sore throat | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| Shortness of breath | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| Loss of smell OR loss of taste | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| | | | | | | | | | | | |
| Screened by: | Mrs. H. Vorster | | | | | | | Date: | | | |

# APPENDIX 5: ETHICAL APPROVAL FROM NATIONAL HEALTH RESEARCH DEPARTMENT

Western Cape Government
Health

[redacted]

REFERENCE: WC_202011_026
[redacted]

[redacted]

For attention: Mrs Humeri Vorster

**Re: Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the** [redacted]

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.
Please contact the following people to assist you with any further enquiries in accessing the following

[redacted]

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
3. In the event where the research project goes beyond the *estimated completion* date which was submitted, researchers are expected to complete and submit a progress report (**Annexure 8**) to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
4. The reference number above should be quoted in all future correspondence.

[redacted]

## APPENDIX 6: PERMISSION FROM HOSPITAL C

### Appendix 6.1: Letter requesting permission to perform pilot test at Hospital C

[redacted]

16 November 2020

[redacted]

For attention: [redacted]

REQUESTING PERMISSION TO CONDUCT RESEARCH AT [redacted]

Dear Dr[redacted]/ Dr. [redacted]

**Re: Proposed research study: "Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole".**

I am Humeri Vorster, a student doing my Master's in Nursing at the Stellenbosch University. My research study has been approved by the Health Research and Ethical Committee (HREC) of Stellenbosch University: Project ID 18867 and Ethics Reference Number S20/10/267. I have also registered my study with the National Health Research Department on the 14th November 2020 and are awaiting feedback. The research I wish to conduct, involves a quantitative study, by means of a self-administered questionnaire.

I have identified [redacted] Hospital as a recruitment site, to conduct my pilot test (in the [redacted]), and am hereby kindly requesting permission to use your esteemed institution as recruitment site.

Should you consider my request, I will briefly meet with the nursing staff, at a convenient time, in the relevant units where spinal cord injured patients are being logrolled to explain the purpose of the study and answer possible questions, via [redacted], Operational Managers and [redacted]. Once permission is granted, a suitable venue will be requested separate from patients for the information session and data collection. Given the Covid-19 pandemic, I will ensure adherence to the Department of Health's Infection Control policies, as well as the Infection Control Policy of your institution, during information and data collection sessions. During the information session and data collection, I will ensure adherence to cough etiquette, and either handwashing (if a venue with a basin with running water is available) and/ or spraying of a hand sanitizer, wearing of a mask and social distancing according to Level 1, Lockdown guidelines. I will do the relevant screening of potential participants and record the findings in the institutions screening register. After completion of the information and data collection sessions, the screening register will be handed to the relevant parties at your institution, as confirmed in advance. Should I or a participant be identified Covid-19 positive after the information sessions or data collection, the investigator will inform the applicable recruitment site to ensure adherence of the hospital Covid-19 policies.

Please find included, a copy of the HREC approval letter, a synopsis of my study, as well as the participant information and consent form.

I would be grateful if you could view my request favorably. Should you require any further information, please do not hesitate to contact me or my supervisor, as indicated below.

Thanking you in anticipation.

Sincerely,

[redacted]

Mrs. H. Vorster

Tel. no. (Work): [redacted]

Cell no: [redacted]

E-mail: [redacted]

Or:

Supervisor

Mrs. R. Anthonie

[redacted]

E-mail: [redacted]

## Appendix 6.2: Approval obtained from Hospital C

Western Cape Government
Health

[redacted]

Dear Ms Vorster

RE: Your study: 'Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in Tertiary Hospitals in Western Cape Metropole.

Permission has been granted to conduct this research at [redacted]. We are not a tertiary hospital, but a Regional Hospital and I have explained this in e mails to you. However, you have spoken with staff who say we do have exposure to cases pre transfer to Tertiary for definitive treatment at that level.

All the best with your study.

Kind regards

[redacted]

Date: 09.03.2021

[redacted]

## APPENDIX 7: REPORT OF PILOT TEST RESULTS

Date for completion of: Information sessions:

- 1st Group session was on 10 March 2021 at 10h30
- 2nd Group session was on 11 March 2021 at 11h30.
- Time was given for to both groups to ask questions to ensure informed voluntarily permission was obtained.

Data collection:

- The 1st and 2nd group took place on 11 March 2021, as the second group requested to complete their questionnaires directly after their information session. Commencement of completion of data collection of the second session was confirmed with Mrs. R. Anthonie before was commenced. The average time it took for participants to complete the questionnaire were approximately 20 – 30 minutes.

A challenge that was experienced, was the fact that forty staff members per hour were taken to receive COVID-19 vaccinations at [redacted] hospital.

Seven female participants were partaking in the data collection, of which five were registered professional nurses, one an enrolled nurse and one an auxiliary nurse. Unfortunately, of the seven questionnaires only three were fully completed (mean of 42.85%), two of which were registered nurses (28.57%), one an enrolled nurse (14.28%) and one an auxiliary (14.28%). Units that partook was trauma- and emergency, critical care and the orthopaedic ward.

The average age of participants was 38.6%, the average years' experience as qualified nurses were 13 years, as registered nurses 14 years and the enrolled nurse had 9 years' experience. The average years of experience in their particular units were 8.66 years.

Of the uncompleted questionnaires, two participants left question five (5) incomplete and one participant left question 31 incomplete. A possible explanation might be that question five was too close to section B, and therefore could have been missed. Section B should be moved further down to indicate a clear separation. Question 31, in the researcher's opinion was randomly missed. In addition, one participant only ticked training was received in the section part of the answer to question 44, where the name of the training course they have received training in logrolling was supposed to be indicated. Unfortunately, the training course that the participant attended for logrolling was illegible and were therefore excluded.

The data collected for the three participants were as follows:

***SECTION B: KNOWLEDGE: The following questions concerns your knowledge in regard to spinal cord injuries and care of spinal injured patients.***
**Indicate your level of agreement with the following statements regarding spinal cord injuries aetiology, mechanism of injury, pathophysiology and logrolling.**

| ***Please indicate your answer by using a X:*** | 1. Strongly disagree | 2. Disagree | 3. Agree | 4. Strongly agree |
|---|---|---|---|---|
| 6. Spinal cord injuries can be sustained due to motor vehicle accidents, pedestrian vehicle accidents, violence, falling from a height, diving or sport injuries | 1. | 2. | 3. | 4. Three |

| | | | | |
|---|---|---|---|---|
| 7. A spinal cord injury leads to the disruption of sensory, motor (movement) and autonomic functions below the level of injury to the spinal cord. | 1. | 2. | 3. One | 4. Two |
| 8. A spinal cord injury affects the spinal cords' ability to send and receive messages to, and from the brain. | 1. | 2. | 3. | 4. Three |
| 9. All patients' that have sustained trauma to their head or spine, and are conscious or unconscious should be treated as if they have a possible spinal cord injury until proven otherwise. | 1. | 2. | 3. | 4. Three |
| 10. Severity of a spinal cord injury disability depends on the level that the spinal cord injury is damaged. | 1. | 2. | 3. | 4. Three |
| 11. All patients with a suspected spinal cord injury should be logrolled, irrespective whether they have a complete or incomplete spinal cord injury. | 1. | 2. | 3. One | 4. Two |
| 12. A final diagnosis, of a complete or incomplete spinal cord injury can only be made in the absence of spinal shock. | 1. | 2. One | 3. Two | 4. |
| 13. A secondary injury can be caused if an incorrect spinal immobilisation technique is applied. | 1. | 2. One | 3. One | 4. One |

| Indicate your level of agreement with the following statements about logrolling a person with a spinal cord injury. Indicate your answer by using an X: | 1. Strongly disagree | 2. Disagree | 3. Agree | 4. Strongly agree |
|---|---|---|---|---|
| 14. Any nurse, (irrespective of registration nurse) can stabilise the head and cervical spine and act as team leader. | 1. | 2. One | 3. Two | 4. |
| 15. Any nurse, (irrespective of registration nurse) should be positioned at the patients' head and cervical spine, and two nurses on each side nurse at each side of the patients' upper trunk/ body. | 1. | 2. Two | 3. One | 4. |
| 16. A fourth team member should always assist with the repositioning of a patient by supporting the patient's back. | 1. | 2. One | 3. One | 4. One |
| 17. There are times where more than four nurses' are required to perform a safe logroll. | 1. | 2. | 3. One | 4. Two |

***SECTION C:** ATTITUDE OF NURSING STAFF: Please indicate your level of agreement with the following statements about logrolling patients with spinal cord injuries.*

| Indicate your answer by using a X: | 1. Strongly disagree | 2. Disagree | 3. Agree | 4. Strongly agree |
|---|---|---|---|---|
| 18. I am always willing to assist when a patient needs to be logrolled. | 1. | 2. | 3. Two | 4. One |
| 19. The last time I had to logroll a spinal cord injured patient, I felt confident. | 1. | 2. | 3. One | 4. Two |
| 20. I am concerned about sustaining a back injury when performing the logrolling technique. | 1. | 2. One | 3. | 4. Two |
| 21. I did not want to assist with logrolling, as I did not feel confident to perform a safe logroll. | 1. One | 2. Two | 3. | 4. |
| 22. In my opinion all nurses should be trained in logrolling. | 1. | 2. | 3. One | 4. Two |
| 23. Do you think it is important to explain to a spinal injured patient what to expect and do during logrolling. | 1. | 2. | 3. | 4. Three |
| 24. There are consequences for the patient, nursing staff and hospital if a spinal cord injured patient is logrolled incorrectly. | 1. | 2. | 3. | 4. Three |
| 25. I always have a positive attitude when working with spinal cord injured patients. | 1. | 2. | 3. One | 4. Two |
| 26. It is important to have good communication amongst team members and spinal cord injured patients while doing logrolling. | 1. | 2. | 3. One | 4. Two |

***SECTION D: PRACTICE: Please reflect on the last three times you were involved in the logrolling of a spinal cord injured patient. And indicate your answer by using a X.***

| | Never | Seldom | Often | Always |
|---|---|---|---|---|
| 27. The registered nurse took the lead as the team leader during logrolling a spinal injured patient, to stabilise/ align the head and cervical spine. | 1. | 2. One | 3. | 4. Two |
| 28. The registered nurse took the lead as the team leader and make sure that the patient is turned on the count of three. | 1. | 2. One | 3. | 4. Two |
| 29. At times an enrolled nurse or auxiliary nurse acted as the team leader due to staff shortages. | 1. | 2. One | 3. One | 4. One |
| 30. The team leaders appeared confident during logrolling, when stabilising the patients' head and cervical spine. | 1. | 2. | 3. One | 4. Two |
| 31. The team performs the logroll in the same way | 1. | 2. | 3. One | 4. Two |

| | | | | |
|---|---|---|---|---|
| for every patient. | | | | |
| 32. There were at least four nurses involved in the logroll. | 1. | 2. One | 3. One | 4. One |
| 33. A registered nurse was positioned at the patients' head and cervical spine, and one nurse at each side of the patients' upper trunk. | 1. | 2. One | 3. | 4. Two |
| 34. A registered nurse aligned the head and cervical spine, and two nurses were on each side of the trunk/ body of a patient during logrolling. | 1. | 2. | 3. One | 4. Two |
| 35. Depending on the patients' weight, length or type of injury/injuries, a fifth team member may be required to assist with logrolling the patient. | 1. | 2. | 3. Two | 4. One |
| 36. I have taught other people on the team how to logroll patients with spinal cord injuries. | 1. | 2. Two | 3. | 4. One |
| 37. There was good communication between the team leader, the rest of the team members and patients' during logrolling to ensure effective logrolling. | 1. | 2. | 3. One | 4. Two |
| 38. During logrolling the patient was educated regarding the procedure. | 1. | 2. | 3. One | 4. Two |

***SECTION E: MANAGEMENT STRATEGIES:** Please indicate your level of agreement with the following statements about the availability of management strategies when logrolling patients with spinal cord injuries. And indicate your answer by using an X:*

| | Yes | No | Unsure |
|---|---|---|---|
| 39.There is a logroll (immobilisation) guideline / standard operating procedure available in my unit. | 1. | 2. Two | 3. One |
| 40. We have sufficient nursing staff on-duty to logroll spinal injured patients. | 1. One | 2. Two | 3. |
| 41. Have you sustained a back injury due to shortage of staff when logrolling spinal injured patients. | 1. | 2. Two | 3. One |
| 42. I have received training to prevent injuries to myself when logrolling patients. | 1. | 2. Three | 3. |
| 43. I have received training how to perform the logrolling technique. If yes, indicate the name of the training course: _____ | 1. | 2. Three | 3. |

| | | | | |
|---|---|---|---|---|
| 44. How long ago was the training? | 1. Within the past 6 months | 6 – 12 months ago | 1 – 2 years ago | 4. More than 2 years ago |

In addition to the questionnaire, the researcher requested the participants to complete a feedback form which consisted of seven questions. The questions included were the following:

1. If the amount of questions covered all aspects relevant to the study, and if no, make a recommendation.
   Yes, was answered by all three participants, and one participant added almost all content and aspects relevant to study were covered but did not make any recommendations.
2. If the time allocated (20 – 30 minutes) were adequate to complete the questions, and if no, to make a recommendation.
   Two participants indicated yes, and one recommended up to 45 minutes is required to complete the questionnaire.
3. If the questions were clear, understandable, and easy to answer, and if no to make recommendations.
   All three indicated yes, and one participant added that it therefore made it easier to answer the questions.
4. If the language used was clear and understandable?
   All three indicated yes, and one participant motivated it was because English is the medium of communication.
5. Any recommendations for additional questions the participants thought to be added which is relevant to the study, and if yes to make recommendations.
   One participant indicated no, one requested to “add signs and symptoms of a head injury to prevent early and unnecessary damage to patient”, which in the researcher’s opinion is not relevant. The third participant indicated yes, requesting questions to be added should include “how did the patient feel or react after logrolling, and was the patient asked or did he/she verbalised being comfortable after being logrolled”. In the researcher’s opinion, this is not relevant to the study.
6. If there were questions duplicated, and if yes, to make recommendations.
   Two participants indicated no, and the third participant indicated that question 14 (Any nurse (irrespective of registration nurse) can stabilize the head and cervical spine and act as team leader and question 15 (any nurse (irrespective of registration nurse) should be positioned at the patients’ head and cervical spine, and two nurses on each side nurse at each side of the patients’ upper trunk/body, are “quite similar but that the one is about stabilizing while the other is about positioning, but the content is the same”. In the researcher opinion, the questions are valid, however suggested to change the wording of the content in brackets to “irrespective of the category of nurse”.
7. Participants were requested to add any other recommendations, should they wish to.
   One participant indicated more questions should be included regarding training of nursing students and standard operating procedures. The same participant also indicated that she gained experience regarding logrolling by working in the trauma and emergency unit (casualty) and by “doing what doctors and paramedics told her to do”. Another participant indicated that she wished the course can be presented at least 3 x times a year, to ensure all nurses “is aware of what to do with a spinal injured patient” (?ASCI course). The last participant recommended that the outcome of the study should be “shared with relevant hospitals or units working with SCI patients, and a logrolling guideline should be made available to orthopaedic units”.

## APPENDIX 8: PERMISSION FROM HOSPITAL B

### Appendix 8.1 Letter requesting permission to perform research at Hospital B

[redacted]

16 November 2020

Dr. [redacted]

[redacted]

For attention: Dr. [redacted]

REQUESTING PERMISSION TO CONDUCT RESEARCH AT [redacted] HOSPITAL

Dear Dr. [redacted],

**Re: Proposed research study: "Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole".**

I am Humeri Vorster, a student doing my Master's in Nursing at the Stellenbosch University. My research study has been approved by the Health Research and Ethical Committee (HREC) of Stellenbosch University: Project ID 18867 and Ethics Reference Number S20/10/267. I have also registered my study with the National Health Research Department on the 14th November 2020. The research I wish to conduct, involves a quantitative study, by means of a self-administered questionnaire.

I have identified [redacted] as a recruitment site and am hereby kindly requesting permission to use your esteemed institution as recruitment site. The units I would like to include for this purpose includes: [redacted].

I hereby kindly request permission to use your institution for this purpose. Should you consider my request, I will arrange a meeting with the nursing staff in the relevant orthopaedic units where spinal cord injured patients are being logrolled, to explain the purpose of the study and answer possible questions, via [redacted], Departmental Heads, Operational Managers and [redacted]. Once permission is granted, a suitable venue will be requested separate from patients, to meet with the potential participants. Given the Covid-19 pandemic, I will ensure adherence to the Department of Health's Infection Control policies, as well as the Infection Control Policy of your institution, during information and data collection sessions. During the information session and data collection, I will ensure adherence to cough etiquette, and either handwashing (if a venue with a basin with running water is available) and/ or spraying of a hand sanitizer, wearing of a mask and social distancing according to Level 1, Lockdown guidelines. I will do the relevant screening of potential participants and record the findings in the institutions screening register. After completion of the information and data collection sessions, the screening register will be handed to the relevant parties at your institution, as confirmed in advance. Should I or a participant be identified Covid-19 positive after the information sessions or data collection, the investigator will inform the applicable recruitment site to ensure adherence of the hospital Covid-19 policies.

Please find included, a copy of the HREC approval letter, a synopsis of my study, as well as the participant information and consent form.

I would be grateful if you could view my request favorably. Should you require any further information, please do not hesitate to contact me or my supervisor, as indicated below.

Thanking you in anticipation.

Sincerely,

Mrs. H. Vorster

Tel. no. (Work): [redacted]

Cell no: [redacted]

E-mail: [redacted]

Or:

Supervisor

Mrs. R. Anthonie

[redacted]

E-mail: [redacted]

## Appendix 8.2: Approval obtained from Hospital B

Western Cape Government
Health

[redacted]

Project ID: 18867

Ethics Reference: S20/10/267

**TITLE:** **Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole.**

Dear Mrs Humeri Vorster

**PERMISSION TO CONDUCT YOUR RESEARCH AT** [redacted]

1. In accordance with the Provincial Research Policy and [redacted] No 40/2009, permission is hereby granted for you to conduct the above-mentioned research here at [redacted]
2. Researchers, in accessing Provincial health facilities, are expressing consent to provide the Department with an electronic copy of the final feedback within six months of completion of research. This can be submitted to the Provincial Research Co-Ordinator (Health.Research@westerncape.gov.za).

[redacted]

**Date:** 11/12/2020

[redacted]

## APPENDIX 9: PERMISSION FROM HOSPITAL A

### Appendix 9.1: Letter requesting permission to perform research at Hospital A

Dear [redacted],

**Re: Proposed research study: "Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole".**

I am Humeri Vorster, a student doing my Master's in Nursing at the Stellenbosch University. My research study has been approved by the Health Research and Ethical Committee (HREC) of Stellenbosch University: Project ID 18867 and Ethics Reference Number S20/10/267. I have also registered my study with the National Health Research Department on the 14th November 2020. The research I wish to conduct, involves a quantitative study, by means of a self-administered questionnaire.

I have identified [redacted] Hospital as a recruitment site and am hereby kindly requesting permission to use your esteemed institution as recruitment site. The units I have identified tentatively, due to the Covid-19 pandemic, for this purpose includes: [redacted]. I hereby kindly request permission to use your institution for this purpose. Should you consider my request, I will arrange a meeting, at a convenient time with the nursing staff in the relevant orthopaedic units where spinal cord injured patients are being logrolled, to explain the purpose of the study and answer possible questions, via [redacted], Departmental Heads and Operational Managers. Once permission is granted, a venue will be requested separate from patients for the information session and data collection. Given the Covid-19 pandemic, I will ensure adherence to the Department of Health's Infection Control policies, as well as the Infection Control Policy of your institution, during information and data collection sessions. During the information session and data collection, I will ensure adherence to cough etiquette, and either handwashing (if a venue with a basin with running water is available) and/ or spraying of a hand sanitizer, wearing of a mask and social distancing according to Level 1, Lockdown guidelines. I will do the relevant screening of potential participants and record the findings in the institutions screening register. After completion of the information and data collection sessions, the screening register will be handed to the relevant parties at your institution, as confirmed in advance. Should I or a participant be identified Covid-19 positive after the information sessions or data collection, the investigator will inform the applicable recruitment site to ensure adherence of the hospital Covid-19 policies.

Please find included a copy of the HREC approval letter, a synopsis of my study, as well as the participant information and consent form.

I would be grateful if you could view my request favorably. Should you require any further information, please do not hesitate to contact me or my supervisor, as indicated below.

Thanking you in anticipation.

Sincerely,

Mrs. H. Vorster

Tel. no. (Work): [redacted]

Cell no: [redacted]

E-mail: [redacted]

Or:

Supervisor

Mrs. R. Anthonie

Cell no: [redacted]

E-mail: [redacted]

## Appendix 9.2: Hospital A: Proposal summary

| ANNEXURE 2 PROPOSAL SUMMARY | |
|---|---|
| Name of Institution/ organisation conducting research | Stellenbosch University |
| Name of Investigators | Humeri Vorster |
| Postal Address | [redacted] |
| Telephone Number | [redacted] |
| Fax number | [redacted] |
| Mobile Number | [redacted] |
| Email Address | [redacted] |
| Institution which gave ethical approval | Health Research Ethical Council Stellenbosch University |
| Date of Ethical approval | 11/11/2020 |
| Date research expected to commence | Awaiting approval from NHRD to conduct pilot test at [redacted] – applied on 14/11/2020 - ?December 2020 /January 2021 |
| Proposed data collection dates at requested facilities | ?December 2020 /?January 2021 depending on approval from NHRD |
| Date research expected to end | January 2021 |
| Date research reports should be expected | July 2021 |
| Western Cape Districts where research will be done: **(Please mark with an X )** | [redacted]<br>**Westcoast**<br>Cape Winelands<br>**Overberg**<br>**Central Karoo**<br>**Eden** |
| WC DOH Facilities where research will be done: **(Please list the name of the facility under appropriate category)** | [redacted]<br>**District Hospitals:** [redacted]<br>**Community Health Centres:**<br>**Clinics:** |

| ANNEXURE 2 PROPOSAL SUMMARY | |
|---|---|
| Other facilities in the WC DOH where research will be done (Please specify) | **Psychiatric Hospitals:**<br><br>**TB Hospitals**<br><br>**Other:**<br><br>**Databases:** |
| Research title | Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole. |
| Research aim | To investigate nurses' knowledge, attitude and practice of logrolling SCI patients' in tertiary hospitals in the Western Cape Metropole. |
| Research objectives | • Determine the knowledge of nurses towards SCI patients and the logrolling of SCI patients.<br>• Determine the attitudes of nurses towards SCI patients and the logrolling of SCI patients.<br>• Determine the practices of nurses when logrolling SCI patients.<br>• Determine management strategies related/influencing to logrolling of SCI patients.<br>• Identify factors associated with nurses' logrolling knowledge, attitude and practice. |
| Key Words | Nurses' knowledge, attitude, practice, logrolling spinal cord injured patients, spinal cord injuries |
| Brief description of methodology<br>**(Please specify estimated sample size and duration of contact with each participant e.g. interview length, clinical exams)** | A non-experimental, descriptive design with a quantitative approach will be employed. All nursing categories caring for spinal cord injured patients. Pilot test: 20 (at [redacted]). Simple random sampling will be utilised. Total sample: Main study - 205 [redacted] Hospital and 115 ([redacted] Hospital). Completion of questionnaire: approximately 20 – 30 minutes. |
| Type of Study Design: e.g. Case Control, RCT, Survey | Self-administered questionnaires in English. |

| ANNEXURE 2 PROPOSAL SUMMARY | | |
|---|---|---|
| Budget for research | R 34 884.50 | |
| Source of funding for the research | Self | |
| The research will have implications for the requested facilities regarding: | **Yes or NO** | **If Yes what are these implications and how does your project plan to mitigate the impact** |
| **1. Additional load on nursing** | No | To arrange with Operational Managers for convenient date, time and venue, to ensure no interference of services. |
| **2. Support services** | No | |
| **3. Consumables** | Yes | Masks and hand sanitizer |
| **4. Laboratory tests** | No | |
| **5. Equipment** | Yes | Thermometer |
| **6. Space** | Yes | Venue to conduct information sessions and data collection |
| **7. Communications** | Yes | With Head of Nursing, Area Managers, Operational Managers and Orthopaedic Mentor |
| **8. Additional OPD visits** | No | |
| **9. Admission of patients** | No | |
| How will the sites be prepared to participate in your research? | Venue will be requested separate from patients for the information session and data collection Venue will be prepared by researcher pre- and post-information and data collection sessions. Cleaning services of institution to clean venue afterwards. Ensure adherence to the Department of Health's Infection Control policies, and Infection Control Policy of institution, during information and data collection sessions. Ensure adherence to cough etiquette, and either handwashing (if a venue with a basin with running water is available) and/ or spraying of a hand sanitizer, wearing of a mask and social distancing of 1.5 m. Screening of potential participants/ actual/ participants and record the findings in the institutions screening register. After completion | |

| ANNEXURE 2 PROPOSAL SUMMARY | |
|---|---|
| | of the information and data collection sessions, screening register will be handed to the relevant parties at institution, as confirmed in advance. Should researcher or a participant be identified Covid-19 positive after information sessions or data collection, the investigator will inform the recruitment site to ensure adherence of the hospital Covid-19 policies. |
| Results dissemination plan<br>**1. Tick which groups will be affected by your research findings** | Provincial managers ☐<br>District Directors ☐ **X**<br>Facility manager and staff ☐ **X**<br>Patients ☐<br>Community ☐<br>Other<br>(please specify) _____ |
| 2. What is the earliest date or period from the end of research collection that the feedback (at least the minimum requirements*) will be expected?<br>*** Minimum research findings feedback template** | Within one month ☐<br>Within one to three months ☐<br>Within three to six months ☐ **X**<br>Longer than six months ☐ |

## Appendix 9.3: Hospital A: Memorandum of understanding

# MEMORANDUM OF UNDERSTANDING

Entered into by and between

**Researcher Mrs Humeri Vorster**

Master's student of the University of Stellenbosch

and

[redacted] **Hospital Management**

Western Cape

This Agreement sets out the areas of collaboration between the Researcher and [redacted] Hospital management, clarifies respective roles and responsibilities and outlines the mechanisms in place to ensure the Researcher meet the objective of the research project.

**PARTICIPATING IN A RESEARCH PROJECT ON LOGROLLING PATIENTS WITH A SPINAL CORD INJURY**

| **TITLE OF RESEARCH PROJECT:** | |
|---|---|
| Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole. | |
| **DETAILS OF PRINCIPAL INVESTIGATOR (PI):** | |
| Mrs. Humeri, Vorster | Ethics reference number: S20/10/267 |
| Full postal address: [redacted] | PI Contact number: (W) [redacted] Cell no.: [redacted] |

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University, HREC Reference No: S20/10/267.** The study will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, the South African Guidelines for Good Clinical Practice (2006), the Medical Research Council (MRC), Ethical Guidelines for Research (2002), and the Department of Health Ethics in Health Research: Principles, Processes and Studies (2015).

**1. Research study**

1.1. The project:

1.1.1. The project aims to investigate nurses' knowledge, attitude and practice of logrolling spinal cord injured patients' in tertiary hospitals in the Western Cape Metropole.

1.1.2. Determine the knowledge of nurses towards SCI patients and the logrolling of SCI patients.

1.1.3. Determine the attitudes of nurses towards SCI patients and the logrolling of SCI patients.

1.1.4. Determine the practices of nurses when logrolling SCI patients.

1.1.5. Determine management strategies related/influencing to logrolling of SCI patients.

1.1.6. Identify factors associated with nurses' logrolling knowledge, attitude and practice.

1.2. Participating hospitals:

1.2.1. The main study is to be conducted at two tertiary hospitals in the Western Cape Metropole, namely [redacted] hospital and [redacted] hospital.

1.2.2. The number of participants to be recruited at [redacted] hospital will be 205, at [redacted] 115 participants and the number of participants altogether will be 320.

**2. Benefit from taking part in this research**

*2.1.* Findings may assist policy makers and healthcare providers to design interventions to ensure consistent logrolling, logrolling SOPs, and standard training programmes.

*2.2.* There will be no personal benefits from the research study, but the investigator hope that the results of the research may assist in future to improve nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole.

2.3. On completion of the research project, any recommendations/findings that can be beneficial to use to take further action that may inform redevelopment of future policy / review guidelines will be forwarded to the HOD and Nurse Manager. A copy of the publication or report will be submitted to GSH on completion of the research.

**3. Acknowledgement of GSH for participating in the research study**

3.1. Feedback will be given to the nursing staff.

3.2. If an article/s is published, acknowledgement will be given to Groote Schuur Hospital's nursing staff.

**4. Requirements to conduct study**

4.1. Venue for staff to complete questionnaires

4.2. Researcher will arrange with Operational Managers for convenient date, time and venue, to ensure no interference of services.

4.3. The research will not interfere with normal patient care.

4.4. Hospital staff will not be asked to assist with the research.

4.5. No patient folders will be needed for this study.

4.6. The research assistant/field worker will have a copy of approval from [redacted] as verification.
4.7. Participation is entirely voluntary, and staff are free to decline to participate.
4.8. Even if staff agree to take part initially, they are free to withdraw from the study at any point.
4.9. Staff will not be compensated to take part in the study and will not have to pay for anything.
4.10. No additional costs to the hospital will be incurred i.e. Lab, consumables or stationery. All nursing however, upon entering the venue will be required to wear a mask. A thermometer and hand sanitiser from [redacted] Hospital will be used to screen all staff before entering the venue, which will be done by the researcher.
4.11. Refreshments will be given by the researcher to each participant when leaving the venue in accordance to Covid-19 regulations.

**5. Participation of [redacted] Hospital staff in the study**

5.1. Staff will be informed in advance of a date, time and venue through, and in agreement with the nursing manager.
5.2. On the day of data collection, staff will receive an informed consent form and questionnaire to complete, upon entering of the venue.
5.3. Staff will be asked to complete a questionnaire which will take between 20 – 30 minutes to complete.
5.4. Two sealed boxes will be placed in the venue, completed questionnaire to be placed in the sealed box marked “questionnaire” and the consent form in the sealed box marked “consent form”.
5.5. The investigator does not foresee any risks and discomforts.
5.6. There are no further obligations involved in this study

**6. Confidentiality**

6.1. Confidentiality will be maintained at all times.
6.2. All information obtained from the study will only be used for the study.
6.3. All the stored data obtained from the study, irrespective whether on paper (the questionnaires) or in electronic format, as stipulated by the Protection of Personal Information (POPI) Act (No. 4 of 2013) will only be kept for a period of 5 years.

**7. Adhering to COVID safety guidelines**

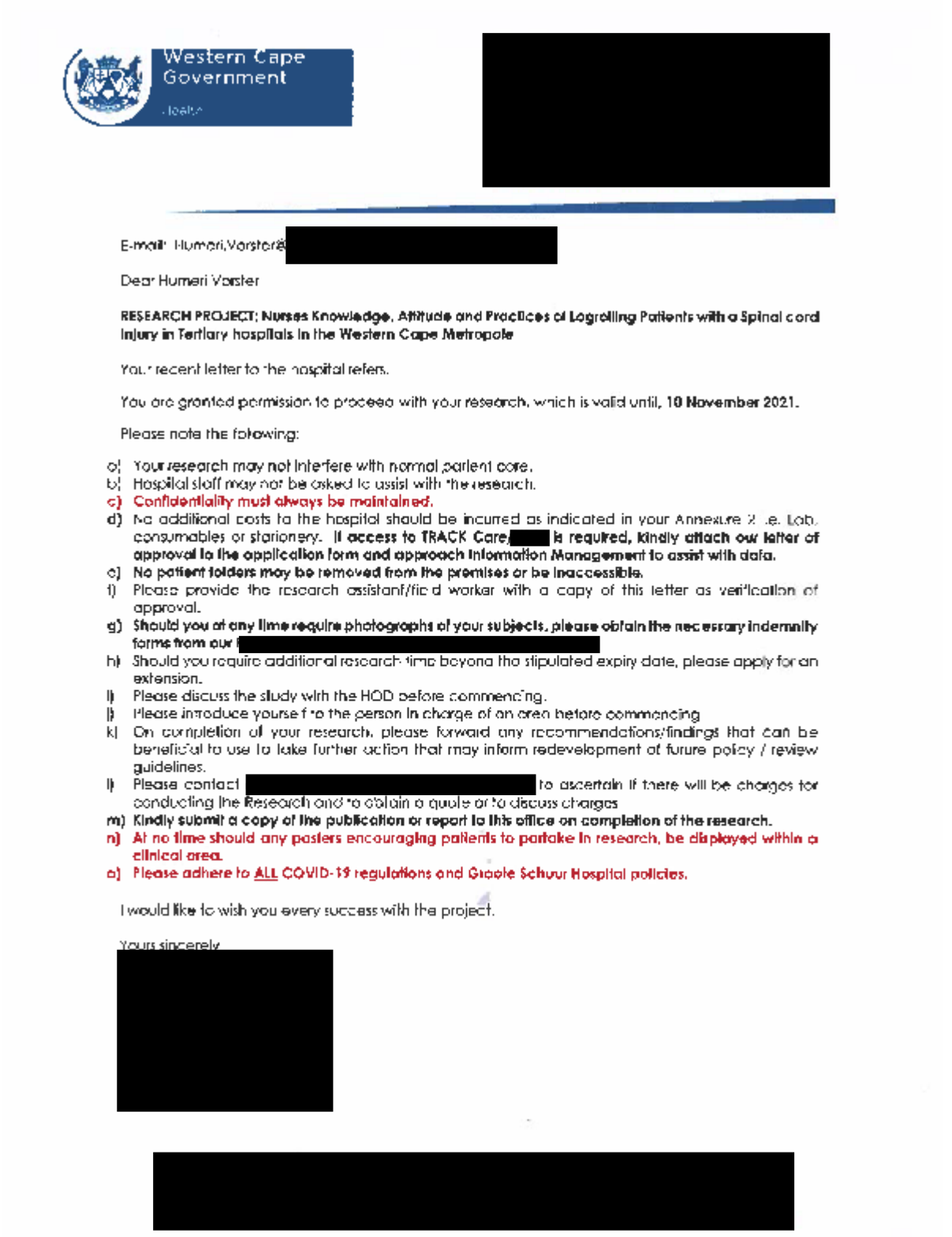
7.1. Due to the COVID-19 pandemic, a “symptom monitoring form for Influenza-like/ Coronavirus symptoms for staff in healthcare settings” screening register,” will be completed before entry into the indicated venue.
7.2. Staff will be requested to adhere to the COVID-19 pandemic, Infection Control Policy of Department of Health. All participants will be requested to wash their hands, use hand sanitiser, wear a mask and adhere to social distancing and cough etiquette upon entering and leaving the venue after completion of the questionnaire.
7.3. This screening register will be kept on the researcher’s personal computer that is password-protected and will afterwards be send to the occupational healthcare department or human resource department (as per Hospital Policy).
7.4. Each participant will receive a pen to prevent possible contamination.

**8. Contact details**

8.1. You can contact Mrs. H. Vorster at [redacted] should you have any further queries or encounter any problems.

8.2. You can contact the Health Research Ethics Committee at [redacted] if there is still something that your investigator has not explained to you, or if you have a complaint.

## Appendix 9.4: Approval obtained from Hospital A



Western Cape Government

[redacted]

E-mail: Humari.Vorster@[redacted]

Dear Humeri Vorster

**RESEARCH PROJECT: Nurses Knowledge, Attitude and Practices of Logrolling Patients with a Spinal cord Injury in Tertiary hospitals in the Western Cape Metropole**

Your recent letter to the hospital refers.

You are granted permission to proceed with your research, which is valid until, **10 November 2021.**

Please note the following:

a) Your research may not interfere with normal patient care.
b) Hospital staff may not be asked to assist with the research.
c) **Confidentiality must always be maintained.**
d) No additional costs to the hospital should be incurred as indicated in your Annexure 2 i.e. Lab. consumables or stationery. **If access to TRACK Care[redacted] is required, kindly attach our letter of approval to the application form and approach Information Management to assist with data.**
e) **No patient folders may be removed from the premises or be inaccessible.**
f) Please provide the research assistant/field worker with a copy of this letter as verification of approval.
g) **Should you at any time require photographs of your subjects, please obtain the necessary indemnity forms from our [redacted]**
h) Should you require additional research time beyond the stipulated expiry date, please apply for an extension.
i) Please discuss the study with the HOD before commencing.
j) Please introduce yourself to the person in charge of an area before commencing
k) On completion of your research, please forward any recommendations/findings that can be beneficial to use to take further action that may inform redevelopment of future policy / review guidelines.
l) Please contact [redacted] to ascertain if there will be charges for conducting the Research and to obtain a quote or to discuss charges
m) **Kindly submit a copy of the publication or report to this office on completion of the research.**
n) **At no time should any posters encouraging patients to partake in research, be displayed within a clinical area.**
o) **Please adhere to ALL COVID-19 regulations and Groote Schuur Hospital policies.**

I would like to wish you every success with the project.

Yours sincerely

[redacted]

[redacted]

# APPENDIX 10: PARTICIPANT INFORMATION LEAFLET AND DECLARATION OF CONSENT BY PARTICIPANT AND INVESTIGATOR

| **TITLE OF RESEARCH PROJECT:** | |
|---|---|
| Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole. | |
| DETAILS OF PRINCIPAL INVESTIGATOR (PI): | |
| Mrs. Humeri, Vorster | Ethics reference number: S20/10/267 |
| Full postal address: [redacted] | PI Contact number: (W) [redacted] Cell no.: [redacted] |

The investigator would like to invite you to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the project investigator any questions about any part of this project that you do not fully understand. It is very important that you are completely satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary,** and you are free to decline to participate. In other words, you may choose to take part, or you may choose not to take part. Nothing bad will come of it if you say no: it will not affect you negatively in any way whatsoever. Refusal to participate will involve no penalty or loss of benefits or reduction in the level of care to which you are otherwise entitled to. You are also free to withdraw from the study at any point, even if you do agree to take part initially.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University.** The study will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, the South African Guidelines for Good Clinical Practice (2006), the Medical Research Council (MRC) Ethical Guidelines for Research (2002), and the Department of Health Ethics in Health Research: Principles, Processes and Studies (2015).

## What is this research study all about?

- *The project aims to investigate nurses' knowledge, attitude and practice of logrolling spinal cord injured patients' in tertiary hospitals in the Western Cape Metropole.*
- *At first a pilot test will be conducted at a secondary hospital, at* [redacted] *hospital where seven participants will be recruited.*
- *The main study will be conducted at two tertiary hospitals in the Western Cape Metropole, namely* [redacted] *hospital.*
- *The number of participants to be recruited at* [redacted] *hospital will be 205, at* [redacted] *hospital 115 participants and the number of participants altogether will be 320.*
- *If you agree to take part in this study, you will be informed in advance of a date, time and venue.*
- *You will be asked to complete a questionnaire which will take between 20 – 30 minutes to complete.*
- *Due to the COVID-19 pandemic, a "symptom monitoring form for Influenza-like/ Coronavirus symptoms for staff in healthcare settings" screening register," will be completed before entry into the indicated venue.*

- *You will be requested to adhere to the COVID-19 pandemic, Infection Control Policy of Department of Health. All participants will be requested to wash their hands, use hand sanitiser, wear a mask and adhere to social distancing and cough etiquette upon entering and leaving the venue after completion of the questionnaire.*
- *This screening register will be kept on the researcher's personal computer that is password-protected and will afterwards be send to the occupational healthcare department or human resource department (as per Hospital Policy).*
- *Each participant will receive a pen to prevent possible contamination.*
- *On the day of data collection, you will receive an informed consent form and questionnaire to complete, upon entering of the venue.*
- *You are requested to complete all sections and all questions on the questionnaire.*
- *Two sealed boxes will be placed in the venue. Please put the completed questionnaire in the sealed box marked "questionnaire" and the consent form in the sealed box marked "consent form".*

**Why does the investigator invite you to participate?**

- *You were invited to participate since you are a professional nurse working in a unit, where spinal cord injured patients are being logrolled.*

**What will your responsibilities be?**

- *A convenient date, time and venue will be arranged with you in advance, convenient to the unit.*
- *After signing the consent form, your only responsibility will be to answer and complete the questionnaire that you will receive.*

**Will you benefit from taking part in this research?**

- There will be no personal benefits from the research study, but the investigator hope that the results of the research may assist in future to improve nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole.

**Are there any risks involved in you taking part in this research?**

- The investigator does not foresee any risks and discomforts. However, if you feel threatened or distressed at any point please feel free to contact the researcher, Mrs. Humeri Vorster at [redacted]. Counselling will be arranged.

**If you do not agree to take part, will there be any consequences?**

- *There will be no consequences should you decide not to participate.*

**Who will have access to your consent form and completed questionnaire?**

- *Any information you share with the investigator during this study, that could possibly identify you as a participant will be treated as confidential and protected. This will be done by allowing you to remain anonymous.*
- *You will not be required to provide your name on the questionnaire, but it will be replaced with a study number that will act as an identification code. Only the researcher, study supervisors and biostatistician will have access to the questionnaire.*
- *The completed questionnaire and consent form will be placed in a sealed box and stored by the investigator for five years. Only the investigator will have access to the questionnaires.*
- *The investigator will personally collect the sealed boxes and keep them in a secure cupboard in the investigators office and personally collate the data. The collated data will be sent to the biostatistician.*
- *The information collected and analysed in this study may be used for further publications.*

- *If it is used in a publication or thesis, the identity of you, as participant will remain anonymous.*

## Will you be paid to take part in this study and are there any costs involved?

- *You will not be compensated to take part in the study, and you will not have to pay for anything, if you do take part.*
- *Refreshments will be given to each participant after leaving the venue.*

## Is there anything else that you should know or do?

- *There are no further obligations involved in this study. If there are any further uncertainties, you as participant will be given an opportunity to ask questions about the study.*
- *Please take note, that there will be no linkage to your personal information on the questionnaire as the investigator will be numbering and coding the questionnaires once collected.*
- *The questionnaires will be kept on a password protected electronic Excel spreadsheet.*
- *Anonymised data captured from the original questionnaires will be kept on the investigators personal computer that is password protected and a backup on an external device will be kept in a secure filing cabinet in the researcher's office.*
- *The anonymised electronic database will be shared with the statistician and study supervisors.*
- *All information obtained from the study will only be used for the study.*
- *All the stored data obtained from the study, irrespective whether on paper (the questionnaires) or in electronic format, as stipulated by the Protection of Personal Information (POPI) Act (No. 4 of 2013) will only be kept for a period of 5 years.*
- *You can contact Mrs. H. Vorster at* [redacted] *should you have any further queries or encounter any problems.*
- *You can contact the Health Research Ethics Committee at* [redacted] *if there is still something that your investigator has not explained to you, or if you have a complaint.*
- *You will receive a copy of the information leaflet.*

## Declaration by participant

By signing below, I ……..…….. agree to take part in a research study entitled Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole.

I declare that:

- I have read this information and consent form, or it was read to me, and it is written in a language in which I am fluent and with which I am comfortable.
- I have had a chance to ask questions and I am satisfied that all my questions have been answered.
- I understand that taking part in this study is **voluntary,** and I have not been pressurised to take part.
- I may choose to leave the study at any time and nothing bad will come of it – I will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the investigator feels it is in my best interest, or if I do not follow the study plan that we have agreed on.

Signed at (*place*) .....…….. on (*date*) ……..…….. 2020.

..... .....

**Signature of participant** **Signature of witness**

## Declaration by investigator

I *(name)* ……..…… declare that:

- I explained the information in this document in a simple and clear manner to ……..
- I encouraged him/her to ask questions and took enough time to answer them.
- I am satisfied that he/she completely understands all aspects of the research, as discussed above.
- I did not use an interpreter.

Signed at (*place*) .....…..……. on (*date*) ……...…….. 2020.

..... .....

**Signature of investigator** **Signature of witness**

## APPENDIX 11: SELF-ADMINISTERED QUESTIONNAIRE

## TITLE OF THE RESEARCH PROJECT:

Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in tertiary hospitals in the Western Cape Metropole.

| STUDY NUMBER: |
| --- |
| ---------- |

**Dear Participant,**

To date no study, which investigate the knowledge, attitude and practice of nurses' logrolling patients with a spinal cord injury could be found that was conducted globally or in tertiary hospitals in the Western Cape Metropole or elsewhere in South Africa. For this reason, your valuable input will be highly appreciated. Your participation may add to the body of knowledge of logrolling SCI patients in South Africa. This in turn can assist those responsible for writing Standard Operating Procedures which ultimately may improve patient outcomes.

**AIM OF STUDY**:

The aim of the study is to investigate the knowledge, attitude and practice of nurses' logrolling SCI patients in in tertiary hospitals in the Western Cape Metropole.

All information you share will be kept confidential. The estimated completion time for the questionnaire is approximately 20–30 minutes.

Please follow the instructions as outlined below:

Please mark the most appropriate answer in your opinion with a (X).

### *SECTION A: BIOGRAPHICAL DATA*

1. Gender

| | | |
| --- | --- | --- |
| 1. | Male | |
| 2. | Female | |

2. Age in full years: …….

3. Indicate your number of years' experience as a qualified nurse: ……...

4. Indicate your current qualification as per SANC registration:

| 1. Registered Nurse ☐ | 2. Enrolled Nurse ☐ | 3. Auxiliary Nurse ☐ |
|---|---|---|

5. Indicate the amount of years you are working in the current department: .....

---

***SECTION B: KNOWLEDGE: The following questions concerns your knowledge in regard to spinal cord injuries and care of spinal injured patients.***

**Indicate your level of agreement with the following statements regarding spinal cord injuries aetiology, mechanism of injury, pathophysiology and logrolling.**

| Please indicate your answer by using a X: | 1. Strongly disagree | 2. Disagree | 3. Agree | 4. Strongly agree |
|---|---|---|---|---|
| 6. Spinal cord injuries can be sustained due to motor vehicle accidents, pedestrian vehicle accidents, violence, falling from a height, diving or sport injuries. | 1. | 2. | 3. | 4. |
| 7. A spinal cord injury leads to the disruption of sensory, motor (movement) and autonomic functions below the level of injury to the spinal cord. | 1. | 2. | 3. | 4. |
| 8. A spinal cord injury affects the spinal cords' ability to send and receive messages to, and from the brain. | 1. | 2. | 3. | 4. |
| 9. All patients' that have sustained trauma to their head or spine, and are conscious or unconscious should be treated as if they have a possible spinal cord injury until proven otherwise. | 1. | 2. | 3. | 4. |
| 10. Severity of a spinal cord injury disability depends on the level that the spinal cord injury is damaged. | 1. | 2. | 3. | 4. |
| 11. All patients with a suspected spinal cord injury should be logrolled, irrespective whether they have a complete or incomplete spinal cord injury. | 1. | 2. | 3. | 4. |
| 12. A final diagnosis, of a complete or incomplete spinal cord injury can only be made in the absence of spinal shock. | 1. | 2. | 3. | 4. |
| 13. A secondary injury can be caused if an incorrect spinal immobilisation technique is applied. | 1. | 2. | 3. | 4. |
| Indicate your level of agreement with the following statements about logrolling a person with a spinal cord injury. Indicate your answer by using an X: | 1. Strongly disagree | 2. Disagree | 3. Agree | 4. Strongly agree |

| | | | | |
|---|---|---|---|---|
| 14. Any nurse, can stabilise the head and cervical spine and act as team leader. | 1. | 2. | 3. | 4. |
| 15. Any nurse, should be positioned at the patients' head and cervical spine, and two nurses on each side nurse at each side of the patients' upper trunk/body. | 1. | 2. | 3. | 4. |
| 16. A fourth team member should always assist with the repositioning of a patient by supporting the patient's back. | 1. | 2. | 3. | 4. |
| 17. There are times where more than four nurses' are required to perform a safe logroll. | 1. | 2. | 3. | 4. |

***SECTION C: ATTITUDE OF NURSING STAFF: Please indicate your level of agreement with the following statements about logrolling patients with spinal cord injuries.***

| Indicate your answer by using a X: | 1. Strongly disagree | 2. Disagree | 3. Agree | 4. Strongly agree |
|---|---|---|---|---|
| 18. I am always willing to assist when a patient needs to be logrolled. | 1. | 2. | 3. | 4. |
| 19. The last time I had to logroll a spinal cord injured patient, I felt confident. | 1. | 2. | 3. | 4. |
| 20. I am concerned about sustaining a back injury when performing the logrolling technique. | 1. | 2. | 3. | 4. |
| 21. I did not want to assist with logrolling, as I did not feel confident to perform a safe logroll. | 1. | 2. | 3. | 4. |
| 22. In my opinion all nurses should be trained in logrolling. | 1. | 2. | 3. | 4. |
| 23. I think it is important to explain to a spinal injured patient what to expect and do during logrolling. | 1. | 2. | 3. | 4. |
| 24. There are consequences for the patient, nursing staff and hospital if a spinal cord injured patient is logrolled incorrectly. | 1. | 2. | 3. | 4. |
| 25. I always have a positive attitude when working with spinal cord injured patients. | 1. | 2. | 3. | 4. |
| 26. It is important to have good communication amongst team members and spinal cord injured patients while doing logrolling. | 1. | 2. | 3. | 4. |

***SECTION D: PRACTICE: Please reflect on the last three times you were involved in the logrolling of a spinal cord injured patient. And indicate your answer by using a X.***

| | Never | Seldom | Often | Always |
|---|---|---|---|---|
| 27. The registered nurse took the lead as the team leader during logrolling a spinal injured patient, to stabilise/ align the head and cervical spine. | 1. | 2. | 3. | 4. |
| 28. The registered nurse took the lead as the team leader and make sure that the patient is turned on the count of three. | 1. | 2. | 3. | 4. |
| 29. At times an enrolled nurse or auxiliary nurse acted as the team leader due to staff shortages. | 1. | 2. | 3. | 4. |
| 30. The team leaders appeared confident during logrolling, when stabilising the patients' head and cervical spine. | 1. | 2. | 3. | 4. |
| 31. The team performs the logroll in the same way for every patient. | 1. | 2. | 3. | 4. |
| 32. There were at least four nurses involved in the logroll. | 1. | 2. | 3. | 4. |
| 33. A registered nurse was positioned at the patients' head and cervical spine, and one nurse at each side of the patients' upper trunk. | 1. | 2. | 3. | 4. |
| 34. A registered nurse aligned the head and cervical spine, and two nurses were on each side of the trunk/ body of a patient during logrolling. | 1. | 2. | 3. | 4. |
| 35. Depending on the patients' weight, length or type of injury/injuries, a fifth team member may be required to assist with logrolling the patient. | 1. | 2. | 3. | 4. |
| 36. I have taught other people on the team how to logroll patients with spinal cord injuries. | 1. | 2. | 3. | 4. |
| 37. There was good communication between the team leader, the rest of the team members and patients' during logrolling to ensure effective logrolling. | 1. | 2. | 3. | 4. |
| 38. During logrolling the patient was educated regarding the procedure. | 1. | 2. | 3. | 4. |

***SECTION E: MANAGEMENT STRATEGIES: Please indicate your level of agreement with the following statements about the availability of management strategies when logrolling patients with spinal cord injuries. And indicate your answer by using an X:***

| | Yes | No | Unsure |
|---|---|---|---|
| 39.There is a logroll (immobilisation) guideline / standard operating procedure available in my unit. | 1. | 2. | 3. |
| 40. We have sufficient nursing staff on-duty to logroll spinal injured | 1. | 2. | 3. |

| | | | |
|---|---|---|---|
| patients. | | | |
| 41. Have you sustained a back injury due to shortage of staff when logrolling spinal injured patients. | 1. | 2. | 3. |
| 42. I have received training to prevent injuries to myself when logrolling patients. | 1. | 2. | 3. |
| 43. I have received training how to perform the logrolling technique. | 1. | 2. | 3. |

44. **If yes to question 43, indicate the name of the training course**:

……

| | | | | |
|---|---|---|---|---|
| 45. **How long ago was the training?** | 1. Within the past 6 months | 2. 6 – 12 months ago | 1 – 2 years ago | 4. More than 2 years ago |

Thank you for your participation.

Kind regards.

Mrs. H. Vorster

Work telephone number: [redacted]

Cell no: [redacted]

# APPENDIX 12: DECLARATION BY LANGUAGE EDITOR

## CERTIFICATE OF EDITING

**NURSES' KNOWLEDGE, ATTITUDES AND PRACTICES OF LOGROLLING PATIENTS WITH A SPINAL CORD INJURY IN THE WESTERN CAPE METROPOLE**

**by**

**HUMERI VORSTER**

Philip Murton [Editor] has edited the above-mentioned document produced by Humeri Vorster [Author].

The Editor declares that:

- He has edited the document for grammar and consistency in spelling.
- He has pointed out instances where the meaning of the text seems unclear.
- All citations have been checked to see that they have been referenced and if not, the Author has been advised.
- All references have been checked to see that they comply with the format stated in the Guidelines provided. If there are issues, then these have been pointed out. Any references not cited have been highlighted.
- All comments have been made in the Track Changes function of Word, and it is up to the Author to decide whether to accept the comments or not.

The Editor:

- Has 15 years' experience in editing theses and papers in scientific, legal, medical and other disciplines.
- Has graduated with a BSc [UCT] and an LLB [UNISA].
- Is a member of the Professional Editors Group.
- Is available at to deal with any issues and
- Is contactable at

Thus declared at Plettenberg Bay on 22 November 2022.

Philip Murton LLB BSc

Full member – Professional Editors Group

# APPENDIX 13: DECLARATION BY TRANSLATOR AND TECHNICAL EDITOR


To whom it may concern

This serves as confirmation that I, Lize Vorster, performed the translation of the abstract from English to Afrikaans and the technical formatting of Humeri Vorster's thesis entitled:

**Nurses' knowledge, attitudes and practices of logrolling patients with a spinal cord injury in the Western Cape Metropole**

Technical formatting entails complying with the Stellenbosch University's technical requirements for theses and dissertations, as presented in the Calendar Part 1 – General or where relevant, the requirements of the department.

Yours sincerely

Lize Vorster
Language Practitioner