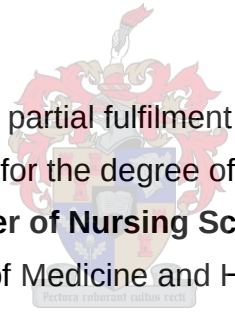
A RETROSPECTIVE AUDIT OF MEDICATION PRESCRIPTION RECORDS IN CRITICAL CARE UNITS OF A TERTIARY HOSPITAL IN THE CAPE METROPOLE

ALETTA BEVERLEY SPOGTER



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DECLARATION

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ABSTRACT

Prescribing and administering medications in a critical care unit is a challenge due to the complexity of the patient's condition. Management of medication prescription records involves the doctor, nurse and pharmacist. The doctor prescribes medication and the pharmacist reviews the prescription to detect possible errors and provides guidance. The nurse interprets the prescription and administers the medication. Failure in this may compromise the safety and quality of patient care. The purpose of this study was to retrospectively audit the medication prescription records of patients in critical care units of a tertiary hospital in the Cape Metropole. The objectives of this study were to determine whether the documentation of:

- medication prescription records are accurately completed by the doctors
- medication prescription records are accurately completed by the nursing staff
- pharmacology requirements by pharmacy staff are accurately completed
- antibiotic stewardship prescription records are accurately completed
- high alert medication records are accurately completed

A retrospective descriptive research design with a quantitative approach was applied to audit the status of medication prescription records of patients in six critical care units at the hospital under study. The target population included the prescription medication prescription records of all patients (N = 1276) who were admitted to and discharged from the six CCUs between 1 July 2013 and 31 December 2013. With the support of a statistician n=255(20%) probability sample using a systematic sampling method was applied to draw the files of patients from the six CCUs. However, due to files not obtainable a final sample size of 13.6% (n=174) was available for the auditing process. The researcher collected data personally using a self-designed audit instrument that met specific standards of the prescription records of patients in CCUs. The reliability and validity were assured through experts in nursing science, intensive care nursing, a statistician, a research methodologist and a pilot study. Ethical approval for conducting the study was obtained from the Health Research Ethics Committee of the University of Stellenbosch and a waiver of consent to work on the patients' files was granted (Reference number: S14/06/132), as well as from the tertiary hospital (Annexure C). Descriptive and inferential analyses were performed with the support of the statistician, utilising the SPSS version 22 (IBM) program. Results are presented in bar graphs and tables. Comparisons of variables were done with the application of the ANOVA, post-hoc Bonferroni on a 95% confidence interval.

The results of the study showed that none of the medication prescription records were 100% completely documented. Incomplete status varied between all the role players. Illegible handwriting throughout medication prescription records n=27(16%) was still evident. Furthermore, failure to correctly acknowledge medication documentation errors is still high amongst role players. Doctors fail to sign (85%) and indicate date of error (92%), nurses fail to sign (98%) and indicate date of error (96%), while pharmacists fail to sign (62%) and indicate date of error (66%) on files applicable to each one.

Recommendations to improve documentation on medication prescription include the introduction of continuous quality improvement programme, staff orientation and induction to CCU, in-service training for all staff and ensuring a just culture.

Key terms: quality improvement audits, structured in-service training programmes, safe and effective point of care of the critically ill, CCU environment, patient safety

OPSOMMING

Die voorskryf en toedien van medisyne in ‘n kritieke sorgeenheid is ‘n uitdaging, weens die kompleksiteit van die pasiënt se mediese toestand. Die hantering van mediese rekords betrek die dokter, verpleegster en apteker. Die dokter skryf medisyne voor en die apteker gee ‘n oorsig van die voorskrif om moontlike foute uit te skakel en om leiding te verskaf. Die verpleegster interpreteer die voorskrif en gee die medisyne. Indien daar versuim word om dit uit te voer, kan die veiligheid en kwaliteit van die pasiënt se sorg gekompromitteer word. Die doel van hierdie studie was om in retrospeksie, die voorskrifmedisyne-rekords van pasiënte in intensiewe sorgeenhede aan ‘n tersiêre hospitaal in die Kaapse Metropoolgebied te oudit.

Die doelwitte van hierdie studie was om vas te stel of die dokumentasie van:

- voorskrifmedisyne-rekords akkuraat deur dokters voltooi is
- voorskrifmedisyne-rekords akkuraat deur verpleegpersoneel voltooi is
- farmakologiese vereistes deur apteekpersoneel akkuraat voltooi is
- die verantwoordelike bestuur van antibiotikums volgens voorskrifrekords akkuraat voltooi is
- hoë waarskuwing medikasie rekords is korrek voltooi is

‘n Retrospektiewe beskrywende ontwerp met ‘n kwantitatiewe benadering is toegepas om die status van voorskrifmedisyne-rekords van pasiënte in ses intensiewe sorgeenhede by die hospitaal onder die soeklig te oudit.

Die teikenbevolking sluit in die voorskrifmedisyne-rekords van al die pasiënte aan die ses kritieke sorgeenhede (N= 1276) wat opgeneem en ontslaan is tussen 1 Julie 2013 en 31 Desember 2013. Met die hulp van ‘n statistikus is ‘n 20% (n=255) waarskynlikheidssteekproef deur ‘n sistematiese steekproefmetode gebruik om al die lêers van pasiënte van die ses kritieke sorgeenhede te trek. Nietemin, omdat lêers nie verkry kon word nie, is ‘n finale steekproefgrootte van 13.6% (n=174) beskikbaar vir die ouditproses gestel. Die navorser het data persoonlik gekollekteer deur ‘n self-ontwerpte oudit-instrument te gebruik wat aan spesifieke standaarde van voorskrifrekords van pasiënte in kritieke sorgeenhede voldoen. Die betroubaarheid en geloofbaarheid is verseker deur kundiges in verpleegwetenskap, intensiewe sorgverpleging, ‘n statistikus, ‘n navorsingsmetodoloog en ‘n loodsondersoek. Etiese goedkeuring vir die navorsing van die studie is verkry van die Gesondheidsnavorsingsetiek-komitee van die Universiteit van Stellenbosch en ‘n kwytskelding vir toestemming om te werk aan pasiënte se lêers is goedgekeur (Verwysing nr S14/06/132), asook van die tersiêre hospitaal (Anneks C).

Beskrywende en afgeleide analises is met die hulp van die statistikus uitgevoer deur gebruik te maak van die SPSS weergawe 22 (IBM) program. Die resultate van die ondersoek het getoon dat nie een van die voorskrifmedisyne-rekords 100% voltooi is nie. Uitslae is in staafgrafieke en tabelle aangebied. Vergelykings van variante is met die toepassing van die ANOVA, posthoc Bonferroni op ‘n 95% betroubaarheidsinterval gedoen. Die onvoltooide status het gevarieer en by alle rolspelers voorgekom. Onleesbare handskrifte is in die voorskrifmedisyne-rekords (n=27/16%) bespeur.

Voorts word daar nagelaat om ruiterlik te erken dat foute in die dokumentering van voorskrifmedsyne onder rolspelers beduidend voorkom. Dokters versuim om te teken (85%) en om die datum van die fout aan te dui (92%), verpleegsters versuim om te teken (98%) en om die datum van die fout aan te dui (96%), terwyl aptekers versuim om te teken (62%) en om die datum van die fout aan te dui (66%) op lêers wat vir elkeen van toepassing is.

Aanbevelings om dokumentasie oor voorskrifmedisyne te verbeter, sluit in die instel van voortdurende programme om die kwaliteit te verbeter; personeeloriëntasie en induksie tot die kritieke sorgeenheid (KSE); indiensopleiding vir alle personeellede en die versekering van ‘n regverdige kultuur.

Sleutelterme: kwaliteitverbeteringsoudit; gestruktureerde indiensopleidingsprogramme; veilige en effektiewe versorgingsruimte vir die kritiese siekes; KSE-omgewing; pasiëntveiligheid

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ABBREVIATIONS

CCU	Critical Care Unit
SOP	Standard Operating Procedure
DR	Doctor
DRs	Doctors
NS	Nursing Staff
PS	Pharmacy Staff
ASP	Antibiotic Stewardship Programme
HAM	High Alert Medication
PED	Prophylactic, Empirical or Definitive
AIRMS	Adverse Incident Reporting Management System

CHAPTER 1:
FOUNDATION OF THE STUDY

1.1 INTRODUCTION

Documentation of patient care is a central prerequisite in providing quality and safe care for patients in a hospital. Accurate documentation ensures continuity of treatment and care of the critically ill patient, even in the challenging health care environments. . Documentation serves many purposes and is evident in the complex environment of the Critical Care Unit (CCU) where high-risk patients are placed together and high care interventions are employed (Moyen, Camiré & Stelfox, 2008:3).

Documentation also known as recordkeeping refers to written information that is proof of care that was given or observed, as well as its outcomes (Searle, 2008:262). The aim of recordkeeping is to communicate the course of a patient's problems, treatment and responses to treatment. Furthermore, it facilitates the coordination of health care efforts and provides a means for continuity of care (Ferrell, 2007:61). Critically ill patients are susceptible to medication errors due to their prolonged stay in a complex CCU environment (Moyen *et al*., 2008:3).The systematic, accurate and complete documentation therefore provides continuity of quality care (Geyer, 2008:8).

According to Pera and Van Tonder (2011:105) the accuracy and completeness of documents in the patient's files serve as valuable information in case of any legal implications. Furthermore, record-keeping provides data for research. Accurate and complete documentation takes time and effort, but it ensures that records do not become lost in erroneous recording (Karp, Huerta, Dobbs & Dukes, 2008:3). Systematic and well-organized records are strong defensible medical records in decision making.

Nursing activities in a CCU entails administering medications and initiating changes in ventilator settings according to arterial blood gasses. Evaluating the effectiveness, safety, dosage and titration of medication, as well as the patient's tolerance thereof, and discontinuation of medication will indicate progress or deterioration in the patient's condition (Urden, Stacey & Lough, 2010:6)

Globally, hospitals handle drug prescriptions by hand and the administrative processes are also handwritten (Hartel, Staub, Röder & Eggli, 2011: 4). The complexity of

medication involves multiple intravenous lines and other medication in the critical care environment. In addition, nurses manage continuous infusions and frequent boluses of medications. Steps have been taken to standardize the use of different lines by grouping medication according to compatibilities (Nemec, Kopelent-Frank & Greif, 2008:1648). Calculation of high dosages and changing prescriptions can be a huge challenge to nurses. Furthermore, the programming of infusion pumps and weight-based intravenous therapy rely on estimated body weight of the patient (Moyen *et al*, 2008:3).

Shulman, Singer, Goldstone and Bellingan (2005:516) conducted a large study in the United Kingdom and found that more than 56% of medication errors were noted on the prescription records. The different parts in the prescribing systems of medication are complex and if the process is left unchecked it may lead to errors. Medication errors in patients' medication documentation can be a significant springboard for adverse drug events (Hartel *et al*., 2011:199).

The Institute of Medicine reported "to Err Is Human" which means that it is common for people to make mistakes and should therefore be forgiven (Bates, 2007:S3). However, medication-related errors account for one out of every 131 outpatient deaths and one out of 854 inpatient deaths. Data collected from previous reports led to the drafting of *Preventing Medication Errors* in 2007. Their report also emphasises the importance of drastically reducing medication errors, the continual monitoring for errors, and improving as well as standardising medication labelling and drug-related information (Hughes & Blegen, 2008:397). Stelfox, Palmisani, Scurlock, Orav and Bates (2006:175) extensively researched the effect of "to err is human" in their report. Jewell and McGiffert (2009:12) reinforced regular risk assessments and improvement plans to ensure competency and standards for patient safety.

A self-reporting survey was conducted by the anaesthetic department of an academic hospital in the Western Cape and it was found that anaesthetists do administer incorrect medication at some stage during their career. In addition, the results indicate that strategies are needed to reduce medication errors (Gordon, 2004:7).

Medication errors are recognized as adverse events in the prescribing, transcribing, dispensing, administering and monitoring of medication (Camiré, Moyen & Stelfox, 2009: 936). Reporting such events would make epidemiological and preventive information available to the medical fraternity (Kane-Gill, Jacobi & Rothschild, 2010: 85).

World Health Organization (WHO) (2012:265) states that the safety of medicines is an essential part of patient safety. International medication safety depends on strong national systems that monitor the development and quality of medicines. WHO encourages the accurate reporting of medication risk assessment and reports that the international sharing of information on adverse effects of medication strengthens medication safety (WHO, 2012:250). Proactive decisions can be taken to protect patient safety when problems reoccur (WHO, 2012:241).

1.2 RATIONALE

Critical Care Medicine (CCM) is a multidisciplinary and multi-professional field that is concerned with patients who have sustained or are at risk of sustaining acutely life-threatening single or multiple organ system failure due to disease or injury (Vincent, Singer, Marini, Moreno, Levy, Matthay, Pinsky, Rhodes, Ferguson, Annane & Hall, 2010:1349). These critically ill patients require immediate and complex interventions in a high-risk environment (Camire, Moyen & Stelfox , 2009:936). The calculation of multiple intravenous medications in the CCU creates opportunities for errors (Wilmer, Louie, Dodek, Wong and Awas, 2010:1).

CCU nurses form part of the multidisciplinary team in the acute-care setting. Information collected and recorded influence the clinical decision making of the multidisciplinary team (Geyer, 2007:4). Furthermore, staff shortages experienced in CCUs are further aggravated by a staff establishment of newly-qualified nurses, agency nurses and non-professional nurses. The CCU environment and workload demands a fast adjustment to the critically ill patient care setting and thus creates a “hurried culture”.. Critical care nurses have to demonstrate competencies, one of which is to implement a plan of treatment. In the event of respiratory and cardiac failure, CCU nurses must be able to implement interventions, such as ECG interpretations and the use of mechanical ventilation to sustain physiological function of the patient. ECG monitors, hemodynamic monitoring and X-ray interpretations are strategies to provide optimal patient care. Geyer (2007: 7) also explains that nursing records of the strategies implemented will determine whether the patient is getting better or deteriorating. The complexity of these activities can contribute to errors on medication prescription records.

Antibiotic stewardship is the demonstration of the dedicated use of antibiotics. Furthermore, it improves patient outcomes and purposeful use of antibiotics. (Nathwani, Sneddon, Malcolm, Wiuff, Patton, Hurding, Eastaway, Seaton, Watson,

Gillies, Davey & Bennie, 2011:2). Mendelson (2012:607) states that a team approach is necessary to improve prescriptions, drafting policies, directives, training and auditing. The Federation of Infectious Diseases Societies of Southern Africa organized the first South African Antibiotic Stewardship Programme (SAASP) conference in February 2012. Clear directives were stipulated about the steps to be taken to promote correct prescription and appropriate use of antibiotics. The advantage of education and networking with other health facilities across South Africa will prevent the misuse and overuse of antibiotics. (Mendelson, 2012:607). According to the United States Department of Health and Human Services (2013:43), Antibiotic stewardship entails the right dose, right time, right duration and for the right purpose. Thus, the patients in the CCU will receive effective treatment with the antibiotics that are available at the healthcare facility.

Furthermore, a study completed in British Columbia, Canada, reflect some drug-related hazardous conditions. Discrepancies were found in potassium, magnesium, liver enzymes, blood glucose, and serum creatinine level and platelet count. A nurse reviewed all records and found adverse events with potential injury related to medication errors in the Medical and Surgical ICUs (Wilmer, Louie, Dodek, Wong and Najib, 2010:3). In the CCU environment care is performed and documented with a patient-focussed approach. Recording and reporting include assessment, planning, intervention and evaluation which are central to the care of the critically ill patient (Australian Commission on Safety and Quality in Health Care, 2010:54). .

According to Hartel et al. (2011: 2) documentation on medication prescription records are evaluated and assessed under the following three categories:

- Prescribed errors on prescription records, such as wrong date and omission of dosage.
- Transcription errors in the process of transcribing from a prescription record to a patient's medication record.
- Documentation errors after administration of medication by the nurse.

The researcher experienced that medication errors are not reported in the CCUs. Wolf and Hughes (2008:350) describe the following reasons for not reporting medication errors:

- Nurses tend to differ over the definition of medication errors.
- The report of an error appears to be irrelevant.
- Nurses and nurse managers fear for their reputation in the unit and the embarrassment of jeopardizing the health of the patient.

- Nurse's fear of retaliation, punishment and disciplinary actions.
- Nurses are misinformed on method of reporting and consider reporting to be too much effort and also a time-consuming task.
- The existing policies, procedures and reporting mechanisms causes confusion.

The Patients' Rights Charter stipulates that patients have a right to a healthy and safe environment to ensure their physical and mental health (Department of Health, 1999). According to the National Core Standards, all steps should be taken to ensure patient safety of care in an environment through the on-going assessment and management of potential risks regarding medication documentation. Patient safety forms one of the six fast-track priorities for clinical governance information and quality care. (National Department of Health, 2012:18). Furthermore, a healthy, safe and clean environment foster faith and trust in the health care providers. The pharmacists ensures good clinical practice by interpreting and evaluating medication prescription records. (Government Gazette, 2015:69).

Thus a retrospective audit of medication prescription records will identify shortcomings in the medication prescription records which compromise the safety and quality of patient care.

1.3 SIGNIFICANCE OF THE STUDY

Various role players engage with the medication prescription records on a daily basis, and more so in a CCU environment. Incomplete medication prescription records and inaccurate documentation by the multidisciplinary team contribute to medication adverse events. The researcher had anticipated that this study would identify the current status of the CCU medication prescription records of discharged patients at the tertiary hospital under study to serve as a basis for addressing factors that may influence the accurate completion of such documents. Policy makers and educators in health will be enabled to introduce strategies in addressing shortcomings in the completion of medical prescription charts.

1.4 RESEARCH PROBLEM

In the CCU, critically ill patients are receiving multiple interventions, including intravenous medications. As described the complex environment may pose challenges to the CCU nurse in ensuring that no errors are made when medications are transcribed and administered. However, errors are made as prescribed and nurses fail to document and report these errors. It is against this background that a scientific

investigation was required to complete a retrospective audit of medication prescription records in critical care units of a tertiary hospital. By completing this study medication errors that were made by the multidisciplinary team member in the CCU will be identified.

1.5 RESEARCH QUESTION

The research question which gave guidance to this study was “What is the status of a retrospective audit of medication prescription records in the CCUs of a tertiary hospital in the Cape Metropole?”

1.6 RESEARCH AIM

A retrospective audit of medication prescription records in critical care units of a tertiary hospital in the Cape Metropole was conducted.

1.7 RESEARCH OBJECTIVES

The objectives of this study were to determine whether the documentation of:

- medication prescription records are accurately completed by the doctors (DRs)
- medication prescription records are accurately completed by the nursing staff (NS)
- pharmacology requirements by pharmacy staff (PS) are accurately completed
- antibiotic stewardship prescription (ASP) records are accurately completed
- high alert medication (HAM) records are accurately completed

1.8 RESEARCH METHODOLOGY

A brief overview of the research methodology as applied in the study is discussed in this chapter and in more depth in chapter three.

1.8.1 Research design

A retrospective descriptive research design with a quantitative approach was applied to audit the status of the medication prescription records of patients admitted to and discharged from CCUs of a tertiary hospital in the Cape Metropole between July 2013 and December 2013.

1.8.2 Population and sampling

For the purpose of this study the target population was the medication prescription records of all patients (N = 1276) who were admitted to and discharged from six CCUs at a tertiary hospital in the Cape Metropole between 1 July 2013 and 31 December

2013. A probability sample of 20% (n=255), using a systematic sampling method was used to draw the files of patients from six CCUs. The k value was calculated (k=5) and guided the selection of patient files. Only n=174 (68.2%) patient files of the initial sample (n=255/100%) were available at the time of the retrospective audit of patient files at the tertiary hospital.

1.8.2.1 Selection criteria

The following selection criteria were set for the sample:

- Files of all adult patients (18 years and older)
- Files of all adult patients who were admitted to and discharged between July and December 2013 from the CCUs as decided for the purpose of this study.

1.8.3 Data collection instrument

An audit instrument (Annexure A) was used to collect data for the study. The audit questions were directed to record the complete or incomplete status of medication prescription records.

1.8.4 Pre-test of audit instrument

The pre-test was done to test the instrument for any inaccuracies and ambiguity. Furthermore, the pre-test enabled the researcher to refine the instrument and be assured of the feasibility of the study.

1.8.5 Data collection

The audit instrument was used by the researcher to retrospectively audit the status of the medication prescription records of the patients that were discharged from CCUs in the tertiary hospital.

1.8.6 Reliability and validity

The reliability and validity were supported by circulating the audit instrument to experts in critical care nursing for validation of the audit instrument. A pilot study was conducted to establish whether it has face validity for the actual study

1.8.7 Data analysis

The data was entered onto a Microsoft Excel® spreadsheet and then analysed using a Statistical Program for Social Sciences (SPSS version 22 IBM) in consultation with the biostatistician.

1.8.8 Ethical considerations

Ethics approval for the study was obtained from the Health Research Ethics Committee of the Stellenbosch University, reference number S14/06/132 (Annexure B); and the Chief Executive Officer of Groote Schuur Hospital (Annexure C). The researcher received a waiver of consent to work on the patients' files (Annexure D).

Patient files were identified with a number and not by the hospital folder numbers to ensure confidentiality and anonymity. Only the researcher, the statistician, supervisor and co-supervisor have access to the collected data. All completed audit instruments are kept in a locked cabinet for at least 5 years.

1.9 OPERATIONAL DEFINITIONS

1.9.1 Documentation

Documentation is an accurate written account of performances and generates information regarding clinical practices (Day, 2009:77).

1.9.2 Critical Care Units (CCU)

A Critical Care Unit also referred to as ICU, is an area in the hospital that is designed to treat critically ill patients with medical, surgical, respiratory, cardiovascular and cardiothoracic and neurosurgery conditions. A highly skilled multidisciplinary team is involved in the specialized care for these critically ill patients (Jastremski, 2009:41). For the purpose of this study, CCU is used.

1.9.3 Retrospective Study

It is a study that records practices over a specific period in the past and compares it with present ones. This includes medication records, patient care plans and adverse events (Burns, Grove & Gray, 2013:310, Brink, Van der Walt & Van Rensburg, 2012:102).

1.9.4 Medication prescription records

Medication prescription records requires the completion of date, dose, actual time, name, route of specific medication for specific patient (College of Registered Nurses of Nova Scotia, 2012:11).

1.9.5 Audit

Auditing is measuring compliance and quality of care to patients in the CCU. The findings of this process will indicate whether we need to change or continue current practice (Wong & Masterson, 2015: 5). Furthrmore, this systematically analysis of performances will ensure improved strategies for quality patient care and professional practice (Travaglia & Debono 2009:16).

1.10 LAYOUT OF THE STUDY

Chapter 1: Foundation of the study

In chapter one the background and rationale for the research study, problem statement, the research objectives, a brief overview of the research methodology and the ethical considerations are discussed.

Chapter 2: Literature Review

This chapter will discuss the documentation of medication prescription records in depth and the nature of patient care in the CCU.

In this chapter an in-depth review of the relevant literature related to medication prescription records in the CCU is described.

Chapter 3: Research Methodology

In chapter three the research design and research methodology applied in this study are described.

Chapter 4: Results

The data analysis and interpretation are described in this chapter.

Chapter 5: Discussion, conclusion and recommendations

In this chapter the results are discussed, conclusions made and recommendations proposed based on the scientific evidence of the study.

1.11 SUMMARY

Errors in documentation of medication prescription records do occur and the challenges of care in the CCU environment increase the risk for such documentation errors to occur. Any member of the multidisciplinary team could contribute to these incomplete documentation errors. The use of an audit instrument could be effective in assessing the status of medication prescription records of CCUs, as well as the factors that may have an impact on the effective completion and documentation of medication

prescription records. Incomplete medication prescription records compromise continuity of care and can also cause uncertainty in the CCU environment.

1.12 CONCLUSION

In this chapter, the researcher described the study that was undertaken, with specific reference to the rationale for the study, the problem statement, the goal, the objectives and the research methodology that were applied. The ethical considerations relevant to the study were also discussed. Chapter two offers a detailed review of existing literature related to medication record and documentation errors as part of patient safety. The quality of prescription records are not seen as a contributing factor to medication errors.

CHAPTER 2:
LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, the definition of medication documentation errors, as well as an overview of the literature regarding medication prescription errors are presented. This include an overview of previous relevant research conducted on medication prescription errors and the findings thereof. The purpose of the literature review was to understand what is presently known about the topic of medication prescription error and how the problem affects the nursing care of patients in CCU.

2.2 REVIEW OF THE LITERATURE

A literature review is an organised written prescription of what has been published about a topic by various scholars (Burns & Grove, 2011:189) The search terms used in different combinations were " keeping good nursing records", "medications for analgesia", "sedation in the intensive care unit", "role of critical care pharmacist" and "documentation in the CCU". The search was conducted on the various search engines and included: CINAHL, SCIENCE DIRECT, PUBMED, and GOOGLE SCHOLAR databases.

The literature is presented according to a conceptual framework, followed by the various factors that influence the effective recordkeeping in CCU environments:

- Conceptual framework of factors influencing the CCU environment
    - CCU environment
    - Legislation and policy
    - Quality Assurance of CCU records
    - Role players in CCU

2.3 CONCEPTUAL FRAMEWORK

A conceptual framework is the arrangement and diagrammatic display of concepts associated with the research question which provides the foundation for the intended study (LoBiondo-Wood and Haber, 2010:58).

Documentation errors on medication records occur due to challenges in a complex system. A complex environment may include all aspects discussed below and the presence or absence of high technology, diagnostic equipment and advanced

treatments with possible medical errors. Additional risk factors to name a few are intravenous insulin, analgesia, antibiotics and inotropes as high alert medication (Garrouste-Orgeas, Philippart, Bruel, Max, Lau & Misset, 2012:5).

Various factors can influence effective record-keeping in the CCU environment as depicted in figure 2.1 below. Awareness of the various influencing factors may assist the multidisciplinary team members in various stages of experience and expertise to identify their role and responsibilities in medication, record-keeping and in particular the medication prescription chart in the CCU environment.

Conceptual framework (Figure 2.1) guided the study and illustrates that each role player and various factors involved with the medication-related recordings contribute to the prompt and safe care of the critically ill patient.

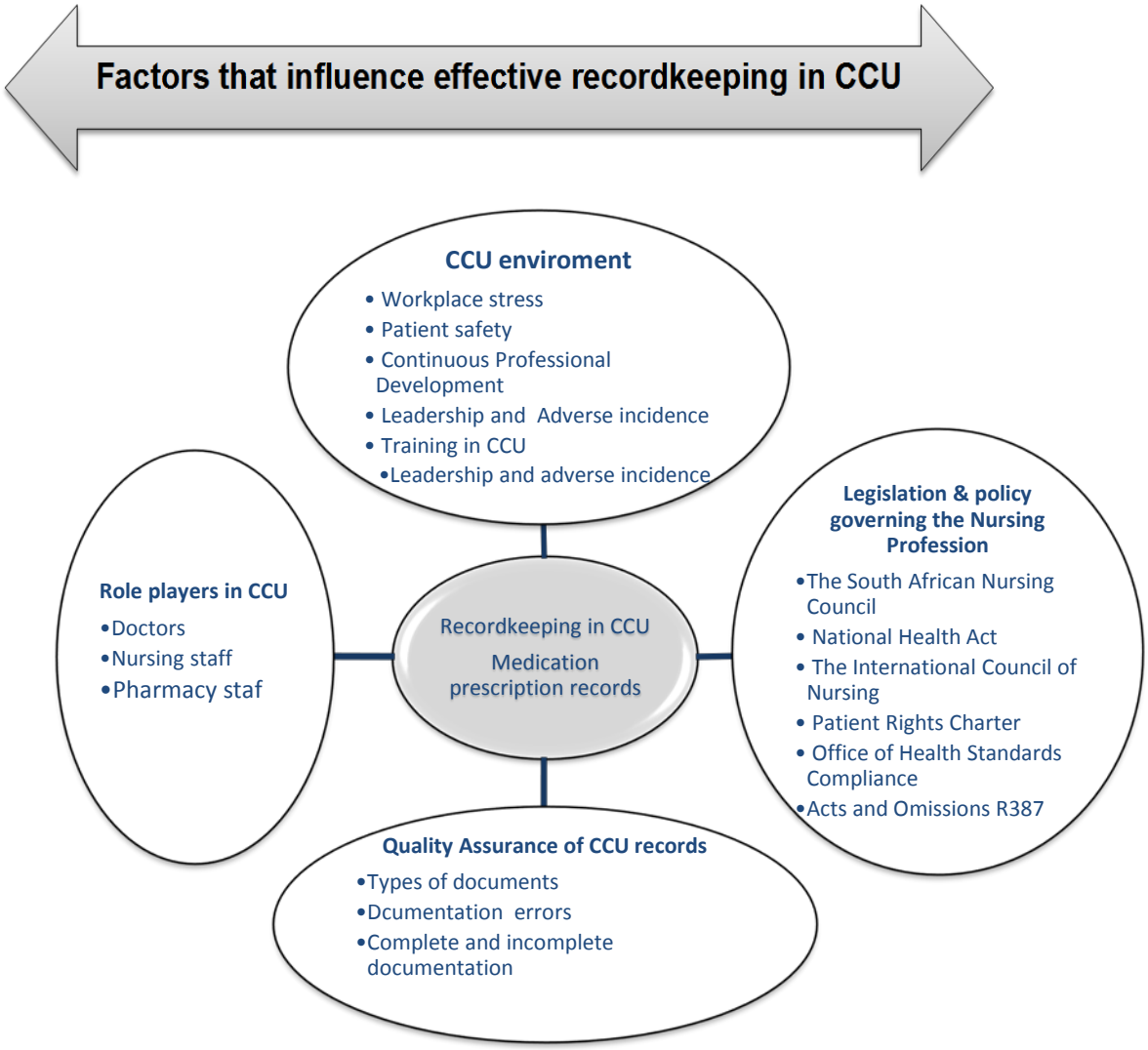

Figure 2.1: Conceptual Framework: Factors influencing effective recordkeeping in CCU (Illustrated by the researcher)

2.3.1 CCU Environment

The CCU environment could be a very challenging and stressful workplace. The American Association of Critical-Care Nurses (AACN) completed a survey (Critical Care Nurse Work Environment Survey) and identified the relationship between a healthy critical care environment and quality patient care. Results revealed noticeably high ratings given to collaboration and that open communication enhances the atmosphere in the CCU environment (Ulrich, Lavander, Hart, Woods, Leggett & Taylor, 2014:64). High patient acuity, busy workloads, stress, fatigue and lack of knowledge attribute to unsafe medication practices (Franklin, 2010: 38). Therefore certain documents are needed to guide and standardise care in CCUs.

There are various documents in the CCU environment that guide healthy and safe care environment. The existing drug guideline in the CCU is a valuable document in the critical care environment to ensure safe medication management as described by Jamieson and Mills (2013:16) who outline dose ranges, concentrations, routes and rates of administration in adult critical care management.

2.3.1.1 Workplace stress

Workplace stress can encompass various aspects, such as high demand on attention spans and compassion, extensive workload, staff shortages, critical monitoring and intervention of the vulnerable critically ill patient (Preto & Pedrão, 2009:839). A Norwegian research study about work stress, work satisfaction and burnout in the CCU in which nurses and clinicians participated, showed that 90% of nurses found the CCU workplace stressful, weary and tiring (Myhren, Ekeberg and Stokland, 2013:4). A study done in Canada revealed that hospitals are under- resourced and many nurses have to work during their break times to complete the work. Some nurse participants expressed that they have to arrive early or leave the workplace later in order to complete the work. Only the minority of participants in their study indicated that there is enough time during the day to get the work done (Kathryn & Shields, 2008:7). Nurses are held accountable for their own acts and omissions and therefore practise inter-dependently in a multidisciplinary environment (McBride & Foureur, 2006:39). Nurses working in high level stress CCUs find it difficult to prioritize the complexity of duties associated with critically ill patients. Consequences, such as reduced quality of patient care and even an increase in nosocomial infections were noted during a study in the City of São Paulo (Cavalheiro, Moira Junior & Lopes, 2008:31).

Nurse Managers play a vital role to ensure nursing staff satisfaction in the work place environment in order to produce safe, effective and ethical care for health care

consumers (College of Nurses of Ontario Practice Standard, 2008:5). Work place stress could also be caused by an inadequacy to cope with work overload (Muller, 2009: 292). Increased absenteeism amongst staff members contribute to work overload where scheduled staff are expected to complete additional tasks (Muller, 2009:292). A good relationship among the role players, such as clinicians, nurses, nurse managers and the pharmacist at the point of care is key to a healthy CCU environment (George, 2010:590). Carayon and Gurses (2008:208) state that an increase in workload compromises safety and the presence of critical tasks in such situations create opportunities for errors and unsafe patient care. Excessive workloads and inadequate staffing furthermore compromise safe medication administration (Hughes & Blegen, 2008: 397). Complete and accurate documentation of patient information is viewed as first priority in commencing medication administration (Jenkins & Vaida, 2007:44). According to Etchells, Juurlink and Levinson (2008:63) simplifying the way we work will improve safe medication administration. Strategies to standardise the way we approach our work in CCUs, need to be put in place.

2.3.1.2 Patient safety

Patient safety can be ensured through calculating the nurse-patient ratio in the CCU. Uneven nurse-patient correlation may impact patient care outcomes negatively (Carayon & Gurses, 2008:206). Incident reporting systems are valuable in CCUs and health institutions, as these aim to provide important information about incidents and guide directives to prevent such incidents from repeating itself. Ulrich, Lavandero, Woods and Early (2014:13), report on a comparative study done in 2006 and 2013, how patient safety is at risk in the critical care nurses' work environment. Furthermore, patient safety is subjected to adverse events, reduced quality of care and patient mortality.

The Department of Health in the Western Cape designed an Adverse Incident Reporting and Management System (AIRMS) for all health institutions in the Province (Bateman, 2008:72). This system was used in a petition written by a mother complaining of the maltreatment of her daughter received at three health facilities within the Western Cape. The Head of Health in Western Cape Government explained this system in a memorandum in 2015.

Patient safety and quality improvement became an international priority at the Patient Safety Global Action Summit 2016. Disseminating learning to networks globally was emphasised to ensure safe access, effective, efficient and equitable care in all health systems (Yu, Flott, Chainani, Fontana & Darzi, 2016:6). The World Health Organisation

(WHO) recognises the need for patient safety and quality assurance measures (Muller, Bezuidenhout & Jooste, 2009:487). The WHO World Alliance for Patient Safety launched the Africa project in Durban and identified medication errors as a health care error (WHO, 2005:4). A study done in New Zealand, South and West-Australia, reported that most medication prescription errors were due to omission and overdose (Gommers & Baker, 2008:1; Roughead & Semple, 2009:5). Such errors lead to potential adverse drug events.

2.3.1.3 Continuous Professional Development

Continuous Professional Development (CPD) is the on-going, structured process of learning and development, which is self-directed and could focus on personal and or professional development (Bruce, Klopper & Mellish, 2011:342). The International Pharmaceutical Federation concludes that it is essential for each individual practising pharmacist to participate in a structured CPD programme to ensure care of a patient that is contemporary, competent practice with improvement in skills and performance (International Pharmaceutical Federation, 2002: 3). It is the responsibility of each pharmacist to keep abreast with current developments to ensure safe practices. The Institute for Safe Medication Practices, Canada is an independent, national, non-profit agency that enhances and ensures medication safety internationally (College of Nurses of Ontario Practice standard, 2008:8). It emphasises that any deviation from prescriptions on medication should be rectified by the prescriber. Accurate documentation of medication administration records prevents transcription errors and time spent to rectify illegible handwriting. It is found that the availability of drug information, hospital policies and the patient's clinical results ensure smooth and correct medication administration (Keohane, Bane, Featherstone, Hayes, Woolf, Hurley, Bates , Gandhi & Poon, 2008:25). The Pharmaceutical Society of Ireland, 2016:11, has drawn up policies and Standard Operating Procedures (SOPs) for pharmacists to assess themselves. Compliance to these documents guides the pharmacist to supply medication and administer prescriptions safely. Thus, it is essential for staff to continuously update their knowledge on policies, procedures and documents that inform safe medication administration.

Recording the administration of prescribed medication is required by law or hospital policy (Mogotlane,Manaka-Mkwanazi, Mokoena, Chauke & Young, 2004:212).

Errors occur on both system and individual level in spite of efforts made to maintain high quality patient care (McBride & Foureur, 2006:40). In 2003, New Zealand developed the Quality and Safe Use of Medicine Initiative to address system-related

issues. An error rate of 60 percent during a research study conducted on medication administration was due to wrong rate, wrong time and wrong dose (Hughes & Blegen, 2008:6) Inadequate in-service training compromises safe medication administration (Hughes & Blegen, 2008: 397).

The South African Nursing Council has been presenting information sessions in view of implementing CPD for next year to design activities for improving skills, knowledge and performance of nurses and midwives especially medication prescription and treatment within the mandate of the Nursing Act (Act 33 of 2005). Section 26 of the Health Professions Act, 1974 (Act No. 56 of 1974) whereby the Health Professions Council of South Africa (HPCSA) stipulates that continuing the education and training of doctors is required to retain their registration which includes activities such as the steps followed for prescribing medication (Health Professions Council of South Africa, 2008:3). Guidelines for continuing professional development is emphasised for all health carers in South Africa to maintain competency and patient safety (Health Professions Council of South Africa, 2011:6).

2.3.1.4 Training in the CCU

Medication errors in CCU can be reduced by in-service training programmes as stipulated by NCS (National Core Standards). CCU provides comprehensive specialized care to patients with complex diagnosis, therefore experienced critical care nurses are required.

The multidisciplinary team (MDT) should have a monthly meeting on morbidity and mortality where required information on preventing adverse events can be disseminated (Development group, 2013:6).

Creating learning opportunities in the CCU will assist in overcoming the daily challenges of the critically ill patient. The Department of Health (2013:50) recognises an urgent need to introduce Continuing Professional Development (CPD) programmes for nurses and midwives. Critical care nurses have to keep abreast with current developments on international and national level, by belonging to WHO and remaining informed of the National Health Act, Nursing Act, Medicine and Related Substances Act.

2.3.1.5 Leadership and adverse incidence

It is the responsibility of health care leaders to develop a strategy to improve patient safety. Studies have illustrated that the leadership ability of nurse managers improves

nursing work environments (Boev, 2012:8). Furthermore, leaders should be approachable, support health improvement strategies and effectively manage the reporting of medication errors and the analysis and improvement of medication error reporting systems. The Adverse Incident Report Management System (AIRMS) model has the potential to increase an awareness of being competent and help create a culture that values improvements in the steps nurses take to ensure patient care outcomes by advocating for adequate resources and systems of safe practices (College of Nurses of Ontario Practice standard, 2008:6). The Just System outlines how errors are caused by the way the system operates and not solely the responsible individual (Marx, 2007:11). However, McBride and Foureur (2006:37) reveal that the greater part of medication errors remains underreported. It was found that nurses express their fear for the consequences when reporting errors to managers and co-workers, such as the fear of being "labelled" should they report medication errors.

Nurses also fear punishment. They can also develop a complex and low self-esteem should they report wrong administration of medication (Khowaja, Nizar, Merchant, Dias, Bustamante-Gavino & Malik, 2008: 674). Findings in a study that was conducted in Australia indicated an urgent need for the reviewing of medication prescription records and to record medication-related problems. Errors were found with the prescription of medication, wrong or missing doses or unclear prescriptions (Runciman, Roughhead, Semple & Adams, 2003:i55). Such errors affect the care and treatment of patients in CCUs and could set a platform for adverse events that must be managed by nurse leaders. Mitchell (2008:6) explains that medication errors are associated with the following factors: poor leadership, breakdown in communication or teamwork, deviation from the goals and ignoring policies and procedures.

A confidential self-reporting survey was conducted by the Department of Anaesthesia at an Academic hospital in the Western Cape, South Africa. It was found that anaesthetists administer wrong medication at some stage during their career. The outcome of the survey was an indication of strategies needed to reduce medication errors (Gordon, 2006:7-8), which was the first research survey done by anaesthetists self-reporting wrong medication administration and the findings were found to be similar to those of first world countries.

2.3.2 Legislation and policy governing the Nursing Profession

There are various legislative bodies and documents that guide record-keeping in the health care environment, such as: South African Nursing Council (SANC), National Health Act, the International Council of Nurses (ICN), the Patient Rights Charter and

Office of Health Standards Compliance (OHSC) and the Regulation on the Acts and Omissions (R387) as promulgated by the Nursing Act of 1978 (Act 50 of 1978).

2.3.2.1 The South African Nursing Council (SANC)

The South African Nursing Council is the governing body of the nursing profession in South Africa and stipulates that nursing documentation must not be taken for granted (Searle, 2005:262).Training and practice of nurses are regulated through the Nursing Act of 2005 (RSA, 2005).

Nursing Acts, and omissions related to nursing practice, and the Scope of Practice form the legal and ethical framework of the nursing profession of South Africa stipulates that the pharmacological actions and nursing considerations of the medication should be documented and proof of administration be kept in a file in terms of chapter two of the Nursing Act 33 of 2005 (RSA, 4014 & RSA, 2005). Furthermore, the acts or omissions set out in this regulation are deemed to be acts or omissions in respect of which the council can take disciplinary steps against a registered nurse in terms of chapter four of the Nursing Act 33 of 2005 (RSA, 2005). This refers to the wilful or negligent omission to maintain the health status of a patient under his care or charge, and include correct patient identification, as well as the correct administration of treatment, medication and care. Nurses are educated with regard to the Scope of Practice by the SANC. An outline of the Medicines and Related Substances Act Records that are accurately kept, also guard the nurses from becoming legally responsible for errors by demonstrating that they have done everything in their power to prevent harm, including consulting with others (Ellis and Hartley, 2008:324). Recording the administration of prescribed medication is required by law or hospital policy (Mogotlane et al., 2004:212).The critical care nurse is guided by the professional responsibilities for patient care as indicated by R2598, as promulgated by the Old Nursing Act No 50 of 1978. This is, still enforced in this instance until the new scope of practice is available. Maintaining standards and criteria of appropriate recording of patient's medication is very important when conducting the assessment of the patient.

2.3.2.2 National Health Act (Act No 61 of 2003)

The National Health Act, 61 of 2003 provides for the establishment of a health system that must ensure that the population of South Africa has a quality and affordable health service. The rights and duties of the health care users and providers are clearly stated in the National Health Act of 2003 (Act No 61 of 2003). The Act stipulates the importance of access, protection and safeguarding of the health care user's records. Therefore, the continuity of care is ensured when accompanied by the necessary

documents between the different levels, such as tertiary, secondary or district health for patient care. Thus, the records of the patient in CCU should be meticulously completed and protected. This promotes accessibility and prevention of unnecessary disruptions or delay of health care and service delivery in CCUs.

2.3.2.3 The International Council of Nursing (ICN)

The ICN in their continuum of competencies framework set clear parameters of competencies for the registered nurses to work within their scope of practice, even in documentation of medication prescription records in the CCUs. The key competencies relating to record-keeping include interventions related to assessments, planning of care, implementation and evaluation.

Furthermore, the International Code of Ethics for nurses emphasises that nurses do have an obligatory responsibility to promote health, to do no harm to the patient, and to do good by actively helping and protecting the patient, as well as serving the patient with dignity and respect. Protecting the patient also includes protecting and taking care of all records related to the patient care. Thus, the medication prescription records are included in the records of the CCU (ICN, 2007:3, 18-22).

2.3.2.4 Patient's rights charter

The rights of the patients that arise from the common law of the country protect and safeguard the patient's name, person as well as their property. Therefore, it is acceptable practice that nurses will perform their duties with due care and consideration for the rights of their patients in the CCU environment. A study that was conducted by Tao, Ellenbecker and Wang Li (2015:142) reports that CCU nurses' unhappiness are attributed to stressful situations caring for very unstable and complex patients. Furthermore, the documentation is time-consuming and often intricate and different, since the increase of complaints from patients and their families. They further emphasized that the new regulations to reduce medical discrepancies have increased documentation requirements.

The rights of the patients are encapsulated in the South African Patient's Rights Charter (2005), which includes the right to a healthy and safe environment. The right of the public to safe nursing care is reflected in the rights of each individual to acceptable, legal, knowledgeable and ethical safe nursing (Searle, 2005:73). Therefore the CCU environment should strive to ensure patient safety when administering medication and providing treatment (Muller, Bezuidenhout & Jooste, 2009:487).

The first stipulation in the patient's rights charter for the population of South Africa is that everyone has the right to a safe and healthy environment (National patient's right's charter, 2008:2).

2.3.2.5 Office of Health Standards Compliance

The Office of Health Standards Compliance (OHSC) has been introduced through the National Health Amendment Act of 2013 (DoH, 2015). Recently the Procedural Regulation, Regulation 1275 dated October 2016 pertaining to the powers of the OHSC, was promulgated through the National Health Act of 2003 (Act 61 of 2003) giving OHSC the powers to inspect health establishments, to ensure that there is compliance with reference to the national norms and standards which include the relevant records and documentation.

2.3.2.6 Acts and Omission (R387)

Disciplinary steps can be taken if registered or enrolled nurses compromise the health status of the patient by not administering medication according to the prescription record. This regulation emphasises the importance of accurately documenting after action performed e.g. after administering medication as stipulated in section 35 of the Nursing Act, 1978 (RSA, 2014).

2.3.3 Quality assurance of CCU records

2.3.3.1 Types of documents

According to Collins, Bakken, Vawdrey, Coiera and Currie (2011:45), documentation in the CCU entails nurses' notes, physicians' notes, treatment flow sheets, medication prescription records, respiratory flow sheets and intake and output flow sheets. These records form a common goal for patient care. A checklist was designed in a hospital South of London to audit documentation of critical care observations, medications, management, and overall progression in the general CCU. Results of the audit indicated an improvement from 57% to an overall improvement of more than 77% on daily documentation, (Zucco & Webb, 2014:3).

2.3.3.2 Types of documentation errors

McBride and Foureur (2006:34) classify medication errors as acts of commission or omission. An example could be omitting to document the administration of medications and care provided. This classification includes the wrong drug, wrong route, incorrect dosage, wrong patient, wrong timing of drug administration, a contra-indicated drug for

that patient, wrong site, incorrect drug form, incorrect infusion rate, expired medication date or prescription rate (Ronda & Blegen, 2008 :400).

High alert medications (HAM) frequently used in CCUs are drugs that pose a high risk if administered incorrectly. These drugs include insulin, anticoagulants, opioids, inotropes and sedatives. Inaccurate calculation and reconstitution of these drugs and lead to major adverse effects such as hypoglycaemia, respiratory arrest, cardiac depression, major bleeding incidences etc. (Anderson &Townsend, 2015:20).

Standardised medication administration record, fluid balance documentation are records that ensure safe high alert medication treatment. All high alert medication infusions requires a smart pump with an updated datasets to ensure expected outcomes (Patient Safety Council 2009: 9).

2.3.3.3 Complete and incomplete documentation

Incomplete entries of patient clinical records result in poor, ineffective and sometimes incorrect patient care by a health care member. Prideaux (2011:1450) states that nurses are liable for the quality of patient care that they provide. They are accountable for incomplete or inaccurate documentation, especially detecting changes in the clinical condition. Stevens and Pickering (2010:43) remind nurses that incomplete and poor documentation can lead to uncertainty and errors in the care provided.

According to Simpson, Peterson and O'Brien-Ladner (2007:185) documentation errors in the CCU could occur with the completion of drug charts, mouth care, peptic ulcer prophylaxis, deep vein prophylaxis, peripheral and central line compliance. South London thus introduced a checklist as a quality improvement strategy which resulted in a significant enhancement of medication prescription chart completion (92%), prescription of analgesia (76%), compliance of mouth care (95%), elevation of head of bed (65.9%) and stress ulcer prophylaxis (100%) in ventilated patients. The researchers emphasise that a checklist can be a useful tool to measure completeness of patient records. The different flow sheets indicate the trend and continuity of care rendered to critically ill patients. Monthly CCU meetings are held to review current documents of patients in the CCU department of the tertiary institution in this study. Changes or improvement can be discussed and are adjusted accordingly.

2.3.4 Role players in medication documentation

Medication management in the CCU involves different role players, such as doctors (DRs) Nursing staff (NS), pharmacy staff (PS).

2.3.4.1 Various role players

Various role players function interdependently from one another. Medication prescribed by the clinician involves clinical decision making, drug choice, drug regimen determination, medical record documentation and medication order prescribing. The following members of the multi-disciplinary team is involved with medication management in CCUs:

- Medication transcribing involves checking the medication prescription for correctness, which is the responsibility of the medical staff.
- Medication is prepared and dispensed by the pharmacist.
- Medication is administered by the nurse by following the 5 rights (right patient, right medication, right dose, right route and right time of medication delivery (Smetzer & Cohen, 2007:12).

2.3.4.2 Doctors (DRs)

Booyens (2008: 141) explains that only the doctors (clinicians) prescribe on a medication record. After a physical examination and awareness of patient allergy status, the doctor will prescribe generic name, route, dose, time, frequency and duration of medication (WHO, 2005:231). A study was conducted in South Ethiopia and reflected 52, (5%) prescription errors. These medication prescribing errors revealed that the dose, frequency, route and unit indications were omitted. The most prevalent prescription errors were antibiotics (32.5%), followed by cardiovascular drugs (26.3%) and analgesics (9.6%) (Agalu, Ayele, Bedada & Woldie, 2011:380). Grissinger and Alghamdi (2014:149) report that nurses will not be able to administer high alert medication if not prescribed by the doctors. However, it is only allowed by CCU specialized nurses in emergencies and by informing the doctor responsible for the specific patient. Omission of high alert medication necessary for the patient's condition can prolong length of stay in the CCU due to staff shortages

2.3.4.3 Nursing Staff (NS)

Nursing staff include all experienced registered nurses and trained critical care nurses who are involved in record-keeping. Medication errors can occur at any step of the medication management process. The nurse ensures that the prescription, dosage, date, time and doctor's signature is legible. Furthermore, the nurse should follow the prescription carefully and therefore require assistance by other team members to reduce effects of interruptions (Flynn, Liang, Dickson, Xie, & Suh, 2012: 182).

Choo, Hutchinson and Bucknall (2010:853), recognize the nurse as being essential for medication and patient safety.

2.3.4.4 Pharmacy Staff (PS)

Pharmacists in the CCU play an invaluable role in medication safety. As part of the multidisciplinary team they identify prescription errors and give guidance with correct dosages, frequencies and reason for prescribing (Lee, Chiao, Khan & Buro, 2007:337). Furthermore, their study revealed great improvement in the recommendations of medication by pharmacists according to the patient's medical conditions regarding right combination, right dose and frequencies (Lee, Chiao, Khan & Buro, 2007:337). A CCU pharmacist clarifies effective dosages and regimens of different dosages (Chant, 2012:5). Sinha (2014:107) explains that the pharmacists have an essential task in ensuring that the patient's prescription record displays the right drug, right dose and administration instructions.

2.4 CONCLUSION

Improving patient safety requires change in practice. The establishment of an efficient reporting system, documentation of errors and removal of barriers to reporting may result in reduced frequency of medication errors. Considering the relationship between medication error incidence and working conditions, it appears that by creating an acceptable working environment with decreased work tension, the occurrence of medication errors may reduce. Multidisciplinary teamwork in an open and constructive environment is required to provide quality patient care.

CHAPTER 3:
RESEARCH METHODOLOGY

3.1 INTRODUCTION

Chapter three outlines the research methodology that was applied in this study to investigate the status of medication prescription records in CCUs of a tertiary hospital in the Cape Metropole. Furthermore, the research design, population and sampling procedures, data collection and data analysis methods are also discussed.

3.2 AIM AND OBJECTIVES

The aim of this study was to retrospectively audit medication prescription records in CCUs of a tertiary hospital in the Cape Metropole.

The objectives of this study were to determine whether the documentation of:

- medication prescription records are accurately completed by the doctors (DRs)
- medication prescription records are accurately completed by the nursing staff (NS)
- pharmacology requirements by pharmacy staff (PS) are accurately completed
- antibiotic stewardship prescription (ASP) records are accurately completed
- high alert medication (HAM) records are accurately completed

3.3 STUDY SETTING

The study was conducted at a tertiary hospital in the Cape Metropole in South Africa.

3.4 RESEARCH DESIGN

A retrospective descriptive research design with a quantitative approach was applied to audit the status of the medication prescription records of patients admitted to and discharged from CCUs of a tertiary hospital in the Cape Metropole between July 2013 and December 2013. Grove, Burns and Gray (2013:23) define quantitative research as a formal and systematic process whereby the researcher collects numerical data to understand particular aspects of the research problem. A descriptive study aims to gather more information about characteristics within a particular field of study and provide a picture of a situation as it naturally happens. Descriptive designs may be used to identify problems with current practices (Burns & Grove, 2011: 256). Furthermore, a retrospective study investigates a phenomenon, situation, problem or

issue that has happened in the past and is conducted on the basis that data are available for that period. The instrument used would produce the same results during repeated measures (Lobiondo-Wood & Haber, 2010:204).

3.5 POPULATION AND SAMPLING

Population refers to a particular group of elements, which is the focus of a research project (Burns & Grove, 2011:290). A target population is the total number of elements or individuals who will participate in the research (Burns & Grove, 2009:343). For the purpose of this study the target population (N) were the medication prescription records of all the patients (N=1276) who were admitted to and discharged from six CCUs at a tertiary hospital in the Cape Metropole between 1 July 2013 and 31 December 2013 (table 3.1).

Table 3.1: Total population of admissions per month over a six-month period (July-December 2013) for each CCU

ICU	July	August	September	October	November	December
Unit 1	24	31	40	45	33	37
Unit 2	8	8	7	6	4	5
Unit 3	33	29	26	27	24	22
Unit 4	58	49	58	51	53	37
Unit 5	59	55	61	64	61	39
Unit 6	35	33	27	37	49	41
TOTAL	217	205	219	230	224	181

A sample is a sub-group of the population that is selected for inclusion in a specific study (Burns & Grove, 2011:51). Sampling is the process of selecting a smaller group as part of the population under investigation. It is therefore important that the population is clearly defined so that the sample is the same as the remainder of the study (LoBiondo-Wood & Haber, 2010:22). Brink, Van der Walt and Van Rensburg (2012:137) explain that systematic sampling allows for the selection of elements at equal intervals. Every fifth, tenth or fifteenth element can be selected.

For the purpose of this study a 20% probability sample using a systematic sampling method was used to draw the files from each CCU to ensure a total of 255 files for a retrospective audit of medication prescription records (table 3.2). The kth value interval was calculated based on the population and sample size (k=5). Every 5th file was then taken. The starting number for the sample was selected by drawing appointed file

numbers from a hat. Thereafter, every fifth file was selected to represent the population (n=255). The initial planned 20% sampling size had been calculated by a qualified biostatistician, employed at the University of Stellenbosch, to ensure adequate representation of the total population. The k^{th}-value was strictly applied to select patient's files. However, due to the lack of information and or missing medication prescription records some participant files were not obtainable and were therefore excluded from the sample. The medication prescription records of 81(31.8%) patient files were missing and therefore excluded from the sample. The researcher was only able to audit 174 files. A new sample size of 13.6% (n=174) of the total population (N=1 276) was compiled for the final actual sample used in this retrospective audit of medication prescription records in CCUs of a tertiary hospital (table 3.3).

Table 3.2: Total population of admissions and proposed sample for each intensive care unit over the six-month period (July to December 2013)

ICU	Total population	Sample 20%
Unit 1	210	42
Unit 2	38	8
Unit 3	161	32
Unit 4	306	61
Unit 5	339	68
Unit 6	222	44
	N = 1276	n = 255

Table 3.3: Total population of admissions and final actual sample for each intensive care unit over the six-month period (July to December 2013)

ICU	Total population	Sample 13.6%
Unit 1	210	29
Unit 2	38	5
Unit 3	161	22
Unit 4	306	42
Unit 5	339	46
Unit 6	222	30
	N = 1276	n = 174

3.5.1 Selection criteria

The following selection criteria defined the sample:

- Files of all adult patients (18 years and older)
- Files of all adult patients who were admitted to and discharged between July and December 2013 from the CCUs as listed in tables 3.1 and 3.3, as decided for the purpose of this study

3.6 PRE-TESTING OF AUDIT INSTRUMENT

A pilot test is a smaller version of a proposed study (Burns & Grove, 2011:49). Mouton (2011:103) highlights that the need for piloting is to do a pre-test before the actual research. Furthermore, a pilot test is conducted to detect the errors and flaws in a research design on a small scale and to enable refining of the methodology prior to the actual study (Burns & Grove, 2009:44). A preliminary data sample n=26 (10%) of the n=255 (100%) patient data files was drawn to conduct the pre-test and included files from units 1, 2, 3, 4, 5 and 6, similar to the main study. Each data file drawn by the researcher from each unit for the sample was allocated a number. The researcher worked only with these numbers and not the file. Results from the pre-test were not included in the main study. Findings obtained from the pre-test showed some duplication in the questions, e.g. strength and dosage and were thus eliminated. The researcher modified the audit instrument as guided by the findings of the pre-test.

3.7 RELIABILITY AND VALIDITY

The reliability of the research instrument is defined as the extent to which the instrument would produce the same results during repeated measures (Lobiondo-Wood & Haber, 2010:295). Furthermore, reliability is concerned with how consistent the research instrument measures a variable or concept (De Vos et al., 2011:177). The audit instrument was reviewed by the researcher's supervisor, co-supervisor, experts in nursing science and critical care nursing. A statistician from the Bioethics Unit at Stellenbosch University's Tygerberg Campus also reviewed the audit instrument. Furthermore, a pre-test was conducted on n=26 (10%) of the initial sample size of n=255 (100%) patient data files.

Reliability scores for the four domains were calculated. The Cronbach's alpha coefficient tests were done on the questions related to the four domains and the results indicated that the questionnaire was sufficiently reliable to use for this study. An alpha of 0.7 indicates acceptable reliability and 0.8 or higher indicates good reliability (Zaionts, 2013:1). The results were as follow:

- Doctors (DRs): 0.82
- Nursing staff (NS): 0.81
- Pharmacy staff (PS): 0.82
- Antibiotic stewardship prescription records(ASP): 0.82

Validity is the extent to which the instrument accurately measures the attributes of a concept (Lobiondo-Wood & Haber, 2010:286). Validity thus reflects how relevant the instrument actually reflects or measures what it is supposed to measure.

Content validity was secured by the literature, experts in critical care nursing, a biostatistician and research methodologist. The content of the measurement instrument was substantiated by the scientific nursing process. The audit instrument on critical care prescription medication documentation was circulated to experts, the supervisor and co-supervisor. Modifications to the instrument were done based on feedback from a practising critical care nurse and a qualified critical care nursing lecturer who have insight in the standards of prescription medication documentation, as well as the findings of the pre-test.

3.8 ETHICAL CONSIDERATIONS

According to McQuoid-Mason & Dada (2011:164), ethical principles encompass respect for persons, beneficence and justice which guide researchers to conduct ethical research in an ethical manner. These principles are based on human rights that need to be protected (Pera & van Tonder, 2011:120). Permission for this study was obtained from the Health Research Ethics Committee of the University of Stellenbosch who gave ethical clearance for the study and granted a waiver of consent to work on the patients' files for research purposes (See annexure B & D). In addition, a written consent was obtained from the Chief Executive Officer of the tertiary hospital to conduct the research in the hospital and specifically to gain access and to utilize patient files (See annexure C). A number was allocated to each file drawn by the researcher for the sample. The researcher only worked with these numbers and not the file numbers of the patients. This ensured confidentiality, privacy and anonymity of patient information. Only the researcher had access to the information and data obtained during this study. Data is now kept in a locked cupboard allowing only access to the researcher. The researcher will retain all data for a period of 5 years in a locked cupboard thereafter, it will be destroyed.

3.9 DATA COLLECTION INSTRUMENT

The researcher utilized an audit instrument (Annexure A) to collect data for the study. Instrumentation is the application of specific rules to the development of a measurement instrument or instrument (Grove, Burns & Gray, 2013: 44; Polit & Beck, 2010:338). The researcher developed an audit instrument based on all the detail needed to declare the medication prescription records used for patients in the CCUs of the tertiary hospital patients as accurately completed.

An audit is evidence of care in a structured, standardized and objective record of nursing activities (Ewles & Simnett, 2007:139). The audit instrument was designed to evaluate the status of medication prescription records and included all the written recordings completed by the doctors (DRs), the nursing staff (NS) and the pharmacology staff (PS) of the CCUs in the tertiary hospital.

The questions were designed to record complete, incomplete or not applicable status. For each item recorded as complete, a score of 1 point was indicated if the information was indicated throughout the whole document where applicable and 100% score was calculated. An incomplete score of 0 points was indicated for the information not completely indicated throughout the whole document and ≤ 99% was calculated. All information deemed as not applicable was not added to the total scores. The audit instrument comprised of two sections (A and B).

3.9.1 Section A: Biographic data (Question 1-8)

In this section the focus was on the biographic data that consisted of the date (year and month of audit), unique file number and unit name (1, 2, 3, 4, 5 or 6). Other biographic data comprised of patient information that was indicated on the patient file, which included the transfer or admission date, discharge date, age, gender and medical diagnosis. All this information appears on the patient's sticker.

3.9.2 Section B: Medication Prescription records (Question 9-75)

Section B was divided into five subsections which evaluated the set standards for the five different domains on the medication prescription record and was allocated a numerical value to indicate complete (1), incomplete (0) or not applicable status.

3.9.2.1 Section B1: Medication prescription record (Questions 9-13)

This section consisted of five subsections which evaluated the status of detailed information, which required completion by the doctor (DR), nursing staff (NS) and Pharmacology staff (PS). In some cases responsibility for completing the information

was shared between the DR, NS and PS. Subsection headings on the audit instrument evaluated the completion of the following information:

- Questions 9 -13: B.1.1 Identification requirements on patient sticker: Full name, hospital name, address, telephone number, date of birth on sticker.
- Questions 14 – 16: B.1.2 The prescription record contains all the required patient's information handwritten in absence of the patient sticker: name, folder number, birth.
- Questions 17 – 20: B1.3 The prescription record contains all required additional handwritten information: Ward/unit name, department, date of admission, number of record indicated.
- Questions 21 – 32: B.1.4 This accounts for medication detail completed by the doctor (DR). The subsection assesses how completely DR indicated 12 sets of detailed information such as: medication name, generic name only, date prescribed, doctor's name, doctor's signature, route, dose, frequency, correct dose selection, duration, correct instruction to stop medication is reflected, the correct instruction to continue medication is reflected.
- Questions 33 – 44: Correct acknowledgement and documentation of medication errors by: DR (B.1.5), NS (B.1.1.6), and PS (B.1.7). The same standards for indicating medication errors were assessed for all categories of staff and included (single line through error, signature of person who created the error, date of error indicated, clear description of correct information).
- Questions 45 – 47: Patient allergy status documented was the shared responsibility of DR and NS respectively indicated on nursing notes, doctor's notes, on prescription record.
- Questions 45 – 47: B.1.9 Omission of drug administration by NS (omission noted correctly, reason for omission indicated, and signature on medication record).

3.9.2.2 Section B2: Pharmacology prescription record (Questions 51 - 53)

This section consisted of 3 subsections which evaluated the status of detailed information which required completion by the doctor (DR). Subsection headings on the audit instrument evaluated the completion of the following information:

- Question 51: Results of serum blood levels to determine therapeutic and toxic level noted on Pharmacology result form.
- Question 52: Medication prescribed as PRN accompanied by written guidelines, e.g. signs and behavioural patterns.
- Question 53: Appropriate medication prescribed for the patent.

3.9.2.3 Section B3: Antibiotic stewardship prescription (ASP) record (Questions 54 - 63)

This section consisted of two subsections which evaluated the status of detailed information which required completion by the doctor (DR). Subsection headings on the audit instrument evaluated the completion of the following information:

- Questions 54 – 63: B.3.1 Appropriate antibiotic prescribed and recorded by the doctor which include starting date, starting time, time intervals, duration time, signature of consultant, medication stopped, source of infection, cultures sent before antibiotics are administered. (The record indicated whether treatment is prophylactic, empirical or definitive). Furthermore, the record reflects the prescription record indicating whether treatment is prophylactic, empirical or definitive (PED); prescription record indicates the source of infection as community or hospital acquired.
- Questions 64 – 66: B.3.2 Antibiotic medication discontinuation and required completion by DR which include discontinuation date indicated by doctor, doctor indicate reason for discontinuation, doctor's signature to approve discontinuation.

3.9.2.4 Section B4: Antibiotic stewardship pharmacy record (Questions 67 - 69)

In this section the status of detailed information requires completion by the Pharmacy Staff (PS).

Furthermore, this is to evaluate whether the pharmacist indicated if medication is on ward profile, quantity issued if not on ward profile and initials of approval for dispensation. Subsection headings on the audit instrument evaluated the completion of the following information:

- Question 67: Pharmacist indicated if medication is on medication profile of the ward.
- Question 68: Pharmacist indicated the quantity issued if not on ward profile.
- Question 69: Initials of pharmacist dispensing the prescribed medication is indicated.

3.9.2.5 Section B5: High alert medication (HAM) (Questions 70 – 75)

This is the last section and required collective completion by all role payers (DR, NS and PS) and is divided into two parts.

Question 70 – 72: B.5.1: Doctor prescription of inotropes or any other high alert medication on the audit instrument evaluated DR's completion of the following information: concentration or quantity of medicine, name and volume of diluents indicated, rate and duration of administration indicated.

Question 73: Every new dose of high alert medication infusion signed by the nursing staff (NS).

Questions 70-73: High alert medication (HAM) by all staff evaluated legible handwriting throughout the document, appropriate use of institutionally accepted abbreviations.

At the end of the audit instrument the final total complete or incomplete score for each audited medication prescription was based on the number of responses.

3.10 DATA COLLECTION

Data collection is the specific, systematic gathering of information relevant to the research purpose, specific objectives or questions according to a pre-established plan (Burns & Grove, 2011:52). The researcher collected the data personally utilising the audit instrument. The data collection spanned from 01 September 2014 to 26 February 2015. The discharged patient's files accompanied by a letter of approval from the ethics committee were requested from the medication records department 24 hours before the time. A copy of the letter of approval from the tertiary institution was obtained. For the first few records it took the researcher about one hour to audit one file and thereafter 1 hour to audit 3 files. The audit process was delayed due to missing files that needed to be tracked, e.g. at Medico-legal investigations and outpatient department for patient coming for follow-up visits. The researcher completed retrospective audits of 174 (68.2%) patient files from the initial sample (n=255) without assistance. Thus, the final number of audited files were n=174 (100%) and included all relevant information and medication prescription records.

3.11 DATA ANALYSIS

Data analysis is the ability to reduce, organise and give meaning to collected data. In research, quantitative data can be analysed manually, or by computer (Burns & Grove, 2011:52). A qualified biostatistician, employed by Stellenbosch University was consulted throughout the study and also assisted with the data analysis. The researcher utilized an excel sheet that was designed by a statistician to capture the data. A statistical package (SPSS) was used to statistically analyse the data. Data was analysed and reported on by using descriptive and inferential statistics, such as

frequency tables and relative frequencies, and graphically illustrated by using bar charts. Descriptive statistics were used to describe and summarise numerical data obtained from populations and samples as described by Polit and Beck (2006:352); Polit and Beck (2010:392). Information gathered reflects the actual picture (Grove, Burns & Gray, 2013: 216). Furthermore, areas of concern were identified and how to improve outcomes. Inferential statistics is, however, concerned with the characteristics of a population and uses sample data to make an inference, or suggestion about the population (De Vos, Strydom, Fouché & Delport, 2011:251). Continuous variables were summarised, using means and standard deviations since they were normally distributed. Data is illustrated in graphs, frequencies and tables. De Vos et al., (2011: 252), further express that information found of one variable correlates with information of another one.

Associations between final scores, length of stay and medical diagnoses were measured, using one way analysis of variance (ANOVA), with final scores as the dependant variable with length of stay and medical diagnoses as independent variables. Mean and standard deviations of final scores were reported per role player domain (DR, NS, PS and ASP).

If a significant ANOVA p-value was obtained with final total completion scores as continues variable, then post-hoc Bonferroni adjusted multiple comparisons were performed to determine the pair-wise differences in the mean length of stay categories, as well as medical diagnoses.

Statistical significance is referred to as the extent to which the observed results are likely and not due to chance (Burns & Grove, 2011:549). For the purpose of this study a p-value of ($p < 0.05$) was used to determine statistically significant differences between variables.

The following statistical tests were utilised to analyse the collected data.

3.11.1 Analysis of variance

ANOVA is a statistical test method, used to identify differences among two or more groups, by comparing the variability among groups with the variability within each group (Burns & Grove, 2011:532).

The following ANOVA statistical tests were applied to analyse the data.

3.11.1.1 Bonferroni

Bonferroni is a post-hoc comparison that is used to judge statistical significant results. Post-hoc comparisons are calculated to guard against the potential errors when multiple comparisons are made (Pallant, 2016:211).

3.11.1.2 Mean

The mean refers to the arithmetic average of all scores, which is a measure of central tendency (LoBiondo-Wood & Haber, 2010:581).

3.11.1.3 Standard deviation

The standard deviation is a measure of the average deviation of scores from the mean (LoBiondo-Wood & Haber, 2010:586).

3.11.1.4 Post-hoc analysis

Post-hoc analysis is a statistical technique, performed with more than two groups to determine which groups are significantly different (Burns & Grove, 2011:544).

3.11.1.5 Frequency distribution

The frequency distribution is a descriptive statistical method, used to summarise the occurrences of events being studied (LoBiondo-Wood & Haber, 2010:578).

3.11.2 P-value (level of significance)

The level of statistical significance is the probability level at which the results of a statistical analysis are judged to indicate a statistically significant difference among groups (Burns & Grove, 2011:377). In most nursing studies, the level of significance has been reported as 0.05. If the level of significance found in a statistical analysis is therefore 0.05 or less, the compared groups would be considered as being significantly different (Burns & Grove, 2011:377).

3.12 SUMMARY

In this chapter, the research methodology, i.e. the population, sampling, data collection and data analysis methods were discussed. In the next chapter, the results and interpretation of the collected and analysed data are presented and discussed.

CHAPTER 4:
RESEARCH FINDINGS

4.1 INTRODUCTION

In this chapter, the research study results are presented and the analysed outcomes are summarised in tables and histograms. The data in this study was analysed with the support of a statistician, by using computerised data analysis software, i.e. the Statistical Program for Social Sciences (SPSS version 22 IBM). The quantitative data was captured on a Microsoft Excel spreadsheet that had been customised by the statistician for the purpose of this study, and care was taken to accurately capture the data. Results are presented in descriptive analysis and percentages including tables and graphs. Where non-applicable items were identified the calculations were based only on the items that were applicable and are indicated throughout this chapter.

4.2 AUDITING OF FILES

Files were audited and the following points were allocated:

- Complete = 1
- Incomplete = 0

All sections on the medication prescription records were audited for a complete or incomplete status. The medication prescription records from the audited files (n=174100%) were found to be recorded as incomplete. Scores will be further discussed under various sections of chapter four below.

4.3 SECTION A: BIOGRAPHIC DATA (QUESTION 1-8)

In this section the researcher focused the questions on the biographic data that consisted of the date (year and month of audit), file number and unit name (1, 2, 3, 4, 5 or 6). Additional biographic data comprised of patient information that was indicated on the patient file, which included the transfer or admission date, discharge date, age, gender and medical diagnosis.

4.3.1 Question 3: Unit / ward

The distribution of total scores of audited files per unit is reflected on the pie chart in figure 4.1. The audit tool identified the CCU name and classified the name from units one to six where the patients were admitted. Thus, table 4.1 shows the units and the

total number of files audited from each unit which included a medication prescription record.

The majority n=52 (30%) of medication prescription records represented files from the coronary care (unit 5), while the second highest n=44(25%) records were drawn from cardiothoracic care (unit 4). Table 4.1 also shows the mean score obtained by the number of files audited in each unit with unit 2 (general surgical) the highest (56.5) and unit 6 (neurosurgical) obtaining the lowest score (37.4).

As shown in figure 4.1, none of the medication prescription records in patients' files where 100% completed. Completion status of medication prescription records varied between 60-99% completed scores. Minority n=4 (2.3%) files had a total score of 60 – 69% completion status, while majority n=99 (56.9%) of medication prescription records in patient files achieved a 80-89 % completion score The highest total completion score was 90-99% was found in only n=5 (2, 9%) audited files.

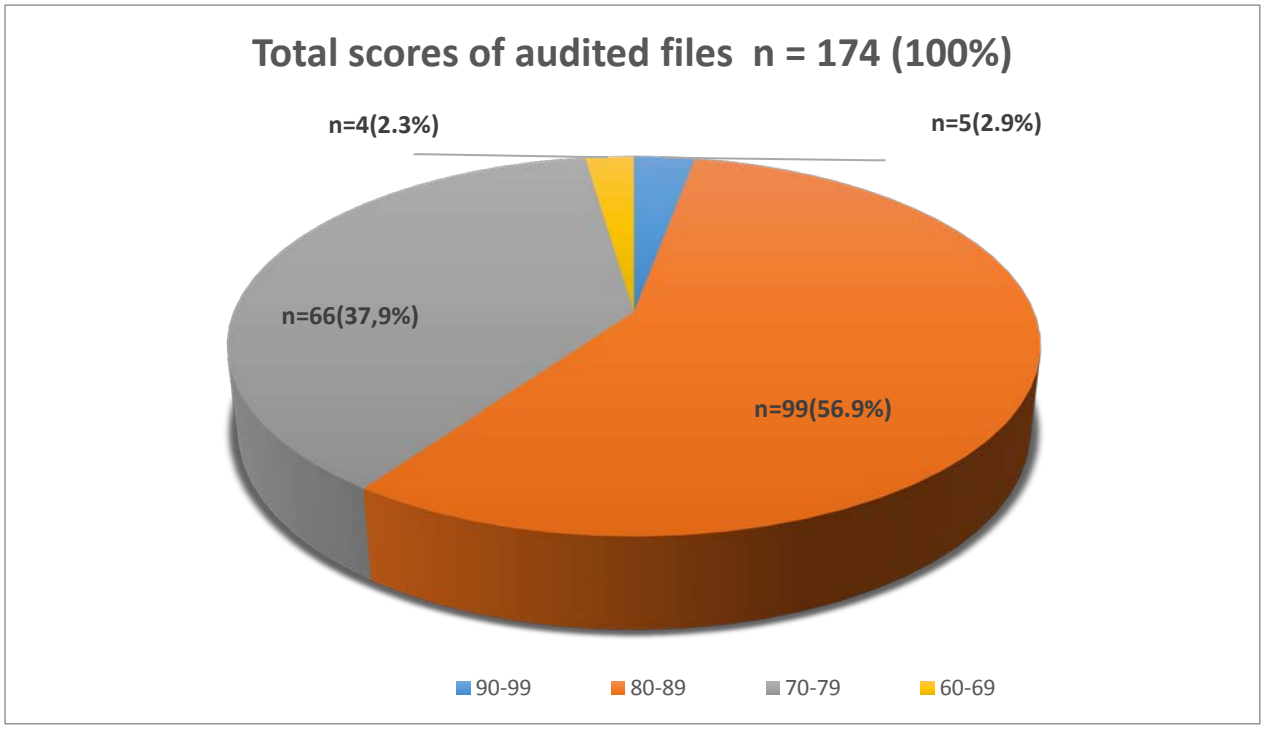

Figure 4.1: Total scores of audited files

Table 4.1: Total mean scores per CCU

CCU	Number of files (n)	%	Mean Score
Unit 1	22	12.5	56.1
Unit 2	27	15.5	56.5
Unit 3	8	5	55.3
Unit 4	44	25	48.8
Unit 5	52	30	39.5
Unit 6	21	12	37.4
TOTAL	174	100	

4.3.2 Questions 4-5: Transfer or admission and discharge date

The patient's admission or transferred into the unit date, as well as the discharge dates were recorded on the audit tool. The length of stay in CCU was calculated based on the admission and discharge dates. These lengths of stay dates were further categorised as: short stay (1 – 5 days); long stay (6- 10 days); extended stay (11 – 20 days); and extended stay with complications (> 20 days) as shown in table 4.2 below.

The mean length of stay was 6 days, with a standard deviation of 7.26. The minimum length of stay was 2 days with the maximum length of stay of 55 days. The files audit revealed that patients are admitted to CCU for various types of interventions which then influence their length of stay in the CCUs. The majority of files showed that patients experienced a short stay n=132(76%), while the minority n=8 (4.5%) experienced an extended stay with complications.

Table 4.2: Length of stay

Length of stay Category	Number of files (n)	%
Short stay (1 – 5 days)	132	76
Long stay (1– 10 days)	21	12
Extended stay (1 – 20 days)	13	7.5
Extended stay with complications (> 20 days)	8	4.5
TOTAL	174	100

4.3.3 Questions 6-7: Age and gender distribution

The average age of the patients admitted to the units was 52.2 years, with a standard deviation of 17.33. The most dominant age range was between 55 – 74 years. However, the minimum age was 15 years with the highest age at 88 years as shown in figure 4.2.

The majority of patients admitted to the CCU during the audit period were males n= 102 (59%).

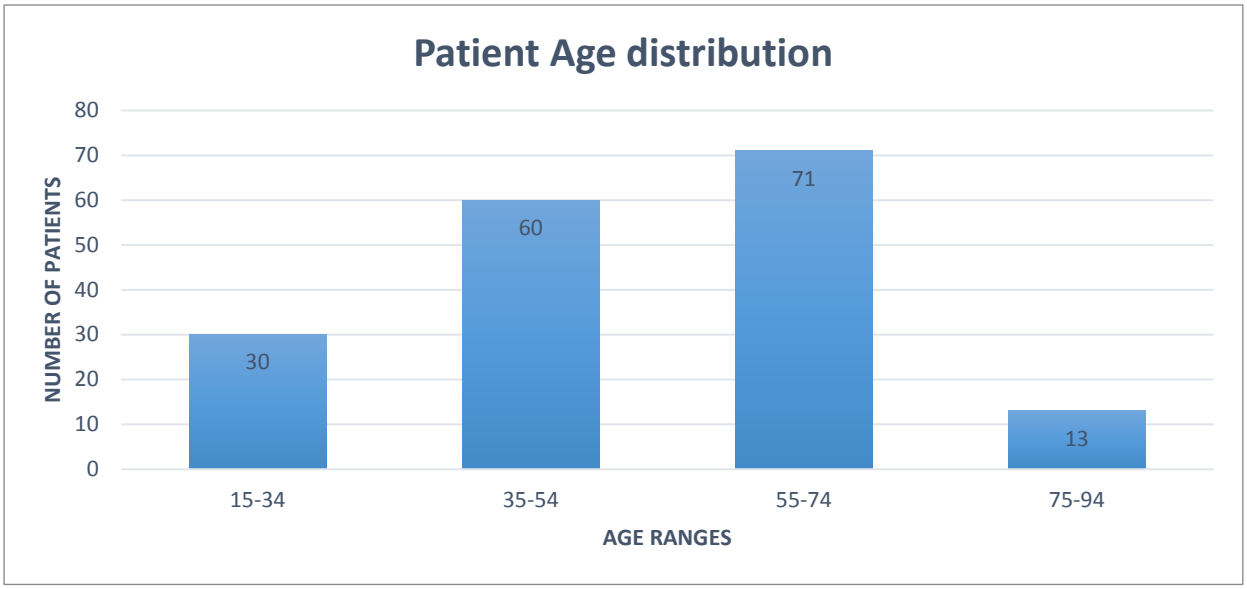

Figure 4.2: Age distribution of patients

4.3.4 Question 8: Medical diagnosis

The medical diagnosis of the patients were categorised as shown in table 4.3.

Majority n=52 (30%) of medication prescription records indicated that patients in CCUs were diagnosed with a cardiovascular disease, while n=38 (22%) were post-operative cardiothoracic surgery and the minority (n=9/5%) were acute spinal cord admissions. A further analysis shows that the completion rate of the audited medication prescription records of patients with a respiratory diagnosis obtained the highest total mean score of 56.1.

Comparisons of completion scores were calculated between the different medical diagnoses indicated on medication prescription records. A statistical difference was identified between the audited medication prescription records indicating cardiovascular disease and general surgery (p=0.004) and neurosurgery (p=0.001). Concluding that the status of medication prescription records of patients diagnosed

with general surgery or neurosurgery was found to be more complete than medication prescription records status of patients diagnosed with cardiovascular disease.

Table 4.3: Medical Diagnoses category of patients (n=174)

Medical Diagnoses category of patients	n	%	Total mean scores
Respiratory	23	13	56.1
General Surgery	32	18	55
Acute Spinal Cord Injury	9	5	53.8
Cardiothoracic Surgery	38	22	46.5
Cardiovascular Disease	52	30	39.5
Neurosurgery	20	12	37.4
Total	174	100	

4.4 SECTION B.1.1-9

Section B was divided into five subsections which audited the set standards for the five different domains on the medication prescription record and was allocated a numerical value to indicate complete (1), incomplete (0) or not applicable status of the medication prescription records as summarised in table 4.4.

4.4.1 Section B1: Medication prescription record

This section reports audit results on various sections of the medication prescription record which is a shared responsibility among the multi-disciplinary team.

4.4.1.1 Questions 9-13: Identification requirements on patient information sticker:

As shown in table 4.4 (questions 9-13) it was required that all patient records be identified with patient information that consisted of a full name, hospital number, address, telephone number, date of birth which would automatically be displayed on the patient sticker. Differences in patient details occurred when some files were not updated with all the identification requirements during the data collection period. Table 4.4 shows that none (n=0%) of the information stickers were complete.

Table 4.4: Required information on patient's sticker

Prescription record contains all required patient's information on patient sticker:			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
9. Full name	n=170 (98%)	n=4 (2%)	n=174 (100%)
10. Hospital number	n=170 (98%)	n=4 (2%)	n=174 (100%)
11. Address	n=167 (96%)	n=7 (4%)	n=174 (100%)
12. Telephone number	n=124 (71%)	n=50 (29%)	n=174 (100%)
13. Date of birth	n=168 (97%)	n=6 (3%)	n=174 (100%)

4.4.1.2 Questions 14-16: Prescription record contains all required patient's information to be handwritten in absence of the patient sticker (n=69/100%)

In the absence of the official patient information sticker it was required that the staff completed the patient information in writing by hand. The majority n=105 (60%) of the prescription records reflected the patient's information sticker and n=69 (40%) required handwritten information. The audited status of the applicable files n= 69(40%) are discussed below.

Questions 14 – 16 in table 4.5 indicate the status of n=69 (100%) applicable files. Only n= 18 (26%) of the prescription records without a patient sticker had the name of the patient and folder number handwritten and was deemed complete, while n= 51 (74%) of the files were incomplete with either no handwritten name or folder number. Furthermore, an even higher number of these files n=59 (86%) had no date of birth written in.

Table 4.5: Patient's information handwritten in absence of the patient sticker

Prescription record contains all required patient's information hand written in absence of the patient sticker applicable to n= 69 (100%) files			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
14. Name	n=18 (26%)	n=51 (74%)	n= 69 (100%)
15. Folder number	n=18 (26%)	n=51 (74%)	n=69 (100%)
16. Birth date	n=10 (14%)	n=59 (86%)	n=69 (100%)

4.4.1.3 Questions 17-20: Prescription record contains all required additional handwritten information

Additional handwritten information regarding the location of the patient, date of admission and the number of prescription records used for each patient were required on the front page of the medication prescription record.

The name of the unit was handwritten by staff on n=158(91%) of the medication prescription records, while the department's name was found complete on n=123 (71%) of the files. In the CCU environment patients might have more than one prescription record therefore, the number of the record referred to in question 20 of table 4.6 indicated the number of medication prescription records used per patient. The majority n=172 (99%) of the prescription records were not numbered.

Table 4.6: Additional handwritten information

Prescription record contains all additional handwritten information			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
17. Ward/unit name	n=158 (91%)	n=16 (9%)	n=174 (100%)
18. Name of Department	n=123 (71%)	n=51 (29)	n=174 (100%)
19. Date of admitted	n=97 (56%)	n=77 (44%)	n=174 (100%)
20. Number of record indicated	n=2 (1%)	n=172 (99%)	n=174 (100%)

4.4.1.4 Questions 21-32: Medication detail completed by doctors (DRs)

Doctors follow specific steps to communicate the administration of prescribed medication. An indication of the prescribed medication name (question 21) was found to be complete on n=172 (99%) of the medications as indicated by the doctor. Two (1%) files had no medication name and were found to be incomplete.

Table 4.7 illustrates that the doctors completed the (question 22) generic medication names on n=50 (29%) of the audited files, however n=124 (71%) failed to write the generic medication names. Furthermore, the printing of the prescriber's name (question 24) must at least appear once on the prescription record to exclude confusion with the different signatures. The doctor's name was printed on n=53 (30%) of the records. In most of the prescription records n=165 (95%) the doctors signed (question 25) the medication that they prescribed, but they omitted to print their names n=121(69%). The correct instruction to stop medication (question 31) was not followed on n=158(91%) of the audited medication prescription records. Only n= 22 (27%) of the doctors completed (question 32), the correct instruction to continue medication (when the prescription expired).

In n=168 (97%) of audited records the prescription indicated the route for medication administration, while only n=6(3%) were incomplete (question 26).

The frequency of medication (question 27) was recorded by doctors in almost all the medication prescription records, n= 170 (98%) and n=4 (2%) incomplete.

Ninety five percent (n=165) prescription records indicated the medication dosage and only 5% (n=9) records did not indicate the dose of medication.

Table 4.7 reflects that the majority of prescription records n=158 (91%) revealed that doctors incorrectly indicated how to stop medication (question 31). Signatures of doctors appeared in n=165 (95%) when medication was discontinued, however n=121(69%) failed to print their names. The instructions to stop medication were not followed in n=158(91%) of the audited prescription records.

The status of the completion of medication prescription records of doctors for the various CCU's were compared. Further analysis shows that the total mean score obtained by the doctors for the completion rate of the audited medication prescription records was highest (30.4) for CCU 2 (general surgery) and lowest (22.4) for CCU 6 (neurosurgery).

Furthermore, the mean completion scores of doctors managing patients were the highest (30.4) on medication prescription record indicating respiratory conditions and lowest (22.4) for medication prescription records indicating neurosurgical diagnoses.

Table 4.7: Medication detail completed by doctor (DR)

Medication detail completed by doctor (DR):			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
21. Medication name	n=172 (99%)	n=2 (1%)	n=174 (100%)
22. Generic name only	n=50 (29%)	n=124 (71%)	n=174 (100%)
23. Date prescribed	n=167 (96%)	n=7 (4%)	n=174 (100%)
24. Doctor's name	n=53 (30%)	n=121 (69%)	n=174 (100%)
25. Doctor's signature	n=165 (95%)	n=9 (5%)	n=174 (100%)
26. Route indicated	n=168 (97%)	n=6 (3%)	n=174 (100%)
27. Frequency indicated	n=170 (98%)	n=4 (2%)	n=174 (100%)
28. Dose indicated	n=165 (95%)	n=9 (5%)	n=174 (100%)
29. Correct dose selection	n=155 (89%)	n=19 (11%)	n=174 (100%)
30. Duration indicated	n=135 (78%)	n=39 (22%)	n=174 (100%)
31. The correct instruction to stop medication is reflected	n=16 (9%)	n=158 (91%)	n=174 (100%)
32. The correct instruction to continue medication is reflected	n=22 (27%)	n=59 (73%)	n=81 (100%)

4.4.1.5 Questions 33 - 36: Correct acknowledgement and documentation of medication errors by doctor (DR) (n=89/100%)

Correct acknowledgement and documentation of medication errors by the DR was not applicable to all files, thus the not-applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on what was applicable n=89 (100%) as reflected in table 4.8. It was found that when errors were made, a single line was not always drawn through by the doctor n=40 (45%), a signature was not added n=76 (85%) and the date of the error n=82 (92%) was not indicated.

Table 4.8: Correct acknowledgement and documentation of medication errors by doctor (DR):

Correct acknowledgement and documentation of medication errors by Doctor (DR) applicable to n= 89 (100%) files			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
33. Single line through error	n=49 (55%)	n=40 (45%)	n=89 (100%)
34. Signature of person who created the error	n=13 (15%)	n=76 (85%)	n=89 (100%)
35. Date of error indicated	n=7 (8%)	n=82 (92%)	n=89 (100%)
36. Clear description of correct information	n=42 (47%)	n=47 (53%)	n=89 (100%)

4.4.1.6 Questions 37-40: Correct acknowledgement and documentation of medication errors by nursing staff (NS) (n=54/100%)

Correct acknowledgement and documentation of medication errors by NS was not applicable to all of the files. Thus, the not-applicable files were removed from the 174 medication records that were audited and the calculations are based on the applicable n=54 (100%) as reflected in table 4.9.

Nursing staff did not always draw a single line through errors n=45 (83%), add a signature to an error n=53(98%) and indicate the date of error n=52(96%). Further analysis shows that the total mean score obtained by the nursing staff for the completion rate of the audited medication records was highest (14) for CCU 3 (acute spinal cord injury) and lowest (13) for CCU 4 (cardiothoracic).

The total completion scores for medication prescription records completed by nurses were calculated and compared amongst the various patient diagnoses. The mean completion scores for nursing staff was highest (13.9) for medication prescription records indicating acute spinal cord injury conditions and lowest (13) for medication prescription records indicating general surgery.

Table 4.9: Correct acknowledgement and documentation of medication errors by nursing staff (NS)

When Correct acknowledgement and documentation of medication errors by nursing staff (NS) applicable to n=54 (100%) files			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
37. Single line through error	n=9 (17%)	n=45 (83%)	n=54 (100%)
38. Signature of person who created the error	n=1 (2%)	n=53 (98%)	n=54 (100%)
39. Date of error indicated	n=2 (4%)	n=52 (96%)	n=54 (100%)
40. Clear description of correct information	n=9 (17%)	n=45 (83%)	n=54 (100%)

4.4.1.7 Questions 41-44: Correct acknowledgement and documentation of medication errors by pharmacy staff (PS) (n=29/100%)

Correct acknowledgement and documentation of medication errors by PS was not applicable to all of the files, thus the not-applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on the applicable n=29 (100%) as reflected in table 4.10. Pharmacy staff did not always draw a single line through errors n=7 (24%), add a signature to an error n=18(62%) and indicate the date of error n=19(66%).

A clear description of correct information was recorded by pharmacy staff on n=20 (69%) of the medication prescription records. Further analysis shows that that the total mean score obtained by the pharmacy staff for the completion rate of the audited medication prescription records was highest (3.2) for CCU 1(respiratory) and lowest (1.8) for CCU 5 (cardiovascular).

Furthermore, the total completion scores for medication prescription records completed by the pharmacists were calculated and compared amongst the various patient diagnoses indicated on the medication prescription records. The mean completion

scores for pharmacy was highest (3.2) for medication prescription records indicating respiratory conditions and lowest at (1.8) for cardiovascular conditions.

Table 4.10: Correct acknowledgement and documentation of medication errors by pharmacy staff (PS)

Correct acknowledgement and documentation of medication errors by pharmacy staff (PS) applicable to n=29 (100%) files			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
41. Single line through error	n=22 (76%)	n=7 (24%)	n=29 (100%)
42. Signature of person who created the error	n=11 (38%)	n=18 (62%)	n=29 (100%)
43. Date of error indicated	n=10 (34%)	n=19 (66%)	n=29 (100%)
44. Clear description of correct information	n=20 (69%)	n=9 (31%)	n=29 (100%)

4.4.1.8 Questions 45 – 47: Patient allergy status documented

Table 4.11 shows that the patient allergy status was indicated in the majority (n=137/79%) of the nursing notes. However, an alarming number of n=35 (20%) files of nursing notes did not indicate the patient allergy status. Furthermore, the allergy status was not indicated in the doctor's notes n=100 (58%) and n=167(96%) medication prescription record.

Table 4.11: Patient allergy status documented in various documents

Patient allergy status documented in:			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
45. Nursing notes	n=137 (79%)	n=37 (21%)	n=174 (100%)
46. Doctor's notes	n=72 (41%)	n=102 (59%)	n=174 (100%)
47. On the prescription record	n=5 (3%)	n=169 (97%)	n=174 (100%)

4.4.1.9 Questions 48-50: Omission of drug administration by nursing staff (NS) (n=124/100%)

Omission of drug administration by NS was not applicable to all files, thus the not applicable files were removed from the 174 medication prescription records that were audited and the calculations were based on the applicable n=124 (100%) as shown in table 4.12. Only n=14 (11%) of the medication prescription records had a clear description for omission of drug administration by nursing staff. A high number n=110(89%) of the prescription records were unclear regarding omission of drug administration by NS.

Reasons for the omission of medication administration by NS were appropriately indicated on only n=4 (3%) of medication prescription records applicable to NS. The majority n=120 (97%) of medication prescription records displayed no reason why omissions occurred.

Furthermore, the majority n=120 (97%) of the medication prescription records the responsible NS did not sign to acknowledge the omission of medication. Signature of nursing staff who were responsible for the omissions appeared on only n=4(3%) of the medication prescription records.

Table 4.12: Omission of drug administration by nursing staff (NS)

Omission of drug administration by nursing staff (NS) applicable to n=124 (100%) files			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
48. Omission noted correctly	n=14 (11%)	n=110 (89%)	n=124 (100%)
49. Reason for omission indicated	n=4 (3%)	n=120 (97%)	n=124 (100%)
50. Signature on medication record	n=4 (3%)	n=120 (97%)	n=124 (100%)

4.4.2 Section B2: Pharmacology prescription record

4.4.2.1 Questions 51-53

This section will report results on the pharmacology prescription records which evaluated the status of detailed information which required completion by the pharmacist (PS).

Results and status of questions 51-53 about the pharmacology prescription record audit tool are indicated in table 4.13. Question 51, which refers to the serum blood levels to determine therapeutic and toxic levels, were not applicable to all of the files. Thus, the not-applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on the applicable files n=39 (100%) as shown in table 4.13. Results of the critically ill patient indicate whether expected outcomes of current treatment has been achieved or require adjustments. The doctor is able to achieve maximum therapeutic action with very low or no risk of toxicity. Adequate doses of medication are then successfully prescribed. Most of these applicable audited files n=30 (77%) indicated that serum levels were taken as treatment directives, while a minimum of n=9 (23%) of the records indicated no serum levels were taken while the patient was receiving treatment.

Question 52, refers to medication prescribed as PRN accompanied by written guidelines, e.g. signs and behavioural patterns which were not applicable to all files. Thus, the not-applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on the applicable files n=75 (100%) as shown in table 4.13. Medication prescribed as PRN indicated a short period requirement with expected outcomes which was completed on only n=10 (13%) medication prescription records, accompanied by written guidelines, while n=65 (87%) were incomplete.

Question 53, reflects that appropriate medication was prescribed for the patient which was not applicable to all files. Thus, the not-applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on the applicable n=159 (100%) as shown in table 4.13. Results on table 4.13 show that most n=155 (97%) of the prescription records displayed appropriate prescriptions in comparison with the four (3%) records that were incomplete.

Table 4.13: Status of Pharmacology prescription record

Pharmacology prescription record for applicable files :			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
51. Results of serum blood levels to determine therapeutic and toxic level noted on Pharmacology result form	**n=30 (77%)**	**n=9 (23%)**	**n=39 (100%)**
52. Medication prescribed as PRN accompanied by written guidelines e.g. signs and behavioural patterns	n=10 (13)	n=65 (87%)	n=75 (100%)
53. Appropriate medication is prescribed for the patient	**n=155 (97%)**	**n=4 (3%)**	**n=159 (100%)**

4.4.3 Section B3: Antibiotic Stewardship Prescription (ASP) Record

This section will report on the audit results for questions 54-63 which is the responsibility of the doctor (DR) to complete.

4.4.3.1 Questions 54- 63: Appropriate antibiotic prescribed by doctor (DR)

B.3.1 Antibiotic stewardship prescription (ASP) records auditing the appropriate antibiotic prescribed by doctor (DR) was not applicable to all files. Thus, the not applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on the various applicable revised files (n) as shown in table 4.14.

Question 55 n=54 (110%) on table 4.14 shows that the starting time recorded was completed on n=27(50%) of the medication prescription records. Equal number n=27 (50%) of applicable medication prescription records were incomplete. Question 57 n= 81 (100%) on duration time recorded for prescribed antibiotics appeared on n=72 (89%) of the records.

The consultant doctor's signature (question 58) was applicable to n=56 (100%) files and is one of the requirements whenever prescribing antibiotic. Majority (n=48/ 86%) of the prescription records reflected the doctor's signature. Eight (14%) antibiotic stewardship prescription records had incomplete details of the prescribing doctor.

The results obtained from the cultures indicated whether dosages were needed to be adjusted in case of organ dysfunction, e.g. renal impairment. Question 61, refers to cultures sent before antibiotics are administered and recorded, which was applicable to n=43 (100%) files. A few n=8 (19%) of the records in the audited files indicated that cultures were sent before administration for analysis, while the majority (n=35/81%) of the prescriptions omitted to mention whether cultures were sent.

Question 62, on the prescription record indicated whether treatment was prophylactic, empirical or definitive (PED) was applicable to n=46 (100%) files. Equal number of n=23 (50%) of the prescription records indicated that treatment was one of the following: prophylactic, empirical or definitive (PED) and same number n=23 (50%) of prescription records did not reflect whether treatment was one of PED.

Question 60, on the source of infection recorded was applicable to n=50 (100%) files. Only n=8 (19%) of records indicated which infection to be treated, while the majority n=35 (70%) of the prescription records were incomplete and did not indicate the source of infection.

Further analysis shows that the total mean score obtained by the doctors prescribing antibiotics according to ASP was highest (11) for CCU 1(respiratory) and lowest (2.7) for CCU 6 (neurosurgical). The mean scores for doctors was highest (11) for medication prescription records indicating respiratory conditions and lowest at (2.75) for neurosurgical condition.

Table 4.14: Appropriate antibiotic prescribed by doctor (DR)

Appropriate antibiotic prescribed by doctor (DR)			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
54. Starting date recorded	n=79 (92%)	n=7 (8%)	n=86 (100%)
55. Starting time recorded	n=27 (50%)	n=27 (50%)	n=54 (100%)
56. Time intervals recorded	n=75 (90%)	n=8 (10%)	n=83 (100%)
57. Duration time recorded	n=72 (89%)	n=9 (11%)	n=81 (100%)
58. Signature of Consultant	n=48 (86%)	n=8 (14%)	n=56 (100%)
59. Medication stopped been recorded	n=31 (43%)	n=42 (57%)	n=73 (100%)
60. Source of infection recorded	n=15 (30%)	n=35 (70%)	n=50 (100%)
61. Cultures sent before antibiotics are administered and recorded	n=8 (19%)	n=35 (81%)	n=43 (100%)
62. Prescription record indicates whether treatment is prophylactic, empirical or definitive (PED)	n=23 (50%)	n=23 (50%)	n=46 (100%)
63. Prescription record indicates the source of infection as community or hospital acquired	n=8 (17%)	n=40 (83%)	n=48 (100%)

4.4.3.2 Questions 64- 66: Discontinuation of antibiotic medication by doctor (DR)

B.3.2 Antibiotic medication discontinuation by doctor (DR) was not applicable to all of the files. Thus, the not applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on the various applicable revised files (n) as shown in table 4.15.

Question 64, on the discontinuation of medication antibiotics n=63 (100%), were only indicated by the doctor. The minority n=12 (19%) of the ASP records reflected a date for antibiotic medication to be discontinued, while the majority n=51 (81%) did not indicate the discontinuation date for antibiotics.

Question 65 refers to the doctor who indicated a reason for discontinuation n=59 (100%) of antibiotics and only a few n=7 (12%) of ASP records indicated a reason for discontinuation of antibiotic medication. However, reasons for discontinuation of medication was not indicated on the majority n=52 (88%) of applicable ASP records. Furthermore, the majority n=47 (78%) of applicable ASP records did not indicate a doctor's signature (question 66) n=60 (100%) to approve discontinuation of medication.

Table 4.15: The discontinuation of antibiotic medication by doctor (DR)

Antibiotic medication discontinuation by doctor (DR):			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
64. Discontinuation date indicated by doctor	n=12 (19%)	n=51 (81%)	n=63 (100%)
65. Doctor indicated reason for discontinuation	n=7 (12%)	n=52 (88%)	n=59 (100%)
66. Doctor's signature to approve discontinuation	n=13 (22%)	n=47 (78%)	n=60 (100%)

4.4.4 SECTION B4: Antibiotic stewardship pharmacy (ASP) record (Question 67-69)

In section B4 the completion of the antibiotic stewardship pharmacy record is the responsibility of pharmacy staff (PS) and results will be reported. B.4, questions 67-69 were not applicable to all files, thus the not-applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on the various applicable revised files (n) as shown in table 4.16.

The medication profile of a ward is a pharmaceutical list of medication compiled by a pharmacists, for a CCU speciality according to the condition of patients and number of bed occupancy. The pharmacist failed to indicate if medication is on the medication profile of the ward (question 67) n=83 (100%) and only n=25 (30%) of the prescription records were completed. Medication profiles of the ward were not displayed on the majority n=58 (70%) of the ASP records

PS indicating the quantity of medication issued if not on the ward profile (question 68) according to table 4.16, was indicated on n=68 (91%) of the applicable ASP records, while n=7(9%) were incomplete.

Pharmacists displayed their initials (question 69) on n=68 (89%) of the ASP records and n=8 (11%) of ASP records were incomplete.

Table 4.16: Antibiotic stewardship pharmacy (ASP) record completed by pharmacy staff (PS)

Antibiotic Pharmacy Record completed(ASP) by Pharmacy staff (PS):			
Standards	**Complete (1)**	**Incomplete (0)**	**Totals**
67. Pharmacist indicated if medication is on medication profile of the ward	n=25 (30%)	n=58 (70%)	n=83 (100%)
68. Pharmacist indicated the quantity issued if not ward profile	n=68 (91%)	n=7 (9%)	n=75 (100%)
69. Initials of pharmacist dispensing the prescribed medication is indicated	n=68 (89%)	n=8 (11%)	n=76 (100%)

4.4.5 Section B5: High alert medication (HAM) (Questions 70-75)

Section B5 requires collective completion by all role players (DR, NS and PS).

4.4.5.1 Questions 70-73: Doctor (DR) prescription of inotropes or any other high alert medication

B.5.1 Doctor's prescription of inotropes or any other high alert medication e.g. adrenaline or potassium was not applicable to all files, thus the not-applicable files were removed from the 174 medication prescription records that were audited and the calculations are based on the various applicable revised files (n) as shown in table 4.17.

The first four subsections in table 4.17 illustrate the documentation of these medications. The majority n=105(80%) of medication prescription records of patients who required HAM reflected the concentration or quantity of medicine (questions 70) n=131(100%). However, n=26 (40%) of medication prescription records which had HAM prescribed omitted the quantity or concentration of the medication.

Table 4.17 shows that the majority (n=77/ 67%) of the audited prescription records indicated the name and volume of the diluents (question 71) n=117 (100%). However, for HAM the name and volume were not documented in n= 40 (33%) of the records.

Administration of HAM is regulated through an infusion pump at a specific rate and duration titrated according to the patient's condition. Table 4.17 shows that the rate and duration of HAM (question 72) n=113 (100%) were documented on n=70 (62%) of the audited files and (n=43/38%) of the prescription records were incomplete and did not indicate rate and duration.

Majority (n=85 /68%) of the audited medication prescription records n=125 (100%) were signed by the CCU nurse when changing HAM infusion and the rest (n=40/32%) were unsigned as shown in table 4.17.

Table 4.17: Doctor's (DR's) prescription of inotropes or any other high alert medication

Doctor(DR) prescription of inotropes or any other high alert medication:			
Standard	**Complete (1)**	**Incomplete(0)**	**Totals**
70. Concentration or quantity of medicine indicated	n=105 (80%)	n=26 (20%)	N=131 (100%)
71. Name and volume of diluent indicated	n=77 (67)	n=40 (33%)	n=117 (100%)
72. Rate and duration of administration indicated	n=70 (62%)	n=43 (38%)	n=113 (100%)
73. Every new dose of high alert medication infusion signed by the nursing staff	n=85 (68%)	n=40 (32%)	n=125 (100%)

4.4.5.2 Questions 74-75: High alert medication by all staff

According to table 4.18 majority (n=147/84%) of audited records n=174 (100%) indicated legible handwriting (question 74) of staff responsible for completing the medication prescription records, while on n=27 (16%) of prescription records illegible handwriting was found.

A list of institutionally approved abbreviations clarifying the meaning accompanies the medicine trolley. Appropriate use of institutionally accepted abbreviations was not applicable to all files, thus the not-applicable were removed from the 174 medication prescription records that were audited and the calculations are based on the applicable n=170 (100%) as shown in table 4.18. Appropriate use of institutionally accepted

abbreviations (question 75) were written on n=143 (84%) of the audited medication prescription records. However, n=27 (16%) of the patient's prescription records indicated incorrect usage of abbreviations.

Table 4.18: High alert medication by all staff

High alert medication by all staff:			
Standard	**Complete (1)**	**Incomplete (0)**	**Totals**
74. Legible handwriting throughout the document	n=147 (84%)	n=27 (16%)	n=174 (100%)
75. Appropriate use of institutionally accepted abbreviations	n=143 (84%)	n=27 (16%)	n=170 (100%)

4.5 SUMMARY

In this chapter, the data being collected during this study was analysed, summarised, interpreted and reported. The researcher succeeded in exploring, investigating and successfully addressing the research question, i.e.:

"What is the status of a retrospective audit of medication prescription records in the CCUs of a tertiary hospital in the Cape Metropole?"

By employing scientific, investigative techniques, the medication prescription records of the CCUs in a tertiary hospital in the Cape Metropole was audited, and the status of the records were successfully identified.

The following objectives were achieved during the field study:

The objectives as set for this study were achieved, namely to determine whether:

1. Medication prescription records were accurately completed by the doctors (DRs)
2. Medication prescription records were accurately completed by the nursing staff (MS)
3. Pharmacology requirements by pharmacy staff (PS) were accurately completed
4. Antibiotic stewardship prescription (ASP) records were accurately completed
5. High alert medication (HAM) records were accurately completed

In chapter five, discussions, conclusions and recommendations, based upon the scientific evidence obtained through this study are discussed.

CHAPTER 5:
DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The preceding chapters contain a description of the rationale for this study and an in-depth literature review regarding the status of medication prescription records in the CCUs. Furthermore, the research methodology as well as the analysis and interpretation of data were presented and described.

In this chapter the conclusions drawn from the analysis are summarised and the recommendations based on the findings of this study are proposed. The limitations of the study, as well as the final conclusions are presented.

5.2 DISCUSSION

The aim of the study was to conduct a retrospective auditof medication prescription records in critical care units of a tertiary hospital in the Cape Metropole. Critically ill patients are susceptible to medication errors due to their prolonged stay in a complex CCU environment (Moyen *et al*., 2008:3).

A brief discussion of the findings of the study as it relates to the following study objectives follows:

- Completion status of medication prescription records by the doctors (DRs).
- Completion status of medication prescription records by the nursing staff (NS).
- Completion status of pharmacology requirements by pharmacy staff (PS).
- Completion status of the antibiotic stewardship records (ASP).
- Completion status of high alert medication (HAM) records.

A discussion on the achievement of each of these objectives is subsequently provided.

5.2.1 Objective 1: Completion status of medication prescription by the doctors (DRs).

Doctors prescribe medication on a patient identified record and the administration of medication in the CCU is solely performed according to the doctor's detailed prescription on the patient's record. Furthermore, doctors follow specific steps to communicate the administration of prescribed medication. In this study 99% of 174

files indicated the name of medications and 1% was incomplete. However, 71% did not indicate the generic name (table 4.7). The prescription of generic names is an institutional requirement and doctors are therefore encouraged to prescribe the common generic name for the drug. Additionally, according to medical legislation the doctors are required to print their name once and sign for every new medication they prescribe. However, 69% of 174 files indicated the absence of a doctor's name. Even though results of the current study show that the doctor's signature is indicated on 95% of files, it was difficult to identify the responsible doctor without his/her printed name.

Indicating when medication should be stopped is essential for the management of patient health care in CCUs. Doctors failed to reflect the correct instruction to stop medication on 91% of the audit files and therefore increased the risk for adverse events such as drug toxicity. Furthermore, in 73% of 81 files doctors failed to indicate the correct instruction to continue medication for the patient. The desired instruction to stop medication is drawing a line vertically on the date and writing the date of stopping the medication with the doctor's signature and name if not the same person.

Doctors failed to adhere to the correct acknowledgement and documentation of medication errors. Furthermore, on 85% of 89 files in table 4.8 the doctor did not sign when they created an error, 92% did not indicate the date the error occurred, and 53% failed to give a clear description of the correct information. These incomplete and incorrect acknowledgements of medication errors could cause confusion for the nursing staff responsible for administering medication to critically ill patients.

Doctors establish on initial examination whether the patient is allergic to any medication and thus need to indicate any known allergies in the doctor's notes and on the medication prescription record (The Pharmaceutical Journal, 2011:1). As shown in table 4.11, 59% of 174 files did not reflect the patient allergy status in the doctor's notes, and 97% were not indicated on the medication prescription record of the patient. Allergies should be documented in the doctor's notes on admission and on the front page of the medication prescription record where it is visible for anyone of the multidisciplinary team whenever treatment is rendered. In CCU the patients' conditions are unpredictable and in a state of emergency medication could be administered without consulting the allergy status. Furthermore, doctors need to be aware of the patient's allergy status to avoid drug reactions for patients and an anaphylactic shock which could result because of an allergy to a particular medication, such as penicillin. Critically ill patients require immediate and complex interventions in a high-risk environment (Camire, Moyen & Stelfox , 2009: 936)

Medication prescribed as PRN should be accompanied by written guidelines, such as signs and behaviour for when medication should be administered in CCU. Without this information one is unable to measure the outcome of the treatment. This study found (table 4.13) that 87% of 75 applicable files did not include correct PRN medication prescriptions. A European guideline describes that complete and accurate medication prescriptions ensure safe and effective clinical practices (General Medical Council, 2013:13).

Doctors in CCU initiate pharmacological treatment for the patients and should communicate appropriate, clear and legible instructions on the medication prescription records. However, the records for which the doctors were responsible, were incompletely documented. The objective for the DR was thoroughly investigated and reached.

5.2.2 Objective 2: Completion status of medication prescription records by the nursing staff (NS)

Identification of the patient is essential before medication is administered preventing the wrong medication given to the wrong patient (Kavanagh, 2012:58). Prior to nursing staff administering any medication to a patient in CCU, they have to follow the “5 right s” as described in paragraph 2.2.4.2, where identifying the “right patient” is the first step. The presence of a patient sticker containing all patient data is essential when nursing staff (NS) initiate this step. Even though results from this current study show the patient sticker on 98% of 174 medication prescription records indicated the full name and hospital number, 2% did not reflect the patient’s full name (table 4.4).

Errors were identified with reference to documenting a patient’s identity, handwritten in the absence of a patient data sticker. In 74% of 69 files (table 4.5) had no folder number and 86% had no date of birth.. Information about the correct identification of medication prescription records is critically important. Most times critically ill patients require intravenous medications and due to the complexity of the patient’s condition, drugs could be given as urgently required and the possibility of using unidentified medication prescription records may be a risk in the CCU.

Critical care nurses in CCU are primarily responsible for following the doctor’s medication prescription and document after safely administering medication (Choo, Hutchinson and Bucknall 2010:853). All the standards for the correct acknowledgement and documentation of medication errors by NS were incomplete. In 83% of 54 files (table 4.9), nurses did not draw a single line through errors; 98% had

no signature of a person who created the error indicted; in 96% date of error was not indicated and 83% had no clear description of correct information on the medication prescription records . Wolf and Hughes (2008:350) indicated various reasons for nurses failing to report medication errors that can be provided as described in paragraph 1.2, the rationale for this study.

The National Core Standards (DOH, 2013:18) emphasise the patient's right to a physical and mental safe health care environment as discussed in paragraph 1.2. Patient allergy indication on the medication prescription record is one of the measures to prevent adverse events through the administration of incorrect medication. Patient allergy status was not documented on the nursing notes of 21% of 174 files (table 4.11). Absence of the allergy status of the patient poses a high risk to the patient's right to a safe health care environment.

Doctors may request that certain medication be omitted and it is the responsibility of the CCU nurse administering the medication, to indicate when medication is omitted. Literature claims that most medication prescription errors are due to omission and overdose (Gommers & Baker, 2008:1; Roughead & Semple, 2009:5). This study found that in 88% of 124 files, nurses failed to indicate the omissions of drugs administration, 97% did not indicate the reason for the omission of drugs, and 97% failed to sign on the medication prescription record when the drugs were omitted (table 4.12).

High alert medication (HAM) in the CCU is mostly administered intravenously and includes the calculation of infusion rates and create opportunities for errors. Wilmer, Louie, Dodek, Wong and Najib (2010:1) reiterate that these are opportunities for errors. HAM poses high risk if administered incorrectly in critically ill patients with an unstable hemodynamic status. After setting the rate of the infusion pump, the nurse should sign the medication prescription record. However, 32% of 125 (table 4.17) files indicated that nurses did not sign when a new dose of HAM infusion was started. Furthermore, the handwriting of all staff members for 16% of 170 files throughout the medication prescription records were illegible (table 4.18). The signature of a nursing staff member who caused an error appeared on only one (2%) of the medication prescription records (table 4.9). As supported by the literature, a signature is legally essential when medication is given or an error made, because as indicated before, patients are very vulnerable and are susceptible to errors which could compromise the quality and safety of patient care.

Nursing staff in CCU form an integral role in following medication prescription records and documentation after administration. However, the records for which the nurses were responsible were incompletely documented. This objective was thoroughly investigated and reached.

5.2.3 Objective 3: Completion status of pharmacology requirements by pharmacy staff (PS)

George (2010:590) indicates that a good relationship among the various role players, also reflected in the conceptual framework (figure 2.1) and nurse managers at the point of care are key to a healthy CCU environment. Pharmacists in the CCU assist in reviewing the prescription records for treatment suitability. Information of prescribed medication such as dates, dosages and frequency are monitored in case of drug interactions (Chant, 2012:5; Lee, Chiao, Khan & Buro, 2007:337; and Sinha, 2014:107).

However, this study revealed that in 70% of 83 applicable files (table 4.16), the pharmacist did not indicate whether the medication prescribed as reflected on the medication prescription records of the patients were on the medication profile of the ward. It is time consuming and not feasible when nurses and doctors are unsure about obtainability of prescribed medication. Lee, Chiao, Khan & Buro (2007:337) emphasise that the pharmacist is jointly responsible for identifying prescription errors and guiding appropriate medication prescriptions by the doctors. HAM can implicate severe adverse reactions if not prescribed and administered correctly (Grissinger & Alghamdi, 2014:149). In this study a doctor's prescription of inotropes or high alert medication, in 38% of applicable 113 files (table 4.17) omitted to indicate the rate and duration on the medication prescription records. Furthermore, 23% of 39 applicable audited files (table 4.13) did not indicate that the results of serum blood levels to determine therapeutic and toxic levels were noted on the pharmacology result form.

Pharmacy staff (PS) have minimal responsibility compared to the DR or NS for the management of treatment and documentations on the patients medication prescription record. In conclusion, the records for which the PS were responsible were also incompletely documented. Therefore, this objective was thoroughly investigated and reached.

5.2.4 Objective 4: Completion status of the antibiotic stewardship records (ASP)

The doctor who is the responsible consultant in the CCU will decide on the appropriate antibiotic treatment for the patient, as discussed in paragraph 4.4.3.1. Thereafter, the CCU nurse follows the prescription promptly for immediate effect (United States Department of Health and Human Services, 2013:43). Furthermore, the South African Antibiotic Stewardship Programme, as discussed in paragraph 1.2, provides clear directives regarding the correct ASP strategies. Doctors omitted to indicate prophylactic, empirical or definitive (PED) on 50% of the applicable 46 files (table 4.1).

The inappropriate use of antibiotics as identified by the Institute of Medicine has resulted in special attention to the appropriate prescription of these medications (Doron & Davidson, 2011:1121). Results in this study found that in 81% of 43 files, cultures were not sent before antibiotics were administered and recorded (table 4.14). This increases the risk for resistance to antibiotics and mistreatment of infections. Cultures obtained prior to administering antibiotics play an integral role in defining and guiding the prescriber (Luyt, Bréchot, Trouillet & Chastre, 2014:2). The results obtained from the cultures indicated whether dosages were needed to be adjusted in cases of organ dysfunction, e.g. renal impairment. The source of infection can be identified as either community or hospital acquired and was not specified on 83% of the applicable 48 audited files, and neither was the source of infection indicated on 70% of the 50 applicable files. Knowledge of the source of infection can ensure that additional measures, besides antibiotics can be taken to provide patient safety, such as infection control in case of hospital acquired infection (Collins, 2008:548).

Antibiotic stewardship entails the right dose, right time, right duration and for the right purpose. Thus, the patients in the CCU will receive effective treatment with the antibiotics that are available at the health care facility. Changes or discontinuation of antibiotics are indicated by the doctor, depending on patient outcomes. This medication prescription record reflected in 81% of 63 files that doctors failed to indicate the discontinuation date, 88% of 59 files failed to indicate the reason for discontinuations, and in 47% of 60 files doctors failed to sign in order to approve discontinuations (table 4.15).

The antibiotic stewardship programme (ASP) gives guidance to appropriate use of antibiotics. However, the ASP records which the doctors were responsible for were incompletely documented. The objective to evaluate the ASP was thoroughly investigated and reached.

5.2.5 Objective 5: Completion status of high alert medication (HAM) records

High alert medication (HAM) in the CCU is mostly administered intravenously and includes the calculation of infusion rates and create opportunities for errors. Wilmer, Louie, Dodek, Wong and Najib (2010:1) reiterate that these are opportunities for errors. HAM poses high risk if administered incorrectly in critically ill patients with an unstable hemodynamic status. After setting the rate of the infusion pump, the nurse should sign the medication prescription record. However, 32% of 125 (table 4.17) files indicated that nurses did not sign when a new dose of HAM infusion was started. Furthermore, the handwriting of all staff members for 16% of 170 files throughout the medication prescription records were illegible (table 4.18). The signature of a nursing staff member who caused an error appeared on only one (2%) of the medication prescription records (table 4.9). As supported by the literature, a signature is legally essential when medication is given or an error made, because as indicated before, patients are very vulnerable and are susceptible to errors which could compromise the quality and safety of patient care.

5.3 LIMITATIONS OF THE STUDY

It was unfortunate that only 174 (68%) medication prescription records were reviewed of the 255 files initially calculated for the purpose of this study, due to files not being available. In addition, the formal antibiotic stewardship programme was only implemented in three of the six critical care units under study.

In conclusion the results confirm that all the role players involved in medication management are not recording aspects around the administration of medication in CCU accurately. Medication prescription records were found to be incompletely documented.

Consequently, due to the results of this study, the researcher has identified several strategies to address the problem of incomplete documentation records in the CCU environment that will be discussed under recommendations.

5.4 RECOMMENDATIONS

The following recommendations based on the scientific evidence obtained in this study are discussed below.

5.4.1 Continuous quality improvement programme (CQI)

The introduction of a CQI programme is essential in a CCU. This programme will include the auditing of patient files. Daily audits of medication prescription records are a helpful method in identifying errors and making decisions (Lourens: 2012:2). Thus, it is recommended that medication prescription records be reviewed daily in the morning and afternoon ward rounds with reference to progress, changes and cancellation of treatment. Data should be collected and captured as graphs and presented at the morbidity and mortality meetings, which monitor the effectiveness of current practices.

It must be ensured that patients are surrounded within a safe, healthy and therapeutic environment as stipulated in the patient's charter of South Africa (National Patient's Right's Charter, 2008:2). Completion of the AIRMS form ensures that a target to reduce medication omission by 50% could be set, e.g. the omitting acknowledgment of omission of administration by display of signature (Evans, Berry, Esterman, Selim, O'Shaughnessy & De Wit, 2006:42).

5.4.2 Orientation and Induction to CCU

Medication prescription records in CCU have complex information and therefore requires ongoing in-service training for nurses, doctors and pharmacists. The novice to the CCU needs to complete an orientation programme and be found to be competent to administer medication without errors. This study revealed that doctors failed to comply with standard medication prescription requirements in the CCU. Medication errors were not only found in the administration phase but also in the prescribing and dispensing phase (Cutler & Parker, 2009:12). As discussed in paragraphs 5.2.1-5.2.4 the medication prescription records audited were incomplete. These errors were made by the NS, PS and doctors.

A training programme regarding the management of medication in a CCU, by including the commencement of the AIRMS process, is recommended. Medication errors should be reported to quality assurance department so that supportive learning can be arranged (Govender, 2015:9). The agency staff that work in the CCU should be included in a training programme.

Updated developmental plans, policies and medication guidelines by a task team consisting of doctors, pharmacists and nurses are recommended.

5.4.3 In-service training

An in-service training programme should be introduced for all staff in CCU. This programme should emphasise and include the management of medication in the ward, AIRMS, antibiotic stewardship programme, HAM and allergy status of patients.

Monthly, weekly and on-the-spot training could be pursued. Current practices should be evaluated to determine areas of improvement (Nabudere, 2014:28). The engagement of staff in presenting talks will stimulate research and best practices in the CCU. Evaluation of staff should be introduced through short electronic on-line quizzes to determine whether staff is knowledgeable and competent about medication management.

5.4.4 Just Culture

The multi-disciplinary team working in a “hurried culture” environment like CCUs should encourage supportive learning in the event of adverse incidents. SOP’s, policies and procedures available in the units would guide the staff member to report medication errors as part of patient safety and not fear stigmatisation or “labelling” by others (Wolf & Hughes, 2008:350). Furthermore a just culture creates an environment that allows professionals to report any error they have made, without any punitive measures from their superiors. In this way creating an environment for supportive learning and improvement of patient safety (American Nurse Association, 2010: 3. Errors that calls for changes and supportive learning in the system e.g. policies, procedures and methods has positive consequences and enhances safe practices (Washington State Nurses Association 2011:6).

5.5 FUTURE RESEARCH

Policies and procedures on the different specifications for medication prescription, such as medication generic name, dosage form, route, frequency, rate, method and site of administration are proposed for future research. The conduction of a research is recommended in more than one institution after the implementation of the new medication prescription record.

5.6 DISSEMINATION

Research results will be communicated to the educational authority and the results will be published through the University of Stellenbosch and accredited journals. Furthermore, presentations will also be done at an academic year day of the university, critical care conference or congress and other applicable platforms.

5.7 CONCLUSION

The completion of this research study will make all stakeholders in health, role players in medication management, management of CCUs and education aware of the incomplete documentation of medication prescription records in CCUs. Underlying omissions were identified which may compromise the safety and quality of care in the CCU. Omissions identified in this study emphasises the many near-misses and adverse events which may compromise the quality and safety of patient care which ultimately may result in litigation. The study proposed a number of recommendations which should be implemented to avoid negative incidents and near-misses.

Medication errors were not only found in the administration phase but also during the prescribing and dispensing phases. Thus, all staff actively involved in the management of medications should be inducted, orientated and subjected to in-service training and CPD. Therefore, by introducing the recommendations best practices in CCU will be ensured.

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ANNEXURES

Annexure A: Data collection instrument: Audit instrument

APPENDIX A: CHECKLIST FOR AUDITING OF MEDICATION PRESCRIPTION RECORDS OF PATIENTS IN CRITICAL CARE UNITS OF A TERTIARY HOSPITAL IN THE CAPE METROPOLE.

The researcher will conduct a medication audit of the files of patients who were admitted and discharged from the CCU's at a tertiary hospital in the Cape Metro- pole during the period July 2013 to December 2013.

Scoring

The scoring will be done in relation to the domain completeness of information as follows for each item correctly completed:

1. Indicate a score of 1 point for each item correctly completed (Complete – 100%).
2. Indicate a score of 0 point for each item incorrectly completed where applicable (Incomplete ≤ 99%)
3. No score for information not applicable.
4. Ensure that "not applicable" items are not added to the total score.

Section A: Biographical data

1. Date: Year……. Month ……..
2. File no.: ……..
3. Unit: ……..
4. Transfer or admission date: ……
5. Discharge date: ……
6. Age: ……..
7. Gender: .....
8. Medical Diagnosis: ……..

Section B

STANDARDS	Information indicated throughout the whole document where applicable (COMPLETE- 100%) 1	Information not completely indicated throughout the whole document where applicable (INCOMPLETE ≤ 99%) 0	NOT APPLICABLE
Section B.1 : MEDICATION PRESCRIPTION RECORD			
B.1. 1: Identification requirements on patient sticker			
9. Full name	1	0	
10. Hospital number	1	0	
11. Address	1	0	
12. Telephone number	1	0	
13. Date of birth	1	0	
B.1. 2: Prescription record contains all required patient's information hand written in absence of the patient sticker:			
14. Name	1	0	
15. Folder number	1	0	
16. Birth	1	0	
B.1. 3: Prescription record contains all required additional handwritten information			

17. Ward/unit name	1	0	
18. Name of Department	1	0	
19. Date of admission	1	0	
20. Number of record indicated	1	0	
B.1. 4: Medication detail completed by doctor:			
21. Medication name	1	0	
22. Generic name only	1	0	
23. Date prescribed	1	0	
24. Doctors name	1	0	
25. Doctors signature	1	0	
26. Route indicated	1	0	
27. Frequency indicated	1	0	
28. Dose indicated	1	0	
29. Correct dose selection	1	0	
30. Duration indicated	1	0	
31. The correct instruction to stop medication is reflected	1	0	
32. The correct instruction to continue medication is reflected	1	0	
B.1. 5: Correct acknowledgement and documentation of medication errors by Doctor:			
33. Single line through error	1	0	
34. Signature of person who created the error	1	0	
35. Date of error indicated	1	0	
36. Clear description of correct information	1	0	
B.1. 6: Correct acknowledgement			

and documentation of medication errors by Nursing staff:			
37. Single line through error	1	0	
38. Signature of person who created the error	1	0	
39. Date of error indicated	1	0	
40. Clear description of correct information	1	0	
B.1. 7: Correct acknowledgement and documentation of medication errors by Pharmacy staff:			
41. Single line through error	1	0	
42. Signature of person who created the error	1	0	
43. Date of error indicated	1	0	
44. Clear description of correct information	1	0	
B.1. 8: Patient allergy status documented in:			
45. Nursing notes	1	0	
46. Doctors notes	1	0	
47. On the prescription record	1	0	
B.1.9: Omission of drug administration by Nursing staff:			
48. Omission noted correctly	1	0	
49. Reason for omission indicated	1	0	
50. Signature on medication record	1	0	
Section B.2			

PHARMACOLOGY PRESCRIPTION RECORD			
51. Results of serum blood levels to determine therapeutic and toxic level noted on Pharmacology result form.	1	0	
52. Medication prescribed as PRN accompanied by written guidelines e.g. signs and behaviour patterns	1	0	
53. Appropriate medication is prescribed for the patient.	1	0	
Section B.3 ANTIBIOTIC STEWARDSHIP PRESCRIPTION RECORD			
B.3.1: Appropriate antibiotic prescribed by doctor			
54. Starting date recorded	1	0	
55. Starting time recorded	1	0	
56. Time intervals recorded	1	0	
57. Duration time recorded	1	0	
58. Signature of Consultant	1	0	
59. Medication stopped been recorded	1	0	
60. Source of infection recorded	1	0	
61. Cultures sent before antibiotics is administered and recorded	1	0	
62. Prescription record indicate whether treatment is prophylactic, empirical or definitive (PED)	1	0	

63. Prescription record indicate the source of infection as community or hospital acquired	1	0	
B.3.2: Antibiotic medication discontinuation			
64. Discontinuation date indicated by doctor	1	0	
65. Doctor indicate reason for discontinuation	1	0	
66. Doctor signature to approve discontinuation	1	0	
Section B.4 ANTIBIOTIC STEWARDSHIP PHARMACY RECORD			
67. Pharmacist indicated if medication is on medication profile of the ward	1	0	
68. Pharmacist indicated the quantity issued if not ward profile	1	0	
69. Initials of pharmacist dispensing the prescribed medication is indicated	1	0	
Section B5 HIGH ALERT MEDICATION			
B.5.1:Doctor prescription of inotropes or any other high alert medication			
70. Concentration or quantity of medicine indicated	1	0	
71. Name and volume of diluent indicated	1	0	

72. Rate and duration of administration indicated	1	0	
73. Every new dose of high alert medication infusion signed by the nursing staff	1	0	
74. Legible handwriting throughout the document	1	0	
75. Appropriate use of institutionally accepted abbreviations	1	0	
TOTAL SCORE = ……/ 74			
FINAL SCORE = ……%	COMMENTS (COMPLETE / INCOMPLETE)		

Audit carried out by_____ Date _____

Annexure B: Ethical approval from Stellenbosch University

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot • your knowledge partner

Approval Notice
New Application

23-Aug-2014
Spogter, Aletta Beverley A3

Ethics Reference #: S14/06/132
Title: **A retrospective review of medication prescription records in critical care units in the Cape Metropole.**

Dear Ms Aletta Beverley Spogter,

The **New Application** received on **10-Jun-2014**, was reviewed by members of **Health Research Ethics Committee 1** via Expedited review procedures on **21-Aug-2014** and was approved.
Please note the following information about your approved research protocol:

Protocol Approval Period: **21-Aug-2014 -21-Aug-2015**

Please remember to use your **protocol number (S14/06/132)** 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:
Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired. The Committee 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.
Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

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. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). 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 documents please visit: www.sun.ac.za/rds

If you have any questions or need further assistance, please contact the HREC office at 0219389657.

Included Documents:
Investigator declarations (AS, LF, HS)
HREC New application form
Protocol Synopsis
HREC general checklist

Annexure C: Permission obtained from institution

Western Cape Government
Health

GROOTE SCHUUR HOSPITAL
Enquiries: Dr Bernadette Eick
E-mail : Bernadette.Schmitz@westerncape.gov.za

Ms. A.B. Spogter
c/o C26 ICU
NEW MAIN BUILDING

E-mail: Aletta.Spogter@westerncape.gov.za

Dear Ms. Spogter

RESEARCH PROJECT: A Retrospective Review of Medication Prescription Records in Critical Care Units in the Cape Metropole

Your recent letter to the hospital refers.

You are hereby granted permission to proceed with your research.

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) No hospital consumables and stationary may be used.
d) **No patient folders may be removed from the premises or be inaccessible.**
e) Please introduce yourself to the person in charge of an area before commencing.
f) Please discuss the study with the Head of Department before commencing.
g) Please provide the research assistant/field worker with a copy of this letter as verification of approval.
h) Confidentiality must be maintained at all times.

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

Yours sincerely

DR BERNADETTE EICK
CHIEF EXECUTIVE OFFICER
Date: 3rd September 2014

C.C Mr L. Naidoo; Dr A. Krajewski; Mrs M. Ross

G46 Management Suite, Old Main Building,
Observatory 7925

Tel: +27 21 404 6288 fax: +27 21 404 6125

Private Bag X,
Observatory, 7935

www.capegateway.go.v.za

Annexure D: Waiver of consent of participant information and consent form (PICF)

Holy Cross Convent
P. O. Box 1014
Woodstock
7915
5 June 2014

The Head of Research Development and Support
Health Research and Ethics Committee
University of Stellenbosch

Dear Sir

REQUEST PERMISSION FOR WAIVER OF PARTICIPANT INFORMATION AND CONSENT FORM (PICF)

RESEARCH TITLE: A RETROSPECTIVE REVIEW OF MEDICATION PRESCRIPTION RECORDS IN CRITICAL CARE UNITS IN THE CAPE METRO POLE.

The Researcher, Aletta Spogter, who is currently a master's degree student request permission to conduct a retrospective review of medication prescription records in the Critical Care Units at an Academic Hospital in the Cape Metropole.

The research involves no risk or harm to the patients as it only entails the handling of patients' records. The study will include the following advantages:

- To identify accurate account of treatment and care planning
- To determine whether legal requirements for medication documentation are being met in the critical care units of academic hospital in the Cape Metropole
- To identify challenges that has influence on patient care

The files of the patients discharged from July 2013 to December 2013 will be identified and analysed.
Please contact me at work, 021 404 9111 or 076 528 2971 should you have any queries.
The information collected will be locked away in a cupboard until the end of the project. Only the persons associated with the research will have access.

I thank you in anticipation for a favourable response.

Yours sincerely

_____
Aletta Spogter

Annexure E: Declaration by language editor

Lona's Language Services

English/Afrikaans
Afrikaans/English

3 Beroma Crescent Beroma Bellville
Tel 0219514257
Cell 0782648484
Email illona@toptutoring.co.za

* Translations * Editing * Proof Reading
* Transcription of Historical Does
* Transcription of Qualitative Research
* Preparation of Website Articles

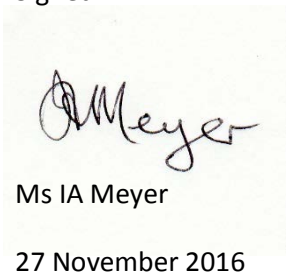
TO WHOM IT MAY CONCERN

This letter serves to confirm that the undersigned

ILLONA ALTHAEA MEYER

has proof-read and edited the document contained herein for language correctness.

Signed



Ms IA Meyer

27 November 2016

FOR: ALETTA BEVERLEY SPOGTER

TITLE: A RETROSPECTIVE REVIEW OF MEDICATION PRESCRIPTION RECORDS IN CRITICAL CARE UNITS OF A TERTIARY HOSPITAL IN THE CAPE METROPOLE

Annexure F: Declaration by technical formatter

Lize Vorster Communication

To whom it may concern

This letter serves as confirmation that I, Lize Vorster, performed the technical formatting of Aletta Spogter's thesis entitled "A retrospective review of medication prescription records in critical care units of a tertiary hospital in the 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.

Yours sincerely

Lize Vorster
Language Practitioner

Vygie street 9, Welgevonden Estate, Stellenbosch, 7600 * e-mail: lizevorster@gmail.com * cell: 082 856 8221