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Final year medical students' reflections on perceived significant events during an integrated primary care block

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FINAL YEAR MEDICAL STUDENTS' REFLECTIONS ON PERCEIVED SIGNIFICANT EVENTS DURING AN INTEGRATED PRIMARY CARE BLOCK

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master in Public Health (Rural Health)

Johannesburg, November, 2021

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Dr Motlatso Mlambo

DECLARATION

I, Samantha Dube, declare that this research report is my own work. It is being submitted for the Degree of Master of Public Health (Rural Health) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

S. Dube

(Signature of candidate)

2nd day of November 2021 in Johannesburg

DEDICATION

Special gratitude to my loving husband *Siphosenkosi Ndlovu.* Your support and encouragement have brought me this far. Thank you for believing in me whenever I was in doubt.

To my mother, *Bernadette Nyathi*. Your strength and hard work have brought me this far.

To my daughter *Uyanaka Aziza Ndlovu.* My source of inspiration, you have made me stronger and more fulfilled than I ever thought possible. I love you.

To my Supervisors, it's been a long and winding road. None of this would have been possible without your support.

ABSTRACT

Background: Adverse events are considered a universal challenge and a burden in healthcare. For that reason, significant event analysis is a necessary tool in primary healthcare, particularly in South Africa where many people access healthcare services from the public health system.

Aim: The study aimed to explore medical students' reflections of perceived significant events experienced during integrated primary care block placement in primary healthcare (PHC) settings.

Methods: Using a qualitative descriptive design with purposeful sampling and maximum variation, structured reflection reports were retrieved from logbooks of final year medical students. During the 2014 academic year students were allocated to 18 primary healthcare settings across three provinces. Of the 228 logbooks that were submitted at the end of seven rotations, only 207 contained a recording of a significant event and met the criteria to be included in the study. Conventional content analysis was used to record the relevant facets of secondary data related to the research question using MAXQDA software version 2020.4.

Results: Following an iterative research process, 128 records of significant events analysed revealed five themes. The type of significant events that were prevalent in PHC settings, included inadequate patient management, patient diagnosis errors, as well as medication and prescription errors. Likely causes of the perceived significant events were cited as human factors and health system challenges. Consequences revealed both students and patients' health-related concerns. An interesting consequence observed was that significant events created learning opportunities for students. The response to recorded significant events was facility specific and ranged from no action taken, to a more positive and structured response such as debriefing sessions during M&M meetings, training, daily equipment and resource checks, display of posters, protocol adherence and close monitoring of patients. Improvement strategies included staff and patient education, as well as addressing human resources and infrastructural challenges.

Conclusion: Significant event analysis is a critical quality improvement reflective learning tool. Using logbooks, it was possible to explore medical students' experiences of significant events as a strategic way towards addressing quality and safe practices in PHC settings. Participants proposed integrated capacity-building to address potential causes of the perceived significant events.

Keywords: significant events, significant event analysis, reflection, medical students, primary healthcare

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ABBREVIATIONS

ABG	Arterial-Blood Gas
AED	Automated External Defibrillator
AIMS	Advanced Incident Management System
CHC	Community Health Centre
CHCW	Community Healthcare Worker
COHSASA	Council for Health Service Accreditation of Southern Africa
CPR	Cardiopulmonary Resuscitation
C/Section	Caesarean Section
CTG	Cardiotocography
CXR	Chest X-ray (CXR)
DKA	Diabetic Keto Acidosis
DR	Doctor
EDL	Essential Drug List
GCS	Glasgow Coma Scale/Score
Gynae	Gynaecologist
HCTZ	Hydrochlorothiazide
HIV	Human Immunodeficiency Virus
HPT	Hydroxytryptophan
IDDM	Insulin Dependent Diabetes Mellitus
IPC	Integrated Primary Care
PHC	Primary Healthcare
MDR-TB	Multi-Drug Resistant Tuberculosis
mini-CEX	Mini-Clinical Evaluation Exercise
M&M	Morbidity and Mortality meetings
MVA	Motor Vehicle Accident
OBS	Obstetrician
PEP	Post-exposure prophylaxis
pH	Potential of Hydrogen
PPH	postpartum haemorrhage

SEA	Significant Event Analysis
TB	Tuberculosis
WHO	World Health Organisation
X-ray	X-Radiation

DEFINITION OF TERMS

Adverse event	An event which results in unintended harm to the patient and is related to the care and/or services provided to the patient rather than to the patient's underlying medical condition (1–3).
Disclosure	The process by which an adverse event is communicated to the patient by healthcare workers (4, 5).
Error (medical)	An act (plan, decision, choice, action, or inaction) in patient care that, when reviewed, was not correct and resulted in patient harm or a near miss (6).
Patient Safety	The pursuit of reduction and mitigation of unsafe acts within the healthcare system, as well as the use of best practices shown to lead to optimal patient outcomes (7).
Primary Healthcare	The first point of contact people have with the healthcare system which provides comprehensive, accessible, community-based care that meets the health needs of individuals throughout their life (8).
Significant Event	Any event deemed significant by a member of a healthcare team in the care of a patient and the way in which this care was provided (9).
Significant Event Analysis	A team safety investigation and quality improvement tool used to help understand the event and why it happened, and direct subsequent learning and improvement efforts (10).

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Introduction

Chapter 1 provides a detailed overview of the study. This includes background information, the problem statement and rationale for undertaking the study. This chapter also provides information about the aim, objectives and the research question of this study. A literature review on significant events is discussed in this chapter.

1.2 Background

Adverse events in medical care are a problem in public healthcare because they compromise patient safety. According to Slawomirsk et al., (11) four in every ten patients experience harm in outpatient and primary healthcare (PHC) worldwide. Patient harm is the 14th determinant of global burden of disease in comparison with malaria and tuberculosis (12). Every year over 421 million people get hospitalised, and 42.7 millions of these experience adverse events globally (13). Hospitals in low and middle income countries experience 134 million adverse events resulting from poor patient care each year (14). There is insufficient information on the safety of patients in primary care settings in comparison with secondary care (15, 16). It is estimated that in the UK, 2% of consultations in primary care result in adverse events (17). In Sub-Saharan Africa, healthcare gets provided in impoverished situations with high levels of illiteracy. Coupled with late hospital presentations and insufficient infrastructure, patients become susceptible to significant events despite the efforts of healthcare professionals to provide quality healthcare (18). Such conditions bring to the fore the public health burden of significant events and the potential threat they pose to patient safety (19, 20).

Every patient is susceptible to significant events and, depending on their severity, it may culminate in worsened patient outcomes, prolonged care and delays in accessing treatment (20). It is therefore crucial to note that errors resulting from significant events in the care of patients are not only costly to the health system, particularly in South Africa, but also have negative implications on the socio-economic status and the welfare of families concerned (21). Significant event analysis (SEA) is a critical tool within the public health sphere to understand the root causes of adverse events. It is a

reflective tool used to analyse events which may affect the care of patients (9). Medical education uses significant event analysis for reflective learning (22, 23) to assist medical students to learn from the incidents for improved patient care.

The distribution and burden of disease in South Africa shows the necessity for a health system which delivers quality health services to the people who need them the most (24). Structural inequities and inequitable resource allocation in health service delivery highlight the disparities in rural areas, underserved communities and urban areas (25). It compromises the quality of care, leaving PHC facilities to deal with the consequences of these inequalities. Taking into consideration that 84% of the South African population rely on PHC services in the public health system (26), significant event analysis provides a platform to learn from reported errors so as to offer quality patient care. However, it is challenging to do so at present as there is limited information on patient safety threats in primary care and their solutions, despite the quantification of incidences of error in secondary care (9).

Significant events in the care of patients are a reflection of wider issues within the health system more than individual factors (27). To understand the magnitude of patient care in PHC facilities within South Africa, the current study reviewed significant events recorded by medical students where they also took part and observed the management of patients.

1.3 Statement of the problem

Uncertainty in patient diagnosis and management is common in PHC settings because of the undifferentiated patients seen at this level of care (28). Symptoms that are often presented, unique as they might be to each patient, cut across a wide range of illnesses and make the environment highly susceptible to the occurrence of significant events (9). Evidence shows that patient safety research on preventing harm to patients in primary care has been slow compared to secondary care (29). Even though this is a public health concern, there is little research on significant events in PHC settings (16, 27, 29–31). For every consultation in primary care, there is a likelihood of a significant event occurring, especially in developing nations like South Africa (29). Thus, failure to have functional significant event analysis processes in place results in missed opportunities to learn from and improve patient care and safety (27).

Significant events are a common occurrence during the delivery of healthcare service and medical students are likely to experience or witness them during their clinical rotations (32). Medical students' involvement in significant event analysis can be a lesson on how to handle errors as a healthcare worker (32). Medical students are often uncomfortable disclosing adverse events they committed or witnessed (33). This is because there is a lack of role models in medical education who readily admit to committing an error, thus imparting the principle of accountability and commitment to patient safety (32). Failure to disclose a significant event presents a missed teaching opportunity for medical students to learn about managing adverse events (34). It also hinders healthcare facilities from improving the quality of care provided, as they would not be aware of the causes and factors associated with the significant events. The continued provision of poor health services in primary care defeats recent efforts for Primary Healthcare (PHC) re-engineering to improve healthcare access and quality to the public (35, 36).

1.4 Justification of the study

Poor quality care in PHC settings inadvertently results in poor health outcomes for South African citizens, because this is where most people access health services (26, 37). The limited research on significant events in primary healthcare poses the risks of missing errors which occur daily where much of the healthcare is provided in the country (38). This may also negatively affect patient referrals from higher levels of care. Failure to manage these patients may cause worsened health outcomes, with cost implications on the already resource-strained health system (26).

There is limited research in South Africa on the prevalence of significant events in a primary care setting, their effects on patients and medical students, and the bases of their causes, making it a challenge to estimate the burden of significant events. There is limited research on the application of significant event analysis processes in primary care settings to improve patient safety. Ideally, this is critical information that should be accessible, especially if one takes into consideration the fact that primary healthcare in South Africa is offered in resource-constrained facilities. A case in point is the Life Esidimeni incident where lives were lost because of the rushed and chaotic execution of a project to an environment with no skill set, infrastructure, and experience on how to handle primary mental healthcare community-based services (39).

There is no documented literature yet on medical students' experiences of a significant event in primary healthcare settings in South Africa. This study will not only contribute to a body of knowledge, but also provide constructive feedback to the coordinators of the Integrated Primary Care block at the University of the Witwatersrand and the healthcare facilities that host the medical students. Therefore, it is important to comprehend significant events in primary healthcare to identify interventions that are likely to reduce the gravity of such errors.

1.5 Research question

What are the final year medical students' reflections on perceived significant events experienced during their integrated primary care block?

1.6 Aim of the study

This study aimed to explore medical students' reflections on perceived significant events experienced during integrated primary care block placement in primary healthcare settings.

1.6.1 Study objectives

- To identify and describe the types of perceived significant events experienced by the medical students during the IPC block placement in primary healthcare settings.
- To explore factors associated with the perceived significant events experienced by the students and the consequences thereof.
- To examine and compare healthcare facilities' responses to the perceived significant events experienced by medical students.
- To document medical students' perceived measures to prevent future recurrence of the incidents.

1.7 Theoretical framework

There is poor implementation of SEA tools in primary care settings and as a result opportunities to learn and improve patient care are missed (27). McKay et al. (9) argue that SEA is not implemented effectively in PHC settings, because healthcare workers do not always use the systems approach to understand why and how these events occur. This means that SEA in PHC

settings often focus on human factors as the likely cause with no investigations on health system factors contributing to the errors (27, 40). Guided by the above assertions, the researcher understood that the health system is complex and therefore used systems thinking to explore medical students' reflections on perceived significant events (9, 27, 41, 42). Applying systems thinking in looking at significant events in PHC settings assisted the researcher in reviewing all layers of the healthcare system and how they may have contributed to significant events as depicted in Figure 1 below (43).

Using systems thinking, the researcher acknowledged that human beings, in this case healthcare workers, are imperfect and therefore prone to making mistakes. However, they cannot take all blame, because there are also weaknesses inherent within the system which need to be fixed to reduce the significant events (27). Through systems thinking, the researcher was able to understand some shortcomings of the health system as a whole in PHC settings which need addressing to lower the occurrence of significant events in the provision of healthcare (27, 43). Framing the study using systems thinking showed how complex interactions within the health system play a role in the occurrence of significant events, as it showed that patients, care providers, the healthcare facility and environment are all interconnected to significant events (27).

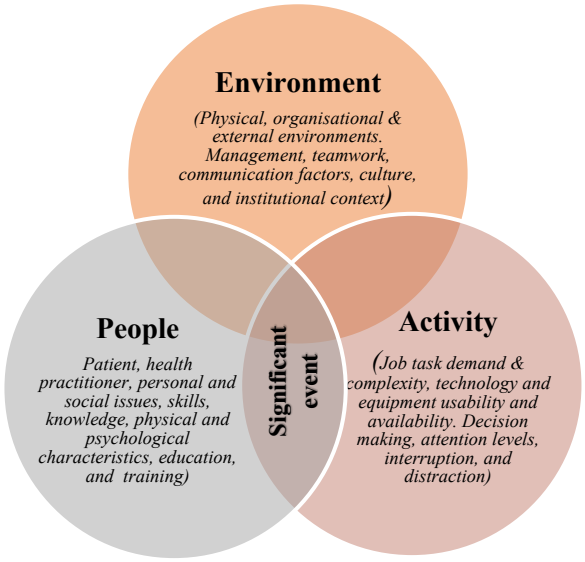

Figure 1: Systems thinking for SEA in primary care settings [1]

[1] Adapted from Bowie P, McNaughton E, Bruce D, et al. Enhancing the Effectiveness of Significant Event Analysis: Exploring Personal Impact and Applying Systems Thinking in Primary Care. 2016.

1.8 Literature review

1.8.1 Definition of a significant event

There is no standard definition of a significant event. Evidence from literature shows that 'significant event' is a blanket term used to define and describe adverse events, near misses, patient safety incidents, errors and critical incidents in the healthcare profession sphere (9, 44). A significant event is broadly described as an incident deemed significant by any healthcare team member in the care of a patient and how this care was provided (44, 45). The definition takes into account that some significant events are neither negative nor positive, but were considered significant in the care of patients by the healthcare workers. While the researcher used this definition throughout, SEA in this study focused on events with undesirable outcomes. The broad definition allowed the researcher to explore various perceived significant events experienced by the medical students, their consequences and the factors associated with the events.

It is crucial to note that significant event analysis refers not only to negative issues in the care of patients, but also good practices within patient care (46). Healthcare workers get encouraged to highlight and share positive events as a learning opportunity for others (44). A significant event analysis can also describe issues that may have been difficult or interesting in the care of patients (27, 44). For example, significant event analysis can describe a health worker's reflection on the treatment of a gravely ill patient where everything was going well until that patient's death, thus a significant event may highlight the emotional toll of such an experience on the health worker (44). Another example is if a patient changes their physical address without notifying the health facility, the facility cannot get hold of the patient to communicate test results (44). Significant events also reflect the quality of health services provided in a facility and may help identify areas of improvement (47). A significant event is a blanket term which encompasses near misses, i.e. patients who were almost harmed, and adverse events where patients were unintentionally harmed (9, 27, 45, 48).

The challenge of not having a universal definition of a significant event is that what is significant to one healthcare worker may not be significant to the other. Significant event analysis allows health workers to hold meetings regularly to process and review events identified as being significant (44). Not having a standard definition means that there may be disagreements on

whether some events are significant or not. The lack of a standard definition also means that health workers focus on adverse events more than the positive in their reviews (44).

However, despite the lack of a standard definition of significant events, it is still important to patient care. Therefore, the onus is on the healthcare workers to decide what makes up a significant event (9). It is crucial to do so in primary care settings to add to the currently available information on errors and patient harm. This way healthcare professionals can learn from such experiences (9).

1.8.2 Types of significant events

The literature on significant events classifies events such as near-misses, errors, complaints, or adverse events (9). Some scholars state that some significant events are adverse events when something goes wrong with patient care and there is a need for the facility to establish what happened (47). The most cited significant events in literature are disease diagnosis, disease management and prescription errors (9).

1.8.2.1 Disease diagnosis and disease management

Delays in disease diagnosis and poor care of a critically ill patient are challenges resulting in significant events (9). Sometimes healthcare workers fail to undertake proper clinical follow-up of the patient because of poor staff training (49). Consistent studies show that healthcare workers who do not conduct a comprehensive physical exam cannot diagnose a patient (49). One study which looked factors which caused poor management of severe disease in children found that first-level healthcare workers based their treatment on narrow diagnoses (50). It resulted in missed opportunities to offer lifesaving treatments to patients. Another study looked at the diagnosis of malaria and found that in healthcare facilities that did not have universal malaria diagnostics, health workers relied on clinical signs and symptoms for treating patients. Sadly, there was no consistency in the diagnostics provided (51). Poor disease diagnosis can cause a missed disease management opportunity despite the advances in medical care. In developing countries, the literature shows that poor knowledge of disease diagnosis and management cuts across all levels of the health workforce and mostly results in substandard and risky healthcare practices (52).

1.8.2.2 Prescribing, dispensing and other drug issues

Mistakes in the dispensing of drug prescriptions can cause adverse events which include prescription errors, patient complaints and patient reactions to drugs (47). Significant events for prescription include improper dosage of prescription medication, an overdose of medicines by patients, and giving wrong prescriptions because of a patient mix-up. Healthcare workers sometimes prescribe an excessive dose of medication which can be very dangerous for a patient (48). Healthcare workers' failures to note contraindications of drugs can be fatal to patients (49). One study found that a patient received the wrong dose of the vaccine because of the nurse technician's mistake (49). Some patients have received expired medication because pharmacies did not check expiry dates. Pharmacists have also had challenges dispensing medication because of problems reading the doctor's handwriting (49, 53). Factors attributed to the wrong dispensing of medication by pharmacists are that they would be under pressure as they are busy, mostly due to being short-staffed (53). Pharmacists become fatigued and prone to making mistakes, sometimes medications can look or sound the same, and pharmacists get interrupted whilst dispensing medication (54).

1.8.2.3 Patient management and communication

Poor communication between health workers or with patients can affect the healthcare patients receive. If a health worker cannot communicate with a patient, they might have challenges in taking a patient's history for optimal care (49). Some patients find it challenging to explain a condition to a healthcare worker, especially the elderly, or because of language barriers. Some challenges in communication include health workers using technical terms that the patients cannot comprehend (55). Poor communication between patients and health workers can cause the incorrect use of medication, i.e. wrong dosage, especially for patients who cannot read, and it can lead to dissatisfaction with the healthcare provided (49). Sometimes this leads to the patient's distrust of the health worker.

Failure to communicate amongst the healthcare workers in the treatment of a patient, miscommunication of information, communication breakdown amongst health workers themselves, misrepresentation of medical records, and difficulty in accessing patient medical records, are detrimental in the care of patients (56). The Agency for Healthcare Research and

Quality (57) states that miscommunication can occur within different departments in a health system or when healthcare workers change shifts. The result of such poor communication is inadequate documentation of patient information or medication information that result in adverse events (58, 59).

Healthcare worker and patient communication challenges, amongst other challenges, have been cited in rape and sexual assault cases (60). In the management of patients, it is important for healthcare workers to be knowledgeable and skilled enough to handle sexual assault and rape cases, as this evidence and all documented medico-legal findings are used by courts in the prosecution of the perpetrators (61). Therefore due to the importance of the management of such cases, training is necessary to address all the challenges that healthcare workers may face (60).

1.8.3 Factors associated with significant events

It is crucial to look at the causes of significant events from a systems approach because it does not only explore situations which may cause significant events, but also seeks to address underlying issues in the health system to reduce the occurrence of these events in the care of patients (9). This section explores the role of the different players resulting in significant events.

1.8.3.1 Individual healthcare professionals' errors

The most cited causes of significant events include individual healthcare professionals' performance and behaviours attributed to their level of knowledge and skill; poor communication between the health facility, health professionals and the patient; and patient behaviour such as poor adherence to medication (9). Ongoing training and education is necessary to equip healthcare workers with skills to ensure patient safety (57, 58, 62). Poor healthcare worker communication with patients is a threat to patient safety, because it compromises the provision of the quality of care and is a threat to patient safety (57,62). If a patient has suffered from multiple errors, it is often associated with poor communication (63). Poor documentation of patient information and medication information can be a result of poor communication among healthcare workers that may culminate into errors (58).

1.8.3.2 Insufficient patient information

Insufficient patient information causes errors because it is crucial to diagnose when conducting investigations and in treatment decisions (57, 58). The transfer of patient information is critical in the patient referral process and this is often a challenge (57). Missing patient information leads to delayed patient treatment which may negatively affect outcomes (57, 64). Similarly, healthcare workers' poor adherence to standards of care, policies, and guidelines leads to sub-optimal care and documentation of patients (27, 57, 64, 65). This is often facilitated by a lack of protocols to guide healthcare workers in healthcare service and can lead to errors when one is not armed to handle all the patient presentations (57).

1.8.3.3 Administrative support

Administrative support is crucial in primary care to ensure patient safety (20). Literature shows that factors such as poor task delivery and ineffective administrative systems result in significant events (9). Administration of significant events cited in the literature includes poor administration of medication shortages, delays in delivering patient lab tests and a lack of funds to purchase medication (49). Medication shortages in PHC facilities hinder the delivery of quality healthcare (66, 67).

1.8.3.4 Patients and family relatives

Concerning the doctor-patient relationship, it is often a challenge to manage a difficult patient (68). Some significant events on patient care result from patients or their relatives who are unsatisfied with the healthcare provided (9). Patients can sometimes be defensive, angry, frightened, or even resistant because of long waiting hours, or patients being fearful about a diagnosis or treatment (69). A strained relationship between a patient and a healthcare worker has stressful consequences for both the healthcare worker and the patient (70).

The conflict between healthcare workers and patients is sometimes because of mentally unwell patients. Patients are often difficult because of mental disturbances, a patient who has chronic pain, is polysymptomatic, or has unmet expectations despite using the health facility frequently (71). Other significant patient events result from patients failing to take medication because of the failure

of the family to provide support to the patient, especially for the elderly or terminally ill patients (49).

1.8.3.5 Shortages of equipment and resources

Delays in the purchase of consumables or replacement of broken and old equipment may cause significant events (72). Healthcare workers from different departments share equipment and consultation rooms in some healthcare facilities. It can prove to be a challenge in case of emergencies, as time gets wasted whilst searching for an available room or equipment (72). Sometimes emergency buzzers do not function properly and it is impossible to locate emergencies (9). The shortage of equipment and resources hinder the delivery of adequate healthcare.

1.8.3.6 Human resource challenges

Human resources shortages can cause errors in the delivery of healthcare in busy healthcare facilities and inadequate supervision is impossible when there is a human resource shortage. Staff shortages put too much pressure on healthcare workers where they have more work than they can handle, thus leading to errors (57). Excessive patient loads leaves healthcare professionals under pressure leaving room for mistakes to occur (57, 58). Findings from Elder et al. (58) show that when physicians feel rushed to provide care because of patient load they will make mistakes. In South Africa, there is an acute shortage of human resources because of unequal distributions between rural and urban healthcare facilities, and also between the private and public health sectors (25). Lack of human resources and inadequate supervision can lead to significant events in health facilities with a high patient load. Because of this, the majority of patients in South Africa are recipients of poor quality health services rendered by understaffed, overburdened health workers in ill-equipped healthcare facilities (25). It is unfortunate that healthcare workers have to shoulder much of the blame even when errors happen because of equipment shortages, staff shortages, lack of operational standards and procedures (72). Healthcare workers in developing countries often lack the needed skills and know-how to provide healthcare of some health conditions and are not equipped with the support they need (72).

1.8.4 Barriers to significant event disclosure

Factors which hinder incident disclosure include fear of blame, fear of damaging reputation, lack of time and poor feedback (31). When compared with secondary levels of care, incident reporting in primary care is low. This shows that there is an existing data gap which stifles efforts to ensure patient safety in primary care (31, 38, 73) because of the prevailing challenges that include limited resources and a shortage of staff.

1.8.4.1 Fear of blame

More often than not, healthcare workers involved in significant events receive negative feedback on their performance (27). It may deter healthcare professionals from reporting health and safety issues amidst concerns that they could get punished (74). Because healthcare workers are exposed to lawsuits and blame, many significant events go unreported (30, 62). It is often challenging for healthcare workers to disclose errors to patients (75), even though they are fundamentally expected to do so, because they fear litigation (76). Though errors need not get absolution, the elimination of blame within the health system is necessary, except for instances where mistakes result from negligence or irresponsible and unethical behaviour (44, 77).

In the case of South Africa, a quality improvement project by the Council for Health Service Accreditation of Southern Africa (COHSASA) known as the Advanced Incident Management System (AIMS) was implemented in the Free State to improve reporting on adverse events. Findings from the study indicated that anonymity in the reporting of medical errors improved the disclosure of errors (78). A disciplinary culture which does not involve punishment in the handling of medical errors means that healthcare workers can report the errors without fear, as well as allowing for authorities to investigate the cause of the incident, thus strengthening the health system (78).

A disciplinary culture that does not involve punishment in the handling of medical errors means healthcare workers can report the errors without fear and allow authorities to investigate the cause of the incident, thus strengthening the health system (78).

1.8.4.2 Legal considerations

One cannot discuss error disclosure without taking into consideration litigations. Healthcare workers must disclose mistakes to patients and their families despite the likelihood that they may sue; the fear of legal action should not be the determinant (77). Other scholars argue that there is no evidence that adverse event disclosure leads to litigations, therefore the fear of any legal action because of disclosing errors is unfounded in the law (42, 79). In the South African context, litigations are on the rise, and this plays a big role in the non-disclosure in mistakes made during patient care (44,77). A healthcare worker may be liable when they cannot report on medical errors, especially if they are discovered later (77). Thus even if a mistake was minor, patients are highly likely to take legal action against a health worker because they failed to disclose information in the first place (75). Insufficient communication of an adverse event by a health worker is the most commonly cited reason patients sue.

1.8.4.3 Lack of support

Healthcare facilities as organisations, particularly facility managers and board members, play a critical role in ensuring patient safety. A health facility committed to patient safety and quality care means healthcare workers are likely to communicate with patients about adverse events (77). If the management team is not working in collaboration with healthcare workers to address mistakes, healthcare workers can be deterred from disclosing their errors (80). If not supported, health workers may not disclose errors to either the hospital or patients in fear of punishment (77,80). The disciplinary of health workers as it stands at present is a hindrance to any efforts in ensuring the health system is safe for all who use it (77). It is because human errors are not allowed and individuals are unwilling to come forward and admit their failures (79). The disciplining of health workers also does little to improve the health system or improve patient safety. Instead, the health facility may provide support to health workers once an error occurs and improve the disclosure of such events (77).

1.8.4.4 Professional image

Healthcare workers are not keen to discuss medical errors even amongst each other because of the culture of perfectionism within the profession (77). The expectation for doctors is that they do not

make mistakes, so they strive for perfection and errors are a sign of failure (79). Healthcare workers are competitive beings and may not disclose errors because of fear that it might ruin their reputation and that they may lose the respect of their colleagues (42, 79).

It therefore shows that medical errors go unreported, posing a challenge in the drive towards preventing errors. Fear of being disapproved by colleagues and tarnishing one's reputation also hinders medical error disclosure and affects how they get addressed (81). Healthcare facilities have hierarchies; this hinders junior health professionals from reporting a witnessed medical error committed by their seniors. Fear of being negatively tested by their seniors leaves medical students unenthusiastic to divulge any medical errors to their supervisors (79).

1.8.4.5 Patient trust

Although different countries have guidelines and policies on how healthcare facilities should handle the disclosure of medical errors, many health professionals, more so doctors, do not think that all errors must get disclosed (34). Doctors are less likely to disclose significant events if they perceive the harm to be minor (79, 82). Some health professionals argue that it is important to disclose any significant event to the patient, but some patients do not want an error disclosed to them and doing so negatively affects the patients' trust in the healthcare worker (82). Therefore, in fear of diminishing patient trust, most healthcare workers are less likely to disclose an error in healthcare if it were a near miss (82, 83). Literature shows that despite experiencing adverse events, patients are highly likely to rate their experience of quality care the same as those who did not experience any adverse event in their care (84).

1.8.5 Consequences of significant events on students

Lessons from undesired outcomes are crucial in work-based education as they improve learning (30). Incidents occur frequently and students will commit or witness them during their clinical rotations. Unfortunately, they have negative effects on the students as they do on other health professionals.

1.8.5.1 Fear to voice opinions

In one study on significant event analysis, students were not keen to discuss their feelings about the event or to disapprove of what their teacher/doctor had done in fear of being marked down (23). Medical students are knowledgeable enough to recognise errors in patient care and have been responsible in many cases to prevent some of these (85), however, to improve patient safety, the students must feel safe to speak up against any witnessed error. Unfortunately, this may never be the case in fear of being negatively graded by their superiors (85). Discouragement by senior health professionals to discuss errors results not only in fear voicing opinions, but also in ethical erosion; through constant exposure to such behaviour, students may think non-disclosure and the avoidance of discussion of medical errors are acceptable (32).

1.8.5.2 Emotional distress

Students may suffer psychologically and emotionally as they may blame themselves for an error which hinders their learning; this usually occurs when a medical error is not reported to their superiors. Thus the students may experience grief and anxiety as they may be concerned about the potential harm to patients (32, 34, 86, 87). By right, when medical errors occur in healthcare facilities, students ought to learn the right way to deal with them from their superiors (34). The emotional effects of medical mistakes on health professionals is not widely discussed (74). Even long after an event has occurred, some health workers still experience emotional distress as they begin to doubt or blame themselves for the incident, lose confidence in their capabilities, and experience anxiety, guilt, embarrassment and remorse (74). For medical students, emotional distress is attributed to self-perceived significant events (88). Errors which occur when students are in training have negative emotional impacts on students, which may result in changes in learning behaviours. These emotions are attributed to the students' lack of knowledge, failure to seek advice, and missing warning signs which result in the occurrence of the significant event (88). Apart from witnessing errors, medical students are also afraid of committing them, with some students experiencing anxiety in fear of committing errors or harming patients (34, 87).

1.8.5.3 Learning opportunity

Significant event analysis and error disclosure can be a learning platform for students. Students

can acknowledge the importance of error disclosure when their seniors take ownership of errors and report them to patients (32). Unfortunately, some medical students get discouraged from disclosing errors, and because of this, many medical errors remain undisclosed (32). Role modelling on how to handle medical errors by senior doctors is essential as a learning opportunity for medical students. Sometimes students were unsure whether an error had occurred or how they could prevent possible medical errors in future practice as there was no one to guide them through the process (32). Some students cited significant event analysis as a great learning and reflective tool, whilst for other students, it was the worst part of their portfolio (89).

The failure of senior health professionals to disclose and handle significant events means that medical students inversely learn not to take responsibility for any errors committed (86). It becomes difficult to ensure patient safety and to learn from the significant events to prevent the reoccurrence of a similar incident (85). The occurrence of and the committing of errors by students changes their learning behaviour (88). The more often they seek help, consult their supervisors when uncertain, the more vigilant and careful they become and pay more attention to patients (88).

1.8.6 Consequences of significant events on patients

Patients are often not aware that their health is in danger because of the failure of health workers to disclose incidents (56). Despite insufficient data on the epidemiology of medical errors on patients in primary care (50), errors such as missed diagnosis, delayed diagnosis, or medication errors have a probability of hurting patients and cause precipitous hospital admission of patients (90). Harm resulting from significant events in patient care is more often minor, as in most cases there would be no significant injury or financial implications (9). Sometimes the consequences of significant events, unfortunately, are catastrophic and can result in patient harm (9, 27, 91).

1.8.6.1 Adverse drug reactions

An adverse drug reaction is an unwanted outcome because of the use of a drug which may enhance toxicity or compromise therapeutic efficacy (92). Significant events which result from prescription, dispensing, and other drug mistakes can cause mild drug reactions and minor physical discomfort in patients (58, 93). Examples of these are diarrhoea, rash, constipation, headache, or other nonspecific symptoms (92). The unfortunate part about adverse drug reactions is that health

workers lack knowledge and may attribute them to other underlying conditions a patient may have (94). In one incident, a patient received a wrong dose of a vaccine and suffered from fever, oedema and local pain (49). Extreme cases of drug reactions include facial paralysis because of an allergic reaction due to the failure of the healthcare worker to take a full history and prescribing contraindicating medication (49). Medication errors and unsafe use of medications are cause-avoidable patient harm and are very costly globally (53, 54, 74, 92, 95).

1.8.6.2 Deterioration of health

Mistakes in the care of patients may cause the health status of a patient to worsen (96). Incidences where a facility does not have specialists, or it takes longer to get tests done, mean that there is a delayed diagnosis of a condition; thus the patient's clinical condition worsens as a result (49). Other consequences of adverse events are decompensated diabetes and decompensated schizophrenia because of lack of medication at the facility and lack of an appropriate prescription form (49). Other instances include complications of an allergy condition because the patient cannot take medication and shortage of medications at the health facility, complications of a gynaecological condition because of poor diagnosis and hypertension complications (49). Most of the causes of patient deterioration cited in literature were due to lack of medication and shortage of specialists for diagnostics (97).

1.8.6.3 Patient hospitalisation

Many adverse events in primary settings do not result in any harm to the patient; only a few mistakes during patient care have resulted in their hospitalisation (58,93). Patients have been hospitalised because of hypertension complications due to wrong medication doses (49). Lack of family support for the elderly has resulted in their hospitalisation because of ingesting wrong medication or wrong doses (49).

1.8.6.4 Psychological and emotional harm

Patients also experience psychological harm because of mistakes in healthcare (98). Patients experience increased emotional distress when they perceive time wasting because of mistakes in their care (58). It therefore means that in looking at the effects of medical errors on patients, it is imperative to not only look at the biological effects, but also the psychosocial effects of medical

errors on the patients. Some patients have experienced anxiety, depression and trauma after hearing that an error occurred in the provision of their healthcare (82). It is because patients fear that there would be more errors, whilst others get angry if the event meant that their recovery would take longer (82). Patients were angry if they perceived the mistakes were because of the health workers' carelessness (82, 99). The way healthcare workers disclose a mistake to the patient influences their emotional experience, and many patients would not be too cross if the health workers were honest about their mistakes (82). Evasive and incomplete explanations of significant events cause distress in patients making it a challenge to cope (82).

1.8.7 Interventions for reducing the risk of patient safety in PHC

1.8.7.1 Incident reporting and learning systems

Local and centrally controlled incident reporting systems are used to encourage health workers to report incidents in the provision of healthcare (100). Evidence shows that local reporting systems have a better chance of increasing the number of incidents reported at a facility, especially when the local clinicians get involved in the assessment of the significant events and the planning of how to improve them, compared to systems which are centrally controlled (101). Evidence from other studies supports this claim that when incidents get reported locally within the facility, then health professionals are more willing to report the incident; this reporting system also makes it possible to implement improvements much quicker (100). The central reporting system is also important to collect reports from various settings and also to address recurring patient safety issues, therefore combining both approaches might yield better results (100, 102).

1.8.7.2 Patient safety culture

Patient safety culture in healthcare facilities is a driver of the staff members' perceptions, behaviours, attitudes, and commitment which drives patient care processes and the effectiveness of patient safety interventions (103). With patient safety culture, healthcare professionals do not get punished for human errors, but are held accountable for any unprofessional conduct (103). Patient safety culture, therefore, allows for the identification and addressing of mistakes; it helps health professionals to learn from errors to avoid their recurrence (100, 104). Using a patient safety culture questionnaire to report incidents in the care of patients results in increased incident

reporting. Complementing the patient safety culture with a practice-based workshop shows that the number of incidents reported by practitioners is much higher than in facilities that only use the questionnaire (100, 104). Patient safety discussions and educating health workers on patient safety culture in their facilities facilitates the increased reporting of patient safety incidents (100–102).

1.8.7.3 Patient Safety Frameworks

The Frankfurt Patient Safety Matrix (FraTriix) and the Manchester Patient Safety Framework (MaPSaF) have been used to improve incident reporting and increase patient safety in healthcare (100, 105, 106). The Frankfurt Patient Safety Matrix is an adaptation of the Manchester Patient Safety Framework used in Germany. The MaPSaF uses group-based self-assessments and interventions to improve the culture of an organisation in the identification and evaluation of patient safety incidents and learn from them, whilst also considering some aspects of the health facility which may compromise patient safety such as communication or teamwork (106, 107). The FraTriix was adapted for the German context; evidence shows it improved the quality of incident reporting, but there was little change in error management (100, 105).

1.8.7.4 Patient safety curricula and examinations

Education is one of the most critical aspects of ensuring patient safety in primary care settings (100). Educational interventions can improve incident reporting and improve patient safety culture and behaviour. Patient safety concerns have drawn medical educators' attention. Through education, patient safety gets promoted, and errors in healthcare are considered a learning opportunity (108). Patient safety education has been used to test health professionals' patient safety skills in clinical examinations (100). Evidence shows that there is no strong relation between exposure to the patient safety curricula and the improved patient safety culture amongst practitioners; for medical students, the clinical examination is a useful tool to assess medical students' competencies on patient safety (108, 109).

1.8.7.5 Electronic health records

Electronic patient records can help improve patient safety in some primary healthcare settings (100). The electronic health records systems help reduce the incidence of medical errors and loss of paperwork (110). The electronic systems are mostly paperless and offer health workers support

to enter clinical notes electronically, have diagnostic codes, access laboratory results, order medication electronically and make referrals (100,110). Electronic health records provide clinical decision support through reminders for chronic disease management and preventative care (100, 110). Studies on this intervention show that health practitioners concur that the intervention helped reduce medication errors and improved the quality of care provided, communication amongst health professionals, the follow-up of tests conducted, the documentation and completeness of data (111, 112). Some health professionals, however, felt that the system compromised the quality of interactions with patients, because they spent more time on medical documentation, which resulted in longer patient visits and longer waiting hours (100, 111, 112).

1.8.7.6 Patient transfer interventions

The changing of patient care responsibility from one health practitioner to another increases patient safety risks (113). It is because there may be poor communication between the two health practitioners; the receiving doctor may not be aware if there are any pending patient results, or responsibilities may be unclear (113). Safe handover is critical to delivering safe, adequate and quality care. Thus, the standardised transfer and structured transfer interventions curb such risks in the care of patients. The standardised transfer makes sure that healthcare workers do not neglect patients during their hospitalisation when one doctor leaves. Outgoing doctors had to create a list of ten tasks for patients who needed continuous care which an incoming intern would attend to for the first three months of their academic year at the facility (100). A patient transfer intervention procedure (TIP) was implemented in the Netherlands to create a patient discharge process for all patients admitted to the hospital to ensure patient safety (114). Proper patient handovers from hospitals to other healthcare workers are an integral part of quality and safe healthcare and most often transfers get delayed, or the patient is not involved in the process (114).

1.9 Chapter summary

This chapter presented the background, statement problem and justification of the study. The chapter also highlighted the research questions, aim and objectives of the research. The researcher discussed the theoretical framework informing the study, and the review of the literature on significant events. The next chapter is a discussion of the methodology used to execute the study.

CHAPTER 2

METHODOLOGY

2.1 Introduction

Chapter 2 gives a detailed outline of how the study was conducted. This section includes the study design, study setting, study population, sampling method, data collection and analysis. This chapter also details information on the trustworthiness of the study, ethical considerations, and limitations of the study.

2.2 Study design

This is a secondary data analysis study based on a section of an Integrated Primary Care (IPC) block logbook focusing on medical student reflections of a significant event. A qualitative descriptive research design was used to portray the significant events in PHC facilities, described as the type of research which seeks to uncover and make sense of a particular phenomenon as perceived by others (115–117). Qualitative description research is useful in healthcare research as it grants one the opportunity to understand the who, what, where, and why of people's experiences or events (117). Therefore, findings from qualitative descriptive studies are important to health practitioners and policymakers (118).

This type of design is suitable for the present secondary data analysis which described the types of significant events that the medical students were involved in, their impact on the students and patients, factors associated with the significant events and how they were handled in different facilities (119). The qualitative descriptive design provided an overview of significant events in primary healthcare settings in South Africa, as it allowed the researcher to present genuine results which highlight significant events in primary care settings (120). This design was appropriate for this study as the researcher did not employ a high level of interpretive analysis of the data (121). The value of qualitative description was therefore not only in the knowledge generated, but also in determining significant, important findings and their implications (122).

2.3 Study site

In 2014, the final year medical students enrolled for the Integrated Primary Care block were placed in nineteen rural and urban (peripheral settlements) healthcare facilities in Gauteng, Mpumalanga and North West provinces for six weeks (Figure 2). The district hospitals and Community Health Centres (CHC) with their supporting clinics in these provinces were used in the block (124). The Community Health Centres offer care and support services and HIV and TB-related treatment. They are founded on a community-oriented primary healthcare programme that monitors and proactively works towards the improved health and wellbeing of families in their areas (124). District hospitals support primary healthcare and offer more specialised care; they receive and manage referrals from clinics and Community Health Centres.

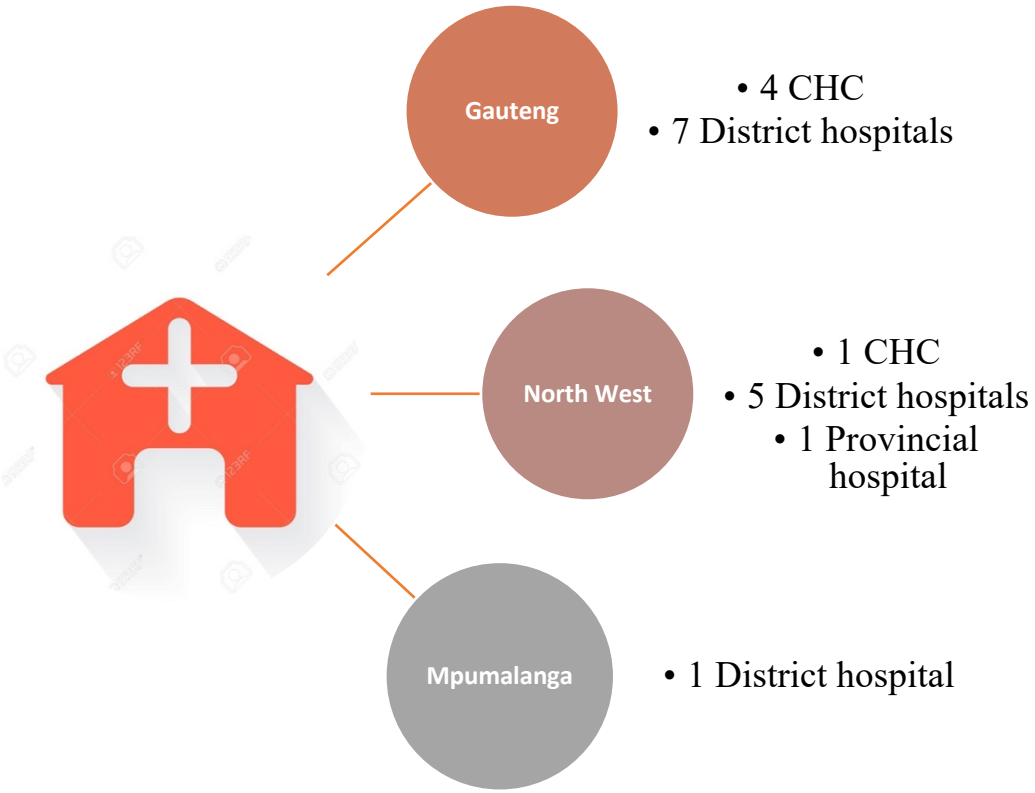

Figure 2: Study sites

2.4 Study population

There were 228 final year medical students enrolled for the IPC block in 2014. Of these, 207 students recorded a significant event in their logbooks and these 207 are the study population.

Four weeks before every IPC block placement, a one-hour briefing session was held with 30-36 final year medical students where they were informed of the objectives of the block, the sites and how many students each of these sites could accommodate (124). Once finalised, the students had an option to select from the 7–9 healthcare facilities where they wished to be stationed for the rotation.

2.4.1 Inclusion criteria

Final year medical students (n=207) enrolled for the IPC block who had completed a significant event in their logbook were included as part of the study population.

2.4.2 Exclusion criteria

Final year medical students enrolled for the IPC block who had not completed a significant event in their logbook were excluded from the study (n=21).

2.5 Study sample

The researcher used a maximum variation purposeful sampling approach to select participants for the secondary analysis (125). Maximum variation purposeful sampling allowed selection of participants from an enormous group of potential participants who possess particular characteristics not common to all the participants (126). This sampling technique allowed the researcher to select rich data to better understand significant events in primary care settings (126).

Before sampling, there were 207 recorded significant events. After maximum variation purposive sampling, 124 cases remained. It is crucial to note that there is no formula to calculate sample size in qualitative research. The researcher had no intention of generalising the study findings to the entire population; thus the sample was not calculated and decisions were made based on empirical evidence, which is why maximum variation purposeful sampling was used (127). Therefore, the 124 cases (ultimate sample) which remained were selected because of their richness of information.

From the 207 final year medical students who had completed a significant event analysis, to ensure maximum variation of the sample, the researcher selected all participants who had experienced a significant event. These were participants directly involved in the significant event they recorded

and eliminated those who described significant events they had observed from a distance, overheard the event discussed by colleagues or had witnessed the event. Through maximum variation sampling, the researcher identified instances where a similar event was recorded by more than one student in the same health facility and within the same group. In such situations, the researcher selected the event with more detailed information and eliminated the rest (126). The elimination of repetition in the data allowed for diversity in the sample. The researcher also eliminated incomplete data. This sampling technique also ensured that there was a representation of the different healthcare facilities across the three provinces included in this study (126).

2.6 Data collection and management

The Division of Rural Health in the Department of Family Medicine at the University of Witwatersrand collected the primary data in 2014 as part of an ongoing evaluation of the Integrated Primary Care (IPC) block. The Department of Family Medicine required all final year medical students to undertake a 6-week clinical placement in primary healthcare centres as part of the Integrated Primary Care block. The purpose of the block was for students to manage common presenting problems in primary care settings.

In 2014, during the 6-week IPC block rotation, students individually completed a pre-structured reflective diary as one of the logbook requirements that contributed towards a formative assessment of the block. The students documented in their logbooks reflections on exposure to different aspects of primary healthcare that included a significant event analysis.

In the logbooks, the medical students the Department of Family Medicine were asked to complete six open-ended questions of a significant event that they had either *'witnessed or were involved in at their site during the 6-week clinical rotation where management of the patient was sub-optimal, an adverse event occurred, or a patient died.'* (Appendix A). Although these formed part of the logbook, similar to portfolios (128), entries about adverse events were considered to be a critical reflection tool that facilitated students in learning about the management of significant events in PHC settings. To get insight into the significant events the medical students reported on, the researcher used secondary data analysis to describe the significant events perceived by the medical students, the causes of these events, the procedures and processes used to manage the significant

events in the healthcare facilities, and how the significant events affected the patients and the students.

2.7 Data analysis

The primary data was captured at the Wits Centre for Rural Health using SPSS software version 27. To prepare for analysis, the researcher exported the secondary data to a Microsoft Word document. The researcher then cleaned the data, assessed its quality and organised the data to ensure that it aligned with the research questions of the research study (129). The data cleaning process involved removing duplicate information, removing irrelevant data which did not fit with the purpose of the study, fixing typos, and eliminating participants with missing information.

To accurately record the significant facets of the data related to the research questions, conventional content analysis was used (130). The researcher familiarised herself with the data as part of the analysis process. Data was coded using MAXQDA software version 2020.4. Once the process was completed, the researcher charted the coded data onto a coding framework. The coding framework gave the data a new structure that made it possible to reduce the data to answer the research question. In the coding framework, the researcher arranged the analysed data according to the objectives of the study, defining every theme and code which emerged from the data analysis.

In content analysis, the events are as abstract; therefore, the data should not be seen as physical events, but as expressions to be read, interpreted and represented for what they mean (131, 132). The conventional content analysis allowed the researcher to give a detailed description of different significant events in PHC facilities. Taking into account the fact that information on significant events in primary healthcare is limited in South Africa, the researcher deemed conventional content analysis the most appropriate approach to analyse data for this study (130).

2.8 Trustworthiness

Trustworthiness is an evaluation criterion of qualitative research to ensure that the study findings can be trusted (133). The criteria to determine the quality of qualitative research are credibility, transferability, dependability, application, reflexivity and confirmability (134). To ensure trustworthiness for this study, the researcher adhered to the following criteria.

2.8.1 Confirmability

Confirmability is the extent to which other researchers can corroborate the study findings (134). To bring to light that the study findings were not a fabrication but resulted from the data, the researcher described the approaches and processes used to collect and analyse data to allow interested researchers to confirm findings to steer away from researcher bias (120).

2.8.2 Dependability

Dependability in qualitative research is the consistency of the study findings over time (134). As this is secondary data analysis and the researcher was not directly involved in the collection of the primary data, to ensure the dependability of the findings, MAXQDA inter-coder agreement was used (135). The researcher also went through the raw data again to cross-check and revise the codes.

2.8.3 Credibility

Credibility is concerned with the extent to which one can be confident that the research findings are true (134). To ensure credibility, the researcher provided detailed accounts based on the data and cross-checked with her supervisors to determine if the findings were accurate. The study findings were linked to a theoretical framework to ensure that they made sense and that they truly represented the data (120, 136, 137). The researcher also engaged with the data for a long time to get to know the data and obtain rich information (133).

2.8.4 Transferability

Transferability entails the extent to which qualitative study results can be carried to other situations with other respondents (134). This means that research findings of a study may be utilised in another setting or study (120). To achieve this, the researcher described in detail the study participants, their experiences and their context to allow for comparisons with other groups.

2.8.5 Application

Since this is a qualitative descriptive study, to make sure there is dissemination of the information, the researcher will ensure the availability of information through publication and poster

presentations (136, 137). The purpose of qualitative descriptive studies is to stimulate more research (120). The researcher hopes that through this study, there will be more interest in significant events in PHC facilities across South Africa.

2.8.6 Reflexivity

The researcher was a Research Intern at the Wits Centre for Rural Health during the study period when she gained an interest in the data used in the study. The researcher played an outsider role in this study as she was neither affiliated with the study sites, nor the participants, thereby eliminating bias in data collection. The researcher gained an interest in this topic because of stories in the media about the high number of litigation cases against healthcare professionals in South Africa. As this was secondary data analysis, it eliminated researcher bias in data collection. The researcher perceived that due to medical students' limited skills, knowledge and experience, they were highly likely to cause medical errors. However, the findings have shown the researcher that while this may be partly true, medical students are very critical in error prevention and should always be encouraged to report errors in patient management. The researcher also subconsciously blamed senior healthcare workers for medical errors, but findings from the study have shown that while the human factor plays a role, there are many underlying issues within the health system that influence the occurrence of medical errors.

2.9 Ethical considerations

Ethical considerations are an extremely important part of research, because they entail adhering to moral standards when using information from people and other sources (138). The Wits Centre for Rural Health which granted the researcher permission to use the primary data (Appendix B), was approved to conduct the primary study by the University of Wits Human Research Ethics Committee (HREC) (**No: M131162)**. For the secondary study, the researcher sought approval from the University of Wits Human Research Ethics Committee (Medical) before commencing with the research (**No: M170853)**.

2.9.1 Informed consent

When data was collected for the primary study, written informed consent was obtained from all the final year medical students allowing the Wits Centre for Rural Health to use their logbook

reflections during the IPC rotation for research purposes which included journal publications and conference presentations (139).

2.9.2 Anonymity and confidentiality

For the secondary analysis, the researcher did not have access to the personal information of the participants and the study sites. No identifying information was used anywhere in the study which kept the participants and the sites anonymous. To ensure confidentiality, data was kept in a password-protected laptop, and only the researcher and supervisors had access to the data (140).

2.10 Chapter summary

This chapter presented the research design and methods used in the study. The chapter also discussed the data collection, data analysis processes, the trustworthiness of the research and ethical considerations. The following chapter is a presentation of the study findings.

CHAPTER 3

RESULTS

3.1 Introduction

Chapter 2 detailed the methods used to conduct the study, including the study design, study setting, sampling method, data collection, data analysis, ethical considerations and the trustworthiness of the study. This chapter presents an analysis of the results from 124 significant reports documented by final year medical students as perceived significant events during a primary care block placement. The results are organised according to the study objectives and presented as five major themes with corresponding subthemes supported by verbatim quotations to validate the experiences of the participants.

3.2 Presentation of results

In the data analysis process, the researcher made use of a thematic approach following systems thinking to understand the information recorded by the participants. Following the systems thinking approach, Figure 3 is a depiction of the perceived significant events experienced by the medical students and it shows how the causes of significant events are not always clear-cut, because the interactions between people, the environment, and their activities may all contribute to their occurrence. The diagram clearly shows the complex interactions in the health system and why things go wrong in the workplace. To reduce the occurrence and re-occurrence of significant events, the health system needs to be continually improved so that the interactions between healthcare workers, patients, the environment and activities all result in the provision of quality healthcare.

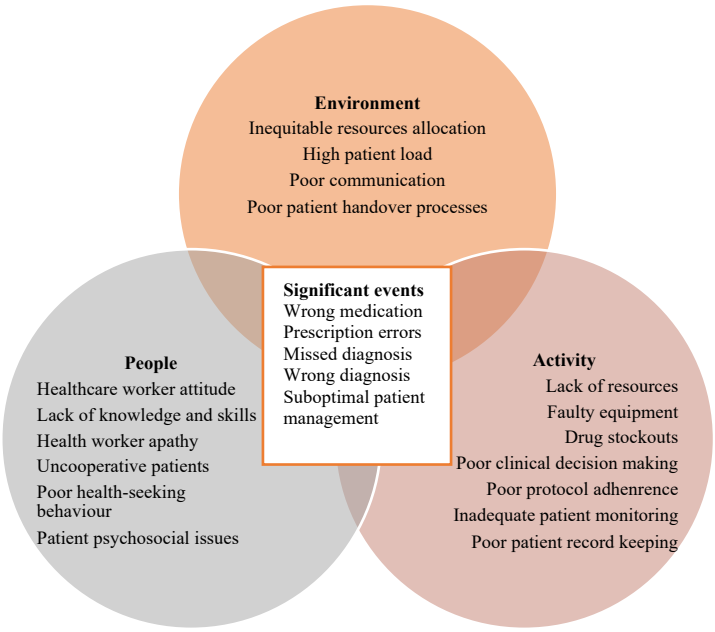

Figure 3: A systems view of medical students' perceived significant events

Figure 4 below outlines the five major themes and their subthemes as presented in this report. Theme 1 shows the type of significant events and is categorised into medication and prescription errors, patient diagnosis errors and inadequate patient management. Theme 2 includes the causes of the perceived significant events, categorised into the human factor and health system challenges. Theme 3 shows the consequences of the significant event, grouped into health and safety concerns and student and patient wellbeing. Theme 4 focuses on facilities' responses to the perceived significant events. Theme 5 focuses on measures to prevent future recurrence of the incidents and includes a discussion of staff education, patient education, as well as human and infrastructure resources.

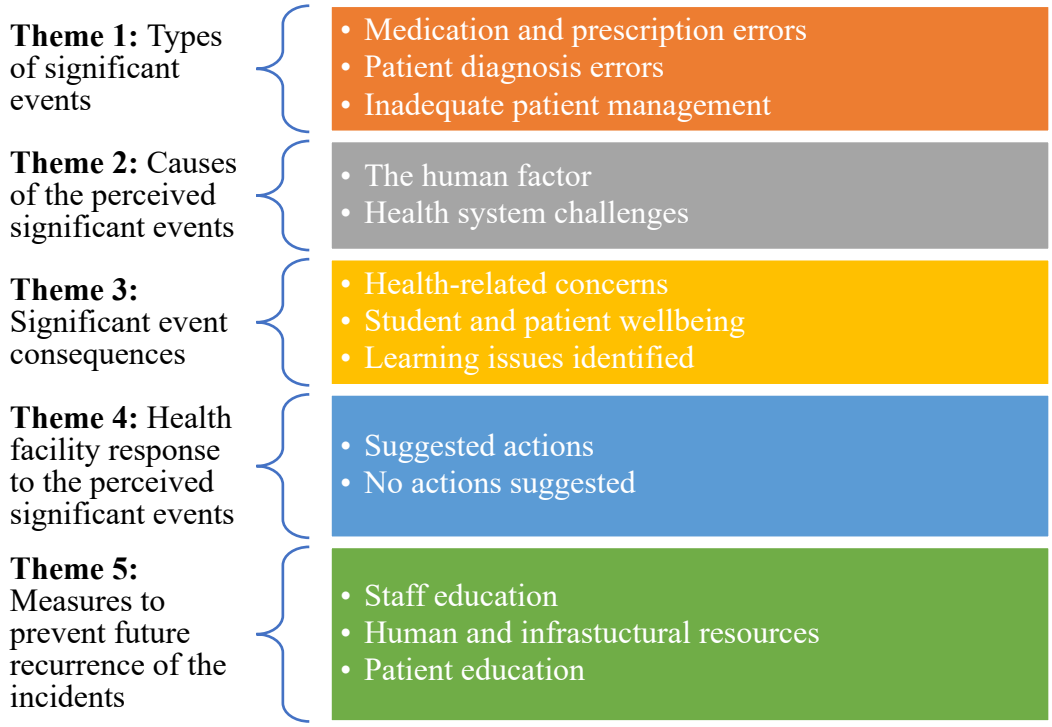

Figure 4: Presentation of main themes and subthemes

3.2.1 Theme 1: Types of significant events

Theme 1 is related to Objective 1 of the study to identify and describe the perceived significant events as recorded by the participants in their logbooks. In response to this objective, the participants recounted the perceived significant events they experienced. The significant events described by the participants were medication and prescription errors, patient diagnosis errors and patient mismanagement. Many of the perceived significant events were reported in the emergency medicine rooms and, in the maternity, and labor wards of the PHC facilities where participants were based for their IPC block.

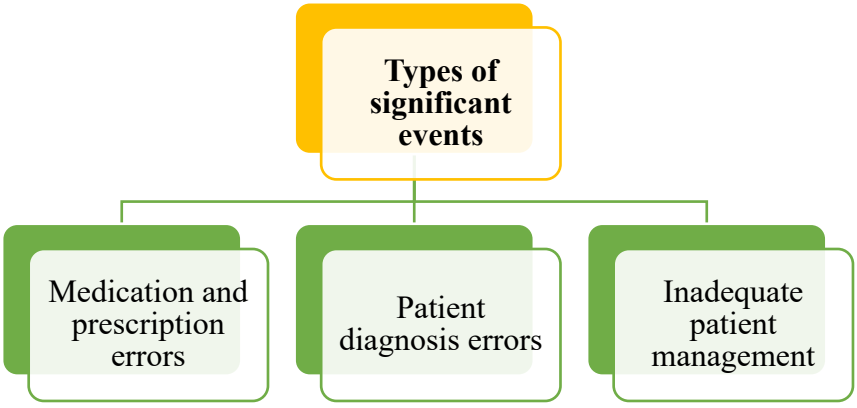

Figure 5: Theme 1 and subthemes

3.2.1.1 Medication and prescription errors

In these perceived significant events, participants recorded incidences where patients received wrong medication or instances where there were prescription errors. Some participants reported that patients received an incorrect treatment regimen for their conditions. Below is an account by one participant:

> *"A patient was diagnosed with MDR-TB, but he was put on first-line regimen regardless. After 6/12 he was obviously not better, so after investigating, the sisters in the TB clinic at* [name of facility withheld] *picked up the mistake in his management."* ***(Participant 7, Rotation 3, Facility 2)***

The participants indicated that healthcare workers did not take medication contraindications into account:

> *"Although many such incidents occurred like this, it will describe the poor prescribing habits of some doctors in the chronic clinic ... a patient with severe gout being dosed on allopurinol and put on Hydrochlorothiazide (HCTZ) for two years."* ***(Participant 77, Rotation, 1, Facility 2)***

Participants reported patient identity mix-ups to be a common occurrence , especially where patients had similar names. Consequently, patients got the wrong medication that was not necessarily prescribed for their condition.

"Patients with the same names were attending chronic patient clinic. Both had hypertension, but only the one had schizophrenia as a co-morbidity. When finding the EDL packets, the psych patient's injection was given to the HPT patient wrongly. Patient did not think she was wrongly being medicated." ***(Participant 34, Rotation 4, Facility 7)***

3.2.1.2 Patient diagnosis errors

Some participants highlighted wrong patient diagnosis and missed diagnosis as areas of concern that resulted in perceived significant events during their clinical rotations.

"A patient came in after a Motor Vehicle Accident (MVA) with the paramedics. He was intoxicated and complaining of chest pain. Primary and secondary surveys were done which showed some tenderness over the sternum, Chest X-ray (CXR) ordered showed slight widening of the mediastinum. X-ray reviewed with senior doctor who said there was nothing to worry about. Later the CXR was shown to a different doctor who after calling the surgery team. Drs. ordered an angiogram that showed leakage of the aorta." ***(Participant 16, Rotation 3, Facility 1)***

Participants recorded instances where healthcare workers disagreed on a course of treatment as their perceived significant events, which resulted in suboptimal care of the patient.

"A patient came in with a snake bite rumoured to be a black mamba bite. Doctor in charge delayed care as they weren't certain if it was a black mamba and the patient deteriorated. Nurse disagreed with the treatment." ***(Participant 29, Rotation 5, Facility 14)***

In other recorded situations, the participants perceived the senior healthcare workers did not consider their suggestions on patient management.

"A patient presented during my mini-CEX with the doctor at the clinic with a history of persistent cough and occasional blood stains and night sweats. He had a contact with a similar problem. I was concerned that he had TB, but the doctor believed he had intestinal lung disease due to the fact that he worked in the mines. He was sent home with Prednisone, Beclomethasone and Asthavent." ***(Participant 46, Rotation 4, Facility 11)***

3.2.1.3 Inadequate patient management

Healthcare workers' attitudes, poor communication, poor management of assault cases and labour cases all resulted in poor patient care. Health workers' attitudes towards patients, in the form of physical and verbal abuse, were ongoing concerns.

> *"A patient came in semi-conscious having diaphragm spasms, we didn't have a history yet to proceed with ABCS while waiting for the family to arrive. When trying to lift the patient off the wheelchair onto the bed, the nurse got irritated that the patient was not carrying her own weight and began hitting her and pulling at the patient's clothes and shouting at her.* ***(Participant 28, Rotation 5, Facility 3)***

Some participants recorded poor management of physical and sexual assault cases as significant events that affected patients' access to quality healthcare.

> *"We had an 8-year-old girl who was sexually assaulted by a 14-year-old neighbour. The forensic sister and I conducted an examination for her and collected the sample. When we were almost finished, we noticed some blood coming out around the urethral area, we tried to order examination under anaesthesia to further access the injury. Gynaecology surgery and urology doctors on call all did not want to see the patient* [and were] *all trying to come up with a reason why they cannot see the patient. We ended up waiting for two and a half hours trying to see who is going to see the patient."* ***(Participant 118, Rotation 6, Facility 4)***

The participants also reported that at times healthcare workers were not clear about who should complete and sign J88 forms as a concern.

> *"The patient had come in following having been assaulted by an adult (patients was 8y/0). The family of the patient wanted a J88 filled so as to lay charges. The attending doctor had me fill out the form and sign – when I signed, then the attending doctor countersigned the document."* ***(Participant 59, Rotation 2, Facility 3)***

Participants perceived that there had been suboptimal management and inadequate monitoring of patients in the labour wards.

"In the labour ward during one of my weeknight calls a gravida 1, para 2 who had arrived in the morning was sitting on the bench in the admission cubicle as no bed had yet been allocated to her despite abundant availability of beds at that time. At about 20h00 she began shouting for a sister, saying that her baby was coming. The sister in charge of her came eventually, ambled to her cubicle and discovered that the baby was crowning significantly. She shouted at the woman to get on the bed and then left immediately to get a delivery pack. While she was gone the baby was delivered and this occurred quickly, while the woman was still struggling to climb onto the bed." ***(Participant 88, Rotation 1, Facility 11)***

3.2.2 Theme 2: Causes of the perceived significant events

Theme 2 is a response to Objective 2, namely factors associated with the perceived significant events as experienced by the participants. In this theme, the participants identified causal factors which may have resulted in the perceived significant events that the researcher will report as findings. The causes of the events in this section were process and system challenges. The participants provided detailed accounts of the causes of the perceived significant events. The researcher categorised the causal factors into two subthemes, human factors and health system challenges, as depicted in Figure 6 below.

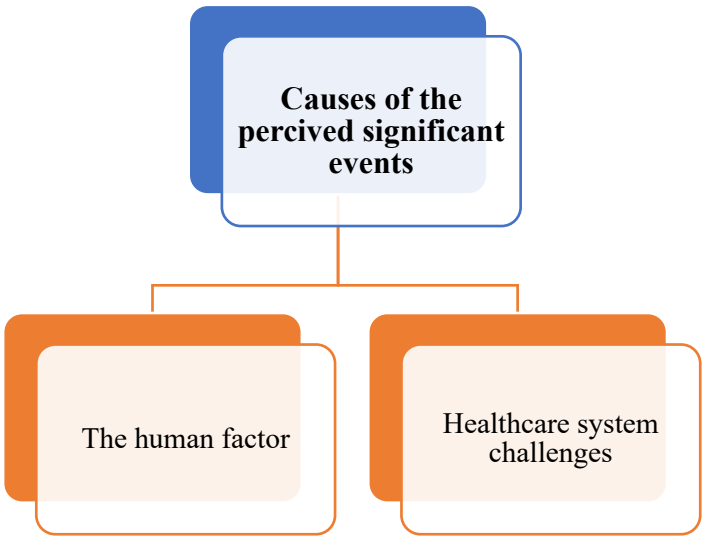

Figure 6: Theme 2 and subthemes

3.2.2.1 The human factor

The human factor subtheme is a discussion of the interaction between patients, healthcare workers in healthcare provision across different healthcare facilities, as well as the interaction with equipment/technologies and how this may have contributed to the occurrence of the significant events as perceived by the participants. This section will focus on healthcare worker-related dynamics and patient-related dynamics.

3.2.1.1.1 Healthcare worker-related issues

Participants perceived mistakes such as inadequate patient examinations by healthcare workers to be causal factors for significant events which resulted in poor patient diagnosis and poor patient management. The quotations below highlight how technology influenced patient care and thus contributed to the events, methods used in clinical decision making and healthcare workers engagement with patients and the environment.

> *"Poor clinical reasoning/decision making by not fully examining the patient and doing a computed tomography of the brain to exclude extradural haematoma because the patient's skull was a visibly depressed. Human error."* ***(Participant 67, Rotation 4, Facility 8)***

> *"Clinical decision making, the stats were looked at, they were used as* [a] *basis not to protect airway, even though the patient was snoring and grunting. Human error, it was late at night, towards morning hours. So the team might have been sleep-deprived and not at optimum levels."* ***(Participant 91, Rotation 7, Facility 1)***

Participants attributed failure to adhere to protocols due to human error in the treatment of patients.

> *"This incident was purely a human error involving all of us at the labour ward. The procedure is that if a high blood pressure reading is found, it must be written with a red pen. None of us followed up on her blood pressure and during the fit and after it read 210/115."* ***(Participant 1, Rotation 3, Facility 1)***

Participants postulated that health workers are not always up to date on the current principles of patient management, leading to their failure to adhere to protocols.

"Poor decision making, not staying up to date with current principle of management, can't plug with adrenaline – blood pressure – Don't give amlodipine, we give 20mg enalapril now." ***(Participant 108, Rotation 6, Facility 4)***

Another participant perceived clinical decision making as tricky, especially with snake bite patients.

"The decision to give antivenom is always difficult as it can also cause anaphylaxis, however the guidelines state that all mamba bites should receive antivenom. The clinical decision however is to try establish if it really was a mamba bite or not (I've had patients who claim mamba bite, that weren't)." ***(Participant 29, Rotation 5, Facility 14)***

Inadequate patient monitoring, improper patient handover processes among healthcare workers and failure to reassess patients during shift changes resulted in significant events.

"I think the cause of the incident was multi-faceted. In the immediate sense, it was due to human error in that the patient had not been monitored adequately and so her rapid progression to full dilation was not noticed. On a broader level, however, the fault could be said to be with the system and process involved in handover between day and night staff. Although re-assessment by the night sister should take place with every patient, but instead the report from the day staff is used and no personal assessment." ***(Participant 88, Rotation 1, Facility 11)***

According to the study participants, communication breakdown amongst healthcare workers was an ongoing challenge. This was notably common during shift changes resulting in delayed access to healthcare.

"A patient presented in [the] *labour ward and was told to wait in the observation room. She was left there for quite some time. A nurse came to see her and did a pelvic exam, auscultated Foetal Heart Rate etc. The patient remained in this room. She started to moan and call the nurses. They went in once or twice and told her to quieten down. Next moment she shouted loudly, and I looked and saw the baby's head had been delivered. I got there first and proceeded with delivery. The nurse arrived and slapped the patient hard on the*

shoulder and shouted at her [for] *pushing without calling anyone."* ***(Participant 58, Rotation 2, Facility 5)***

As part of communication breakdowns in some healthcare facilities, problems such as inadequate patient information resulted in patient mismanagement.

"Not cross-checking packet + patient file number. Human error for not rechecking + checking with patient about the antipsychotic medication. The inadequate filled in files did not lead us to think it was the wrong patient." ***(Participant 34, Rotation 4, Facility 7)***

Poor file organisation patient also led to poor patient management.

"The cause of the incident is a result of poor clinical decision making more than human error. The results of investigations were all present in the patients file, therefore there is no excuse to not know that the patient is Rifampicin resistant. The notes were poorly arranged, which can make it difficult to find information." ***(Participant 7, Rotation 3, Facility 2)***

Healthcare workers' attitudes towards patients influenced the care the patients received, resulting in significant events.

"The cause I believe is that certain health professionals have somehow acquired the idea that they can mistreat patients, most probably having seen their colleagues before them doing it and no stand was taken." ***(Participant 28, Rotation 5, Facility 3)***

The participants linked healthcare worker knowledge and a skills deficits to mistakes in the management of patients.

The Emergency Medical Rescue Services had provided no form of resuscitation prior to arrival, i.e. no dextrose was given, no cardiopulmonary resuscitation/ automated external defibrillator (AED), (Poor clinical decision making). However, should there have been a shockable rhythm, time was taken to determine how the new AED machine works. ***(Participant 27, Rotation 5, Facility 9)***

3.2.1.1.2 Patient-related issues

The patient-related issues is a discussion that focuses on patients' interactions with healthcare professionals, the environment, and their families and how this may have contributed to the perceived significant events.

A standard recommendation is for pregnant women to attend antenatal classes throughout their pregnancies. Failure to do so may cause complications or may lead to complications that go undetected until they present as an emergency.

> *"A 23-year-old P1G2, gestational age of 26 weeks by dates presented to labour wards with Preterm premature rupture of the membranes and in labour with a sternocleidomastoid muscle diluted cervix. She delivered twins (female + male, 600g+900g respectively). Not booked. No antenatal clinics. No diagnosis of twin pregnancy."* ***(Participant 52, Rotation 4, Facility 8)***

Uncooperative patients made it difficult for healthcare workers to provide adequate care and perform their duties timeously. Patients were uncooperative because of pain and intoxication.

> *"… The problem was that the patient was not co-operating, it was hard to check foetal condition. The parent reluctant on the Cardiotocography (CTG). She said she was in too much pain to lie still and she felt her baby was ok + felt like she didn't need the CTG."* ***(Participant 69, Rotation 4, Facility 2)***

Psychosocial issues influenced patients' ability to access healthcare services, and according to the participants, these issues may have led to the occurrence of the events they experienced.

> *"… This patient was very ill – TB, HIV, wasted, defaulted on treatment. She probably needed to seek treatment earlier and she would not have been quite so ill. Lack of resources can also be blamed – she was poor and lived in a rural township – access to healthcare was probably limited …"* ***(Participant 23, Rotation 5, Facility 11)***

3.2.2.2 Health system challenges

Health system challenges, such as inadequate human resources, a lack of equipment, broken equipment, or drug stock-outs are some of the problems identified by participants as contributing to the perceived significant events.

3.2.2.2.1 Lack of resources

Healthcare facilities sometimes lacked equipment or were reported to have faulty equipment to the extent that they could not manage and treat patients timeously. Participants cited lack of resources in the form of arterial blood gas (ABG) machines, cardiotocography (CTG) machines, ultrasound machines, emergency trolleys and faulty pulse oximeters.

> *" ...Lack of resources. ABG machine not operational, lab tests not available (C-reactive protein, Interstitial Cystitis, HCO3-). From this, we could have corrected pH before transferring to the ward."* ***(Participant 56, Rotation 5, Facility 14)***

> "*… In terms of equipment, there was only a faulty pulse oximeter present and the warmer didn't have a working light, when intubated there was no tape to secure the tube. The ambu-bag release valve was not functioning, and the suction was very weak. There was delay in doctors arriving to assist owing to miscommunication by the state of neonate."* ***(Participant 107, Rotation 6, Facility 15)***

The participants identified the inequitable distribution of resources as a problem which may have contributed to inadequate patient care.

> *"There was not necessarily a lack of resources but perhaps poor distribution of resources as all the nursing equipment was available in casualty, but not in the resuscitation where it is obviously most needed."* ***(Participant 100, Rotation 7, Facility 6)***

Drug stock-outs resulted in patients not getting their medication on time, thus contributing to a perceived significant event.

> *"The cause of the incident was a lack of resources. At times when the required medication is not available, an option of using an alternative is available. In this case, the only thing*

that could be done for the patient was to provide oxygen by face mask and place them in a comfortable position and monitor. It's unfortunate that incidences like this have to happen, but fortunately no dire consequences occurred." ***(Participant 65, Rotation 4, Facility 8)***

Infrastructure challenges resulted in delayed care and poor management of patients. These included shortages of beds and fully booked operation rooms.

"I think there was a failure in terms of clinical decision making, the patient was very ill and needed admission. Limited resources also played a part in the patient not being admitted. The doctor simply can't admit every patient that presents in such." ***(Participant 122, Rotation 6, Facility 4)***

Poor servicing of infrastructure sometimes compromised the care of the patients and placed their lives at risk.

"The candle was put in trauma room because the light source for the room was damaged. From the information I could gather the sisters doing the night duty that day, they were just improvising by using the candle. The hazard considerations weren't applied adequately in this case." ***(Participant 36, Rotation 4, Facility 3)***

3.2.2.2.2 Human resources challenges

Participants identified human resources shortages as a cause of the perceived significant events they experienced. In the emergency medical department, lack of paramedics meant inadequate ambulances, which resulted in long waiting hours for patient transfers.

"Lack of human resources [at the] *facility referred to paramedics needed. Lack of physical resources, only one ambulance was available. One ventilator was serving the entire district."* ***(Participant 117, Rotation 6, Facility 4)***

"Patient was referred to [name of facility withheld]. *The transport took a while. He is also diabetic and was becoming hypoglycaemic."* ***(Participant 63, Rotation 2, Facility 12)***

Lack of adequate skilled professionals such as medical doctors meant a doctor may not always be readily available to attend to a patient due to the high patient/healthcare worker ratio in many facilities.

> *"... The doctor was called to assess for a C/Section, but was delayed in theatre and when he came to assess, the woman had progressed too far for a C/Section to take place. Therefore, a natural vaginal delivery had to take place. A suction delivery was done, but the cap was replaced multiple times ..."* ***(Participant 81, Rotation 1, Facility 6)***

The lack of healthcare workers also meant that medical students did not get adequate supervision during patient management, increasing the likelihood of mistakes.

> *"...Lack of supervision of students by midwives. Delayed clinical decision making ... Only two midwives on duty."* ***(Participant 95, Rotation 1, Facility 2)***

3.2.3 Theme 3: Significant events' consequences

The theme is linked to the second part of Objective 2, which looked at the consequences of the perceived significant events experienced by the participants during their primary healthcare clinical rotation. This section considered the root cause analysis in highlighting the interactions between people (patients and healthcare workers), the environment (healthcare facilities, teamwork, management) and the activities involved in the care of patients and their impact on participants and the patients. Figure 7 below is a presentation of Theme 3 and its subthemes.

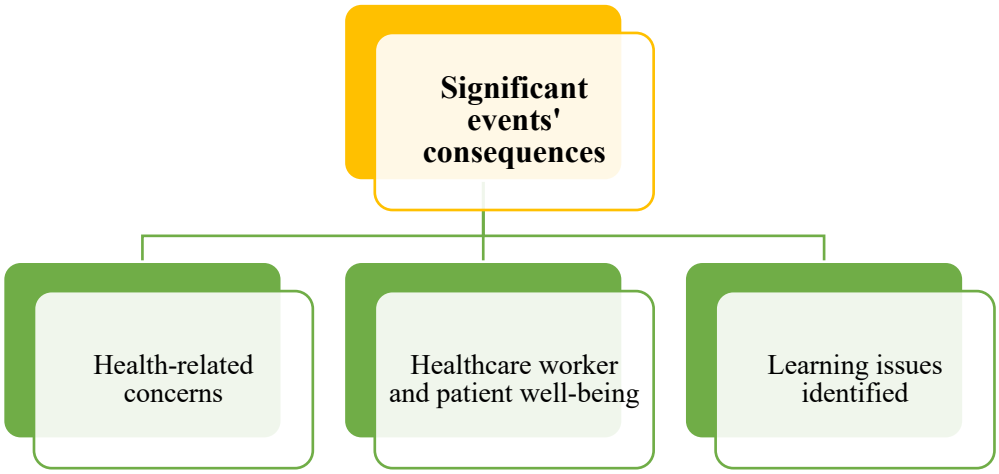

Figure 7: Theme 3 and subthemes

3.2.3.1 Health-related concerns

In this section, the participants shared concerns about the physical health of their patients and themselves. This section looks at student-related concerns and patient-related concerns.

3.2.3.1.1 Student-related concerns

This section describes participants' concerns regarding their physical health and safety because of the significant events they experienced.

Participants had personal safety concerns because of impossible and aggressive patients and families they encountered whilst overtime till late at night.

> *"He was aggressive to all medical personnel, including me. Followed me into a room at one point, which is when I realised how unsafe the set up in the clinic was."* ***(Participant 42, Rotation 4, Facility 5)***

Human resources challenges led to a participant working overtime.

> *"Had to initiate resuscitation, clean the patient, replace linen and left the hospital 1½ hours later than I was supposed to after midnight and my safety of getting back to residence was decreased."* ***(Participant 4, Rotation 3, Facility 3)***

"I was one of the individuals who was threatened, I had to calm down the male family members who were getting rather aggressive." ***(Participant 68, Rotation 4, Facility 8)***

Needle-stick injuries left participants overly concerned for their health in fear of contracting HIV from their patients.

"Needle stick injury! With a needle with visible blood from a patient who was HIV+ and from whom I was drawing blood because his viral load was high … The first needle sick injury. Risk of transmission small, but present." ***(Participant 51, Rotation 3, Facility 3)***

3.2.3.1.2 Patient-related concerns

Patient-related concerns are the effects of the significant events on patients' physical health. The participants highlighted what they perceived to be the effects of the events on the patients. The participants recorded unexpected health outcomes in the maternity wards. These outcomes included excessive bleeding resulting in shock and other complications during labour.

"Post-caesarean for foetal distress, a patient started to have post-partum haemorrhage and went into hypovolemic shock. It took over an hour to arrange theatre for her for a relook. On relook it was found that the surgeon had missed an active bleeder during C/Section." ***(Participant 14, Rotation 3, Facility 7)***

Healthcare workers' uncertainty over which treatment to give, resulted in delayed care which worsened a patient's condition.

"The patient was only given antivenom after 3 hours when her speech slurred and she required intubation; only then was antivenom given. She required life support at this point." ***(Participant 29, Rotation 5, Facility 14)***

According to participants, poor management could cause medical complications. These include residual symptoms for a stroke patient, haemothorax for a patient who had a chest drain inserted and complications for patients with poorly controlled chronic conditions.

*"The patient was held with restraint, and the position was not ideal and accurate position of the chest drain could not be guaranteed, hence patient may still be at risk of haemothorax or spontaneous pneumothorax." (**Participant 24, Rotation 5, Facility 7)***

Physical trauma patients could be at risk of medical complications. For example, a patient had an undiagnosed epidural bleed, another had trauma in the eye and could lose their sight.

*"Undiagnosed epidural bleed. The patient was poorly managed, because assessment for head injury should have been done though the patient was intoxicated." **(Participant 96, Rotation 7, Facility 4)***

*"May not regain vision in that eye, ever. There is an underlying psychiatric illness that was not properly explored/dealt with. There could be various other conditions I missed, and the (lacking) doctor on call missed also." **(Participant 12, Rotation 3, Facility 5)***

An assault patient was at risk of dying because of an unprotected airway.

*"Airway was not protected. Patient had GCS 5/15, had large scalp haematoma post assault. Patient was put at risk of not surviving." **(Participant 91, Rotation 7, Facility 1)***

Participants perceived patients given wrong medications were at risk of allergic reactions, whilst another patient was at risk of reactions to unscreened blood conditions in the maternity ward.

*"Extra pyramidal side effects. Has to attend clinic to see doctor every day. Was seen by CHCW the same afternoon – she was confused about her 'medication'. The tablets she received was not hers, but she did not say anything to the clinic staff." **(Participant 34, Rotation 4, Facility 7)***

Patients experienced physical trauma, especially in the maternity wards through painful birthing experiences and the lack of interventions to reduce pain for patients.

*"She delivered a healthy baby boy but was in severe pain as no analgesia was given for the episiotomy and I don't think it was cut during a contraction." **(Participant 36, Rotation 4, Facility 3)***

In the maternity wards where neonate resuscitations took long or were conducted by unskilled medical students, neonates were likely to suffer from complications such as hypoxia.

> *"The neonate required 12 minutes of resuscitation. There could potentially be hypoxic brain damage. This can affect the rest of the child's life as well as members of the family."* ***(Participant 64, Rotation 4, Facility 7)***

3.2.3.2 Student and patient mental well-being

Student and patient wellbeing is a description of the mental health status of the study participants and patients because of the perceived significant events they experienced.

3.2.3.2.1 Patient well-being

In this section, the participants shared what they perceived to be the mental health status of the patients because of the significant events they recorded. Patients experienced emotional trauma in maternity wards. For example new parents who experienced foetal deaths.

> *"Absolutely traumatising to the mother. She burst into tears as she began bearing down and was crying uncontrollably knowing she was delivering a dead baby. After the delivery her and her husband held the baby and both cried over the loss. They had great difficulty in understanding that the cause of the death in unknown and the mother kept wondering whether it's her fault."* ***(Participant 83, Rotation 7, Facility 6)***

Another example of emotional trauma was that of a mother who dropped her baby during an unassisted delivery.

> *"The patient herself was, fortunately, not injured during the unassisted delivery. However, she did experience emotional trauma through witnessing such a potentially devastating event occurring to her newborn baby, she was also left feeling a significant amount of guilt about the incident reinforced by the nurse repeatedly blaming her for it and upon being given her baby to hold, she repeatedly apologised to him for dropping him..."* ***(Participant 88, Rotation 1, Facility 11)***

The care and management given to patients who had been rape victims caused them further emotional distress.

> *"She waited for me because I was the only female doctor present, however as I cannot do the J88 alone, she had to be seen by him now. Angry, the male doctor refused to see her today* [and] *said she must come back tomorrow. She was traumatised and now had to extend the experience by another day."* ***(Participant 123, Rotation 6, Facility 4)***

3.2.3.2.2 Student well-being

Student well-being focused on the mental health status of the study participants because of the perceived significant events they experienced. Many participants experienced emotional distress in the form of feeling useless, helpless, fear, worry, stress, and self-doubt during their clinical rotations.

> *"Feeling completely useless and like I've failed the patient – what if I had been more patient with him? Also, there was no Dr there to oversee – it is my name on his file."* ***(Participant 49, Rotation 4, Facility 4)***

> *"I was filled with a lot of questions and guilt for not speaking out because I felt threatened and I felt I was still a junior and my opinion was probably invalid. I blamed myself for the outcome."* ***(Participant 84, Rotation 7, Facility 11)***

Others cited feeling frustrated, disillusioned, and sad, due either to their failure to assist the patients, or uncertainty on the management of patients and patients' psychosocial circumstances.

> *"I felt so sad and helpless, she needed people to be there for her and her story made her feel so vulnerable, just wanted to make this process as painless as possible, but now I had to tell her to come back tomorrow and relive to whole experience again."* ***(Participant 123, Rotation 6, Facility 4)***

It shocked participants that health professionals did not give adequate attention to their patients, which resulted in suboptimal patient care.

"I was very shocked and upset that a healthcare professional could make such a great oversight not to examine the patient at all." ***(Participant 49, Rotation 4, Facility 4)***

Other participants expressed that the perceived significant events they recorded left them furious.

"The patient was unpredictable, and he was strong and would often lash out and try to bite. I was scared at times but also angry at the patient when we all were trying to help him. The uncertainty and delay in management while patient deteriorated was unsettling." ***(Participant 29, Rotation 5, Facility 14)***

3.2.3.3 Learning issues identified

For many participants, the consequences of the perceived significant events had either to do with their mental well-being or physical health concerns. However, a few felt their experiences taught them necessary lessons on patient care. To some participants, the perceived significant events they experienced were a learning opportunity. The emergencies taught them how to carry themselves in case of emergencies.

"It was a shock to me and initially I panicked but it was a great learning experience because I learnt how to resuscitate a patient and be fast at the same time. I had to remind myself to be calm." ***(Participant 57, Rotation 2, Facility 11)***

Another lesson to participants was there is only so much health professionals can do, because some situations are inevitable.

"I was shocked by how things could change so quickly and how stressful a situation such as that could be. As much as one tries to prevent situations there will always be one or two that slip through." ***(Participant 40, Rotation 4, Facility 14)***

Participants also revised the management of conditions they were not knowledgeable in, thus gaining more knowledge and skills.

"This incident scared me. I too had forgotten how to manage a patient in PPH and i.e., felt incompetent and useless. The nursing staff looked up to me for directions which I could not provide. Following this incident, I forced myself to learn about PPH and its management

so that I can be and feel like a safe and competent medical practitioner. This event made me see the benefit of revising my old notes." ***(Participant 62, Rotation 2, Facility 11)***

Patient advocacy was a lesson for participants who experienced the mistreatment of patients.

> *"Overwhelmed by experience and was unsure of how to assist and the midwife strictly told us not to. Taught me to be a patient advocate and to provide their needs in all circumstances. Feeling disappointed in my fellow health workers."* ***(Participant 48, Rotation 4, Facility 4)***

Theme 4: Health facilities' responses to the perceived significant events

The theme is linked to Objective 3 that looked at the healthcare facilities' responses to the perceived significant events experienced by the medical students. This theme and subthemes describe the ways in which the healthcare facilities managed the perceived significant events.

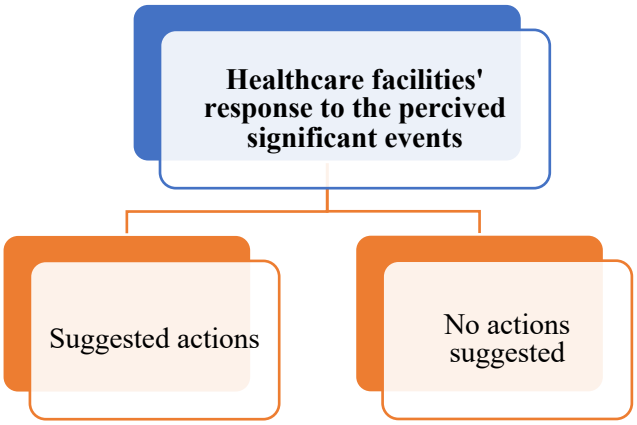

Figure 8: Theme 4 and subthemes

3.2.2.1 Suggested actions

This subtheme highlights suggestions healthcare facilities made to prevent the re-occurrence of perceived significant events experienced by the participants. A few participants stated significant events were addressed in morbidity and mortality meetings. In the maternity and labour wards, it was articulated that healthcare workers closely monitor patients with a high possibility of

complications. Daily checks of equipment and resources were advised as an action which could prevent future significant events.

> *"The incident was mentioned at the paediatric M&M. It was suggested that mums* [who have] *insulin dependent diabetes mellitus (IDDM) be more closely monitored & with tighter glycaemic control."* ***(Participant 32, Rotation 5, Facility 11)***

> *'The patient was discussed in the morbidity and mortality meeting; checking of the various resources and equipment every day was highlighted. Doctors should also have high index of suspicion that delivery and neonate would experience complication."* ***(Participant 107, Rotation 6, Facility 4)***

Some participants suggested the use of posters in the labour wards as a constant reminder to staff members of what they need to do.

> *"Changes suggested was that posters which have information about episiotomy must be printed and put on the walls inside the labour ward to constantly remind staff about how important this procedure is. Significant event review done."* ***(Participant 73, Rotation 1, Facility 1)***

Healthcare workers were trained on how to handle similar events in future.

> *"The nurses with the help of doctors who work at the labour ward had a meeting to discuss the case of what happened and the participant nurses working in labour ward were educated on regular monitoring of vitals and ringing the bell on high-risk patients."* ***(Participant 1, Rotation 3, Facility 1)***

Some healthcare facilities emphasised the need for protocol adherence to curb the recurrence of perceived significant events.

> *"It was suggested to follow protocol and administer antivenom to all mamba bites, however no consensus was reached amongst the doctors. Doctors also expressed reluctance to give antivenom if* [there were] *no neurologic signs and life support is available."* ***(Participant 29, Rotation 5, Facility 14)***

Easy access to protocols was identified as a solution for emergency situations, especially with paediatric cases.

> *"It was suggested that protocols for paediatric management of Diabetic Keto Acidosis (DKA) be instituted for casualty + the wards so that the doctors + the nursing staff are clear on how to manage another such emergency*." ***(Participant 56, Rotation 5, Facility 14)***

3.2.2.2 No actions suggested

Very few healthcare facilities acted on the perceived significant events experienced by the participants. Unfortunately, only a few gave a reason for this. According to one participant, while a review had taken place, the facility had implemented no changes.

> *"An event review was conducted but nothing has particularly been implemented since the incident*." ***(Participant 85, Rotation 1, Facility 7)***

A participant stated that resource challenges could not be addressed at the facility level.

> *"Shortage of staff, health workers is a national challenge which requires intervention at national level."* ***(Participant 92, Rotation 7, Facility 1)***

In another perceived significant event, a participant said no action was necessary as the event was picked up and addressed.

> *"No changes were made as the head injury was picked up just before the patient left."* ***(Participant 96, Rotation 7, Facility 4)***

A patient sent home with no medical attention was called back for further review at the facility.

> *"At that very day, people from the district office had come to conduct facility assessment and one moderator saw this happening. At the wellness end, the patient was to be called for further review."* ***(Participant 99, Rotation 5, Facility 8)***

3.2.3 Theme 5: Measures to prevent future recurrence of the incidents

The theme is linked to Objective 4 of the study which looked at medical students' perceived measures to prevent future recurrence of the incidents. The subthemes include staff education, human resources, infrastructure, and patient education shown in the figure below.

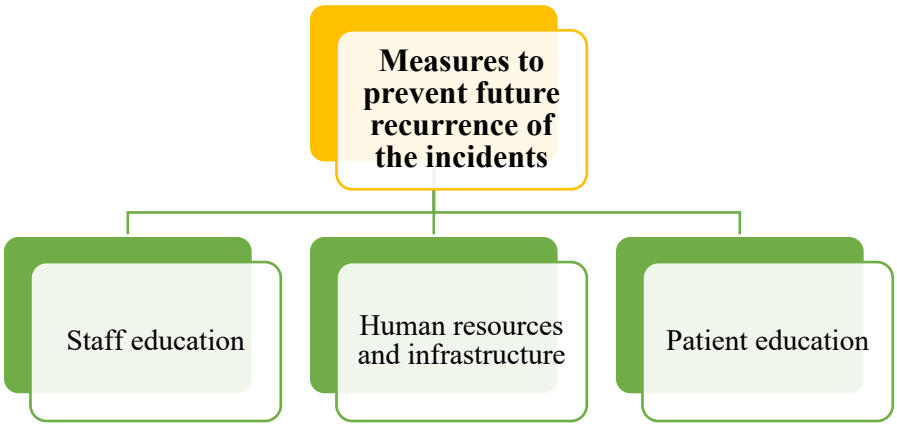

Figure 9: Theme 5 and subthemes

3.2.3.1 Staff education

Several participants were of the view that the provision of health worker education and refresher courses on management of different patient issues would lower the perceived significant events they experienced. These include refresher courses on protocol adherence.

> *"... Adequate staff training on emergency protocol. Training specific nursing staff on intubation or having a Dr on call to address such emergencies. Quick ambulance response time."* ***(Participant 35, Rotation 4, Facility 3)***

Participants perceived that healthcare workers needed education on the completion of legal forms.

> *"We can begin by educating our doctors about legal forms and the correct methodology of their completion and their requirements. Also, to inform doctors of what medical students can and cannot fill out also to emphasise the importance of checking findings before signing to ensure authenticity of findings."* ***(Participant 59, Rotation 2, Facility 3)***

Other participants felt that health worker education was necessary to remind them of how to treat patients with dignity.

> *"Perhaps staff should be counselled on being respectful to all patients – even the terminal ones. I think they need to be reminded just how precious a human life is, and even if inevitable, it is still a tragedy when one is lost. No patient should ever be considered garbage. Perhaps they also need to be reminded that the dead are still our patients and should thus still be treated with some amount of respect …"* ***(Participant 70, Rotation 4, Facility 14)***

Healthcare workers need a reminder on the importance of adequate patient management in the labour wards. It would improve the quality of patient care and reduce significant events.

> *"Proper management of stage 4 of labour. Staff on duty must have regular rounds for all patients so that no one is missed if there is a PPH patient or any other problems the patient has."* ***(Participant 4, Rotation 3, Facility 3)***

Training healthcare workers on implementing functional triage systems would prevent the re-occurrence of perceived significant events, especially in the maternity wards.

> *"The triage system at the hospital needs to be improved as this patient should have been attended to much sooner than he was. Perhaps if the patient had been timeously seen by the doctor and been monitored better, he might have felt safer and that he would receive the necessary care at the hospital."* ***(Participant 47, Rotation 4, Facility 11)***

Some participants perceived a need for education on the importance of better communication among healthcare professionals in the treatment and management of patients, and this included multidisciplinary collaborations between various departments.

> *"There should be a meeting between the various departments and a decision taken. This could include things such as the doctors correctly explaining and suggesting possible treatment."* ***(Participant 55, Rotation 2, Facility 11)***

Healthcare worker education on record-keeping could address challenges in patient management.

"Doctors and nurses should make it a habit to read previous notes, they will provide appropriate follow up and continuity of care. Arranging of clinical notes is a logical order, in terms of chronological order and having the prescription charts, progress notes and investigations." ***(Participant 7, Rotation 3, Facility 2)***

Addressing patient handover during shift changes would prevent certain significant events from occurring.

"... Proper handover of patients in casualty to the next shift. Ensure that healthcare workers work for acceptable hours (that they are not overworked as this influences their clinical judgement." ***(Participant 16, Rotation 3, Facility 1)***

Participants cited the sharing of academic meeting discussions as a solution for those not able to attend the meeting, thus ensuring everyone gets to learn from other experiences.

"... Sessional doctors are not present at academic meetings where most common diseases are discussed – the presentations should be summarised and made available to all sessional doctors so that management is evidence-based." ***(Participant 31, Rotation 5, Facility 14)***

Some participants perceived that the supervision of medical students would help prevent events experienced.

"Students who are unable to make decisive decisions on management should be closely supervised, especially when they repeatedly ask for help." ***(Participant 95, Rotation 1, Facility 2)***

3.2.3.2 Human and infrastructural resources

This subtheme focuses on solutions the participants perceived would address human and infrastructural challenges experienced in PHC facilities.

Regarding the challenges during emergencies, participants perceived that there should always be a person responsible for checking the emergency equipment and re-stocking emergency trolleys to ensure their availability and functionality whenever needed.

"Equipment needs to be checked properly and the individual who signs it off should be held responsible for it, there should not be an opportunity to not have to be held responsible for not doing a proper job. There should perhaps be a dedicated emergency room. All emergencies should be sent to the main building and NOT via Paediatrics." ***(Participant 17, Rotation 3, Facility 7)***

Participants acknowledged the need for more infrastructural resources such as theatres and consultation rooms. Nevertheless, they could not bring any solutions on how to achieve this, because it is a tremendous challenge in PHC facilities, especially in rural areas.

"Good planning of service allocations and hopefully maybe in the future a great new place with lots of rooms can be built to accommodate everything." ***(Participant 103, Rotation 7, Facility 1)***

According to participants, the lack of human resources is an enormous challenge in rural areas; therefore, participants suggested better incentives to attract more health professionals to work in rural facilities.

"Early referral of the patient to hospital. Incentives for rural-based hospitals so that doctors will apply for posts." ***(Participant 92, Rotation 7, Facility 1)***

Participants suggested that home-based carers could ease the human resources shortages through the creation of linkages between the communities, their needs and social welfare services.

"Availability of resources. Assessing children living conditions at home via the help of home-based carers will help identify children in need of intervention from social workers." ***(Participant 66, Rotation 4, Facility 12)***

The participants identified increasing the availability and accessibility of ambulances as a solution to perceived significant events.

"Improve response time for an ambulance and have staff specifically on management of paediatric cases and competent management of health facility." ***(Participant 75, Rotation 1, Facility 8)***

To avoid the lack of medications in cases of emergencies, participants felt that healthcare facilities should always stock up on all medications despite using them only from time to time.

> *"…Advocated that the clinic stocks up on diazepam. The one reason why they possibly didn't have stock in the first place was because they don't usually get such emergency incidents. They should place an order for the drug, even if it's not a lot as every patient is important. This shouldn't wait till it happens again and a life is lost, or irreversible complication occur."* ***(Participant 65, Rotation 4, Facility 8)***

3.2.3.3 Patient education

Sometimes participants perceived significant events could be prevented through patient education. Education of patients and their families on the importance of medication adherence and seeking medical help on time was likely to reduce the incidence of significant events.

> *"Better patient education on compliance and the need for healthcare access. More staff available so that a patient will not be left unsupervised. Better patient counselling with regard to health-seeking behaviour and treatment adherence."* ***(Participant 23, Rotation 5, Facility 11)***

New mothers and guardians should receive training on caring for newborn babies according to another participant.

> *"To counsel all mothers and parents to watch and know danger signs of their babies and to bring babies to the clinic as soon as they know the baby is sick."* ***(Participant 54, Rotation 5, Facility 5)***

Participants identified a need for community education on handling emergencies and to always call for help when family or community members are sick.

> *"The patient must be brought in earlier to the hospital; the community needs to be taught basics lifesaving skills e.g., CPR. Community education -– how to identify danger signs, how to intervene and the importance of calling for help to prevent delayed presentation."* ***(Participant 115, Rotation 6, Facility 4)***

The participants also perceived patient education on rights to quality care as a measure to address some of the reported incidents.

> *"Patients should be encouraged to complain about such individuals, even to request a change of midwife during their labour."* ***(Participant 53, Rotation 3, Facility 5)***

To treat snake bites, participants perceived that there ought to be images of different snakes shown to a patient to identify the snake that bit them.

> *"...Maybe pictures of different black snakes should be kept in casualty and if the patient identifies it, antivenom is given irrespective of neurotoxic signs. Also, intubation trays should be prepared for all snake bites and antivenom recipients."* ***(Participant 29, Rotation 5, Facility 14)***

3.3 Chapter summary

This chapter provided a detailed account of the participants' perceived significant events recorded during their clinical rotation in both rural and urban PHC facilities. The data highlighted how significant events are not always a consequence of one event or individual, but that the interaction between patients and healthcare workers, amongst health workers themselves, and the availability of resources and infrastructure are all factors that contributed to the occurrence of significant events. The participants also made recommendations that might help in addressing the causes of the perceived significant events.

CHAPTER 4

DISCUSSION OF RESULTS

4.1 Introduction

Chapter 3 was a presentation of the study results organised according to the study objectives and presented as five major themes with corresponding subthemes. This chapter is a discussion of the study findings. The results are presented according to the objectives of the study and linked to the literature and theoretical framework.

4.2 Types of perceived significant events

The study showed that medication and prescription errors were a common type of perceived significant event and were often discovered later when patients presented for review. According to Cox (48), wrong-patient medication errors are common and can be very harmful to patients. The current study also found that some healthcare workers do not consider the contraindications of medications when prescribing, especially in patients with chronic conditions. Marchon, Mendes and Pavão (49) state that failure to observe contraindications of drugs can be futile to patients. PHC facilities are the initial point of contact between a patient and the health system. Therefore, medication and prescription errors that are often discovered when a patient presented for their review, delay not only the recovery of the patients, but also add a burden to an already strained health system. The study findings, therefore, show that medication errors are a problem in PHC facilities, and health professionals should adopt a systems approach to ensure the safety of patients. As medication and prescription errors are an outcome of a complex system, reviewing failures within the health system could assist healthcare workers in addressing the problems and thus improve patient safety (95).

Participants also perceived patient diagnosis errors like missed diagnoses and wrong diagnoses as significant according to the study findings. Steinhardt et al. (51) state that disease diagnosis is a challenge in PHC facilities, particularly in low- and middle-income countries, due to lack of essential diagnostics. As a result, healthcare workers use clinical signs and symptoms to treat patients. Consequently, Reid et al. (141) and Visagie and Schneider (142) argue that healthcare

workers in PHC facilities manage common presenting conditions they are familiar with and are common in primary level settings. They may not always have capacity to manage complex medical conditions, especially when they do not receive adequate support from the secondary levels of care concurring with study findings. Singh et al. (143) state that diagnostic errors occur when healthcare workers do not have adequate time to make clinical decisions due to high workloads. From a systems thinking viewpoint, this shows that many factors can be linked to diagnostic errors in PHC facilities. Therefore, this problem cannot be treated in linear terms and blame cannot be placed solely on healthcare workers.

Inadequate patient management was reported to be a challenge (144) and this finding corresponds with Marchon et al. (49), who argue that healthcare workers do not always conduct a comprehensive physical exam and therefore fail to diagnose and treat patients adequately. In this study, inadequate patient management resulted in the physical and verbal abuse of patients, particularly in the labour wards, as well as poor management of rape and assault cases. According to Zitha and Mokgatle (145), women abuse in maternity wards is a concern for healthcare facilities globally. Dapaah (144) also argues that how healthcare workers interact with patients is of grave concern in Sub-Saharan Africa because they often are harsh to patients. In their study, Jina et al. (146) reported that South African healthcare workers in different provinces had little knowledge of working with post-rape cases despite going through a training programme. They further argued that there is a correlation between healthcare worker knowledge and attitudes in delivering sensitive services to patients (146). This study showed that there was poor treatment of patients in PHC facilities. This highlighted the lack of patient-centred care which not only compromises the safety of patients, but may also cause poor health-seeking behaviours among patients. In line with this finding, systems thinking postulates the importance of considering the structure of the work system and human factors in efforts to achieve a person-centred health system. In that regard, healthcare workers are not the only cause of the inadequate management of patients.

4.3 Causes of the perceived significant events

In this study, causes of the perceived significant events were identified to be due to human factors and health system challenges. Under human factors, healthcare worker-related issues and patient-related issues contributed to the events which led to the participants' perceived significant events.

Poor clinical decision making by healthcare workers contributed to the occurrence of some of the perceived significant events. According to Stubbings, Chaboyer and McMurray (147), clinical decision making is a critical process in which healthcare workers choose the best action to achieve the desired goal in the care of patients and is a measure of patient safety and quality of care. Alaseeri et al. (148) state that there are internal and external variables that hinder or facilitate clinical decision making amongst health workers. The internal factors include competence and self-confidence, while the external factors include support and education (148). In this study, an issue that could have contributed to poor clinical decision making was healthcare worker fatigue. It is possible that clinical decision making may have contributed to the occurrence of perceived significant events. Even though healthcare workers made decisions to either improve or strengthen the health of patients, it is possible that the clinical decision was ineffective for the case at hand. In support of the above finding, the systems thinking perspective states that healthcare workers are bound to make mistakes in their decisions because, they are human (149). The systems thinking view further argues that these decisions are made based on what makes sense in the health system at that particular moment in terms of resources, need, pressure and capacity in the system (41).

The study also found poor adherence to protocols caused some of the perceived significant events. Poor protocol adherence was attributed to healthcare workers' poor knowledge of the most recent principles on the management of various conditions and the use of certain medications. Woolf et al. (150) state that guidelines and protocols are crucial in ensuring the quality and consistency of the care patients receive. They caution against using clinical guidelines to generalise conditions instead, motivate for a patient-centred care approach. This finding showed that adherence to protocols in the care of patients is very important to deliver high-quality medical care and to avoid significant events. That being said, this is not always clear cut; healthcare workers function in a very complex environment where interactions and work situations can be unpredictably. As such, they are forced to sometimes conform their management plan to ensure a successful outcomes. Due to these changes in the work conditions, any adjustments may compromise thoroughness and efficiency as healthcare workers use workarounds to cope (41). This means that from a systems thinking view, healthcare workers may fail to adhere to protocols while trying to adapt and cope with some unexpected and unplanned conditions in the health system.

Poor communication among healthcare workers resulted in inadequate patient management. Insufficient patient information in files, disorganised files, poor communication during shift changes or patient handover processes all contributed to the occurrence of the perceived significant events. Elder et al. (58), the Agency for Healthcare Research and Quality (57), and Babiker et al. (59) argue that poor communication amongst healthcare workers often leads to poor documentation of patient information or medication information which can have adverse consequences for the patient. This study showed that mistakes are bound to happen when there is poor communication between healthcare workers. Communication is at the centre of patient care and when it is poor or non-existent, it may result in the wrong treatment being administered to a patient, cause harm to the patient, and disrupt the continuity of care. It is however, important when looking at poor communication as a cause of significant events to also take into account factors that hinder communication within the health system such as the environment, organisation, tasks and resources (151).

Insufficient monitoring and management of patients resulted in some perceived significant events, particularly in the labour and maternity wards. The study showed that there was a high incidence of unsupervised birthing experiences in various PHC facilities. Shimoda et al. (152) found that most midwives did not continually monitor the labour of their patients and that their initial assessments were often brief and lacked reflection. Poor patient management in labour wards has also been widely reported in South Africa (153, 154). This study showed that patients in maternity wards experience below-standard care in PHC facilities which leaves them and their unborn or new born babies at risk of injury and even death. While it may seem appropriate to simply blame healthcare workers for poor patient monitoring and management, systems thinking argues that the environment in which healthcare workers function is influenced by a myriad of issues. These include psychological, social and physical factors which in turn may result in job stressors that hinder quality care and affect the relationship between the patients and healthcare workers (154, 155).

The study found healthcare workers' negative attitudes towards patients caused some significant events. The lack of empathy resulted in patient mistreatment in healthcare facilities. Klopper et al. (156) attributed healthcare workers' attitudes to psychological, physical and social factors that influence the environments that health workers function work in. They are of the view that these

factors cause stress in the workplace, affecting the relationship between healthcare workers and patients and the quality of care provided. Honikman, Fawcus and Meintjes (154) argue that in South Africa where the public health sector serves 84% of the population, healthcare workers face high workloads and long working hours. In line with the above findings, a negative attitude could be attributed to health workers' feelings of powerlessness. This means that it is necessary to include systems thinking in identifying the cause of perceived significant events. It is important to acknowledge the link between a person's character and how they interact with their environment to determine why some healthcare workers have negative attitudes towards their patients (157).

The study found that poor clinical records resulted in poor decision making for the diagnosis, treatment, management, and prescription of medication to patients. According to Mathioudakis et al. (158), keeping clinical records is necessary to ensure patients receive adequate quality care, as it ensures healthcare continuity and improved communication between different healthcare professionals. Shihundla et al. (159) argue that in South Africa, primary healthcare workers, in particular nurses, have very high workloads, and sometimes cannot maintain good clinical records supporting the observations of the study participants. Poor clinical record keeping presented a challenge in PHC facilities resulting in poor patient care. In the systems thinking context, human resources shortages in PHC facilities result in high patient ratios which compromise record keeping.

Patient-related issues linked to perceived significant events included uncooperative patients, women not attending antenatal classes during their pregnancy, and patients' psychosocial issues which may have resulted in delayed access to care. According to McKay et al. (9), patients' negative behaviour and the behaviours of their relatives can affect the quality of care they receive and cause significant events. Chu et al. (69) state that long waiting hours and patients' fear about a diagnosis may sometimes cause them to be angry, frightened and even defensive. The study showed that while attention and blame are often placed on healthcare workers for significant events or errors in healthcare service delivery, patients and their families also contribute to significant events. They also influence the quality of care they receive, because it is a challenge to manage difficult patients. That being said, it is important for the healthcare workers and the system to recognise obstacles that hinder quality care such as work and unmet social needs so as to help patients address these and improve their quality of life (160).

Healthcare system challenges that caused significant events were the lack of resources, including equipment shortages, lack of infrastructure, and human resources challenges. According to Scheffler, Visagie and Schneider (72), delayed replacement of consumables and broken equipment may cause significant events, and the sharing of equipment between departments can sometimes result in time-wasting when people go around looking for equipment or rooms to use. A similar finding was observed in this study. Also, according to the Agency for Healthcare Research and Quality (57), inadequate human resources put a strain on healthcare workers, as it increases their workload, thus leaving room for making mistakes. The study, therefore, showed that the lack of human resources, shortages of equipment, medication and infrastructure in PHC settings greatly impacts the quality of care rendered to patients, resulting in poor patient management. When looking at causes of significant events, we need to move away from blaming individual healthcare workers. This is because errors in patient care are not only a result of negligence on the part of healthcare workers, but are rather an outcome of failures at multiple points of care within the health system (160).

4.4 Significant event consequences

There were physical health-related concerns for the patients and the medical students. The students feared that they were at risk of blood-borne infections due to needlestick injuries. According to Swe et al. (161), medical students are at a higher risk of needlestick injuries because of their limited experience and limited skills in surgical techniques and patient care. Equally so, the students had every right to fear for their health as these kinds of injuries are the most common way in which blood-borne infections are spread between patients and healthcare workers according to Mengistu, Tolera and Demmu (162). This finding, therefore, showed that medical students are bound to experience injuries while rendering services to patients during their clinical skills training due to their limited skills.

Medical students also experienced emotional distress such as feeling useless and helpless in the treatment and care of patients, failing to speak up and voice their opinions in the management of patients, and self-doubt over their skills as doctors. Other perceived significant events left participants frustrated, confused, shocked, upset and angry. According to Bari, Khan and Rathoe (88) when students blame themselves for the mistakes in patient care, they suffer from emotional

and psychological distress (88). While medical students are knowledgeable enough to recognise errors in the care of patients, they often do not feel safe to speak up in fear of their seniors (85). This finding, therefore, showed that medical students experienced negative emotions because their limited knowledge and skills may have contributed to significant events. As such, they were often hesitant to approach their seniors for advice, thereby missing crucial information in the care of patients. The study also showed that the negative emotions also emanated from the students' failure to stand up for patients against the senior healthcare workers. This vulnerability is supported by findings in a study by Mapukata-Sondzaba et al., where clinical associate students were based in PHC settings in Gauteng and North West province (128).

An interesting consequence of the events was that significant events created learning opportunities for students. The significant events allowed participants to learn how to manage emergencies, especially resuscitations. They could also revise and read up on the management and diagnosis of certain conditions. Kiesewetter (32) states that significant event analysis and error disclosure are beneficial as learning opportunities for medical students. Sometimes medical students may not be aware that an error occurred or how to prevent possible medical errors in future practice if there is no one to guide them through the process (32). Some students cited significant event analysis as a great learning and reflective tool (89). This study, showed that some students took the opportunity to revise their notes to avoid future recurrence. Other facilities took the perceived significant events as an opportunity to teach medical students. Therefore, while the consequences of the perceived significant events were mostly negative for the patients and the participants themselves, medical students were able to learn from their mistakes and the mistakes of their colleagues. Similarly, clinical associate students reported learning critical skills during a crisis (128).

Medical complications were a likely consequence of some of the perceived significant events. Patients who experienced delayed care were at risk of medical complications; delayed care placed the safety of patients at risk and, may result in negative patient outcomes according to Simpson and Lyndon (163). Patients given wrong medications were at risk of medical complications and according to Elder, Meulen and Cassedy (58) and Rosser et al. (93).prescription and dispensing errors were linked to patients experiencing drug reactions and other minor physical discomforts. Patients treated in unsterile environments were also at risk of medical complications. According to the South African Medical Association (164) and Dunjwa (165), many South African public

healthcare facilities fail to follow infection control protocols due to a shortage of resources. Thus, it is not uncommon for staff to exhibit poor hygiene practices. This finding, therefore, highlighted how significant events not only compromise the quality of care, but that they also risk the safety of patients and their effects may have detrimental consequences for patients and their families.

Infants born with low APGAR scores and those who were resuscitated for long were at risk of neonatal complications. According to Razaz et al. (166) and Persson et al. (167), infants with low APGAR scores have a higher risk of neonatal mortality, neonatal infections, respiratory distress, asphyxia-related complications and neonatal hypoglycaemia. In South Africa, in 2019, the Gauteng province reported 1,148 cases of Hypoxic-Ischemic Encephalopathy - a condition with causes brain damage to children deprived of oxygen, and 866 septic caesarean section cases in public healthcare facilities (168). The findings from the study, therefore, highlighted that neonatal complications are a cause for concern in public healthcare facilities as a result of reported significant events and errors in maternity wards.

Patients also experienced emotional trauma as a consequence of the perceived significant events. Emotional trauma was largely experienced in the maternity and labour wards due to lack of analgesia while suturing patients, lack of empathy in the management of rape victims, unassisted deliveries, and death of infants. This finding is supported by Elder et al. (58), Mansour et al. (82) and Liukka et al. (99), who not only reported patients' experiences biological effects because of adverse events, but also emotional distress such as anxiety, depression and sadness. This, therefore, means that patients do not only experience the physical effects of significant events, but that poor quality care also takes an emotional toll on patients and their families.

4.5 Health facilities' responses to the perceived significant events

A facility-mediated response to perceived significant events was only followed in a few PHC facilities according to findings in this study. This supports findings cited by Mapukata et al., as they reported on the perceived value of PHC settings as places where medical students experienced good supervision, opportunistic learning, skills development and moral support (124). Some of the perceived significant events were reviewed and addressed in M&M meetings and other short meetings held with dedicated teams to discuss the significant events. Some PHC facilities provided training to the healthcare workers involved in the perceived significant events and advised that

healthcare workers always adhere to protocols. It was emphasised that healthcare workers should closely monitor women in maternity and labour wards and to display posters as a reminder. Other facilities advised daily checks of equipment and resources. Makeham (100) states that a decentralised and local incident reporting system improves the healthcare workers' willingness to report and implement solutions. The study findings showed that a few PHC facilities took action to address the perceived significant events possibly because they have their own local incident reporting systems which encourage healthcare workers to report the incidents. Laatikainen, Sneck and Turpeinen (90) argue that a health facility with a patient safety culture allows healthcare workers accountability for any unprofessional conduct, instead of punishment for human errors. From the study, one can safely argue that the suggested solutions to prevent the re-occurrence of the perceived significant events were not punitive for the healthcare workers and therefore could be a motivating factor for incidence reporting in those facilities.

Many healthcare facilities did not implement any action plan following the occurrence of the perceived significant events. It is highly likely that the events were never reported or that the healthcare facilities did not consider the recorded events significant as they were students' perceptions. McNab et al. (31) and Kaprielian et al. (38) state that the incidence of significant event disclosure in PHC facilities is low compared to other higher levels of care, because they are often faced with limited resources and staff shortages. Healthcare workers may choose not to disclose health and safety issues in fear of being punished (74). This study showed that very few PHC facilities dealt with the perceived significant events as experienced by the participants due to various possible factors, including resource challenges, non-disclosure of significant events in fear of punishment, and the fact that the medical students may have simply recorded the events in their logbooks, but did not report them. From a systems thinking view, it is necessary to eliminate blame within the health system, unless mistakes result from negligence, irresponsible, or unethical behaviour (44, 77).

4.6 Measures to prevent recurrence of the incidents

Staff education and student supervision were suggested as solutions to prevent the re-occurrence of some perceived significant events. The study found that there is a need for refresher courses on the management of a range of patient issues. These include protocol adherence, handling

emergencies, management of chronic conditions, completion of legal forms, ethics in patient care, patient management in labour wards, triaging, and training on adequate communication between healthcare workers and patients. According to Makeham et al. (100), healthcare worker education plays a critical role in ensuring patient safety in primary care settings, because it does not only help improve the quality of care, but also improves incident reporting and improve patient safety culture and behaviour. The Health Foundation (169), Rana et al. (170) and Boonyasai et al. (171) state that different types of training improve healthcare workers' knowledge, skills and attitudes in the delivery of patient care and the processes of care. Training coupled with patient safety culture in facilities also increase reporting of patient safety incidents (100–102).

While the consensus is that healthcare worker training positively impacts the quality of care they render to patients, some studies argue education and training have little impact on adherence to guidelines, protocols or even improving care (172–174). According to Tomlinson (175), adequate clinical supervision of medical students is important for patient safety and quality healthcare. This study showed that healthcare worker education and supervision can help improve patient care and teach healthcare workers to treat patients with dignity and help reduce the occurrence of some perceived significant events. Healthcare worker and patient education can address human factors attributed to the perceived significant events. From a systems thinking perspective, training, supervision and mentoring of healthcare workers can improve their motivation and competencies which would in turn lead to good clinical practice. However, if other issues within the health system are not dealt with such as high patient loads, shortages of resources, and infrastructural challenges, the healthcare services are likely to remain poor despite the training rendered (176).

The education of patients, their families and communities was suggested as a solution to reduce the occurrence of some perceived significant events. This included the education of patients about their rights while receiving care, reporting any form of abuse, managing and reporting emergencies, and taking care of new born babies. Patient education is effective in increasing patient knowledge, to clarify any misconceptions with regard to their conditions, and also improves compliance to medications (177). The study, therefore, suggested that health promotion and community education can positively impact patients' quality of life and improve their knowledge and attitudes, as well as address any myths around healthcare services. In support of the above, using systems thinking for health promotion and patient education means paying attention to how

the system is structured and the power relations that exist between the patients, their families and communities with the healthcare workers (178). This is important because all these individuals influence learning and they should all contribute to the education process to not only create a conducive learning environment, but also a sustainable one.

Responding to observed resources challenges, there was a need to assign an individual to oversee the manning and stocking the emergency trolley daily. Also, facilities should stock up on all medications despite not using them often and conduct regular stock taking to prevent stockouts. According to Rajeswaran and Ehlers (179), there ought to be regular audits on emergency equipment by nurse administrators, and they should check resuscitation equipment daily at the beginning of every shift. To address human resources challenges, there is a need for incentives to attract staff to work in rural healthcare facilities. Honda and Vio (180) found that the availability of medicine and equipment was an extra motivator for healthcare workers to work in rural areas in addition to free housing and the provision of formal education. The participants also suggested using home-based carers to create a link between the community and social services to address patients' psychosocial needs. These findings showed that PHC facilities must be fully equipped with medical and human resources to be able to prevent the occurrence of some of the perceived significant events. While factors such as political influences play a role in the allocation of public spending in the health sector (181), this study showed that to effect change, besides strengthening the health system and reducing the re-occurrence of significant events, there is a need to address the financial and human deficiencies in this sector.

4.7 Chapter summary

This chapter was a discussion of the findings of the significant events perceived by the participants, the factors that caused these events, the consequences of the events on the patients and participants, and the measures proposed to prevent similar incidents from occurring. Findings from the current study are not necessarily unique to South African PHC settings. Significant events are a challenge in both developing and developed countries, as the findings were supported by local and international literature.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Chapter 4 was a discussion of the study findings. The discussion was presented according to the objectives of the study and linked to the literature and theoretical framework. This chapter presents the conclusions of the study, recommendations, limitations, and implications for future research.

5.2 Concluding comments

The logbook reflections on significant events were valuable to this study. Logbooks were a simple tool that assisted the researcher in exploring medical students' perceptions of significant events in South Africa's PHCs. Using logbooks to understand medical students' experiences of significant events in PHCs was a strategic approach to address quality and safe practices in PHC settings. Logbooks in this regard facilitated reflective learning about adverse events and their management in PHC settings.

The significant events described in the study align with previous research and medical students' experiences of such events. The study demonstrated medical students' ability to identify incidents in the care of patients using the SEA approach and their role in assessing patient safety issues in PHC settings. This study showed that significant event occurrences are quite common as students interact with other health professionals and patients. These experiences are therefore valuable in identifying patient safety loopholes in PHC settings and learning opportunities for students.

The significant events identified in the study reflected the complexity of the PHC system as healthcare workers interact with patients on a daily basis. Systemic and individual human-related factors highlighted the value of reflecting on significant events as outcomes of interactions in the PHC system as a whole, instead of perceiving them as individually instigated healthcare worker actions. Significant events were reported as having negative consequences for medical students as junior interns and for the patients in their care. Positive experiences were reported as unfavourable events that resulted in a positive learning experience for some participants. This is considered a significant development, as SEA created learning opportunities for participants.

The study showed that some facilities acknowledged significant events and implemented changes to address the perceived significant events. Evidence of the planned changes and actual implementation demonstrated a willingness by healthcare workers to learn from their mistakes, improve their knowledge and skills, and provide better quality care. Medical students were less likely to be involved in the review and planning of changes from perceived SEA. The participants suggested various health system improvement efforts to prevent recurrence of perceived significant events, and a logical explanation is that participants may have used systems thinking in their analysis.

In conclusion, the study highlighted causes of significant events in PHC settings and potential solutions to prevent recurrences. This study demonstrated that significant event analysis is a critical tool in public health for two reasons. Firstly, SEA is valuable in understanding the causes of adverse events. Secondly, SEA plays a significant role in identifying interventions that reduce the gravity of such errors.

5.3 Recommendations

Healthcare provision is complex and therefore requires a consolidated effort in delivering efficient patients care. Several recommendations are suggested for addressing significant events. These include the following:

1. **Human resources**: In responding realistically to the needs of PHC settings, government should review its recruitment and retention strategy for rural and underserved communities. There should be fair distribution of healthcare workers between the private and public health sectors to ensure that rural communities and underserved communities get first preference in staff recruitment.
2. **Infrastructure**: Government should address infrastructure challenges and facilitate improved access to functional equipment and medications in rural and underserved communities.
3. **Communication**: Primary healthcare services require an effective communication strategy to strengthen teamwork and improve management of referrals. This could be the adoption of technology such as e-filing systems instead of hard copy. This would reduce not only the patient waiting times, but also curtail the incidence of misplaced or incomplete patient files.

4. **Change the significant event analysis approach**: Healthcare workers do not always disclose mistakes in patient care as they fear reprisals. Therefore, significant event analysis should be used to identify improvements and prioritise a whole system approach to organisational change.
5. **Training**: Regular healthcare worker training is necessary to ensure that they are always up to date on the current guidelines on patient care.
6. **Healthcare worker mental wellbeing**: Debriefing sessions and on-demand access to psychosocial support and personal counselling is necessary to address healthcare workers' stress from everyday pressures of their jobs and to boost their morale.
7. **Medical students mental wellbeing:** Medical students mental wellbeing: Students witnessed a number of traumatic events during their integrated primary care block placement.. The department of Family Medicine should provide post placement debriefing for all students and counselling on request. They should also consider adjusting the approach to significant event analysis and encourage students to reflect on a positive and a negative incident.
8. **Patient education**: Teaching patients is essential to providing quality healthcare services. Healthcare workers should establish rapport with their patients, so that the latter can discern the importance of the information shared with them.

5.4 Limitations of the study

The significant event analysis data used in the study was from medical students' recordings of what they perceived as significant events. There was no objective validation of these events. Triangulation using students' reflections and a review of significant events reported in the healthcare facilities would have strengthened the study.

To ensure that all the data was anonymous the researcher did not have access to the participants details in line with the original consent agreement. As a result the researcher could not contact the participants with any follow up questions or to get more data. This has proven to be a limitation to further this research study.

The study employed maximum variation purposive sampling to select information rich data which left it open to selection and participation bias. To minimise selection and participation bias the researcher ensured an extensive sample size for extensive coverage of the study participants

experiences. The researcher also described in detail the participants of the study, their experiences and their context to allow for comparisons with other groups and situations.

The significant event analysis data used in the study was from the 2014 academic year and therefore open to time period bias. To minimise this bias the researcher, used a large data sample which was representative of all the seven clinical rotations in the 2014 IPC block. This allowed the researcher to draw conclusions based on various experiences of the participants.

5.5 Implications for future research

- The study used secondary data based on students' perceptions. Future studies should look at a mixed-method approach using PHC facilities' reports on significant events and primary data to get a better and comprehensive understanding of significant events in PHC facilities across South Africa.
- The data used for this study was drawn from 18 healthcare facilities across three provinces, of which one province only had one facility. A study across all the South African provinces will help determine if the issues on significant events identified in this study are common across the country.
- The literature review highlighted that there are very few studies on significant event analysis in primary healthcare in South Africa and elsewhere in Africa. Findings from this study will inform future research on significant event analysis in primary healthcare settings.

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APPENDICES

Appendix 1: Plagiarism declaration

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I **Samantha Dube (Student number: 1352977)** am a student registered for the degree of Master in Public Health (Rural Health) in the academic year 2021.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.
-

Signature: S. Dube Date: 2 November 2021

Appendix 2: Significant event analysis framework

XXX. SIGNIFICANT EVENT ANALYSIS

Please use this form to reflect on one incident that you were involved in or witnessed at your site, where management of the patient was sub-optimal, an adverse event occurred, or a patient died.

1. Briefly describe the incident that occurred. (Names of individuals involved are not required.)
2. What were the consequences of the incident to all people involved?
    a. The patient
    b. You
    c. Other members of the healthcare team
3. Reflect on the cause/s of the incident: were these related to systems or process failure, lack of resources, clinical decision making, human error, etc?
4. What measures should be taken to prevent this happening in future?
5. Was a significant event review conducted at the site? YES/NO
    a. If yes, what changes, if any, were suggested/implemented after this?
    b. If no, what were the reason(s) given for not conducting a review?
6. Briefly reflect on how this incident may/will influence your performance as a doctor in the future.

Appendix 3: Letter of research approval, Department of Family Medicine

21 Michael Collins Road
Discovery
Roodepoort, 1709
18 May 2017

Dr. Richard Cooke
HOD: Department of Family Medicine
University of Witwatersrand
Parktown

Re: Permission to Use Integrated Primary Care Data: Samantha Dube 1352977

I am a Master of Public Health (Rural Health) at the University. I am working on my dissertation titled '**Final year medical students' reflections on significant events experienced during an IPC block at the University of the Witwatersrand'** under the supervision of Ms. Ntsiki Mapukata and Dr. Motlatso Mlambo.

The objectives of my study are to:

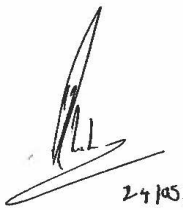
a. To describe the medical errors/ significant events experienced by the medical students during the IPC block.
b. To explore factors associated with the medical errors as experienced by the students and their consequences thereof.
c. To examine how medical errors were handled in the different health facilities.
d. To document recommendations on measures for preventing future recurrence of the incidents.

I would like your permission to use data collected in 2014 from final year medical students' logbooks on significant events analysis in my research study. I will only use the data for my research study. A copy of my research study will be made available to you upon completion.

I will be most grateful if my request is supported.

Sincerely,

Samantha Dube



24/05/2017
PERMISSION GRANTED

Open Rubric

Appendix 4: Ethical clearance

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Ms S Dube

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M170853

NAME: (Principal Investigator)	Ms S Dube
DEPARTMENT:	School of Public Health Medical School
PROJECT TITLE:	Final year medical students' reflections on perceived significant events during an integrated primary care block
DATE CONSIDERED:	25/08/2017
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Ms N Mapukata
APPROVED BY:	Professor CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	05/03/2018

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on 3rd floor, Phillip V Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.
I/We fully understand the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially reviewed in **August** and will therefore be due in the month of **August** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix 5: Turnitin report

Turnitin Originality Report

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Mapukata, Nontsikelelo O., Dube, Rainy, Couper, Ian, Mlambo, Motlatso G., "Factors influencing choice of site for rural clinical placements by final year medical students in a South African university", AOSIS publishing

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