

**FACTORS ASSOCIATED WITH NEEDLE STICK INJURIES AT MAMA LUCY
'KIBAKI HOSPITAL-ACCIDENT AND EMERGENCY DEPARTMENT**

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UNIVERSITY**

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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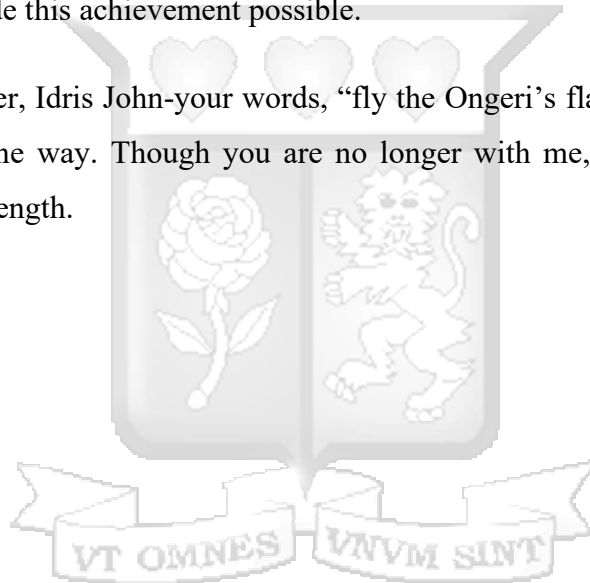
DEDICATION

First and foremost, I dedicate this work to God Almighty, whose grace, strength and guidance have sustained me throughout this journey.

To my beloved family-your unwavering love, sacrifices, and encouragement have been my anchor. I am forever grateful.

To my supervisor, Dr. Elizabeth, thank you for your wisdom, patience, and continuous support. Your mentorship made this achievement possible.

And to my late brother, Idris John-your words, “fly the Ongeris flag high” have lived in my heart every step of the way. Though you are no longer with me, your spirit has been my constant source of strength.



ABSTRACT

Needlestick injuries (NSIs) are a significant occupational risk to healthcare workers (HCWs) globally, consequent upon accidental puncture wounds caused by contaminated sharp objects, particularly hollow-bore syringe needles. Globally, needlestick injuries (NSIs) occur at a rate of 43%, with Africa experiencing the highest incidence at 51% (WHO, 2022). For every 1,000 NSIs from an infected patient, approximately 300 HCWs are prone to contracting HBV. The rates of seroconversion for HCV and HIV are estimated at 30 per 1,000 NSIs and 3 per 1,000 NSIs, respectively. The widespread occurrence of needlestick injuries (NSIs) among Kenyan HCWs, is reported at approximately 58%, and accounts for 76.6% of instances where healthcare workers are exposed to HIV/AIDS in the workplace, highlights the urgent necessity for preventive measures. NSIs not only endanger the physical health of providers but also induce significant psychological distress. Immediate action is imperative, necessitating comprehensive training, access to safety equipment, and the establishment of robust reporting systems to ensure a safer work environment and mitigate the risk of infectious disease transmission to healthcare workers. This study aimed to investigate factors associated with needlestick injuries (NSI) among healthcare workers at Mama Lucy Kibaki Hospital, Nairobi, using the Job Demand and Resource (JD-R) model, Job Experience Curve Theory, and Diffusion of Innovation Theory. It explored the impact of occupational cadre, job experience, working hours, and safety devices on NSI occurrences. Data was gathered from healthcare workers in the Accident and Emergency Department through a semi-structured questionnaire based on a 5-point Likert scale and analyzed using descriptive statistics and inferential methods, including correlation analysis and also thematic analysis. The results revealed strong positive correlations between inadequate safety devices and training (Spearman's rho = 0.578), work experience (Spearman's rho = 0.540), working hours (Spearman's rho = 0.346), and exposure from occupational cadre (Spearman's rho = 0.333) with NSIs. The recommendations focus on improving safety for healthcare workers to reduce needlestick injuries. These include targeted training for nurses, mentorship programs, shift rotations to reduce fatigue, and increased availability of safety-engineered devices (SEDs). Regular safety drills, workshops, and monitoring compliance are also suggested to reinforce best practices.

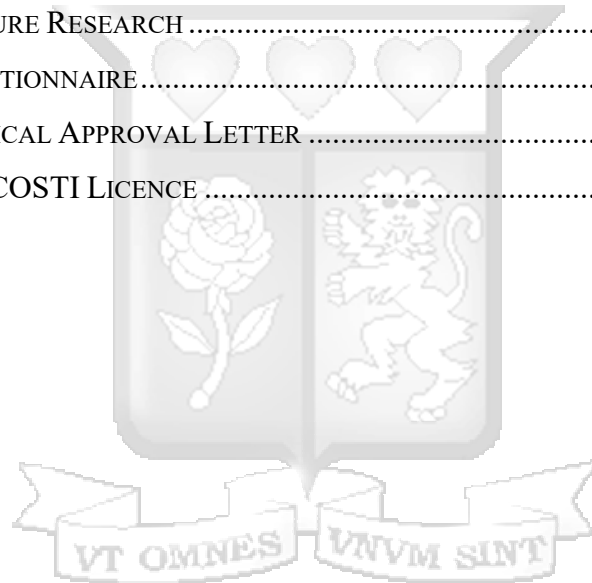
KEY WORDS: Health Care Workers, Needle Stick Injury, Occupation Cadre, Safety engineered Devices, Work Experience.

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LIST OF ABBREVIATIONS AND ACRONYMS

- HBV** Hepatitis B Virus
- HCV** Hepatitis C Virus

HCWs	Health Care Workers
HIV/AIDs	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
MOH	Ministry of Health
NACOSTI	National Commission of Science and Technology
NSI	Needle Stick Injury
PPE	Personal Protective Equipment
PTSD	Post-Traumatic Stress Disorder
SPSS	Statistical Packages for Social Scientists

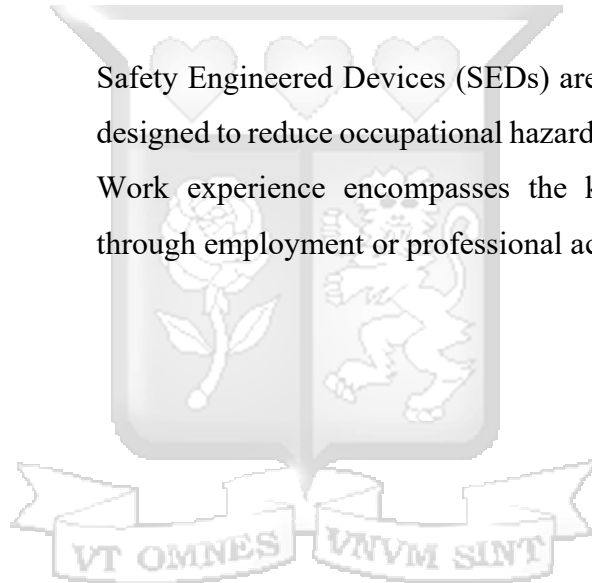


DEFINITION OF KEY TERMS

Burnout

It is a condition of physical, emotional, and mental fatigue that is frequently caused by prolonged, chronic workplace stress and excessive demands, leading to reduced performance and a sense of disillusionment.

HBV (Hepatitis B Virus)	It is a contagious liver-infecting virus with acute and chronic forms, primarily transmitted through infected blood and body fluids.
HCV (Hepatitis C Virus)	It is a liver-infecting virus that often presents with mild or no symptoms initially, is transmitted primarily through blood-to-blood contact
Needle Stick Injury	Trauma occurring to a healthcare worker following inadvertent prick by a hypodermic needle while performing a procedure such as injection.
Occupational Cadre	Occupational cadre refers to distinct groups or categories of job roles and responsibilities within a specific profession or industry.
Post-Traumatic Stress Disorder (PTSD)	It is a mental health condition that can develop after experiencing or witnessing a traumatic event.
Safety Engineered Devices	Safety Engineered Devices (SEDs) are specialized tools or equipment designed to reduce occupational hazards and promote workplace safety.
Work Experience	Work experience encompasses the knowledge and skills acquired through employment or professional activities.



CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter addresses the background, problem statement, objectives, research questions, scope, delimitations, limitations, assumptions, and dissemination of findings.

1.1.1 Background of the Study

In clinical and healthcare settings, needlestick incidents pose substantial job-related risk to healthcare workers, exposing them to the risk of bloodborne pathogens and infections (Jayaprada et al., 2022). Various factors and practices contribute to an increased likelihood of healthcare workers experiencing needlestick incidents, thereby compromising their safety and well-being (Taalat, 2003). These factors include device-related aspects such as the type of needles and sharp devices used, location-related factors like the department or setting where the injuries occur, and action-related behaviours including recapping used needles and improper disposal methods (Talaat 2003). Additionally, factors like fatigue, inadequate access to personal protective equipment, occupational stress high mental workload, and training have been identified as significant contributors to the occurrence of needlestick injuries (Talaat et al., 2003; Makary et al., 2007). The general risks associated with the transmission of the three most common blood-borne viruses including Hepatitis B (HBV), Hepatitis C (HCV) and HIV (Health and Safety Executive, 2024).

Needlestick injuries (NSIs) are accidental puncture wounds caused by contaminated sharp objects, primarily hollow-bore syringe needles (Major Medical, 2018). NSIs pose serious health and psychological risks (Cooke & Stephens, 2017; Jayaprada et al., 2022). Per 1,000 NSIs, infection rates are 300 for HBV, 30 for HCV, and 3 for HIV (Health and Safety Executive, 2024). Psychologically, NSIs contribute to depression, anxiety, stress, PTSD, and insomnia among healthcare workers (Cooke & Stephens, 2017). Underreporting remains a major issue

due to fear of consequences, lack of awareness, and perceived insignificance of injuries (Joukar et al., 2018; BD, 2024). Globally, NSIs affect 43% of healthcare workers, with Africa recording the highest prevalence at 51% (WHO, 2022). The leading causes include recapping needles, improper disposal, and working in high-risk areas such as general wards, with nurses being the most affected group (WHO, 2022).

A comprehensive analysis of needlestick injuries revealed that the incidence of such injuries in the healthcare workers in the United States stands at 39.4%. Furthermore, it is approximated that annually, over 385,000 healthcare professionals in the U.S. encounter percutaneous injuries resulting from needle or sharp object accidents (The global challenge of needlestick injuries in healthcare, BD, 2023). In China, NSIs represent a significant occupational risk within the healthcare sector. The heightened risk of NSIs among HCWs in China is linked to demanding psychosocial working conditions and a negative perception of stress (Wang et al., 2019). In Saudi Arabia, a retrospective study of all reported cases of NSIs is at 8.4% with nurses being the most affected staff (52.5%), compared to that of physicians 24.9% (Alfulayw, Al-Otaibi, & Alqahtani, 2021).

In Ethiopia, the prevalence of needlestick injuries is reported at 18.5% (Berhan et al., 2021). Key factors associated with these injuries include gender (being male), lack of safety instructions in the workplace, absence of safety and health training, possessing work experience of 5 years or less, and the unsafe practice of recapping used needles (Berhan et al., 2021). In Nigeria, approximately 55.8% of healthcare workers experience needlestick and/or sharp injuries, with a significant portion (52.4%) occurring during the administration of intramuscular injections. A substantial proportion (51.4%) takes place during use, while 23.4% are related to disposal procedures (Oluwatosin, Oladapo & Asuzu, 2016). The commonness of needle stick injuries (NSIs) in South Africa is at 26.3% (McDowall & Laher, 2019). The majority of NSIs (64.5%) are sustained during intravenous line insertion. During recapping of needles 36% of NSIs occur and (28.3%) occur during disposal of the used device. The majority of injuries 73.1% occur at end of the shift, indicating that long working hours and shift work contribute to the risk of NSIs (McDowall & Laher, 2019).

In Kenya, the Health Act, 2017 and the Occupational Safety and Health Act, 2007 (OSHA) establish a unified health system and regulate workplace safety (The Occupational Safety and Health Act, 2007; Kenya Gazette Supplement, 2017). OSHA, the primary legislation on occupational health, outlines employer and employee responsibilities, emphasizing risk assessment, hazard control, and the prevention of workplace injuries, including needlestick incidents. It mandates training, protective gear, and proper waste management to safeguard workers (The Occupational Safety and Health Act, 2007). The Health Act, 2017 provides a comprehensive legal framework for healthcare delivery, protecting both patient rights and healthcare worker safety, complementing OSHA in ensuring quality healthcare services (Kenya Gazette Supplement, 2017).

The Kenyan Ministry of Health (MoH) prioritizes healthcare worker safety through policies like the National Strategy for Patient Safety, Safety of Health Workers, and Quality of Care (2022), which emphasizes infection prevention and control (IPC) (MOH, 2021). IPC programs train staff on hygiene, sharps handling, and PPE use, while the National Human Resource for Health (NHRH) Strategic Plan integrates occupational safety into workplace standards (MOH, 2021). The Kenya Quality Model for Health (KQMH) further promotes safe practices within quality healthcare delivery (MOH, 2021). However, safety concerns persist, with 58% of healthcare workers reporting needlestick injuries (NSIs) due to inadequate safety device use and protocol non-compliance (Basaza, Otieno & Haddock, 2021; Gala, 2023). Work-related stress and exhaustion are also major contributors, with 50% of NSIs linked to these factors (Achungo, 2016).

Mama Lucy Kibaki Hospital is the focal point of this study as it serves Nairobi's densely populated slum areas, where bloodborne infections like HIV are more prevalent. Research by Madise et al. (2012) reports HIV rates of 12% in slum residents, compared to 5% and 6% in non-slum urban and rural areas, respectively. This increases healthcare workers' risk of contracting infections from needlestick injuries, exacerbated by understaffing and inadequate protective gear (Selina Teyie, 2022). The high patient load further strains workers, reducing alertness and increasing NSI risk (Alfulayw, Al-Otaibi, & Alqahtani, 2021). This study focuses

on the accident and emergency department, where the urgency of care heightens NSI risks if safety protocols are not strictly followed (U.S. Department of Labour, 2024).

1.2 Problem Statement

Needlestick injuries (NSIs) are a major occupational hazard for healthcare workers, increasing the risk of bloodborne infections like HIV, HCV, and HBV (Goniewicz, 2012). They also cause significant psychological distress, including anxiety and PTSD (Cooke & Stephens, 2017). NSIs commonly affect the fingers, hands, and arms, with nurses and cleaners being the most vulnerable (Khabour et al., 2018; Khraisat et al., 2014). Female healthcare workers aged 20-30 and those with less experience face higher risks. Causes include accidental pricks, patient non-compliance, and, rarely, intentional injuries (Berhan et al., 2021). The consequences are severe, with HBV posing the highest infection risk, followed by HCV and HIV (Cooke & Stephens, 2017; Mbaisi et al., 2013).

In Kenya, (NSIs) present significant challenges for healthcare workers with a substantial prevalence of such incidents being reported. NSIs account for 76.6% of instances where HCWs were exposed to HIV/AIDS in the workplace (Gala, 2023). These exposures to blood are closely linked to a lack of safety device usage and insufficient adherence to safety protocols (Gala, 2023). Sharp and splash-related needle injuries (SSNIs) evidently affect the quality of life of healthcare workers (Ogata & Duffy, 2018). According to Basaza, Otieno and Haddock (2021) a significant proportion, approximately 58%, of healthcare workers in Kenyan healthcare facilities have encountered NSIs, underscoring the widespread nature of this issue. Additionally, Healthcare workers' insufficient training and skills regarding the proper recapping of sharp objects is the main contributing factor to NSIs with 30% statistics (Wafula, 2012). Additionally, the pressure of work and fatigue are also among the leading factors associated with NSIs among HCWs. 50% of the health care workers associate the occurrence of needle stick injuries through work pressure and fatigue, and which result to human errors (Achungo, 2016). These difficulties not only jeopardize the health of healthcare providers but also leads to psychological distress. This study will therefore examine the factors linked to needle stick injuries at Mama Lucy Kibaki Hospital.

A number of scholarly investigations have been undertaken to scrutinize factors associated with NSIs. Motaarefi et al. (2016) conducted a review to investigate the factors associated with needlestick injuries in health care occupations primarily emphasizes the incidence and contributing factors of (NSIs) among HCWs, highlighting age, education, shifts, and training history. While the study provides valuable insights into the topic, it is important to note that it relies on secondary data sourced from previously published articles. The use of secondary data can have certain limitations, including potential issues related to data quality, the inability to tailor data collection to the study's specific needs, and the dependence on the methodologies and research questions of the original studies.

Beyene (2023) carried out research on magnitude and Factors Associated with NSIs among Nurses at Yekatit 12 medical hospital underscoring that one-third of nurses at Yekatit 12 Hospital Medical College experienced needlestick injuries within a year. Factors such as age, gender, and department significantly influenced the risk, with younger nurses and females being more vulnerable, while those in the maternity unit had a significantly lower risk of needlestick injuries. The research carried out in Ethiopia yields valuable insights regarding the occurrence and factors contributing to needlestick injuries among healthcare professionals. However, a contextual gap exists, as Ethiopia's healthcare settings, policies, and workplace practices may differ from those in this study's context. This study addressed the contextual gap by focusing specifically on healthcare settings within Kenya, particularly at Mama Lucy Kibaki Hospital, thereby capturing local workplace practices, policies, and cultural dynamics that may differ from those in other countries

Nyaberi et al. (2014) A study to investigate the perceived job-related risk of infection among mortuary staff in Nyanza Province, Kenya was conducted. Only 28.6% of participants had received in-service training on infection prevention. Nearly half did not consider deceased bodies a source of infection, though 88% felt at risk of occupational infections. None had received job-related immunizations, yet all recognized the importance of protective clothing. It's worth noting that the study did not cover needlestick injuries, and it did not explore the impact of different occupational categories (such as nurses and doctors) on the occurrence of such injuries, representing a notable gap in the study's scope. This study addressed the noted

gap by specifically examining needlestick injuries among healthcare workers and exploring how different occupational categories such as doctor, nurse, EMT, theatre Technician, laboratory technician, medical interns/students and clinical officers are affected. Masese (2022) conducted an investigation focusing on the occupational roles and hazards faced by community-embedded peer educators delivering services related to HIV, hepatitis C, and harm reduction to individuals who engage in drug injection within Nairobi, Kenya. The study found that occupational hazards included encounters with law enforcement and drug dealers, needlestick injuries, and exposure to drug-use environments that could trigger relapse. A key limitation was the reliance on interviews, which often involve smaller samples than questionnaires, limiting generalizability. This study addressed the limitation of relying solely on interviews by employing a semi-structured questionnaire, which allowed for the collection of both quantitative and qualitative data from a larger and more diverse sample of healthcare workers. This approach improved the depth and breadth of the findings while enhancing the generalizability of the results across similar healthcare settings.

1.3 Objectives of the Study

1.3.1 General Objective

The main objective of this study is to investigate the factors associated with Needle Stick Injuries at Mama Lucy Kibaki Hospital, Accident and Emergency Department.

1.3.2 Specific Objectives

Specific objectives of the study will be:

- i. To determine the association between the occupational cadre and the occurrence of needle stick injuries at Mama Lucy Kibaki Hospital.
- ii. To investigate the influence of the number of working years at a particular station and the occurrence of needle stick injuries at Mama Lucy Kibaki Hospital.
- iii. To assess the effect of total number of hours worked per shift on the likelihood of needle stick injuries among healthcare workers at Mama Lucy Kibaki Hospital.

- iv. To determine the impact of safety devices in preventing needle stick injuries among healthcare staff at Mama Lucy Kibaki Hospital.

1.4 Research Questions

The study will answer the following questions:

- i. What is the association between the occupational cadre and the occurrence of needle stick injuries at Mama Lucy Kibaki Hospital?
- ii. What is the influence of the number of working years at a particular station on the likelihood of needle stick injuries among healthcare workers at Mama Lucy Kibaki Hospital?
- iii. What is the association between total number of hours worked per shift and the likelihood of needle stick injuries among healthcare workers at Mama Lucy Kibaki Hospital?
- iv. How does the availability and utilization of safety-engineered devices impact the prevalence of needle stick injuries among healthcare staff at Mama Lucy Kibaki Hospital?

1.5 Scope of the Study

The study investigated the factors associated with needlestick injuries (NSIs) at Mama Lucy Kibaki Hospital in Kenya. It aimed to address several key objectives: to examine the association between the occupational cadre and the incidence of needlestick injuries at the hospital, to determine the influence of job experience on the likelihood of needlestick injuries among healthcare workers, to assess the effect of working hours on the occurrence of needlestick injuries, and to evaluate the impact of safety devices in preventing needlestick injuries among healthcare staff. Specifically, the study investigated the occurrence of NSIs in the Accident and Emergency department at Mama Lucy Kibaki Hospital. This focus was particularly relevant, given the fast-paced and demanding environment, which increased the risk of accidental needlestick injuries. The target population consisted of 100 healthcare workers based in this department, including Doctor, Nurse, EMT, Theatre Technician, Laboratory Technician,

Medical interns/students and Clinical Officers. The study utilized primary data collected through a semi-structured questionnaire.

1.6 Significance of the Study

The hospital administration and management of Mama Lucy Kibaki Hospital benefited significantly from the insights generated by this research. By offering a thorough understanding of the factors associated with needlestick injuries (NSIs) among healthcare workers, the study provided hospital administrators with valuable information to shape targeted strategies for preventing NSIs within their healthcare facilities. The research informed decisions related to resource allocation, staff training initiatives, and the implementation of safety protocols, ultimately contributing to improved workplace safety and a reduction in NSI occurrences.

The government and policymakers found the study instrumental in formulating effective policies and guidelines aimed at prioritizing healthcare worker safety. The research served as a valuable resource for developing regulations concerning the use of personal protective equipment, limitations on working hours, and specialized training programs designed to reduce the risks associated with NSIs. By grounding these regulations in evidence-based findings from the study, policymakers contributed to the establishment of safer working environments in healthcare settings.

Researchers and academicians regarded this study as a significant contribution to the scholarly discourse on needlestick injuries. By providing a comprehensive examination of the diverse factors linked to NSIs, the study laid a strong foundation for continued research and exploration. It inspired further investigations, which in turn led to the development of evidence-based practices, innovative interventions, and academic contributions focused on enhancing healthcare worker safety.

Additionally, the study advanced the understanding of key theoretical frameworks in occupational health and organizational behavior. It provided empirical evidence supporting or challenging the Job Demands-Resources (JD-R) theory by identifying job demands and resources that influenced the likelihood of needlestick injuries among healthcare workers. The

study also shed light on the role of job experience in mitigating or increasing injury risk, aligning with the Job Experience Curve theory. Furthermore, it examined the adoption and diffusion of safety innovations such as safety-engineered devices in healthcare settings, offering insights into organizational diffusion processes and supporting core principles of the Diffusion of Innovations theory.

1.7 Delimitation of the Study

Infections could potentially be transmitted through bodily fluid splashes, though this study specifically focused on infection transfer via needlestick injuries. The investigation carefully confined itself to sharp injuries, acknowledging various objects that could cause such incidents, such as needles, scalpels, and broken glass. However, it specifically targeted needlestick injuries, maintaining precision in the research scope. While recognizing the occurrence of needlestick injuries across different hospital departments, such as the laboratory and general wards, the study deliberately narrowed its focus to the Accident and Emergency department. Considering the broad impact of needlestick injuries on healthcare professionals, the study confined its analysis to nurses, doctors, emergency medical technicians, theatre technicians, and laboratory technicians. Additionally, amidst numerous hospitals in Kenya, the study selectively concentrated on Mama Lucy Kibaki Hospital, ensuring a thorough investigation into needlestick injuries within this specific setting. This delineation facilitated a contextually grounded exploration, crucial for contributing substantively to the existing body of knowledge in healthcare safety and occupational health.

1.8 Dissemination of Findings

The findings were shared with the Mama Lucy Kibaki Hospital administration to ensure that key decision-makers within the institution are fully informed about the study's results and their broader implications. By sharing these findings, the hospital's leadership was equipped with evidence-based insights that can guide the enhancement of healthcare safety measures, improve patient care protocols, and inform strategic decision-making processes. The direct dissemination of these results also fostered a collaborative approach between the research team and the hospital administration, enabling them to address any identified gaps and implement the recommended improvements.

1.9 Limitations of the Study

Participants' ability to fully engage or participate in the study was hindered by time constraints stemming from their job demands. Furthermore, some individuals were unwilling to participate, which potentially impacted the overall representativeness and validity of the collected data. However, the study addressed this by strategically employing a comparatively large sample size, thereby mitigating the potential impact of non-participation among certain individuals. This deliberate approach ensured that the study maintained sufficient statistical power to derive meaningful conclusions, thereby bolstering the reliability and validity of the results.

1.10 Assumptions of the Study

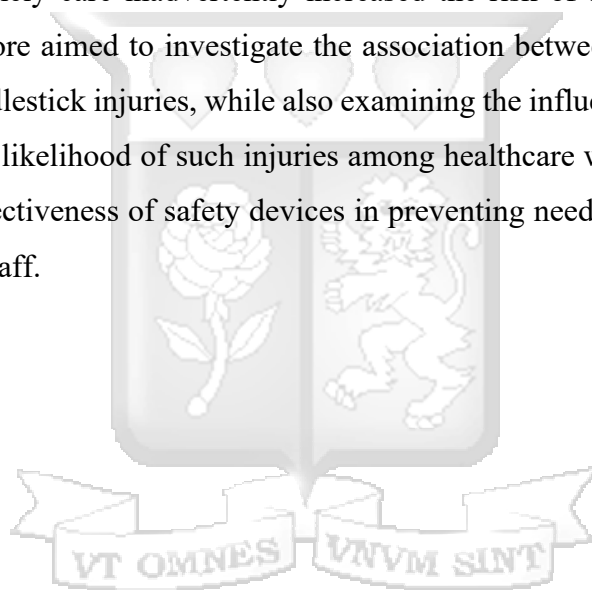
This study presupposed a direct correlation between factors associated with needlestick injuries and the occurrence of needlestick injuries among healthcare workers (HCWs), implying that an increase or decrease in these factors was likely to correspond with a similar trend in the incidence of needlestick injuries. Moreover, it relied on the accuracy of data collected on needlestick injuries and associated factors, assuming the validity and appropriateness of the measurement tools utilized in the research. It also presupposed that findings derived from the Mama Lucy Kibaki Hospital case study could be generalized to other healthcare settings, suggesting broader implications for similar contexts. Finally, the study assumed that the selected sample size adequately represented the healthcare workers at Mama Lucy Kibaki Hospital who were at high risk of needlestick injuries, allowing for meaningful conclusions about the factors influencing needlestick injuries in this specific setting.

1.11 Summary

This chapter provided a comprehensive overview of needlestick injuries (NSIs) in healthcare settings, highlighting their significant occupational hazards to healthcare workers worldwide. It discussed various contributing factors to NSIs, including device-related aspects, location-related factors, and action-related behaviors. Moreover, it explored the health and psychological effects of NSIs, emphasizing the risks of bloodborne pathogens such as HIV, HBV, and HCV, as well as the psychological impact on healthcare workers. The prevalence of NSIs was examined across different regions, with statistics from Africa, the United States, China, Saudi

Arabia, Ethiopia, Nigeria, and South Africa. Additionally, it discussed relevant legislation and policies aimed at protecting healthcare workers, such as the Health Act and the Occupational Safety and Health Act in Kenya.

The study focused on Mama Lucy Kibaki Hospital in Nairobi, highlighting its role in serving densely populated areas with a heightened prevalence of bloodborne infections. It underscored the challenges faced by the hospital, including staffing shortages that put pressure on the healthcare workers, leading to burnout, and inadequate facilities, such as protective gear, which increased the risk of NSIs among healthcare workers. The study narrowed its focus to the Accident and Emergency department due to its fast-paced and demanding environment, where the urgency to deliver timely care inadvertently increased the risk of accidental needlestick injuries. The study therefore aimed to investigate the association between occupational cadre and the occurrence of needlestick injuries, while also examining the influence of job experience and working hours on the likelihood of such injuries among healthcare workers. Additionally, it sought to assess the effectiveness of safety devices in preventing needlestick injuries within the hospital's healthcare staff.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers theoretical and empirical literature that forms the foundation of the study. The theoretical review presents the theories that inform the study and their appropriateness. The empirical review presents prior studies related to the current study and describes the linkages between the variables under examination. The conceptual framework elaborates the proposed relationships between the study variables. Research gaps emerging from the empirical review are also presented.

2.2 Theoretical Review

2.2.1 Job Demands-Resources (JD-R)

The Job Demands-Resources (JD-R) model was initially brought forward by Bakker and Demerouti (2007). The model purposes to explain the association between employee wellness, job attributes, and the outcome of an organization. The JD-R model suggests that every job includes unique demands and resources, with job demands referring to elements that require physical, psychological, or emotional effort from employees. These can include time pressure, workload, role ambiguity, and emotional demands (Bakker & Demerouti, 2007). Meanwhile, job resources are aspects that assist individuals meet job demands, reduce job stress, and achieve work goals. The JD-R model highlights that job demands and resources influence employee outcomes in different ways. High job demands, when not adequately supported by sufficient resources, can lead to stress, burnout, reduced job satisfaction, and higher turnover intentions (Bakker & Demerouti, 2007). Conversely, ample job resources can offset the negative impact of job demands, foster work engagement, and result in good outcomes such as improved job satisfaction, stronger organizational commitment, and enhanced performance.

The Job Demands-Resources (JD-R) model provides a comprehensive framework for evaluating the impact of working hours on the likelihood of needlestick injuries among healthcare workers. Long working hours contribute to heightened job demands, potentially leading to exhaustion, burnout, and increased stress levels among healthcare staff. These factors can impair cognitive function, decrease attention to safety protocols, and elevate the risk of accidents, including needlestick injuries (Bakker & Demerouti, 2017). Adequate rest breaks, manageable workloads, and supportive organizational policies serve as critical job resources that can help mitigate the negative impact of long working hours, thereby promoting employee well-being and reducing occupational hazards (Schaufeli & Taris, 2014).

In the context of occupational cadre and needlestick injuries, the theory suggests that different occupational cadres may face varying levels of job demands and resources, which in turn influence their risk of exposure to needlestick injuries. For example, healthcare professionals in high-demand roles, such as emergency room nurses or surgical doctors, may face elevated levels of stress and time pressure due to the critical nature of their work and the need for rapid response to patient needs. These high-demand roles involve multitasking, decision-making under pressure, and frequent exposure to sharp instruments, increasing the risk of accidental needlestick injuries, especially when cognitive resources are strained (Adams & Walls, 2020).

Leiter (2003), along with his colleagues, has raised concerns about the Job Demands-Resources (JD-R) model's conceptualization of burnout, arguing that its focus on job resources as a buffer against job demands may oversimplify the complex nature of burnout and fail to adequately account for individual differences in coping strategies and resilience. Similarly, Taris (2006) has criticized the JD-R model for its lack of attention to the broader organizational context, contending that its emphasis on individual-level factors may overlook the influence of organizational policies, culture, and structural factors on employee well-being and job performance.

The study addressed the criticisms of the JD-R model by incorporating both individual factors (e.g., experience, training) and organizational factors (e.g., safety protocols, devices, resources) in the questionnaire. This approach provides a more holistic understanding of how job demands and resources, alongside individual and organizational factors, influence the likelihood of

needlestick injuries and burnout among healthcare workers. By considering both the personal experiences of healthcare workers and the broader organizational context, the study offers a comprehensive perspective on the factors that contribute to workplace safety and well-being.

2.2.2 Job Experience Curve Theory

The Job Experience Curve theory, also known as the Learning Curve theory, was initially formulated by Henderson (1972). The theory is based on the idea that with increased experience and cumulative production, the average cost per unit decreases systematically over time. The Job Experience Curve theory posits that as workers become more familiar with their tasks and processes through repeated practice and exposure, they become more efficient and productive. This increased efficiency can lead to reductions in both time and resources required to perform tasks, ultimately resulting in lower production costs (Henderson, 1972). The learning process encompasses various elements, including improvements in skills, streamlining of procedures, and better utilization of resources.

The Job Experience Curve theory is highly relevant to investigating the influence of job experience regarding the incidence of needlestick injuries among healthcare workers. According to this theory, as workers gain experience in their roles, they become more proficient and efficient in executing tasks, including those related to handling needles and sharps (Becker, 1964). As a result, experienced healthcare professionals are expected to demonstrate better mastery of safe needle handling techniques, increased situational awareness, and improved ability to anticipate and mitigate risks associated with needlestick injuries (Ale et.al, 2008). Studies have shown that experience not only enhances skill development but also contributes to better safety practices, thus reducing the risk of occupational injuries.

Child (1972) criticizes the theory for its narrow focus on individual learning and experience accumulation, advocating for an integrated approach that considers both individual and organizational dimensions of learning. Additionally, Levitt and March (1988) challenge the assumptions underlying the Job Experience Curve theory, arguing for the recognition of nonlinear patterns in learning processes influenced by various factors such as task complexity and organizational adaptation.

The study addressed Child's (1972) criticism of the narrow focus on individual learning by incorporating both individual factors, such as work experience and training, and organizational factors, including safety protocols, resources, and safety devices. The study assessed (Working Hours and Needlestick Injuries) and (Safety-engineered Devices and Needlestick Injuries) and how these organizational resources and training influenced the likelihood of needlestick injuries, aligning with Child's call for a more integrated approach. Additionally, the study addressed Levitt and March's (1988) critique of nonlinear learning processes by considering various factors like experience, education, and workload. By exploring how these factors, such as shift length and task complexity, interact to influence injury risk, the study acknowledged the nonlinear nature of learning processes, as suggested by Levitt and March.

2.2.3 Diffusion of Innovation Theory

The Diffusion of Innovations Theory was by Rogers (1962) proposes that the adoption of new ideas, technologies, or practices adheres to a foreseeable trend within a social system, characterized by five stages: decision, knowledge, confirmation, persuasion and implementation. It posits that individuals within a social system vary in their propensity to adopt innovations, with groups comprising early adopters, innovators, laggards, early majority and late majority. The theory underscores the significance of communication channels, social networks, and perceived characteristics of innovations (such as compatibility, relative advantage, complexity, observability and trialability) in influencing the diffusion process (Rogers, 1962).

In the context of safety-engineered devices and needlestick injuries, the diffusion of innovations theory suggests that the adoption of these devices among healthcare staff may depend on various factors such as their awareness of the devices (knowledge), their perception of the benefits and advantages of using them (persuasion), their decision-making process in choosing to implement the devices in their practice (decision), the actual integration of the devices into their work routines (implementation), and their assessment of the outcomes and benefits of using the devices (confirmation).

Allen (1984), in his work, has critiqued the Diffusion of Innovations Theory for its focus on individual adoption decisions while overlooking the role of social networks and interpersonal relationships in the diffusion process. He argues that the theory's emphasis on the attributes of innovations and the characteristics of adopters fails to adequately account for the influence of social interactions, communication patterns, and network structures on innovation diffusion. Hannan and Freeman (1984) have critiqued the Diffusion of Innovations Theory from a sociological perspective, highlighting its neglect of organizational factors and institutional influences on innovation adoption. They argue that the theory's focus on individual-level attributes and diffusion patterns overlooks the role of organizational structures, institutional pressures, and competitive dynamics in shaping innovation adoption decisions within organizations and industries.

The study addressed the critiques of the Diffusion of Innovations Theory by incorporating both individual and organizational factors. Allen's critique on the focus of individual adoption decisions was mitigated by considering organizational elements such as safety protocols, training, and safety devices, which reflect the role of social networks and communication in innovation adoption. Similarly, Hannan and Freeman's critique on overlooking organizational and institutional influences was addressed by including factors like resources and safety devices, highlighting the importance of institutional structures in the diffusion process within healthcare settings.

2.3 Empirical Review

2.3.1 Occupation Cadre and Needlestick Injuries

Masese (2022) conducted an investigation focusing on the occupational roles and hazards faced by community-embedded peer educators delivering services related to HIV, hepatitis C, and harm reduction to individuals who engage in drug injection within Nairobi, Kenya. This study involved interviews with peer educators (PEs) selected through a combination of random and purposive methods at two harm reduction sites in Nairobi. Thematic analysis was employed to delve into the expected versus real roles of PEs in their service to people who inject drugs (PWID), as well as their personal motivations, challenges, and the occupational health risks they encounter. The data analysis was facilitated through the use of Atlas.ti software. The

findings pinpointed that Occupational health hazards encompassed encounters with law enforcement and drug dealers, needlestick injuries, and exposure to drug-use settings, which could potentially trigger relapse. One limitation of the study is that it employed interviews as the primary data collection method. Interviews typically cover a smaller sample size compared to questionnaires, which can reach a larger population and enhance the generalizability of the findings.

Sharew, (2017) conducted a study on the topic of occupational exposure to injuries from sharp objects among healthcare providers in regional medical facilities within Ethiopia. The data collection period took place between April and May 2016, utilizing self-administered questionnaires. The study revealed that out of the 195 surveyed Healthcare Providers (HCP), 97.5% participated, and a 32.8% prevalence of sharps injuries. Upon adjusting for pertinent factors, it became clear that the absence of on-the-job training and prior experience with sharps injuries were determined to be significant risk factors based on statistical analysis. Healthcare providers who hadn't undergone in-service job training were nearly five times more prone to encounter sharps injuries than those who received such training. Similarly, Healthcare providers who had previously experienced sharps injuries were nearly four times more susceptible to encountering such injuries than their counterparts with no prior exposure. The study, however, did not explore the distinct roles of healthcare providers, including nurses, doctors, cleaners, lab technicians, and their respective departments of work, in influencing the occurrence of needlestick injuries.

Nyaberi et al. (2014) investigated the perceived job-related risk of infection among mortuary staff in Nyanza Province, Kenya was conducted. The primary aim of the study was to ascertain how mortuary attendants in hospital settings within Nyanza Province perceive the occupational risks associated with infections. Data collection was carried out using a semi-structured questionnaire, involving attendants with an average age of 38.5 years, the majority being male (83.3%). It was observed that just 28.6% had undergone in-service training in infection prevention. Additionally, nearly half of the participants believed that deceased bodies were not a source of infection, while 88% viewed themselves as susceptible to occupationally-acquired infections. Surprisingly, none had received job-related immunizations, although all

acknowledged the significance of using protective clothing when handling deceased bodies. Furthermore, it was observed just 14% of the mortuaries had the availability of flowing water, and none had established written infection control policies. It's worth noting that the study did not cover needlestick injuries, and it did not explore the impact of different occupational categories (such as nurses and doctors) on the occurrence of such injuries, representing a notable gap in the study's scope.

2.3.2 Working Hours and Needlestick Injuries

Lo, Chiou, Huang, and Chien (2016) carried out research to explore the connection between prolonged working hours, persistent insomnia, and incidents of NSIs among hospital nurses in Taiwan. During the period of July to September 2014, the participants anonymously filled out a questionnaire. The research employed multivariate logistic regression models to assess the influence of extended hours of working and chronic insomnia on the occurrence of these injuries. The findings indicated that individuals working 41 to 50 hours per week, over 50 hours per week, and those experiencing chronic insomnia faced a significantly elevated risk of needlestick injuries when compared to those working fewer hours and without insomnia. It's worth noting that this study, while informative, was conducted in a different setting therefore healthcare practices and conditions may differ from the specific context of the present study.

Stimpfel, Brewer and Kovner, (2015) undertook a study with an aim of profiling the shift patterns of recently licensed nurses and investigate their link to nurse injuries, while considering the influence of various factors in 34 states and district hospitals in Colombia. Descriptive statistics and bivariate and multivariate Poisson regression models was used in this study to analyse this relationship. The results revealed that a substantial portion of recently licensed nurses (79%) worked 12-hour shifts, with (44%) on night shifts, and (61%) reported weekly overtime, either mandatory or voluntary. 32% of NSIs was associated with nurses with weekly overtime, while night-shift nurses faced a 16% higher risk of sprain or strain injuries. The study has a limited scope of factors considered, which solely included shifts and overtime working hours. In contrast, my study will address this gap by encompassing not only shifts and overtime working hours but also the critical aspects of adequate breaks and leaves.

Dimitriu et al. (2020) investigated the occurrence of burnout syndrome in medical residents in Romania during the COVID-19 pandemic. Primary data was gathered through questionnaire. The results emphasized that burnout was significantly more common among medical residents working in regular wards, with an 86% prevalence, compared to those working in departments categorized as front-line areas. These front-line areas included the radiology (including CT/MRI department), emergency unit, and ICU, where the prevalence of burnout was lower, standing at 66%. The study therefore concluded that burnout prevalence varied with different specialties. While their research shed light on the prevalence of burnout across different medical specialties during the COVID-19 pandemic, it does not explore whether burnout levels had any influence on the occurrence of needlestick injuries.

Afonso, Fonseca, and Pires (2017) examined the working hours impact on mental health and sleep, comparing two working hour groups, LWHG and RWHG. Using a quantitative approach, participants were classified based on a 48-hour weekly threshold, and their mental health and sleep patterns were assessed. Notably, the LWHG (53% of the sample, n = 256) displayed higher anxiety and depression symptoms and poorer sleep quality than the RWHG (47% of the sample, n = 223). Longer working hours were linked to higher corporate positions, which were associated with increased HADS scores. These scores, in turn, correlated positively with PSQI scores and inversely with age. The study suggested that extended working hours are associated with worsened mental health, heightened anxiety, and increased depression symptoms, but it did not investigate any potential relationship between working hours and needlestick injuries.

2.3.3 Job Experience and Needlestick Injuries

Smeulers et al. (2014) undertook a study to investigate the encounters of nurses and their viewpoints on averting errors in administering medications. Between March and December of 2011, a qualitative interview investigation was carried out with 20 nurses working at an academic medical centre. The research discovered that the experiences of nurses align with the expectation that they play a leading role in ensuring safe medication management. Nonetheless, their effectiveness in fulfilling this responsibility hinges on possessing the necessary knowledge to evaluate the risks associated with medication administration, as well as the specific work conditions they encounter. The study primarily focuses on nurses' experience and medication

administration errors and it does not explore whether work experience, specifically the lack of experience, could potentially elevate the likelihood of needlestick injuries.

James (2021) Explored Australian primary healthcare (PHC) nurses' experiences with telehealth during the COVID-19 pandemic, including the use of various communication methods for healthcare delivery. Phone interviews with a semi-structured format were carried out between June and August 2020, assessing PHC nurses' readiness, telehealth accessibility, patient interactions, and effects on nursing roles. While some nurses were experienced with telehealth, others lacked preparation and suitable technology. Telehealth expanded patient access to care but had limitations in complex clinical assessments. Participant engagement depended on factors like access, tech skills, safety perceptions, and the perceived value of remote care. Frustration was expressed about telehealth funding and its impact on their scope of practice. The study primarily concentrated on the association between work experience and the use of telehealth among Australian (PHC) nurses during the COVID-19 pandemic. While it illuminates how nurses' experiences and readiness affect their telehealth adoption, it doesn't explore any potential link between work experience and the occurrence of NSIs.

Ardebili et al. (2021) aimed to conduct a comprehensive investigating the encounters of healthcare personnel operating during the COVID-19 pandemic. It involved a semi-structured interviews with 97 healthcare professionals and uncovered four main themes: Their experiences during the pandemic, changes in personal life and increased negative emotions, gaining expertise and adjusting to the pandemic, and issues related to mental health. The research primarily focuses on the experiences of healthcare staff during the COVID-19 crisis, delving into themes related to their work during the pandemic, personal life adjustments, experience acquisition, and mental health concerns. Notably, the study does not investigate any potential connection between work experience and the occurrence of needlestick injuries.

2.3.4 Safety-engineered Devices and Training and Needlestick Injuries

Schuurmans, Lutgens, Groen and Schneeberger, (2018) study assessed the effectiveness of implementing (SEDs) in reducing (NSIs) among (HCWs) at Jeroen Bosch Hospital in the Netherlands using an interview-based approach. The results revealed that, even with the (SEDs) introduction, the incidence of (NSIs) rose to 1.9 per 100. Healthcare Workers before their

implementation to 2.2 per 100 HCWs. Moreover, a noticeable decrease in NSIs related to blood sugar needles and injection was observed but a sudden increase in (NSIs) occurred, specifically linked to nadroparin calcium and infusion needles used with (SEDs). The primary reasons cited for NSIs were improper needle disposal and issues with the safety features. The limitation of the study is that it employed interview methods to gather data. Interviews can introduce interviewer bias, potentially leading to socially desirable responses, affecting data accuracy. The current study will use questionnaires which being self-administered, reduce this bias, enabling candid and independent participant responses.

De Jager, Zungu, and Dyers (2018) study aimed to assess the cost-effectiveness of implementing (SEDs), a training program (TP), and a combined approach to reduce (NSIs) among (HCWs) in South Africa. Utilizing a Markov model, these interventions were compared to current practices over a 45-year period, considering their associated costs and benefits. The findings indicated that all three interventions proved to be cost-effective, with a threshold of USD 6,483.90 per quality-adjusted life-year gained. Specifically, the training program was the most cost-effective at USD 32.90 per QALY, followed by SEDs at USD 432.32 per QALY, and the combined strategy at USD 377.08 per QALY. Notably, the combination strategy demonstrated cost-effectiveness 95.4% of the time at this threshold. This research assesses the cost-effectiveness of implementing (SEDs) and training programs to reduce (NSIs) among (HCW) in South Africa. However, it does not investigate the direct impact of these interventions on the actual occurrence of needlestick injuries, focusing solely on cost-effectiveness.

Yao et al. (2013) assessed the impact of occupational safety training and educational programs (OSTEP) on (NSIs) in Chinese nursing students. Initial questionnaires collected NSI data from 248 students. Following a four-year OSTEP, data were collected again from 246 students. The results, analyzed with SPSS software, revealed a significant reduction in NSIs, dropping from 4.65 to 0.16 events per nurse. While the study highlights OSTEP effectiveness in reducing NSIs, it doesn't consider contextual healthcare variations or the role of (SEDs) in injury prevention.

Phan (2019) conducted a study on healthcare workers' practices when removing personal protective equipment (PPE) and the potential transfer of pathogens. The research monitored viral respiratory infections in a hospital from March 2017 to April 2018. Findings highlighted

common doffing mistakes, such as removing the gown from the front and taking off the face shield before the mask. Deviations from recommended PPE doffing procedures were widespread, raising concerns about contamination risk. The study primarily focuses on PPE and pathogen transfer, without exploring safety engineered devices and their role in preventing needlestick injuries.

2.4 Summary of Research Gaps

Table 2. 1: Research Gap Table

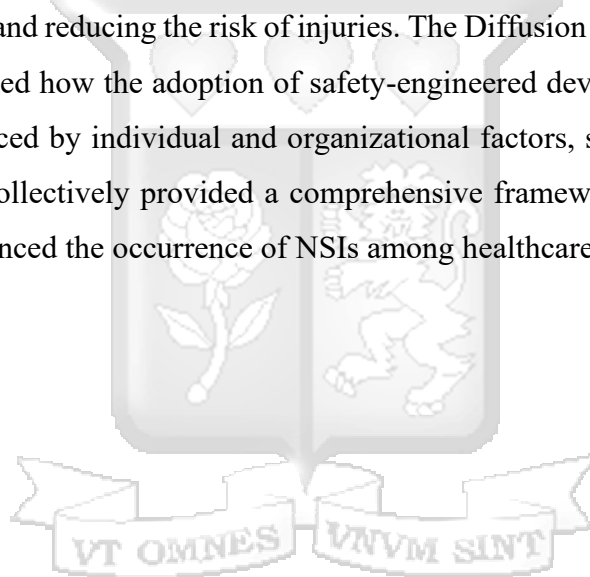
Study	Methodology	Findings	Research Gap
Masese (2022)	Interview with persons who inject drugs in Nairobi, Kenya.	Peer educators face occupational health hazards, including encounters with law enforcement and drug dealers and needlestick injuries.	The study employed a questionnaire which is limited to a small group of participants. Current research uses questionnaires to allow a larger group of participants (respondents) which allows for generalizations to be drawn from the sample to the population.
Sharew (2017)	Questionnaire	Identifies the frequency of sharps injuries among healthcare providers, and uncovers contributing factors, including the absence of training provided while on the job and prior encounters with sharps injuries.	The study did not explore the varying roles of healthcare providers, such as nurses, doctors, cleaners, lab technicians, and their respective departments of work, in influencing needlestick injuries.
Nyaberi et al. (2014)	Employs a semi-structured questionnaire to examine the way hospital-based mortuary works in Nyanza Province Kenya perceives job-related risks associated with infection.	Mortuary attendants perceive themselves at risk of occupationally acquired infections and recognize the importance of wearing protective clothing when handling corpses.	The study did not encompass needlestick injuries, and it did not explore the influence of the occupational cadre (nurses, doctors) on such injuries, which represents a notable gap in the study's focus.
Lo, Chiou, Huang, and Chien (2016)	The participants anonymously filled out a questionnaire.	Hospital nurses face a higher risk of needlestick injuries when they work long hours and experience chronic insomnia.	Study was conducted in a different setting therefore healthcare practices and conditions may differ from the specific context of the present study.

Study	Methodology	Findings	Research Gap
Stimpfel, Brewer and Kovner (2015)	Descriptive statistics and bivariate and multivariate Poisson regression models	Nurses with weekly overtime and night-shift nurses face a higher risk of needlestick injuries, emphasizing the impact of extended working hours.	Limited scope of factors considered, which solely includes shifts and overtime working hours. This research will address this gap by encompassing not only shifts and overtime working hours but also the critical aspects of adequate breaks and leaves.
Dimitriu et al. (2020):	The research employed a questionnaire to gather primary data.	Burnout varies with different medical specialties	Does not explore whether burnout levels had any influence on the occurrence of needlestick injuries.
Afonso, Fonseca, and Pires (2017)	Quantitative research	Prolonged working hours correlate with deteriorating mental well-being, increased anxiety, and symptoms of depression.	The study does not explore the potential link between working hours duration and the incidence of needlestick injuries.
James (2021)	Conducted a qualitative research study through interviews with 20 nurses working at an academic medical center from March to December 2011.	Australian PHC nurses' telehealth adoption depended on their experience and readiness, impacting patient access. However, limitations in clinical assessments and funding frustrations were noted.	The study did not explore whether work experience, specifically the lack of experience, could potentially elevate the likelihood of needlestick injuries.
Ardebili et al. (2021)	Employed a semi-structured interviews with 97 healthcare professionals.	The study identified four key themes related to the healthcare staff experience throughout the COVID-19 pandemic encompassed various aspects, including working amid the pandemic, personal life changes leading to heightened adverse emotions, acquiring knowledge and adjusting to the pandemic, and addressing mental health issues.	The study did not investigate any potential connection between work experience and needlestick injuries occurrence
Smeulers et al. (2014)	Conducted a qualitative interview investigation with 20 nurses working at an academic health center from March to December 2011.	Nurses' crucial role in safe medication management is contingent on their knowledge and the work conditions they face.	The study did not explore whether work experience, specifically the lack of experience, could potentially elevate the likelihood of needlestick injuries.

Study	Methodology	Findings	Research Gap
Schuurmans, Lutgens, Groen and Schneeberger (2018)	The study employed an interview method.	Despite the introduction of (SEDs), there was an increase in the occurrence of (NSIs) from 1.9 per 100 (HCWs) before their implementation to 2.2 per 100 HCWs after their introduction.	The limitation of the study is that it employed interview methods to gather data. Interviews can introduce interviewer bias, potentially leading to socially desirable responses, affecting data accuracy.
De Jager, Zungu, and Dyers (2018)	Markov model was used to compare these interventions with current practices over a 45-year period	The findings indicated that at a threshold of USD 6,483.90 per quality-adjusted life-year gained, all three interventions were deemed to be cost-effective. Training was the most cost-effective at USD 32.90 per QALY, followed by SEDs at USD 432.32 per QALY, and the combination strategy at USD 377.08 per QALY	Focused on cost-effectiveness but did not assess the occurrence of needlestick injuries.
Phan (2019)	Epidemiological research	Frequent mistakes included removing the gown from the front, taking off the face shield before the mask, and making contact with possibly contaminated surfaces and personal protective equipment (PPE) during the doffing process.	Primarily focuses on healthcare workers' practices related to personal protective equipment (PPE) and does not explore the broader context of safety engineered devices and their influence on needlestick injuries.

2.5 Conceptual Framework

Conceptual framework is meant to depict proposed relationships between variables under examination. The study focused on independent variables such as work experience, job performance, work hours, safety devices, and training, and the dependent variable, which was the occurrence of needlestick injuries (NSIs). To analyze the relationship between these variables, the study integrated the Job Demands-Resources (JD-R) model, the Job Experience Curve theory, and the Diffusion of Innovations theory. The JD-R model highlighted how job demands, such as long working hours and inadequate resources, increased the likelihood of NSIs, while job resources like training and safety devices helped mitigate these risks. The Job Experience Curve theory emphasized the role of accumulated experience and training in improving workers' skills and reducing the risk of injuries. The Diffusion of Innovations theory, on the other hand, explained how the adoption of safety-engineered devices within healthcare organizations was influenced by individual and organizational factors, shaping the likelihood of NSIs. These theories collectively provided a comprehensive framework for understanding how various factors influenced the occurrence of NSIs among healthcare workers.



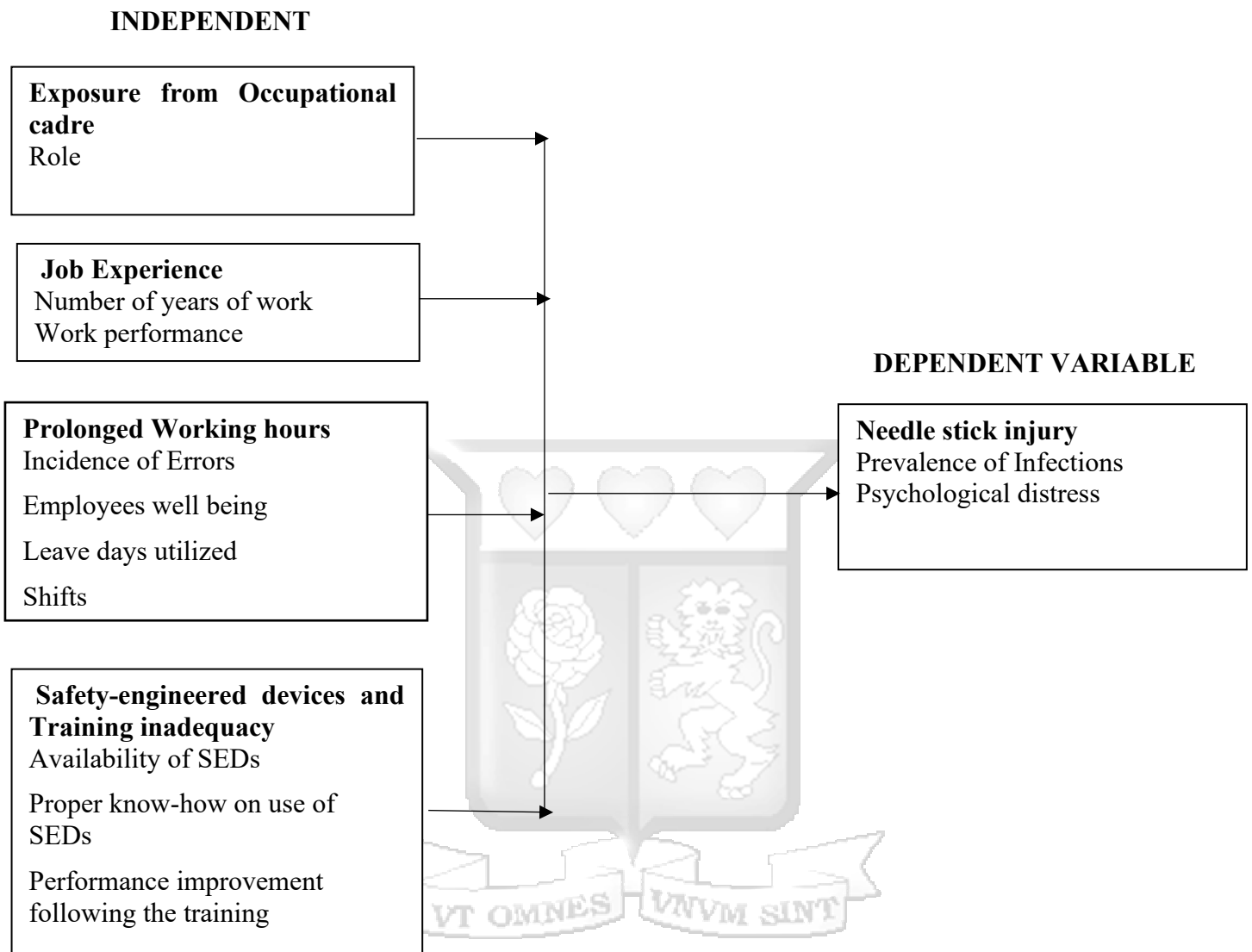


Figure 2. 1: Conceptual Framework

Table 2. 2: Operationalization of Variables

Variable	Attribute	Operationalization
Exposure from Occupational cadre	➤ Role	Likert scale (Nemoto,2014)
Job Experience	➤ Number of years of work ➤ Work performance	Likert scale (Nemoto,2014)
Work Hours	➤ Errors ➤ Employees well being ➤ Leave ➤ Shifts	Likert scale (Nemoto,2014)
Safety devices and training	➤ Availability of Safety devices ➤ Proper know-how of use of safety devices ➤ Performance improvement following the training	Likert scale (Nemoto,2014)
Needle stick injury	➤ Prevalence of Infections ➤ Psychological distress	Likert scale (Nemoto,2014)

2.6 Chapter Summary

The theoretical review explored three key theories relevant to understanding occupational hazards, particularly needlestick injuries among healthcare workers. The Job Demands-Resources (JD-R) model by Bakker and Demerouti (2007) emphasized balancing job demands with adequate resources to prevent negative outcomes like burnout. It suggested that healthcare professionals in high-demand roles might face elevated stress and time pressure, increasing the risk of needlestick injuries. The Job Experience Curve theory (Henderson, 1972) proposed that increased experience leads to greater proficiency and efficiency, potentially reducing needlestick injuries. Additionally, the Diffusion of Innovations Theory (Rogers, 1962) illuminated the adoption of safety-engineered devices to prevent needlestick injuries.

In the empirical review, key studies provided insights into factors influencing needlestick injuries among healthcare workers. For instance, Masese (2022) explored hazards faced by peer educators, identifying needlestick injuries as one of the occupational risks but overlooked the role of healthcare provider categories in injury occurrence. Sharew (2017) found a connection between lack of training or experience and increased injury risk but did not delve into the role

of provider categories. Lo et al. (2016) linked long work hours and insomnia to injury risk, although preventive measures were not explored. Schuurmans et al. (2018) evaluated the effectiveness of safety devices, acknowledging challenges but did not investigate the reasons for the increased incidence of injuries.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter introduces research philosophy, research design, target population, sampling technique and size of sample, research quality, collection of data instruments and procedures, data analysis and ethical consideration.

3.2 Research Philosophy

Research philosophy encompasses the beliefs, assumptions, and perspectives that guide a researcher's approach to inquiry and knowledge development. It informs the choice of research design, methodology, and data collection techniques. This study adopted a pragmatist research philosophy, which emphasizes practical solutions to research problems by drawing from both positivist and interpretivist traditions. Pragmatism was particularly suited for studies employing mixed methods, as it allowed the use of both quantitative (closed-ended questions) and qualitative (open-ended questions) data to gain a comprehensive understanding of the research problem. This philosophy aligned with the study's objective of capturing measurable patterns while also exploring participants' subjective perspectives, thereby facilitating both objective analysis and contextual interpretation.

3.3 Research Design

For this research, a cross-sectional survey was conducted in the Accident and Emergency department at Mama Lucy Kibaki Hospital, a method chosen in line with our objectives of the study. Cross-sectional survey is grounded in its ability to capture a snapshot of data at a specific point in time, allowing for a comprehensive and instantaneous assessment of various factors within the emergency department. This approach was particularly suitable for gaining insights into the prevalence, patterns, and characteristics of the variables relevant to the study, providing a valuable and efficient means of data collection for this study's research goal.

3.4 Target Population

Population is the total group of persons, objects, or occurrences that share a trait or combination of characteristics that pique the researcher's interest. Population is the target group that the researcher plans to examine and draw conclusions about. The location of the population was within the accident and emergency department of Mama Lucy Kibaki Hospital, providing a clear physical setting for the study and highlighting the specific environment in which the healthcare workers operate. Their occupational roles as Doctor, Nurse, EMT, Theatre Technician, Laboratory Technician, Medical interns/students and Clinical Officers further delineated the population, as these individuals are directly engaged in providing medical care and performing procedures within the accident and emergency department. The targeted number of 100 individuals indicated the total count of eligible healthcare workers within the accident and emergency department who were included in the study.

3.5 Sampling Technique and Sample Size

Sampling is the process of choosing a smaller group of individuals or elements from a larger population for study or analysis purposes. The goal of this process was to make inferences about the whole population based on observations or measurements taken from the chosen sample. In this study, census was used to select Doctor, Nurse, EMT, Theatre Technician, Laboratory Technician, Medical interns/students and Clinical Officers in the accident and emergency department. In this approach, every individual or unit in the population was included in the study. A census was used in this study to ensure that data was gathered from the entire population of interest, thereby eliminating sampling error and enhancing the accuracy of the results. This method was particularly suitable because the target population was relatively small and accessible, making it feasible to collect data from every unit. According to Cooper and Schindler (2014), a census is preferable when the population is manageable and when a complete enumeration can yield more precise and valid results compared to sampling. Furthermore, in contexts where everyone's input is vital such as among healthcare workers at risk of occupational hazards like needlestick injuries a census helps capture the diversity of experiences and minimizes the exclusion of potentially important insights, thus improving the internal validity of the study. Therefore, all 100 healthcare workers within the department were part of the study.

Table 3. 1 Sample Distribution Table

Occupation	Number
Doctors	10
Nurses	40
Emergency medical technicians	10
Theatre technicians	5
Laboratory technicians	5
Medical interns/students	15
Clinical officers	15
TOTAL	100

3.6 Data Collection

To collect primary data, a semi-structured questionnaire was used. Bryman (2016) discusses the advantages of semi-structured questionnaire, highlighting how it provides both flexibility and consistency, which allows researchers to explore specific issues in detail while ensuring comparability across participants. The questionnaire was designed using Google Forms, and a link was generated and sent to the respondents via email. The questionnaire was structured so that each variable was evaluated using a 5-point Likert scale, allowing the study participants to rate how much they agreed or disagreed with each statement. Participant anonymity was maintained by excluding names or any identifying information during the completion of the questionnaire.

3.7 Research Quality

3.7.1 Pilot Testing

Pilot testing is a fundamental component of research quality assurance. It plays a crucial role in ensuring that research instruments, methodologies, and procedures are robust, reliable, and valid before full-scale data collection. A sample of 21 individuals were selected from Mama Lucy Kibaki Hospital's accident and emergency department. This sample included 3

participants from each cadre. Baker (1994) recommends a sample size of 10–30 participants for pilot studies to test feasibility and refine data collection methods. This sample size is considered enough to identify potential problems with the study design, data collection methods, and instruments without requiring too many resources and time. Therefore, a sample size of 21 individuals, as used in this study, falls within the threshold for pilot studies and is appropriate for testing the feasibility of the study design and refining the data collection methods. By including 3 participants from each cadre, the sample effectively represents different roles within the accident and emergency department, allowing for a comprehensive assessment of the study instruments.

Participants in the pilot test were requested to fill out questionnaire and offer feedback on the clarity and understandability of the questions. By conducting pilot tests, the researcher identified and addressed potential issues or deficiencies in research instruments, such as questionnaire clarity or data collection procedures, thereby enhancing the overall quality and credibility of the research study. Additionally, pilot testing allowed researchers to practice data analysis techniques, refine presentation methods, and mitigate personal biases, all of which contribute to the rigor and integrity of the research outcomes.

Validity, conversely, is how well the results of data analysis align with the objectives of the study. It addresses the accuracy and appropriateness of the research tool in measuring the intended variables. Ensuring validity was vital for maintaining the integrity of study results and the meaningfulness of conclusions drawn from collected data. To evaluate validity, i will employ the Kaiser-Meyer-Olkin (KMO) test in this study. The KMO test was selected for its ability to assess sampling adequacy for factor analysis, providing insights into the suitability of the collected data for such analytical techniques. By utilizing the KMO test, the research aimed to ensure both conceptual and empirical alignment of measurements and variables with the study objectives, thereby enhancing the overall credibility and trustworthiness of the findings.

Reliability concerns the consistency and stability of measurement, indicating how reliably a research tool or approach produces similar outcomes when used repeatedly in similar conditions. It's a crucial aspect of research, enhancing the reliability and trustworthiness of study results by ensuring the consistency of measurements and reducing variability or error.

Establishing reliability enabled researchers to make accurate conclusions from their data. In this study, Cochran test assessed the reliability of the research tool, which is particularly suitable for evaluating the consistency of categorical data like survey responses.

Furthermore, the pretesting provided an opportunity to evaluate the analysis and data presentation. Researcher tested the methodologies for analysis on the pilot test data, ensuring that they are equipped to analyze the full dataset accurately and effectively. Additionally, researchers were able to test different methods for presenting the data, such as tables, charts, or graphs, to determine the most suitable format for conveying the results. Finally, it helps to mitigate personal bias in the research process. By soliciting feedback from participants, the researcher identified and eliminate potential biases in the questionnaire design, data collection procedures, and analysis techniques. This collaborative approach fostered transparency and objectivity in the research process, enhancing the credibility and trustworthiness of the study's findings.

3.8 Data Analysis

The completeness and accuracy of the questionnaires was verified. Further, data was coded and entered SPSS (version 26). Percentages, frequency, standard deviation, and mean were used to evaluate the dispersion of study findings. The relationship that existed was assessed by analysing inferential statistics, where Spearman's rank correlation was employed. Correlation analysis examined the strength of association between variables under examination. For qualitative data, thematic analysis was used. The process began with familiarization, where responses were read and re-read to gain a deep understanding. This was followed by the generation of initial codes from significant statements. The third step involved searching for themes by organizing codes into potential themes. These themes were then reviewed and refined to ensure they accurately reflected the data. Subsequently, the themes were defined and named to capture their essence. Finally, the findings were reported by linking the themes to the research objectives and integrating relevant quotations to support the analysis.

3.9 Ethical Consideration

The study prioritized ethical considerations by obtaining informed consent from the hospital administration of Mama Lucy Kibaki Hospital. This involves transparent communication with

hospital administrators about the nature and purpose of the research, ensuring they fully understand the study's objectives. Voluntary participation was emphasized, with the participants having the autonomy to make a choice about participating in the study. Moreover, individuals are at liberty to opt out of study whenever they wish. The commitment to protect participant privacy was extended to ensuring the anonymity of individuals by prohibiting the inclusion of personal identifying information in the research survey. Electronic questionnaires were securely stored on computers protected by password with restricted access. It is crucial to emphasize that a rigorous anonymization and coding process was applied to all collected data, eliminating any personal identifiers and further safeguarding confidentiality.

The research adhered to the principles of objectivity in data analysis and reporting, maintaining transparency in the findings by avoiding the manipulation or selective presentation of results to uphold the integrity of the study and its contribution to knowledge. Furthermore, ethical clearance was obtained from Strathmore University Ethical Committee, a research permit from NACOSTI, and approval from the hospital administration of Mama Lucy Kibaki Hospital. Additionally, the Informed Consent Form (ICF) was provided to all participants, ensuring that they were fully informed about the study's objectives, procedures, potential risks, and benefits before participation.

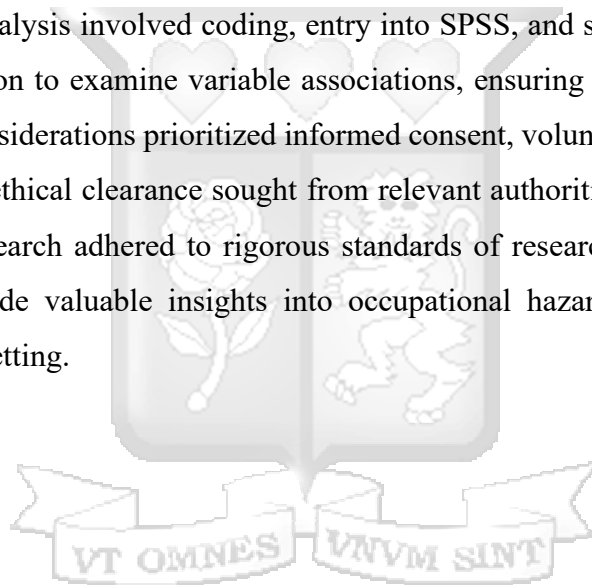
3.10 Chapter Summary

This chapter outlined the foundational principles guiding the research, the methodology employed, the demographic group under investigation, the approach to selecting participants, the methods ensuring research integrity, the tools used for collecting data, the analysis plan, and the ethical considerations addressed. A pragmatist research philosophy guided the investigation, emphasizing practical solutions to research problems by integrating both quantitative and qualitative approaches. This philosophy allowed for the use of measurable data to capture patterns, while also exploring participants' subjective perspectives, facilitating both objective analysis and contextual interpretation within the Accident and Emergency department at Mama Lucy Kibaki Hospital.

Employing a cross-sectional survey design, the research aimed to capture a snapshot of various factors pertinent to the study's objectives, aligning with the chosen research philosophy. The target population included doctors, nurses, EMTs, theatre technicians, laboratory technicians,

medical interns/students and clinical officers within the department, totalling 100 individuals, enabling comprehensive insights into their occupational roles and experiences. Sampling employed a census approach, ensuring inclusivity and representation of all eligible healthcare workers, thereby enhancing the study's validity and generalizability.

Data collection utilized a semi-structured questionnaire administered via Google Forms, maintaining participant anonymity and facilitating efficient data gathering. Pilot testing, involving 10 individuals from the department, preceded the main data collection to ensure questionnaire clarity and refine data collection procedures. The validity of the study was assessed using the Kaiser-Meyer-Olkin (KMO) test to ensure alignment with research objectives, while reliability was evaluated through the Cochran test to ensure consistency of survey responses. Data analysis involved coding, entry into SPSS, and statistical tests such as Spearman's rank correlation to examine variable associations, ensuring robust analysis of the collected data. Ethical considerations prioritized informed consent, voluntary participation, and participant privacy, with ethical clearance sought from relevant authorities to uphold research integrity. Overall, the research adhered to rigorous standards of research quality and ethical conduct, aiming to provide valuable insights into occupational hazards among healthcare workers in the specified setting.



CHAPTER FOUR: ANALYSIS AND PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter presents the analysis of the collected data and discusses the findings in relation to the study objectives.

4.2 Response Rate

This chapter defined the response rate as the percentage of participants who completed the survey, which was 81% in this study. This figure is important because it reflects participant involvement and affects the reliability and generalizability of the survey results. Generally, a response rate of 60% or higher is regarded as acceptable for research, as it ensures the sample adequately represents the target population and lowers the risk of non-response bias (Babbie, 2010).

4.3 Background Information

The participants' background information was evaluated and displayed using graphs and charts, as illustrated below.

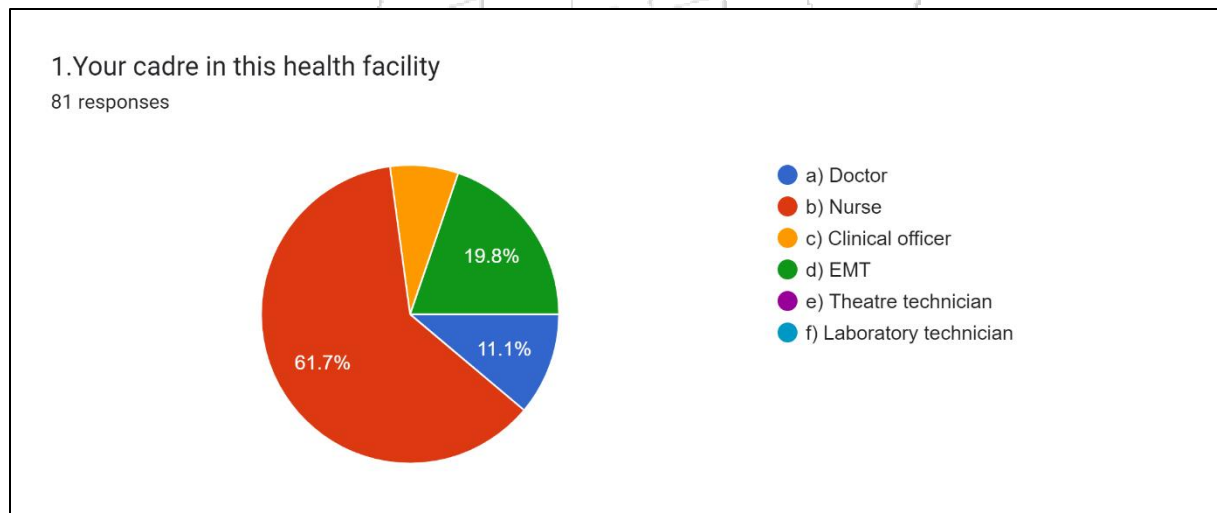


Figure 4. 1: Background Information on cadre

The pie chart provided a breakdown of the participants' cadre in the health facility's accident and emergency department based on 81 responses. The largest group represented were nurses, who accounted for 61.7% of the respondents. Clinical officers made up 19.8%, followed by doctors at 11.1%. Emergency Medical Technicians (EMTs) comprised 4.9% of the sample. Theatre technicians and laboratory technicians were the least represented, each making up 1.2% of the respondents.

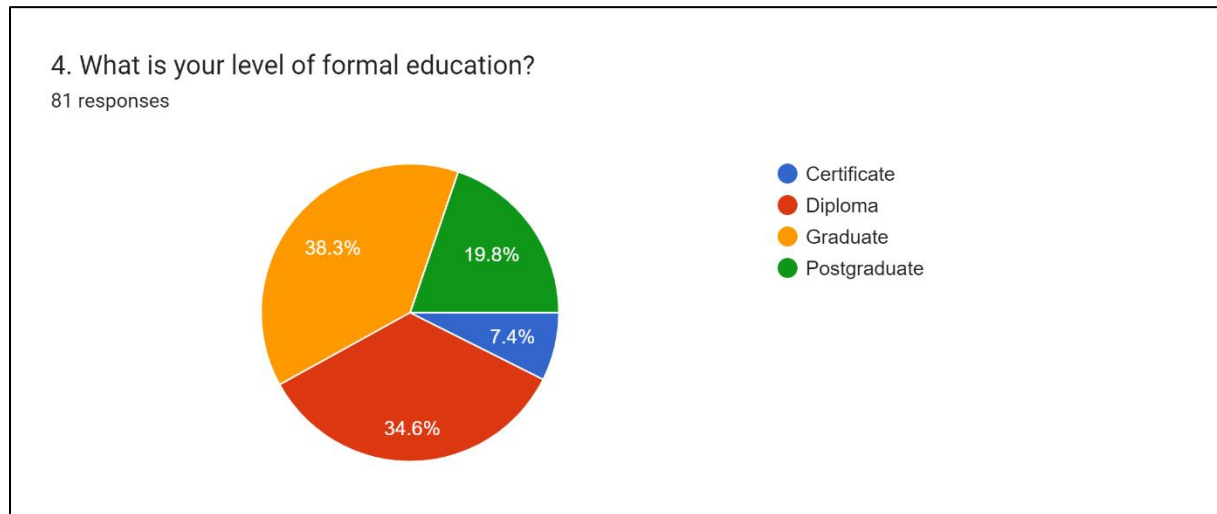


Figure 4. 2: Background Information on Education Level

The figure illustrated the participants' levels of formal education based on 81 responses. The largest proportion, 38.3%, of respondents had a graduate-level education. This was followed closely by those with a diploma, accounting for 34.6% of the participants. Postgraduate-level education was held by 19.8% of the respondents, while only 7.4% possessed a certificate-level education. This distribution indicated that the majority of participants had attained higher levels of formal education, with a significant number holding graduate and postgraduate degrees.

5. How long have you worked here in this facility?

81 responses

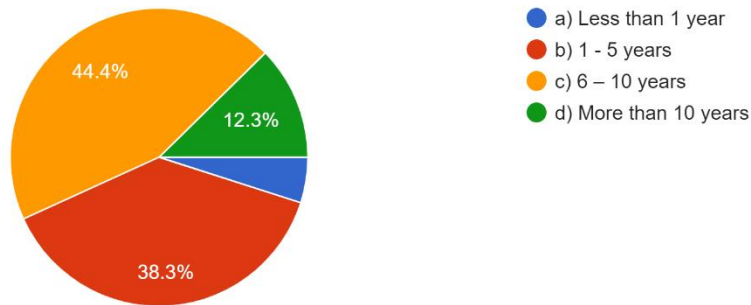


Figure 4. 3: Background Information on the Years of Experience

The responses regarding the length of time participants had worked in the facility were analyzed. A small portion, 4.9%, had worked in the facility for less than 1 year. The majority, 44.4%, had been employed for 6 to 10 years, while 38.3% had worked there for 1 to 5 years. A smaller group, 12.3%, had more than 10 years of experience at the facility. This distribution showed that most of the participants had significant experience working in the facility, with a large portion having been there for more than 6 years.

6. How do you perceive the impact of needlestick injuries at Mama Lucy Hospital?

81 responses

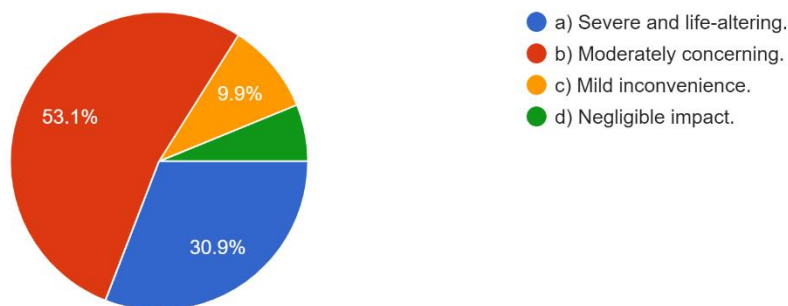


Figure 4. 4: Background Information on Perception of needlestick Impact

The responses regarding the perception of the impact of needlestick injuries at Mama Lucy Hospital were analyzed. A substantial majority, 53.1%, considered the impact to be moderately concerning. This was followed by 30.9% of respondents who viewed the injuries as severe and life-altering. A smaller percentage, 9.9%, perceived the injuries as a mild inconvenience, while only 6.2% believed the impact to be negligible. The participants perceived the injuries as moderately concerning, mild inconveniences, or negligible in impact, with only a few recognizing them as severe and life-altering. This underscores the importance of continuous awareness and preventive measures to effectively address the risks associated with needlestick injuries. It is essential to ensure that all staff recognize the seriousness of these incidents and their potential consequences.

4.4 Validity and Reliability Test

Table 4. 1: Validity and Reliability

Variable	No. of Items	Cronbach's Alpha	KMO Statistics	Decision Rule
Exposure from occupation cadre	2	0.691	0.622	Accept
Lack of Work Experience	6	0.929	0.889	Accept
Long Working Hours	10	0.966	0.921	Accept
Inadequate Safety-engineered devices	6	0.911	0.864	Accept
Needle stick injuries	13	0.767	0.753	Accept

Source:(Researcher, 2024)

4.5 Descriptive Statistics

Descriptive statistics provide a foundational framework for summarizing and simplifying data, allowing for insights into the central tendencies and variations within a dataset. This approach fosters a deeper understanding of the research variables and lays the groundwork for more detailed analysis. In this study, descriptive statistics were crucial in analyzing the data. Measures such as mean, median, mode, and standard deviation were employed to assess the central tendencies and variability of the variables in question. This thorough methodology

enabled an extensive exploration of both the contextual background and the key research variables, enhancing the overall analysis.

Table 4. 2: Exposure from Occupation Cadre

Statement	N		Mean	Mode	Std. Deviation
	Valid	Missing			
a) Different occupational role makes health workers have different exposure levels to needle stick injuries	81	0	3.78	4 ^a	1.360
b) The difference in education level makes healthcare worker more or less likely to experience needlestick injuries	81	0	2.52	2	1.216

Source (Researcher, 2024)

For the first statement, "Different occupational role makes health workers have different exposure levels to needlestick injuries," the mean score was 3.78, with a mode of 4, indicating that a significant majority of participants concurred that certain occupational roles are more susceptible to needlestick injuries than others. The standard deviation of 1.360 suggests a moderate spread of responses, indicating some variation in opinion but with a general tendency towards agreement.

For the second statement, "The difference in education level makes healthcare workers more or less likely to experience needlestick injuries," the mean score was 2.52, with a mode of 2, indicating that most participants disagreed that education level significantly influences the risk of sustaining needlestick injuries. The lower standard deviation of 1.216 reflects a slightly tighter clustering of responses, suggesting less variation in opinion on this issue. The data therefore indicated that healthcare workers believe that the specific occupational roles they hold are a critical factor in their risk of needlestick injuries, regardless of their level of education.

4.5.2 Work Experience

Table 4. 3: Work Experience

Statement	N		Mean	Mode	Std. Deviation
	Valid	Missing			
I am confident in my capability to handle medical equipment safely, based on my work experience.	81	0	4.11	5	1.162
My familiarity with hospital protocols and procedures has increased with my years of experience, reducing the risk of needlestick injuries.	81	0	4.04	5	1.134
Over the course of my career, I have observed improvements in safety measures that have effectively reduced the occurrence of needlestick injuries.	81	0	3.89	4	1.151
I believe that more experienced healthcare professionals are less prone to needlestick injuries due to their heightened awareness and vigilance.	81	0	3.56	4	1.151
I have personally experienced a decrease in the frequency of needlestick injuries as I have gained more years of work experience in the hospital.	81	0	3.65	4	1.120
The training and education provided to employees on needlestick injury prevention have improved with time, contributing to a safer work environment.	81	0	3.80	4	1.123

Source: (Researcher, 2024)

According to the overall table, the mode for all the statements was consistently 4, except for the first statement, where the mode was 5. This suggested that the majority of respondents frequently selected a 4 or 5, indicating general agreement or strong agreement that their accumulated job experience has made them less susceptible to needlestick injuries.

4.5.3 Working Hours

Table 4. 4: Working Hours

Statement	N		Mean	Mode	Std. Deviation
	Valid	Missing			
a) Extended working hours contribute to increased fatigue, potentially leading to a higher risk of needlestick injuries.	81	0	3.91	4 ^a	1.164
b) During busy shifts, the likelihood of needlestick injuries is higher due to increased workload and time pressures.	81	0	3.85	4	1.246
c) The stress levels associated with long working hours contribute to lapses in attention and focus, increasing the risk of needlestick injuries.	81	0	3.90	4	1.200
d) Extended working hours have a negative impact on my ability to follow safety protocols and guidelines related to needlestick injury prevention.	81	0	3.56	4	1.235
e) Fatigue resulting from irregular working hours increases the chances of accidental needlestick injuries.	81	0	3.75	4	1.168
f) I believe that needlestick injuries are more likely to occur during long and demanding shifts.	81	0	3.91	5	1.175
g) The risk of needlestick injuries is heightened during periods of high workload and tight schedules.	81	0	3.80	4	1.249
h) Long working hours contribute to a decline in overall well-being, which may indirectly increase the risk of needlestick injuries.	81	0	3.80	4	1.177
i) I find it challenging to maintain a high level of alertness and attention to detail during extended work hours, increasing the likelihood of needlestick injuries.	81	0	3.62	4	1.231
j) Busy shifts and prolonged working hours contribute to a more stressful work environment, impacting the likelihood of needlestick injuries.	81	0	3.88	4	1.133

Source:(Researcher, 2024)

The table showed that the mode for all statements regarding the effect of extended working hours on needlestick injuries was consistently 4. This shows that a substantial portion of respondents concurred with the statements, demonstrating a general consensus that extended

working hours, increased workload, and stress are key factors that contribute to the risk of needlestick injuries. The high mode values reflected that respondents frequently cited fatigue, lapses in attention, and the demanding nature of long shifts as contributors to an elevated risk of needlestick injuries. The standard deviations for the statements indicated a moderate spread of responses, showing that while many respondents agreed, there was also some variability in perceptions of the impacts of working hours that are long on safety practices.

4.5.4 Safety-engineered Devices and Training Inadequacy

Table 4. 5: Safety-engineered Devices

Statement	N		Mean	Mode	Std. Deviation
	Valid	Missing			
a) Safety devices, such as retractable needles and needleless systems, are readily available in the workplace.	81	0	2.37	2	1.219
b) I feel adequately trained on the proper usage of safety-devices to prevent needlestick injuries.	81	0	3.30	4	1.134
c) There is a systematic process in place for the regular maintenance and restocking of safety devices in our healthcare setting.	81	0	3.00	3 ^a	1.173
d) I am confident in the proficiency of safety devices in averting needlestick injuries when used correctly.	81	0	3.59	4	1.149
e) The hospital provides ongoing training sessions to update staff on the proper use and benefits of safety devices.	81	0	3.17	3 ^a	1.104
f) There is a culture of prioritizing the use of safety devices over traditional devices to enhance overall workplace safety.	81	0	3.10	4	1.147

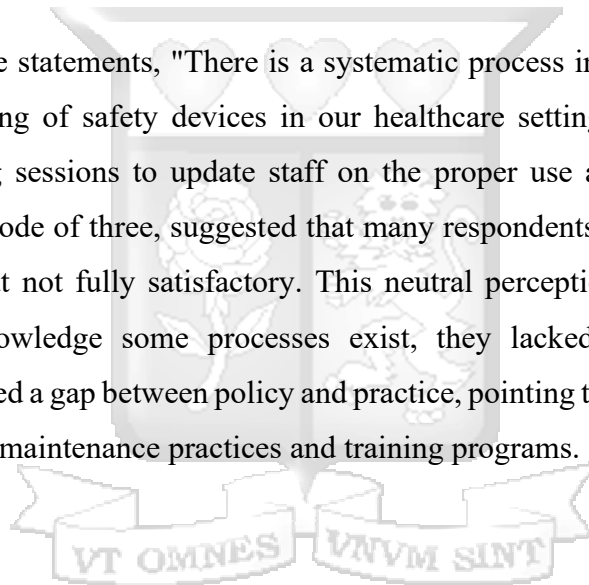
Source (Researcher, 2024)

The data revealed differing perceptions about the effectiveness and availability of safety devices in preventing needlestick injuries. The mode for most of the statements fluctuated between 2, 3, and 4, reflecting varied responses from the participants. The lowest mode, 2, was observed for the statement regarding the availability of safety devices that includes the needles that are retractable and needleless systems, indicating that a notable number of respondents disagreed

on the accessibility of such devices. This suggested a potential gap in the supply or availability of these crucial safety tools.

On the other hand, there was a higher mode of 4 for statements like feeling adequately trained in the use of safety devices and being confident in their effectiveness when used correctly. This indicates stronger agreement that training and device efficiency play a positive role in preventing needlestick injuries. Additionally, the standard deviations indicated moderate variability in the responses, suggesting that while some respondents felt positively about the training and safety protocols, others were less confident in their adequacy, particularly regarding the systematic maintenance and the culture of prioritizing safety devices in the workplace.

The findings regarding the statements, "There is a systematic process in place for the regular maintenance and restocking of safety devices in our healthcare setting," and "The hospital provides ongoing training sessions to update staff on the proper use and benefits of safety devices," both having a mode of three, suggested that many respondents viewed these aspects as somewhat adequate but not fully satisfactory. This neutral perception implied that while healthcare workers acknowledge some processes exist, they lacked confidence in their effectiveness. This indicated a gap between policy and practice, pointing to a need for healthcare administrators to enhance maintenance practices and training programs.



4.5.5 Needle Stick Injuries

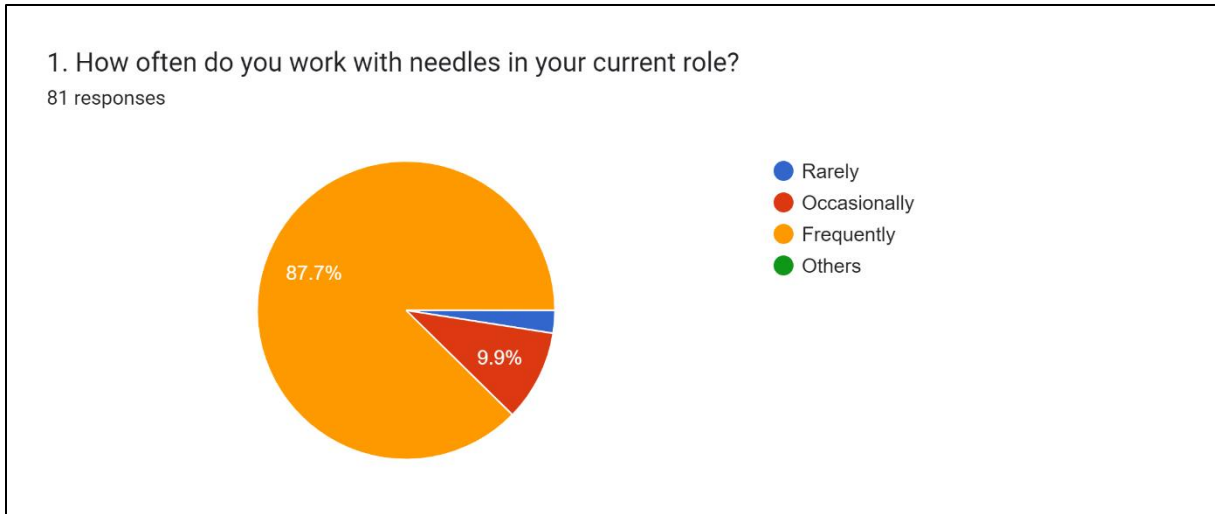


Figure 4. 5: Frequency of Working with needles

A mere 2.5% of participants indicated they rarely work with needles, while 9.9% reported occasional use. In contrast, a significant majority 87.7% of respondents reported that they frequently work with needles. This highlighted that most of the participants were in roles that increased their risk of needlestick injuries. Frequent needle usage underscores the critical importance of implementing comprehensive training programs that emphasize safe needle-handling techniques.

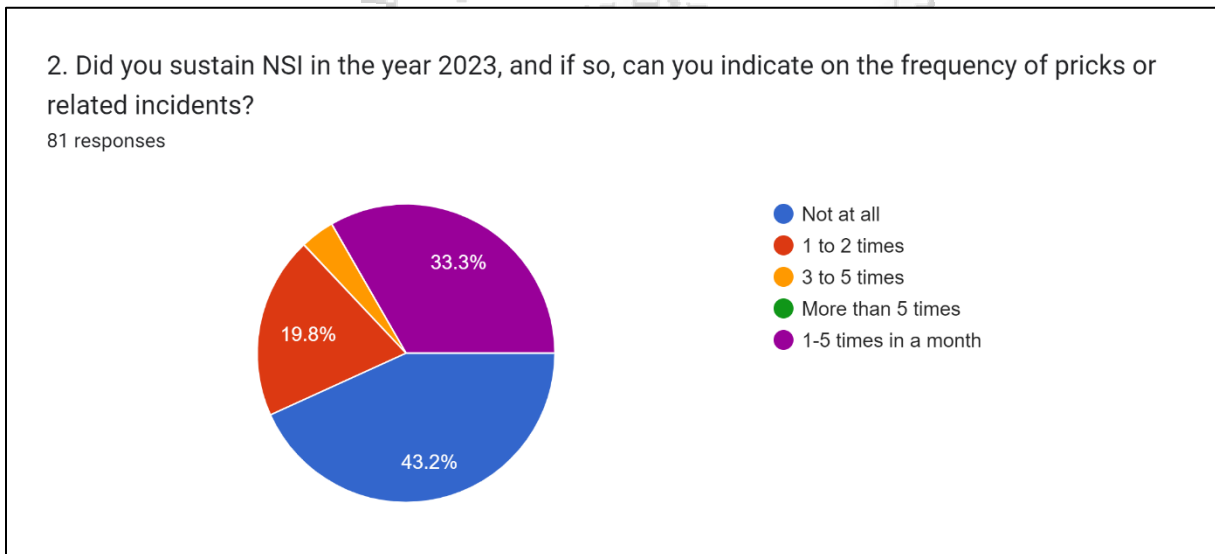


Figure 4. 6: Frequency of Pricks

The data revealed significant variation in the monthly frequency of needlestick injuries (NSI) among respondents in 2023. A large portion, 43.2%, had not experienced any NSI incidents throughout the year, suggesting that many individuals were likely adhering to safety protocols or working in roles where the risk of injury was minimized. This group appeared to benefit from effective safety measures, like proper training or adequate protective equipment usage. Meanwhile, 19.8% of respondents reported experiencing NSI one to two times per month, while 3.7% encountered these incidents three to five times per month. These findings indicated that a notable portion of individuals experienced occasional risks, pointing to possible lapses in safety or exposure to high-risk procedures. The most concerning result was that 33.3% of respondents reported sustaining NSI one to five times every month. This high recurrence suggested that a significant portion of the workforce may be facing repeated exposures due to factors such as inadequate training, not adhering to safety measures, insufficient protective equipment, or high-pressure work conditions that compromise safety.

Q3 circumstance of the injury (e.g. location, and activity being performed)

Many participants reported injuries during tasks such as cannulation, suturing, and injection administration, particularly in high-risk medical environments. One participant shared their experience, stating, *"During suturing, I sustained a needle injury on my finger."* These incidents frequently occurred in high-pressure settings like Accident and Emergency (A&E). One of the participants described their injury, noting, *"In the emergency room while cannulating a patient."* While another participant stated that; *"In the A&E when giving an injection to a restless patient,"* This emphasized that A&E, are particularly susceptible to needlestick injuries (NSIs). A significant contributing factor to these injuries was the uncooperativeness of patients, especially during procedures like IV access. For instance, one healthcare worker recalled, *"I was giving a patient an IM injection when the patient, due to fear, accidentally knocked my hand, and the needle pricked me on the finger."* This emphasizes the increased risk healthcare workers face when dealing with anxious or combative patients, underscoring the need for improved strategies to manage patient anxiety during medical procedures.

In addition to procedural challenges, environmental and operational factors emerged as key contributors to NSIs. Many participants cited improper needle disposal practices, which can

significantly heighten the risk of accidental injuries. One respondent explained, "Some needles were disposed off together with IV fluids empty bottles...by non-medical personnel." This lack of adherence to proper disposal protocols further exacerbates the issue of NSIs. Additionally, fatigue from long working hours was frequently mentioned as a factor leading to decreased focus and increased risk. One participant remarked, "Fatigue due to long working hours" was a reason for distraction during procedures.

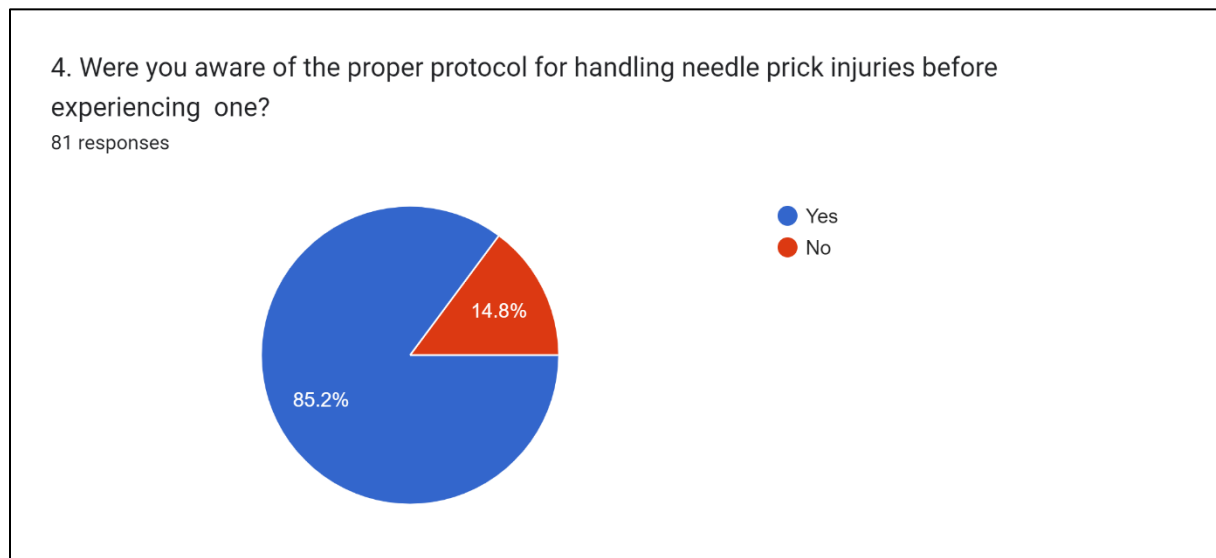


Figure 4. 7: Awareness on proper protocol for handling needle pricks

The responses regarding awareness of proper protocols for handling needle prick injuries revealed significant insights into the preparedness of healthcare workers in dealing with needlestick injuries. With 85.2% of participants indicating that they were aware of the proper protocols before experiencing a needle prick injury, it suggested that a majority of healthcare professionals had received training or education on safety measures related to needle handling and proper use of safety devices. This high level of awareness was encouraging; however, it also highlighted that other factors apart from training might have contributed to the occurrence of needlestick injuries.

5. Do you feel comfortable reporting needle prick injuries to your supervisors?

81 responses

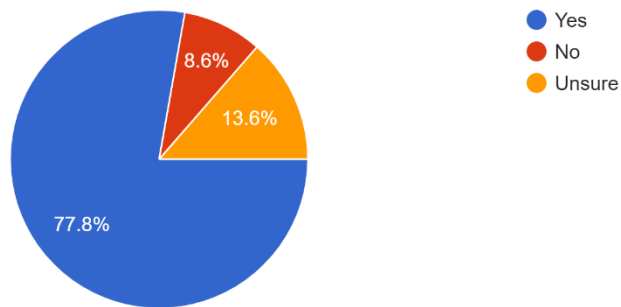


Figure 4. 8: Comfortability of Reporting Needle Pricks

The responses regarding comfort in reporting needle prick injuries revealed important insights into the workplace culture surrounding needlestick injuries. With 77.8% of participants indicating that they felt comfortable reporting such incidents, it suggested the presence of a very supportive environment where healthcare workers were encouraged to communicate about safety concerns. This high level of comfort could be attributed to effective training and on safety protocols, which were essential for promoting transparency and proactive measures in addressing needlestick injuries.

Conversely, the 8.8% of respondents who reported feeling uncomfortable and the 13.6% who were unsure highlighted a noteworthy concern. These individuals may have experienced uncondusive work environment or felt that their reports would not lead to constructive action. This uncertainty could have hindered the reporting process, potentially leading to underreporting of incidents and a lack of necessary improvements in safety protocols.

6. Are you aware of the procedures for reporting needle prick injuries to the appropriate authorities?
81 responses

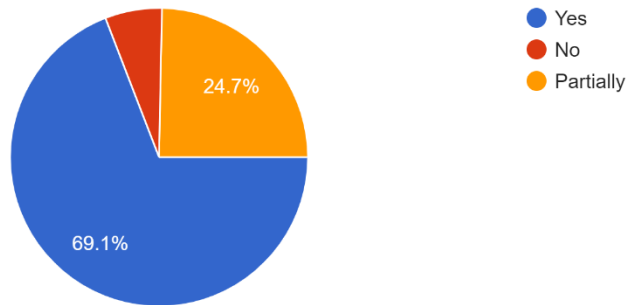


Figure 4. 9: Procedure on Reporting Needle Pricks

The data regarding awareness of procedures for reporting needle prick injuries revealed a substantial level of familiarity among healthcare workers. With 69.1% of participants indicating that they were aware of the reporting procedures, it suggests that a significant majority had received adequate training or information on how to properly report such incidents. However, the 24.7% of respondents who reported only partial awareness raises concerns about potential gaps in understanding these essential protocols. This lack of complete knowledge could hinder timely reporting and response to needlestick injuries, which is critical for ensuring both the safety of staff and the implementation of preventive measures. Additionally, the 6.2% of participants who were unaware of the procedures highlight a small but important group that may require targeted education and training. Overall, while the majority of healthcare workers seemed to understand the reporting protocols, the existence of partially informed and uninformed individuals indicated that further efforts are needed to enhance awareness and compliance with reporting procedures to effectively address needlestick injuries.

7. How are needlestick injuries handled at Mama Lucy Kibaki hospital

81 responses

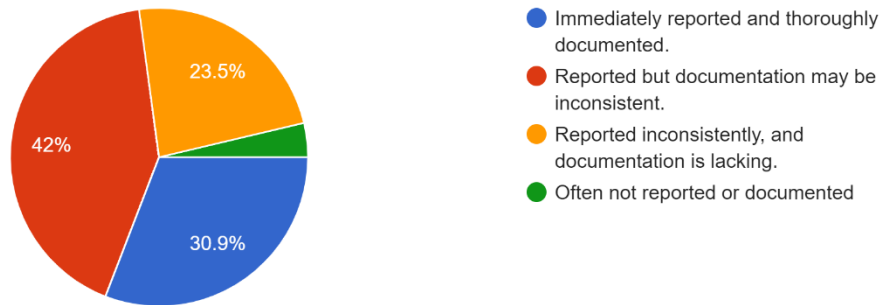


Figure 4. 10: Handling of Needle Pricks

A percentage of the participants (30.9%) indicated that these injuries are immediately reported and thoroughly documented, while a larger portion 42% reported that injuries are documented inconsistently. This inconsistency could hinder the hospital's ability to analyze trends and implement effective preventive measures. Additionally, 23.5% of respondents noted that injuries are reported inconsistently, with documentation lacking, which raises concerns about the overall safety culture within the hospital. Such lapses in reporting not only compromise the accuracy of incident tracking but also limit opportunities for timely interventions.

Moreover, the insufficient reporting and documentation significantly contributed to the prevalence of infections among healthcare workers and patients. With 3.7% of respondents stating that needlestick injuries are often not reported or documented, healthcare workers faced a heightened risk of unknowingly exposing both themselves and their patients to infectious diseases. Inadequate communication about these injuries prevented proper follow-up care and monitoring for potential infections, which could lead to outbreaks and heightened health risks.

8. What do you consider applicable at the hospital in relation to counselling. NSI patients

81 responses

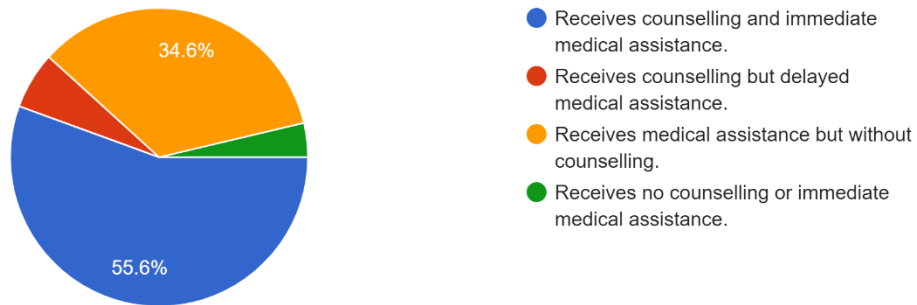


Figure 4. 11: Counselling

The findings regarding the counseling and medical assistance provided to patients who have experienced needlestick injuries (NSIs) at the hospital reveal a mixed picture of care. A significant 55.6% of respondents indicated that NSI patients receive counseling and immediate medical assistance, suggesting that the hospital has some effective protocols in place for addressing the psychological and physical needs of these patients. This proactive approach is essential, as timely counseling can help alleviate anxiety and provide critical information about the potential risks associated with NSIs.

However, the remaining responses indicated notable areas for improvement. While 34.6% of participants reported that patients receive medical assistance but without counseling, this raised concerns about the adequacy of the support provided. Counseling plays a crucial role in helping patients process their experiences and understand the implications of their injuries. Additionally, 6.2% of respondents noted that patients receive counseling but delayed medical assistance, which can exacerbate the physical risks associated with NSIs. Lastly, the 3.7% of respondents who stated that patients receive no counseling or immediate medical assistance highlight a significant gap in care. This lack of support can lead to increased anxiety, inadequate management of potential infections, and detrimental psychological distress.

Table 4. 6: Needlestick Injuries

Statement	N		Mean	Mode	Std. Deviation
	Valid	Missing			
a) [I am aware of colleagues or myself experiencing needlestick injuries during our work in the hospital.]	81	0	3.89	4	0.949
b) [There is a concern among staff about the risk of contracting infections such as HIV, Hepatitis A, and B due to needlestick injuries in our workplace.]	81	0	3.99	4	1.112
c) [I believe that needlestick injuries are a prevalent issue in our hospital, impacting the overall safety of healthcare professionals.]	81	0	3.74	4	1.034
d) [In my experience, there is adequate reporting and documentation of needlestick injuries to track their prevalence in our healthcare setting.]	81	0	3.11	3	1.118
e) [The hospital provides sufficient resources and support for the prevention and management of needlestick injuries, considering the potential transmission of bloodborne infections.]	81	0	3.20	3	1.198
f) [I feel adequately informed about the risks and consequences of needlestick injuries, including the potential transmission of HIV, Hepatitis A, and B.]	81	0	3.90	4	1.147

Source:(Researcher, 2024)

The survey results indicated a generally positive awareness and concern regarding needlestick injuries among healthcare professionals. The mean scores for most statements ranged from 3.74 to 3.99, suggesting that respondents largely recognized the occurrence of needlestick injuries and the related risks of contracting infections like HIV and Hepatitis. The mode for most items was 4, reflecting strong agreement with statements about awareness and concern, particularly regarding the potential health risks stemming from needlestick injuries.

However, there were notable gaps in perceptions regarding the reporting and management of these injuries. The statement concerning the adequacy of reporting and documentation received a lower mean score of 3.11 and a mode of 3, indicating that many respondents felt there was room for improvement in tracking needlestick injuries within the hospital. Similarly, the

statement about the sufficiency of resources and support for prevention and management also yielded a mean of 3.20 with a mode of 3, suggesting that while awareness is high, the actual support systems in place may not be perceived as adequate. The standard deviations across the statements, which ranged from 0.949 to 1.198, demonstrate moderate variability in responses, highlighting a mix of confidence and concern regarding the hospital's ability to address needlestick injury risks effectively.

4.6 Correlation Analysis

Correlation analysis examines the strength and direction of the linear relationship between independent and dependent variables. Spearman’s Rho was utilized.

Table 4. 7: Correlation Analysis

		Needlestick injuries	Exposure from occupation cadre	Work Experience	Working Hours	Safety engineered devices
Needlestick injuries	Rho	1				
Exposure from occupation cadre	Rho	.333**	1			
Work Experience	Rho	.540**	.510**	1		
Working Hours	Rho	.346**	.530**	.629**	1	
Safety engineered devices	Rho	.578**	.415**	.505**	.305**	1

Source:(Researcher, 2024)

The results revealed varying strengths of correlation between needlestick injuries and the analyzed variables. Inadequate Safety-engineered devices and training had the strongest positive correlation, with a Spearman’s Rho of 0.578, emphasizing the critical importance of availability of both proper training and safety-engineered devices in reducing the risk of needlestick injuries. Work experience followed with a strong positive correlation, with a Spearman’s Rho of 0.540, indicating that employees with more experience faced a higher likelihood of encountering such injuries. Working hours showed a strong positive correlation,

with a Spearman's Rho of 0.346, suggesting that longer working hours increased the risk of needlestick injuries. Lastly, exposure from occupation cadre had a strong positive correlation, with a Spearman's Rho of 0.333, indicating that employees in certain occupational roles were more likely to experience needlestick injuries.

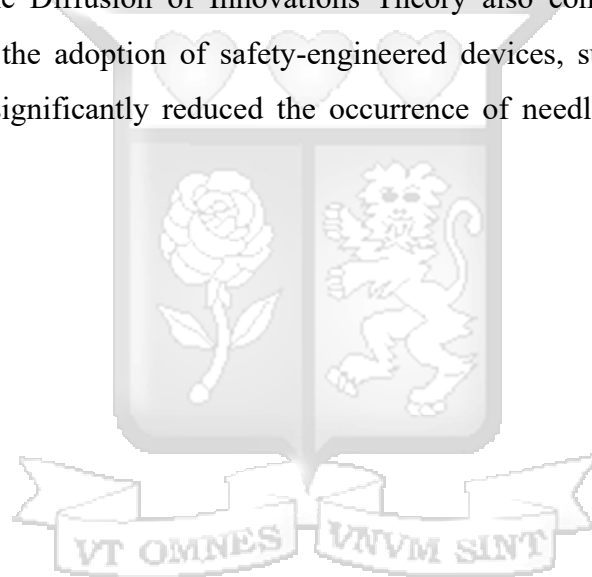
4.7 Interpretation of Findings

The descriptive analysis highlighted the perceptions of healthcare workers regarding various factors influencing the risk of needlestick injuries. Participants largely agreed that their occupational roles significantly impact their exposure to these injuries, reflected by a mean score of 3.78 and a mode of 4. This suggested that specific job responsibilities played a crucial role in determining the likelihood of encountering needlestick injuries. While most respondents felt that their work experience helped them avoid such injuries, with a mode of 4 or 5, opinions varied on the influence of education, as indicated by a lower mean score of 2.52 and a mode of 2. Additionally, the data revealed a consensus that longer working hours contribute to the risk of needlestick injuries, emphasizing the negative effects of fatigue and stress on safety practices.

The correlation analysis revealed important relationships between various factors and needlestick injuries. Exposure from occupational cadre had a strong positive correlation with needlestick injuries (Spearman's rho = 0.333), indicating that employees in specific occupational roles, particularly nurses, were more exposed to situations that led to injuries. Work experience showed a strong positive correlation with needlestick injuries (Spearman's rho = 0.540), indicating that more experienced healthcare workers (HCWs) reported higher awareness of needlestick injuries (NSIs) and the measures to address them. This may be because experienced HCWs typically handle a greater workload and are therefore more exposed to high-risk situations. At the same time, less experienced HCWs may be more prone to NSIs due to errors stemming from a lack of confidence or insufficient training. Working hours also had a moderate positive correlation with needlestick injuries (Spearman's rho = 0.346), showing that employees working longer hours faced a higher risk, likely due to fatigue or reduced attention. Inadequacy of safety-engineered devices and training had a strong positive correlation with needlestick injuries (Spearman's rho = 0.578). This could be due to inadequate training on how to properly use these devices or a failure to implement them effectively in the workplace. This

can be attributed to limited access to protective devices and insufficient training on their proper use. Without adequate safety tools, healthcare workers are more vulnerable to accidental injuries, and poor training increases the likelihood of mishandling sharps or failing to follow safety protocols.

The Job Demands-Resources (JD-R) model aligned with the current study's findings, highlighting how high job demands, like long working hours, can lead to burnout and increase the risk of needlestick injuries, while adequate resources help mitigate these risks. Similarly, the Job Experience Curve Theory supported the findings by suggesting that as healthcare workers gain experience, their proficiency in safe needle handling improves, potentially reducing injury rates. The Diffusion of Innovations Theory also concurred with the study findings, suggesting that the adoption of safety-engineered devices, supported by adequate training and awareness, significantly reduced the occurrence of needlestick injuries among healthcare workers.



CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1: Introduction

This chapter offers a thorough overview of the entire study, summarizing conclusions drawn from the findings. It also presents recommendations that closely correspond with the study's results. Furthermore, the chapter recognizes the limitations of the study and discusses the measures taken to mitigate their effects. Lastly, it highlights areas that require further exploration in future research endeavors.

5.2 Discussion

The investigation of factors associated with needlestick injuries at Mama Lucy Kibaki Hospital achieved a commendable response rate of 81%, enhancing the reliability and generalizability of the findings. The Spearman's rho correlation analysis revealed the following findings: Inadequate safety-engineered devices and training had the strongest positive correlation with needlestick injuries (Spearman's rho = 0.578). Work experience showed a strong positive correlation (Spearman's rho = 0.540). Longer working hours had a positive correlation (Spearman's rho = 0.346). Exposure from occupational cadre also had a positive correlation (Spearman's rho = 0.333).

5.2.1 Occupational Role

The analysis revealed that healthcare workers perceive their occupational roles as significantly influencing their exposure to needlestick injuries. Specific job responsibilities were seen as critical in determining the likelihood of encountering these injuries. Workers in certain roles, likely those involving frequent interaction with needles or sharp instruments, were more exposed to risk. Nurses, in particular, were found to be more susceptible to needlestick injuries due to the nature of their tasks, which often involve frequent handling of needles. The correlation analysis confirmed this perception, showing a positive relationship between occupational roles and needlestick injuries.

Masese (2022) investigated occupational hazards among peer educators providing harm reduction services in Nairobi. The study identified needlestick injuries as a common hazard. This agrees with the current study, which found that specific job roles, particularly those with frequent needle interaction like nursing, have higher exposure to needlestick injuries. Sharew (2017) assessed sharp object injuries among healthcare providers in Ethiopia and found that lack of in-service training and prior injury exposure increased the risk of such injuries. While this study didn't disaggregate by occupation, it aligned with the current study's conclusion that occupational role and training are critical factors influencing needlestick injuries. Nyaberi et al. (2014) studied infection risks among mortuary staff in Nyanza and reported limited training and perceived susceptibility to infections. Although needlestick injuries were not directly studied, the emphasis on occupational risk perception supported the current study's findings that role-based exposure affects vulnerability to injuries.

5.2.2 Work Experience

The descriptive findings indicated that work experience played a significant role in reducing the risk of needlestick injuries among healthcare workers (HCWs). Most respondents reported that their experience helped them avoid such injuries. The correlation analysis revealed that more experienced healthcare workers (HCWs) were highly aware of needlestick injuries (NSIs) and their implications, as indicated by the positive correlation. This suggested that less experienced HCWs were at a greater risk of NSIs, likely due to insufficient training, lack of confidence, and underdeveloped reflexes necessary for avoiding accidental exposure in high-risk environments. These findings emphasize the importance of experience and underscore the need for targeted training programs and additional support to enhance the safety of less experienced HCWs.

Smeulers et al. (2014) highlighted that nurses' experience impacts medication safety and error prevention, indicating that experienced staff are more cautious. This agrees with the current study, which found that more experienced healthcare workers were less prone to NSIs due to better awareness and reflexes. James (2021) explored nurses' telehealth experiences during COVID-19 and found varied readiness based on experience levels. Although unrelated to NSIs, the findings supported the current study's conclusion that job experience influences safety and

performance. Ardebili et al. (2021) noted that healthcare workers gained expertise and adapted to challenges during COVID-19. This concurred with the current study's position that experience contributes positively to healthcare workers' ability to avoid NSIs.

5.2.3 Working Hours

Longer working hours were identified as a significant contributing factor to the risk of needlestick injuries. The descriptive analysis revealed that fatigue and stress associated with long shifts impair attention and reduce the effectiveness of safety practices. The correlation analysis showed a positive relationship between working hours and needlestick injuries, indicating that extended shifts increase the likelihood of accidents. This highlights the importance of managing working hours to ensure that healthcare workers remain alert and focused on safety, especially during long shifts.

Lo et al. (2016) reported that extended working hours and insomnia significantly raised the risk of NSIs among nurses in Taiwan. This supports the current study's findings, which revealed that long working hours increased fatigue and reduced safety, thereby heightening the risk of needlestick injuries. Stimpfel, Brewer, and Kovner (2015) found that long shifts, especially night shifts and overtime, increased NSI occurrences and other injuries among newly licensed nurses. This agrees with the current study, which identified a positive correlation between long working hours and injury risk. Dimitriu et al. (2020) explored burnout across departments and found variation in stress levels, especially during COVID-19. While their study focused on burnout, not NSIs, it aligns with the current study's implication that stress from prolonged hours can affect safety outcomes. Afonso et al. (2017) found that longer working hours were associated with worse mental health, anxiety, and sleep disorders. This agrees with the current study, which links fatigue from extended shifts to reduced focus and increased NSI risk.

5.2.4 Safety-Engineered Devices and Training Inadequacy

Regarding safety-engineered devices and training availability, responses were mixed, with some healthcare workers expressing dissatisfaction about the availability of these tools and training programmes. While some workers felt adequately trained in their use, others expressed concerns about the accessibility and functionality of these safety devices. The correlation

analysis indicated a strong positive relationship between the inadequacy of safety devices and training with needlestick injuries. This suggests that without proper tools and training, workers are more likely to experience injuries, mishandle sharps or fail to follow safety protocols, increasing the risk of injuries.

Schuurmans et al. (2018) assessed the effectiveness of safety-engineered devices (SEDs) and observed a slight increase in NSIs after implementation, though injuries from specific devices like blood sugar needles decreased. This partially agreed with the current study, which found that inadequate safety tools and training increased NSI risk, but also suggests that availability alone may not eliminate risk without proper training. Sharew (2017) also emphasized that lack of training significantly increased the risk of sharp injuries. This fully supported the current study's findings that inadequate training and limited access to safety devices correlate with higher NSI rates.

5.3 Conclusion

In conclusion, the study highlights that occupational role, work experience, working hours, and the availability of safety-engineered devices and training significantly influence the risk of needlestick injuries among healthcare workers (HCWs). Nurses, due to frequent handling of needles, are particularly vulnerable, emphasizing the need for role-specific safety measures. Less experienced HCWs are at higher risk, underlining the importance of targeted training and mentorship programs to build confidence and reflexes. Long working hours contribute to fatigue and reduced attention, increasing the likelihood of injuries, thus necessitating better shift management. Additionally, inadequate access to safety tools and training exacerbates risks, making it imperative to ensure their availability and proper use.

5.4 Recommendations

5.4.1. Exposure from Occupational Cadre

The correlation analysis revealed a strong positive correlation between exposure from occupational cadre and needlestick injuries, with nurses being at a higher risk. To address this, it is recommended that healthcare facilities implement targeted training programs for nurses, focusing on the proper handling of needles and sharps, as well as the consistent use of safety-

engineered devices (SEDs) to enhance safety awareness. Regular safety drills and refresher courses should also be conducted to ensure that nurses are continually practicing and reinforcing best safety practices, making injury prevention an integral part of their daily routines. To further enhance safety, a system for regularly monitoring compliance with these safety protocols should be established. This system will help identify areas for improvement and reinforce accountability among nurses, ensuring that safety remains a priority regardless of occupational role.

5.4.2. Work Experience

The correlation analysis indicated a strong positive correlation between work experience and needlestick injuries. These findings suggest that experienced healthcare workers are less likely to encounter needlestick injuries than less experienced healthcare workers.. To mitigate this risk, regular refresher training sessions should be implemented to reinforce the importance of adhering to safety measures and protocols. Establishing mentorship programs where less experienced workers can learn from their more seasoned counterparts can also be beneficial. This initiative encourages the sharing of best practices and safety insights, fostering a culture of vigilance. Additionally, healthcare institutions should prioritize regular safety workshops and simulations to reinforce best practices, including the mandatory use of SEDs at all times when handling needles, ensuring all workers are well-prepared to minimize the risk of accidental exposure to needlestick injuries.

5.4.3. Working Hours

The analysis revealed a moderate positive correlation between working hours and needlestick injuries, although the regression analysis showed a positive but statistically insignificant relationship. Despite the lack of significance, the correlation emphasizes the need for strategies to address fatigue-related risks associated with long working hours. Implementing a shift rotation system that limits the number of consecutive hours worked can help reduce fatigue and maintain employee focus during critical tasks. Additionally, it is crucial to enhance training on safety protocols specifically for employees working extended hours. This training should stress the importance of adhering to safety measures, especially in high-risk situations. Furthermore, mandatory training on the proper use of safety-engineered devices should be instituted for all

healthcare workers. By ensuring that all employees are knowledgeable about these devices and how to utilize them effectively, the overall safety of the workplace can be improved, thus minimizing the risk of injuries related to fatigue.

5.4.4. Safety-Engineered Devices and Training

The correlation analysis showed a strong positive relationship between availability of safety-engineered devices and needlestick injuries. These results suggest that healthcare facilities should prioritize increasing the accessibility of SEDs, ensuring they are available in all departments. Additionally, regular and comprehensive training programs should be conducted to educate healthcare workers on the proper use, handling, and advantages of these devices, emphasizing their crucial role in preventing needlestick injuries. It is also essential that healthcare institutions implement strict policies mandating the consistent use of SEDs during all needle-related procedures, with monitoring systems in place to ensure compliance and reinforce the importance of safety practices.

5.5 Limitations

One limitation of this study is its use of a survey method that employed a semi-structured questionnaire. Surveys depend on self-reported data, which can be affected by respondent bias. Participants might give answers they perceive as socially acceptable or may overstate their views, which could compromise the accuracy and reliability of the results.

5.6 Area for Future Research

Future research should focus on the implementation and utilization of safety-engineered devices in preventing needlestick injuries. This area is critical to understanding the barriers and facilitators that influence the effective use of these devices among healthcare workers. Studies could investigate how training, organizational policies, and workplace culture impact the proper adoption and functionality of safety-engineered devices. Additionally, research could explore the perceptions and experiences of healthcare workers regarding these devices to identify any gaps in knowledge or areas for improvement.

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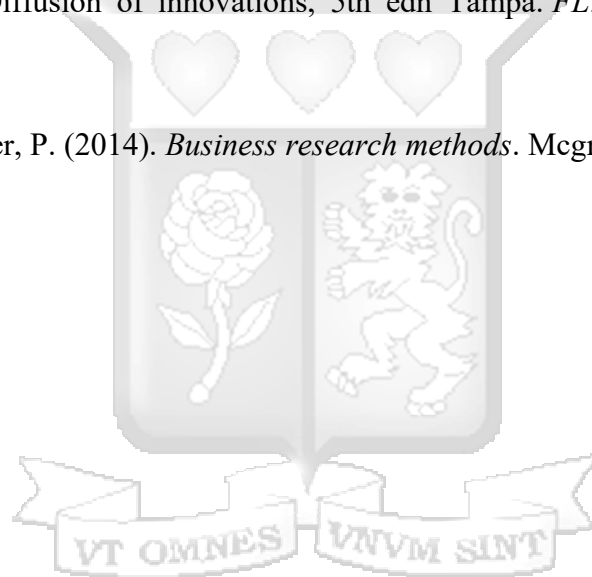
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▲ APPENDICES

▲ Appendix I: Consent Form

Title of Study: An Investigation of Factors Associated with Needle Stick Injuries At Mama Lucy Kibaki Hospital

Description of the study

You are invited to take part in a survey conducted by Stella Kemunto Onger, an MBA in Healthcare Management student at Strathmore University Business School. The study aims at providing information on occurrence of Needle Stick Injuries at your workplace. Your participation is voluntary, it will include participating in an interview and having a questionnaire completed by a research assistant.

Risks

There are no expected risks linked with participating in this survey.

Perceived benefits

Perceived benefits from this study will include partial fulfillment for the award of Master of Business Administration in Healthcare management Strathmore University Business School. The findings of this study will contribute to the current pool of information and provide valuable insights to the relevant institutions for enhancing their services. It will also be useful in assessing the care of HCWs after NSI

Confidentiality

The data collected will be handled with the highest level of confidentiality and anonymity of the participants be preserved both during and after the study. The primary data obtained will be stored securely and will solely be utilized for this research.

Voluntary participation

Your participation in this study is completely optional. You have the freedom to opt out of participation, and you can withdraw your agreement to participate whenever you wish. There

will be no repercussions or penalties if you make a decision to not participate or withdraw from this study. No financial reward or any other form of compensation is anticipated.

Contact information

For any clarifications or enquiries regarding the consent please contact:

Stella Kemunto Ongeru

0728243358

Institute of HealthCare Management.

Strathmore University Business School.

Consent

I have read this consent and have been given the opportunity to ask questions. I give my consent to participate in this study.

Participant's signature: _____ Date: _____

Declaration by the principal investigator

I have clearly explained to the participant the purpose and expected benefits of this study and have answered his/her questions regarding this research on the date on this consent form.

_____ Date: _____

Signed by investigator

Appendix II: Questionnaire

This questionnaire seeks to collect data in relation to a study titled: “AN INVESTIGATION OF FACTORS ASSOCIATED WITH NEEDLE STICK INJURIES AT MAMA LUCY KIBAKI HOSPITAL.” Please respond to all the questions.

Section A: General information

1. Your cadre in this health facility

- a) Doctor
- b) Nurse
- c) Clinical officer
- d) EMT
- e) Theatre technician
- f) Laboratory technician

2. Your gender

- a) Male
- b) Female

3. Please tick the group that represent your current age.

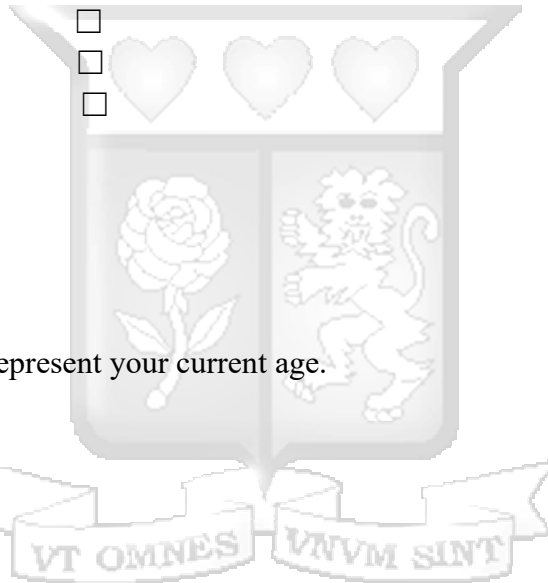
- a) 18-35 Years
- b) 36-45 Years
- c) 46-55 Years
- d) Above 55 Years

4. What is your level of formal education

- a) Certificate
- b) Diploma
- c) Graduate
- d) Postgraduate

5. How long have you worked here in this facility?

- a) Less than 1 year
- b) 1 - 5 years
- c) 6 – 10 years



d) More than 10 years

6. How do you perceive the impact of needlestick injuries at Mama Lucy Hospital?

- a) Severe and life-altering.
- b) Moderately concerning.
- c) Mild inconvenience.
- d) Negligible impact.

Section B: Exposure from Occupation Cadre

- a) From your point of view, which of the following occupations would you consider to be more likely exposed to needle stick injuries?
- i. Doctors
 - ii. Nurses
 - iii. Clinical officers
 - iv. Emergency medical technician
 - v. Theatre technician
 - vi. Laboratory technician
 - vii. All the above
 - viii. None of the above
- b) Kindly indicate the extent to which occupational cadre and education exposes one to needle stick injuries.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Different occupational role makes health workers have different exposure levels to needle stick injuries					
The difference in education level makes healthcare worker more or less likely to experience needlestick injuries					

Section C: Work experience and needlestick injuries

The statements relate to the extent to which work experience influences needlestick injuries. Please specify your level of disagreement or agreement with each of the given statements.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

I am confident in my capability to handle medical equipment safely, based on my work experience.					
My familiarity with hospital protocols and procedures has increased with my years of experience, reducing the risk of needlestick injuries.					
Over the course of my career, I have observed improvements in safety measures that have effectively reduced the occurrence of needlestick injuries.					
I believe that more experienced healthcare professionals are less prone to needlestick injuries due to their heightened awareness and vigilance.					
I have personally experienced a decrease in the frequency of needlestick injuries as I have gained more years of work experience in the hospital.					
The training and education provided to employees on needlestick injury prevention have improved with time, contributing to a safer work environment.					

Section D: Working Hours and Needlestick Injuries

How does time spend in the workplace influence needle stick injuries? Please indicate the extent to which you disagree or agree with each statement.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Extended working hours contribute to increased fatigue, potentially leading to a higher risk of needlestick injuries.					
During busy shifts, the likelihood of needlestick injuries is higher due to increased workload and time pressures.					
The stress levels associated with long working hours contribute to lapses in attention and focus, increasing the risk of needlestick injuries.					

Extended working hours have a negative impact on my ability to follow safety protocols and guidelines related to needlestick injury prevention.					
Fatigue resulting from irregular working hours increases the chances of accidental needlestick injuries.					
I believe that needlestick injuries are more likely to occur during long and demanding shifts.					
The risk of needlestick injuries is heightened during periods of high workload and tight schedules.					
Long working hours contribute to a decline in overall well-being, which may indirectly increase the risk of needlestick injuries.					
I find it challenging to maintain a high level of alertness and attention to detail during extended work hours, increasing the likelihood of needlestick injuries.					
Busy shifts and prolonged working hours contribute to a more stressful work environment, impacting the likelihood of needlestick injuries.					

Section E: Safety-engineered Devices and Needlestick Injuries

Please indicate the extent to which you disagree or agree with each of the statements in relation to safety engineered devices and needle stick injuries.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Safety devices, such as retractable needles and needleless systems, are readily available in the workplace.					
I feel adequately trained on the proper usage of safety-devices to prevent needlestick injuries.					
There is a systematic process in place for the regular maintenance and restocking of safety devices in our healthcare setting.					

I am confident in the proficiency of safety devices in averting needlestick injuries when used correctly.					
The hospital provides ongoing training sessions to update staff on the proper use and benefits of safety devices.					
There is a culture of prioritizing the use of safety devices over traditional devices to enhance overall workplace safety.					

Section F: Needle Stick Injuries

1. How often do you work with needles in your current role?

- a. Rarely
- b. Occasionally
- c. Frequently
- d. Others

2. Did you sustain NSI in the year 2023, and if so, can you indicate on the frequency of pricks or related incidents?

- a. 1-5 times in a month
- b. 6-10 times in a month
- c. c) More than 10 times in a month



3. Please describe the circumstance of the injury (e.g. location, activity being performed)

4. Were you aware of the proper protocol for handling needle prick injuries before experiencing one?

- a. Yes
- b. No

5. Do you feel comfortable reporting needle prick injuries to your supervisors?

- a. Yes
- b. No
- c. Unsure

6. Are you aware of the procedures for reporting needle prick injuries to the appropriate authorities?

- a. Yes
- b. No
- c. partially

7. How are needlestick injuries handled at Mama Lucy Kibaki hospital

- a) Immediately reported and thoroughly documented.
- b) Reported but documentation may be inconsistent.
- c) Reported inconsistently, and documentation is lacking.
- d) Often not reported or documented

8. What do you consider applicable at the hospital in relation to counselling. NSI patients

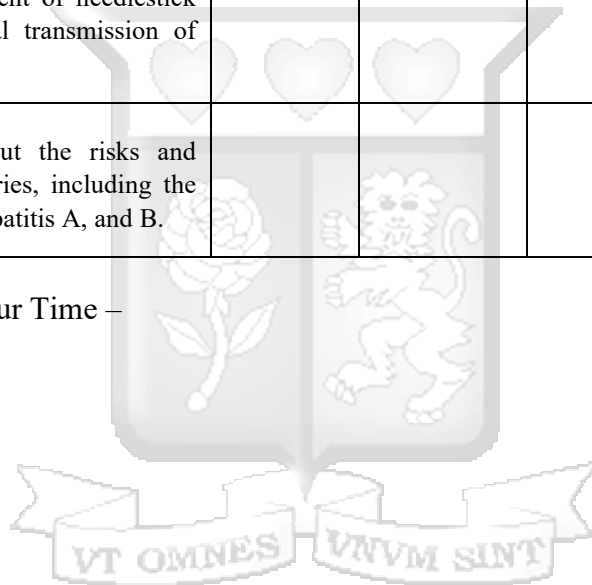
- a) Receives counselling and immediate medical assistance.
- b) Receives counselling but delayed medical assistance.
- c) Receives medical assistance but without counselling.
- d) Receives no counselling or immediate medical assistance.

10. Please indicate the extent to which you agree or disagree with each of the statements below

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am aware of colleagues or myself experiencing needlestick injuries during our work in the hospital.					

There is a concern among staff about the risk of contracting infections such as HIV, Hepatitis A, and B due to needlestick injuries in our workplace.					
I believe that needlestick injuries are a prevalent issue in our hospital, impacting the overall safety of healthcare professionals.					
In my experience, there is adequate reporting and documentation of needlestick injuries to track their prevalence in our healthcare setting.					
The hospital provides sufficient resources and support for the prevention and management of needlestick injuries, considering the potential transmission of bloodborne infections.					
I feel adequately informed about the risks and consequences of needlestick injuries, including the potential transmission of HIV, Hepatitis A, and B.					

Thank You for Your Time –



Appendix III: Ethical Approval Letter



21st August 2024

Ms Ongerì Stellah,
stellah.kemunto@strathmore.edu

Dear Ms Ongerì,

RE: An Investigation of Factors Associated with Needle Stick Injuries at Mama Lucy Kibaki Hospital

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** proposal. Your application reference number is **SU-ISERC2303/24**. The approval period is from **21st August 2024 to 20th August 2025**.

This approval is subject to compliance with the following requirements:

- I. Only approved documents including (informed consents, study instruments, MTA) will be used.
- II. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
- III. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 72 hours of notification.
- IV. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 72 hours.
- V. Clearance for the export of biological specimens must be obtained from relevant institutions.
- VI. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- VII. Submission of an executive summary report within 90 days of completion of the study to SU-ISERC.



Before commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke/> and obtain other clearances needed.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Ambrose Rachier".

Mr Ambrose Rachier,
Chairperson; SU-ISERC

Appendix IV: NACOSTI Licence

Republic of Kenya
National Commission for Science, Technology and Innovation
Ref No: 935250
Date of Issue: 28/October/2024
RESEARCH LICENSE

This is to Certify that Miss. STELLAH KEMUNTO ONGERI of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: **AN INVESTIGATION OF FACTORS ASSOCIATED WITH NEEDLE STICK INJURIES AT MAMA LUCY KIBAKI HOSPITAL for the period ending : 28/October/2025.**
License No: NACOSTIP/24/41264
Applicant Identification Number: 935250
Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.
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