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TOPIC: KNOWLEDGE, ATTITUDES AND PRACTICES OF ANTIMICROBIAL RESISTANCE AMONG HEALTH CARE PROFESSIONALS AT SALLY MUGABE CENTRAL HOSPITAL.

ABSTRACT

Antimicrobial resistance (AMR) is a growing global public health threat that undermines the effective treatment of infectious diseases and increases morbidity, mortality, and healthcare costs. Healthcare professionals play a critical role in antimicrobial prescribing, administration, and infection prevention practices, making their knowledge, attitudes, and practices (KAP) key determinants in combating AMR. This study assessed the knowledge, attitudes, and practices regarding antimicrobial resistance among healthcare professionals at Sally Mugabe Central Hospital.

A cross-sectional descriptive-analytical study design was employed. Data were collected from 127 healthcare professionals, including medical doctors, nurses, pharmacists, and laboratory scientists, using a structured self-administered questionnaire. Data were analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics summarised KAP levels, while inferential statistics, including Pearson correlation and multiple linear regression, examined relationships between variables.

The findings revealed that healthcare professionals had generally good knowledge of antimicrobial resistance (mean score = 7.20, SD = 1.62), with 52% demonstrating good knowledge. Attitudes toward antimicrobial stewardship were largely positive, with 62% of respondents exhibiting favourable perceptions. However, antimicrobial practices were inconsistent, with only about half of respondents demonstrating good practices. Correlation analysis showed a weak but significant relationship between knowledge and attitudes ($r = 0.227$, $p = 0.010$), no significant relationship between knowledge and practices ($r = -0.007$, $p = 0.936$), and a moderate positive relationship between attitudes and practices ($r = 0.449$, $p < 0.001$). Regression analysis identified attitude as the only significant predictor of antimicrobial practices ($\beta = 0.461$, $p < 0.001$). The study concludes that although knowledge and attitudes toward antimicrobial resistance are generally adequate, they do not consistently translate into appropriate practices. Attitude plays a critical role in influencing behaviour, highlighting the need for antimicrobial stewardship interventions that incorporate behavioural change strategies alongside education. Strengthening institutional support systems, improving access to diagnostic services, and promoting multidisciplinary collaboration are essential for improving antimicrobial practices.

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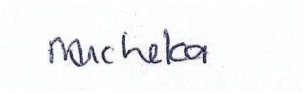
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I would like to acknowledge Bindura University of Science Education for providing the academic foundation and resources necessary for this study.

Finally, I wish to express my deepest appreciation to my family and friends for their unwavering support, encouragement, and understanding throughout my academic journey.

DECLARATION

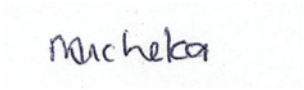
I Memory Mucheka, do declare that this project is an original work and has not been submitted to this university or any other university in Zimbabwe.

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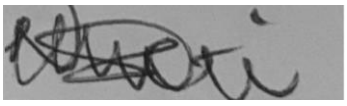
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MR N. HANDIREKETI (Signature of the supervisor). Date: 02/09/26

To be completed by the chairperson of the department:

I certify that to the best of my knowledge; the required procedures have been followed, and the preparation criteria have been met for this dissertation.



Ms. MANWERE A. (Signature of Chairperson). Date: 02/09/26

DEDICATION

This dissertation is dedicated to my family, whose unwavering support, encouragement, and sacrifices have made this achievement possible. I also dedicate this work to all healthcare professionals committed to improving patient care and combating antimicrobial resistance, whose efforts continue to make a difference in the healthcare system.

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LIST OF ABBREVIATIONS

AMR – Antimicrobial Resistance

AMS – Antimicrobial Stewardship

ANOVA – Analysis of Variance

CPD – Continuous Professional Development

IPC – Infection Prevention and Control

KAP – Knowledge, Attitudes, and Practices

LMICs – Low- and Middle-Income Countries

MOHCC – Ministry of Health and Child Care

SPSS – Statistical Package for the Social Sciences

WHO – World Health Organization

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Antimicrobial resistance (AMR) is widely recognised as one of the most significant global public health threats of the 21st century, undermining the effective prevention and treatment of infectious diseases. The World Health Organization defines antimicrobial resistance as the ability of microorganisms including bacteria, viruses, fungi, and parasites to resist the effects of antimicrobial medicines, rendering standard treatments ineffective and increasing morbidity, mortality, and health care costs (World Health Organization [WHO], 2023). Globally, inappropriate and excessive use of antimicrobials in human medicine had accelerated the emergence and spread of resistant organisms, particularly within hospital settings where antimicrobial consumption was high (Prestinaci et al., 2015; WHO, 2023).

In health care settings, inappropriate and excessive use of antimicrobials has accelerated the emergence and spread of resistance organisms, particularly within hospital environments where antimicrobial consumption is high. Hospitals represent critical points for both the development and containment of AMR due to factors such as antimicrobial prescribing, invasive procedures, prolonged hospitalisation, and the concentration of immunocompromised patients. Evidence from both high-income and low- and middle-income countries indicates that hospital-acquired infections caused by resistant organisms were associated with longer hospital stays, increased costs of care, and higher mortality rates (Laxminarayan et al., 2016; Murray et al., 2022). Effective infection prevention and control (IPC) measures and antimicrobial stewardship programmes (ASPs) were therefore essential components of hospital-based strategies to combat AMR.

In sub-Saharan Africa, including Zimbabwe the burden of antimicrobial resistance is further exacerbated by weak health systems, limited diagnostic capacity, and inconsistent implementation of antimicrobial stewardship programmes (O'Neill, 2016; Oluoma et al., 2022). Despite increasing awareness of AMR, inappropriate antimicrobial use remains common, often driven by diagnostic uncertainty, limited laboratory support, and patient related pressure. Studies conducted across African hospitals had demonstrated widespread inappropriate antimicrobial prescribing, limited use of culture and sensitivity testing, and poor adherence to treatment guidelines (Godman et al., 2020; Oluoma et al., 2022). Healthcare

professionals play a critical role in antimicrobial prescribing, administration, dispensing, and infection prevention practices. Their knowledge, attitudes, and practices (KAP) are therefore important determinants of antimicrobial use and patterns. However, evidence suggest that while awareness of AMR is high this does not consistently translate into antimicrobial practices. Knowledge influences understanding of resistance mechanisms, appropriate antimicrobial selection, and stewardship principles; attitudes shape perceptions of responsibility, risk, and institutional support; while practices reflected actual clinical behaviours such as guideline adherence, de-escalation, documentation, and compliance with IPC measures (Kenga et al, 2026; Balilram et al., 2021). Empirical evidence suggested that while awareness of AMR might be high among health care professionals, detailed technical knowledge and translation of positive attitudes into optimal practices were often inadequate (Pulcini et al., 2019; Balilram et al., 2021).

In Zimbabwe, antimicrobial resistance had been identified as an emerging public health concern within the health system. A study conducted mong prescribers in public primary health care facilities in Harare reported substantial gaps in knowledge regarding appropriate antimicrobial selection and resistance patterns, as well as inconsistent prescribing practices influenced by limited diagnostic resources and patient expectations (Olaru, 2021). However, there was a notable lack of published evidence examining antimicrobial resistance-related knowledge, attitudes, and practices among multidisciplinary health care professionals working in tertiary referral hospitals. Sally Mugabe Central Hospital, as a major tertiary institution, high patient volumes and complex case management increase antimicrobial use and risk of resistance. Despite the presence of IPC programmes, there is limited institution-specific data assessing healthcare professionals' KAP regarding AMR. This study was therefore conducted to generate context specific evidence to inform antimicrobial interventions.

1.2 STATEMENT OF THE PROBLEM

Antimicrobial resistance poses a serious threat to patient safety and quality of care, particularly in tertiary hospital settings where antimicrobial use is intensive and complex. Although antimicrobial stewardship programmes and infection prevention and control measures are recognised as effective strategies for reducing antimicrobial resistance, their success depends largely on the knowledge, attitudes, and practices of health care professionals. In Zimbabwe, available evidence on antimicrobial resistance-related knowledge and practices among health

care professionals remains limited and is predominantly focused on primary health care settings. There is insufficient empirical evidence on how health care professionals working in tertiary referral hospitals understand antimicrobial resistance, perceive their professional responsibility in its prevention, and apply antimicrobial stewardship principles in daily clinical practice. Tertiary referral hospitals such as Sally Mugabe Central Hospital are characterised by high patient turnover, complex case management, frequent use of broad-spectrum antimicrobials, and invasive procedures. These factors increase antimicrobial selection pressure and the risk of emergence and transmission of resistant organisms. In such setting, inappropriate antimicrobial use and suboptimal infection prevention practices can significantly accelerate the development and spread of resistance. Despite the presence of antimicrobial stewardship programmes and infection prevention and control measures the effectiveness of these interventions was constrained by the absence of context-specific evidence of healthcare professional's knowledge, attitudes, and practices. The lake of institution-specific data at Sally Mugabe Central Hospital limits the ability to design targeted interventions, implement effective training programmes, and strengthen policy frameworks aimed at improving antimicrobial use.

Without such evidence, efforts to strengthen antimicrobial use and infection prevention practices remain poorly informed. This study therefore sought to address this gap by assessing the knowledge, attitudes, and practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital, with the aim of generating evidence to inform antimicrobial stewardship interventions and improve clinical practice.

1.3 PURPOSE OF THE STUDY

The purpose of this study is to assess the knowledge, attitudes, and practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital to generate evidence that can inform the strengthening of antimicrobial stewardship and infection prevention and control interventions at the institution.

1.4 RESEARCH OBJECTIVES

1.4.1 GENERAL OBJECTIVE

To assess the knowledge, attitudes, and practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital in 2026.

1.4.2 SPECIFIC OBJECTIVES

- To determine the level of knowledge regarding antimicrobial resistance and antimicrobial stewardship among health care professionals at Sally Mugabe Central Hospital.
- To assess the attitudes of health care professionals toward antimicrobial resistance and antimicrobial stewardship initiatives at Sally Mugabe Central Hospital.
- To examine antimicrobial use and infection prevention practices among health care professionals at Sally Mugabe Central Hospital.
- To determine the relationship between knowledge, attitudes, and practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital.

1.5 RESEARCH QUESTIONS

- What is the level of knowledge regarding antimicrobial resistance and antimicrobial stewardship among health care professionals at Sally Mugabe Central Hospital?
- What attitudes do health care professionals hold toward antimicrobial resistance and antimicrobial stewardship initiatives at Sally Mugabe Central Hospital?
- What antimicrobial use and infection prevention practices are reported by health care professionals at Sally Mugabe Central Hospital?
- Is there a relationship between knowledge, attitudes, and practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital?

1.6 RESEARCH HYPOTHESES

- **H_0 (Null Hypothesis):** There was no statistically significant relationship between knowledge, attitudes, and practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital.
- **H_1 (Alternative Hypothesis):** There was a statistically significant relationship between knowledge, attitudes, and practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital.

1.7 CONCEPTUAL FRAMEWORK

This study was guided by the **Knowledge–Attitude–Practice (KAP) model**, which proposed that knowledge influences attitudes, and attitudes subsequently influence practices. In this study, **knowledge** refers to health care professionals' understanding of antimicrobial resistance mechanisms, appropriate antimicrobial use, antimicrobial stewardship principles, and infection prevention measures. **Attitudes** encompass perceptions of the seriousness of antimicrobial resistance, professional responsibility, confidence in antimicrobial decision-making, and support for stewardship initiatives. **Practices** refer to observable clinical behaviours such as adherence to antimicrobial guidelines, use of culture and sensitivity testing, documentation of antimicrobial indications, de-escalation of therapy, and compliance with infection prevention and control measures. According to the KAP model, increased knowledge is expected to lead to positive attitudes toward antimicrobial stewardship, which in turn promoted appropriate antimicrobial use and infection prevention practices (Ghosh et al, 2025.; Balilram et al., 2021). However, previous studies indicate that this relationship may be influenced by contextual factors such as professional category, prior training in antimicrobial stewardship, availability of diagnostic resources, and institutional support (Pulcini et al., 2019; Oluoma et al., 2022). In this study, knowledge and attitudes were treated as independent variables, practices as the dependent variable, and professional and institutional factors as intervening variables. The framework supported both descriptive assessment of each KAP domain and analytical examination of their interrelationships.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The literature reviewed in this chapter demonstrates a consistent global, regional, and local pattern: although healthcare professionals generally possess high awareness of antimicrobial resistance (AMR) this knowledge does not consistently translate into appropriate clinical practices. This disconnect highlight the limitations of knowledge-based interventions alone and underscores the importance of behavioural and institutional factors. In sub-Saharan African, these challenges are further compound by systemic constraints including limited diagnostic capacity and weak antimicrobial stewardship infrastructure. In Zimbabwe the scarcity of multidisciplinary studies in tertiary hospitals represents a critical gap in literature. Therefore, this study contributes to existing knowledge by providing institution-specific evidence on the relationship between knowledge, practices and attitudes among healthcare professional in a tertiary hospital setting.

2.2 THEORETICAL FRAMEWORK

This study was underpinned by the Knowledge–Attitude–Practice (KAP) theory, a behavioural change theory widely used in public health research to explain how human behaviour was influenced by knowledge acquisition and attitudinal orientation (Fan et al.,2024). The theory posited that knowledge is a prerequisite for developing favourable attitudes, which subsequently translate into appropriate practices. In the context of health care, the KAP theory had been applied to assess professional behaviour related to infection prevention, antimicrobial use, and patient safety interventions (Ghosh et al.,2025; Pulcini et al., 2019). Within antimicrobial resistance research, the KAP theory assumed that health care professionals with adequate knowledge of antimicrobial resistance mechanisms, prescribing principles, and stewardship guidelines were more likely to develop positive attitudes toward antimicrobial stewardship initiatives. These attitudes, in turn, were expected to influence responsible antimicrobial use and adherence to infection prevention and control measures (Balilram et al., 2021). However, empirical evidence suggests that the relationship between knowledge, attitudes, and practices was not always linear, particularly in settings constrained by limited resources, inadequate institutional support, and weak regulatory enforcement (Godman et al., 2020). Although the KAP theory provided a useful behavioural framework, it had been

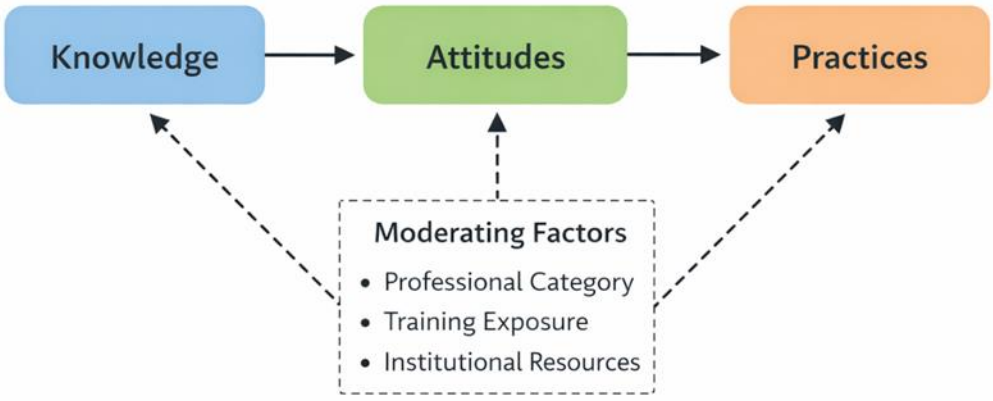
criticised for assuming a linear progression from knowledge to attitudes and then to practice. In complex health care environments, behaviour is often influenced by contextual constraints such as workload, diagnostic uncertainty, institutional culture, and resource availability. Therefore, while this study adopted the KAP framework to guide analysis, it also recognises that knowledge and attitudes alone might not fully explain antimicrobial practices in a tertiary hospital setting.

The relevance of the KAP theory to this study lied in its ability to guide both descriptive and analytical assessment of antimicrobial resistance-related behaviours. It provided a framework for evaluating whether deficits in antimicrobial practices are primarily driven by inadequate knowledge, negative attitudes, or contextual barriers. The theory therefore supported the examination of associations between knowledge, attitudes, and practices, as well as the identification of leveraged points for antimicrobial stewardship interventions within hospital settings.

2.3 CONCEPTUAL FRAMEWORK

The conceptual framework for this study was based on the Knowledge–Attitude–Practice (KAP) model. In this framework, knowledge and attitudes were considered independent variables, while antimicrobial use and infection prevention practices represented the dependent variable. Knowledge was expected to influence attitudes, which in turn affected practices. However, this relationship might be influenced by intervening variables such as professional category, years of experience, availability of guidelines, and prior antimicrobial stewardship training. The framework therefore assumed both direct and indirect relationships between variables. The conceptual framework for this study was derived from the KAP theory and illustrated the assumed relationships between the study variables. In this framework, knowledge and attitudes regarding antimicrobial resistance were treated as independent variables, while antimicrobial use and infection prevention practices constitute the dependent variable. Knowledge includes understanding of AMR causes, transmission, appropriate antimicrobial use, stewardship principles, and infection prevention measures. Attitudes encompass perceptions of AMR severity, professional responsibility, confidence in antimicrobial decision-making, and support for antimicrobial stewardship policies. The framework further recognises the role of intervening variables, including professional category (doctor, nurse, pharmacist, and laboratory scientist), years of experience, prior antimicrobial stewardship training, availability of diagnostic services, and institutional policies. These

factors might influence how knowledge and attitudes translate into practice. The conceptual framework therefore supports the study's analytical objective of determining whether knowledge and attitudes predict antimicrobial practices while accounting for professional and institutional characteristics.



Adapted from Balilram, D. et al. (2021)

2.4 EMPIRICAL LITERATURE REVIEW

2.4.1 GLOBAL EVIDENCE ON HEALTH CARE PROFESSIONALS' KAP REGARDING ANTIMICROBIAL RESISTANCE

Globally, numerous studies have assessed health care professionals' knowledge, attitudes, and practices regarding antimicrobial resistance, particularly in hospital settings. These studies consistently report high awareness of antimicrobial resistance as a public health problem but identify persistent gaps in detailed knowledge and appropriate antimicrobial practices.

A study conducted in the United States by Kabbani et al., (2018) examined physicians' knowledge and attitudes toward antimicrobial stewardship in tertiary hospitals. The findings highlight that while there is high awareness of antimicrobial resistance and strong support for stewardship among physicians, significant knowledge gaps remain regarding specific application, such as treatment duration and de-escalation protocols. Many of them lacked

formal training in antimicrobial stewardship and overestimated their competence in antimicrobial prescribing. This knowledge gap was associated with inappropriate prescribing practices, including unnecessary use of broad-spectrum antibiotics.

In a multicentre European study, Dyar et al. (2018) assessed antimicrobial prescribing behaviours among hospital physicians across several countries. The study revealed that inappropriate antimicrobial prescribing remained common despite high levels of awareness about antimicrobial resistance. Factors contributing to poor practices included diagnostic uncertainty, fear of patient deterioration, and limited feedback on prescribing decisions. The authors concluded that behavioural and institutional factors significantly influence prescribing practices beyond individual knowledge.

Similarly, Pulcini et al. (2019) evaluated knowledge and attitudes toward antimicrobial stewardship among hospital clinicians in multiple high-income countries. The study found that while attitudes toward stewardship programs were generally positive, many clinicians reported low confidence in implementing stewardship principles in daily practice. Lack of time, insufficient institutional support, and limited access to local resistance data were identified as major barriers.

A systematic review and meta-analysis by Baur et al. (2017) examined the impact of antimicrobial stewardship interventions on antimicrobial use and resistance outcomes in hospital settings. The review demonstrated that stewardship programs led by multidisciplinary teams were effective in improving prescribing practices and reducing antimicrobial resistance rates. However, the authors noted that the success of these interventions depended heavily on health care professionals' engagement, training, and attitudes toward stewardship initiatives.

Collectively, global evidence suggested that awareness of antimicrobial resistance among health care professionals didn't consistently translate into appropriate antimicrobial practices. That highlighted the importance of not assessing knowledge alone but also attitudes and contextual factors influencing practice.

2.4.2 EVIDENCE FROM SUB-SAHARAN AFRICA

In sub-Saharan Africa, studies on antimicrobial resistance-related knowledge, attitudes, and practices among health care professionals revealed additional challenges linked to resource constraints and weak health systems.

A multi-country cross-sectional study by Oluoma et al. (2022) assessed knowledge, attitudes, and practices regarding antimicrobial stewardship among pharmacy health care workers across 28 African countries. The study found high awareness of antimicrobial resistance but limited implementation of stewardship practices. Participants who had received prior antimicrobial stewardship training demonstrated significantly higher knowledge and better practices, highlighting the importance of continuous professional development.

In South Africa, Balilram et al. (2021) conducted a hospital-based KAP study among doctors, nurses, and pharmacists in a tertiary hospital. The findings showed moderate overall knowledge levels with significant variation across professional categories. While attitudes toward antimicrobial stewardship were largely positive, reported practices such as adherence to guidelines and documentation of antibiotic indications were inconsistent. Institutional barriers, including workload and lack of enforcement, were cited as contributing factors.

A study in Nigeria by Okeke et al. (2019) investigated antimicrobial prescribing practices among hospital clinicians and found widespread inappropriate antibiotic use, including empirical prescribing without laboratory confirmation. Knowledge gaps regarding resistance mechanisms and limited access to microbiological diagnostics were identified as major contributors to poor practice.

Similarly, Godman et al. (2020) reviewed antimicrobial use and resistance patterns across several African countries and reported that weak regulatory frameworks, limited stewardship programs, and inadequate training of health care professionals contributed significantly to inappropriate antimicrobial use. The authors emphasised the need for hospital-based assessments to inform context-specific stewardship interventions.

Overall, evidence from sub-Saharan Africa demonstrates that antimicrobial resistance-related practices are influenced by both individual-level factors (knowledge and attitudes) and system-level constraints. These findings underscore the need for institution-specific studies within tertiary hospitals.

2.4.3 LOCAL EVIDENCE FROM ZIMBABWE

Empirical studies on antimicrobial resistance-related knowledge, attitudes, and practices among health care professionals in Zimbabwe remain limited, particularly in tertiary hospital settings.

A study conducted by Olaru (2021) among prescribers in public primary health care facilities in Harare found that although most participants recognised antimicrobial resistance as a serious problem, significant knowledge gaps existed regarding appropriate antibiotic selection and duration of therapy. Prescribing practices were often influenced by patient expectations and lack of diagnostic support, resulting in frequent empirical antibiotic use.

A surveillance-based study by World Health Organization (2023) reported increasing resistance to commonly used antibiotics in Zimbabwean hospitals, particularly among Gram-negative organisms. The report highlighted inadequate antimicrobial stewardship implementation and inconsistent infection prevention practices as contributing factors, emphasising the role of health care professionals in controlling resistance.

In a hospital audit study, Mudzuru et al. (2019) examined antibiotic prescribing patterns in selected Zimbabwean hospitals and found high rates of inappropriate antibiotic use, including unnecessary combination therapy and prolonged prophylaxis. The authors attributed these practices to limited stewardship oversight and insufficient prescriber training.

Additionally, Mufunda et al. (2016) assessed knowledge and prescribing practices related to antibiotics among health care workers in Zimbabwe and reported inadequate formal training on antimicrobial resistance and stewardship. The study recommended structured educational interventions and strengthened institutional guidelines to improve antimicrobial use.

Despite these studies, most available Zimbabwean evidence focuses on prescribing patterns or primary care settings rather than comprehensive multidisciplinary assessments of knowledge, attitudes, and practices within tertiary referral hospitals. Therefore, remained a lack of institution-specific data examining the relationships between KAP domains among health care professionals working in high-level hospitals such as Sally Mugabe Central Hospital.

2.5 SYNTHESIS OF LITERATURE AND IDENTIFICATION OF RESEARCH GAPS

The reviewed literature demonstrates a growing global consensus that antimicrobial resistance is a critical threat to patient safety and health system effectiveness. Across global, regional, and local contexts, studies consistently report high awareness of antimicrobial resistance among health care professionals; however, this awareness does not consistently translate into comprehensive technical knowledge or appropriate antimicrobial practices (Al-Musa et al.,2025); Dyar et al., 2018; Pulcini et al., 2019). This indicates that knowledge alone is insufficient to drive optimal antimicrobial use.

Globally, empirical studies reveal a persistent gap between positive attitudes toward antimicrobial stewardship and actual prescribing and infection prevention practices. While health care professionals in high-income settings often demonstrate favourable attitudes toward stewardship initiatives, inappropriate antimicrobial use remains common due to factors such as diagnostic uncertainty, fear of negative patient outcomes, and limited feedback mechanisms (Baur et al., 2017; Dyar et al., 2018). These findings suggest that behavioural and institutional factors play a critical role in shaping antimicrobial practices, beyond individual awareness.

Evidence from sub-Saharan Africa mirrors global trends but highlights additional system-level constraints. Studies conducted across African hospital settings demonstrated moderate knowledge levels and generally positive attitudes toward antimicrobial stewardship; however, practices were frequently suboptimal due to limited access to diagnostic services, inadequate stewardship infrastructure, and insufficient training opportunities (Balilram et al., 2021; Godman et al., 2020; Oluoma et al., 2022). Importantly, regional studies consistently showed that prior antimicrobial stewardship training is significantly associated with improved knowledge and better antimicrobial practices, underscoring the importance of capacity-building interventions.

In the Zimbabwean context, available evidence is limited and fragmented. Existing studies primarily focus on antibiotic prescribing patterns or knowledge among prescribers in primary health care settings, with little emphasis on multidisciplinary assessments or tertiary referral hospitals (Mufunda et al., 2016; Olaru, 2021). Surveillance reports and hospital audits indicated increased antimicrobial resistance and inappropriate antibiotic use within hospitals; however, these reports do not systematically examine the underlying knowledge, attitudes, and practices of health care professionals responsible for antimicrobial use and infection prevention (Mudzuru et al., 2019; World Health Organization, 2023).

Across all contexts, three major gaps emerge from the literature. First, there was a consistent disconnect between knowledge and practice, which suggested that positive attitudes and awareness do not automatically result in appropriate antimicrobial behaviour. Secondly, there were limited empirical evidence examining the interrelationships between knowledge, attitudes, and practices within the same institutional setting, particularly in low- and middle-income countries. Thirdly, there was a notable lack of institution-specific, multidisciplinary studies conducted in tertiary referral hospitals in Zimbabwe, where antimicrobial pressure is high and clinical decision-making is complex.

Furthermore, few studies within the Zimbabwean context have applied an analytical approach to determine whether knowledge and attitudes predict antimicrobial practices while accounting for professional and institutional factors. That limited the ability of health institutions to design targeted, evidence-based antimicrobial stewardship interventions tailored to their specific contexts. The present study addressed these gaps by conducting a comprehensive assessment of the knowledge, attitudes, and practices regarding antimicrobial resistance among multidisciplinary health care professionals at Sally Mugabe Central Hospital. By examining the relationships between KAP domains within a tertiary hospital setting, the study provides context-specific evidence to inform antimicrobial stewardship, training programmes, and infection prevention and control strategies in Zimbabwe.

2.6 SUMMARY

This chapter reviewed theoretical, conceptual, and empirical literature related to antimicrobial resistance and the knowledge, attitudes, and practices of health care professionals. The KAP theory was identified as an appropriate theoretical foundation for understanding antimicrobial behaviour. Empirical evidence from global, sub-Saharan African, and Zimbabwean contexts demonstrates persistent gaps between knowledge, attitudes, and practices, particularly in resource-limited settings. The review identified a lack of institution-specific data from tertiary hospitals in Zimbabwe, thereby justifying the present study. The next chapter describes the methodology that was used to address the identified research gaps and achieved the study objectives.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter describes the methodology that was used to achieve the objectives of the study. It outlines the research design, study setting, target population, sample size and sampling procedure, research instruments, data collection procedures, data analysis methods, and ethical considerations. The methodology was designed to ensure that collected data was valid, reliable, and appropriate for assessing the knowledge, attitudes, and practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital.

3.2 RESEARCH DESIGN

The study employed a cross-sectional descriptive-analytical research design. This design enabled the simultaneous assessment of knowledge, attitudes and practices regarding antimicrobial resistance among healthcare professionals at a single point in time. (Setia, 2016). The design was appropriate for the study as it allowed for the simultaneous assessment of knowledge, attitudes, and practices related to antimicrobial resistance without manipulating study variables.

The descriptive component of the design was used to determine the levels of knowledge, attitudes, and practices among health care professionals, while the analytical component examined relationships between those variables. Previous studies assessed antimicrobial resistance-related KAP among health care professionals had successfully utilised cross-sectional designs due to their efficiency, feasibility, and suitability within hospital settings (Balilram et al., 2021; Oluoma et al., 2022). The design was therefore considered appropriate for generating baseline institutional data to inform antimicrobial stewardship interventions at Sally Mugabe Central Hospital.

3.3 STUDY SETTING

The study was conducted at Sally Mugabe Central Hospital, a major tertiary referral and teaching hospital in Zimbabwe. The hospital provided specialised medical and surgical services and served as a referral centre for patients from across the country. Due to high patient volumes, complex clinical cases, and extensive antimicrobial use, the hospital represented a critical setting for examining antimicrobial resistance-related knowledge, attitudes, and practices among health care professionals.

3.4 TARGET POPULATION

The target population for the study comprised of registered health care professionals who were employed at Sally Mugabe Central Hospital and were directly involved in patient care or antimicrobial-related activities. These include medical doctors, nurses, pharmacists, and laboratory scientists. Health care professionals play a critical role in antimicrobial prescribing, dispensing, administration, and infection prevention and control, making them an appropriate population for this study.

Health care professionals who have worked at the hospital for a sufficient period to be familiar with institutional antimicrobial use and infection prevention practices were eligible to participate. Those who were on prolonged leave during the data collection period or not directly involved in antimicrobial-related clinical activities were excluded.

3.5 SAMPLE SIZE

The sample size for this study was determined using a standard approach for cross-sectional studies aimed at assessing proportions within a population. In the absence of prior institution-specific data on the prevalence of adequate knowledge, attitudes, or practices regarding antimicrobial resistance among health care professionals at Sally Mugabe Central Hospital, a conservative estimated proportion of 50% was assumed to maximise sample size and ensure adequate precision. Using a 95% confidence level and a margin of error of 5%, the initial calculated sample size was large; however, this estimate assumed a very large population. Given that the total number of eligible health care professionals at Sally Mugabe Central Hospital is finite, and considering the exploratory nature of the study, available resources, time constraints, and anticipated response rates, a final sample size of 120 health care professionals was considered appropriate. Similar hospital-based KAP studies on antimicrobial resistance have successfully used sample sizes ranging between 100 and 150 participants while still achieving meaningful descriptive and inferential analysis (Balilram et al., 2021; Olaru, 2021). Considering the size of the target population at Sally Mugabe Central Hospital, the stratified sampling approach across professional categories, anticipated response rates, and feasibility within the study period, a final sample size of 120 health care professionals was considered adequate and appropriate. This sample size allowed for proportional representation of key professional groups and supports both descriptive analysis and examination of relationships between knowledge, attitudes, and practices. The sample size was calculated using Cochran's (1977) formula for estimating proportions in cross-sectional studies:

$$n_0 = \frac{Z^2 p(1-p)}{d^2}$$

Where:

- $Z = 1.96$(standard normal value at 95% confidence level)
- $p = 0.5$(assumed proportion in absence of prior institutional data)
- $d = 0.05$(margin of error)

$$n_0 = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2}$$

$$n_0 = \frac{3.8416 \times 0.25}{0.0025}$$

$$n_0 = 384$$

Since the total population of eligible health care professionals at Sally Mugabe Central Hospital was finite (estimated at approximately N ≈ 180–220), finite population correction was applied:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Assuming N = 200:

$$n = \frac{384}{1 + \frac{383}{200}}$$

$$n = \frac{384}{2.915}$$

$$n \approx 132$$

To account for potential non-response (approximately 10%), the adjusted sample size was reduced to 120 participants, which remains statistically adequate to achieve sufficient precision while ensuring feasibility within the study period.

3.6 SAMPLING PROCEDURE

The study employed stratified random sampling to ensure adequate representation of different professional categories within the hospital. The target population was first stratified according to professional category (doctors, nurses, pharmacists, and laboratory scientists). From each stratum, participants were then selected using simple random sampling techniques. Stratified random sampling was appropriate for this study because it reduces sampling bias and ensures that key professional groups involved in antimicrobial use and infection prevention are proportionately represented (Creswell & Creswell, 2018). This approach enhances the generalisability of the findings within the institutional context.

3.7 RESEARCH INSTRUMENTS

Data were collected using a structured self-administered questionnaire adapted from a validated instrument developed for assessing antimicrobial resistance-related knowledge, attitudes, and practices among hospital-based health care professionals (Balilram et al., 2021). The questionnaire was structured to allow for quantitative analysis of knowledge, attitudes, and practices. Knowledge items were scored as correct or incorrect, while attitude and practice items were measured using Likert scales. These responses were used to generate composite scores for each domain, enabling both descriptive and inferential statistical analysis.

The questionnaire consisted of four sections:

Section A: Demographic and professional information

Section B: Knowledge related to antimicrobials and antimicrobial resistance

Section C: Attitudes toward antimicrobial resistance and antimicrobial stewardship

Section D: Practices related to antimicrobial use and infection prevention

The instrument was adapted to reflect local antimicrobial guidelines and institutional practices at Sally Mugabe Central Hospital while retaining its core validated structure. The questionnaire was included as an appendix to the proposal.

3.8 VALIDITY AND RELIABILITY OF THE INSTRUMENT

To ensure content validity, the questionnaire was reviewed by experts in infection prevention and control and antimicrobial stewardship to confirm that the items adequately measure the intended constructs. A pilot study was conducted among a small group of health care

professionals who were not included in the main study to assess clarity, relevance, and appropriateness of the questionnaire items. Internal consistency reliability was assessed using Cronbach's alpha coefficient for the attitude and practice domains. A Cronbach's alpha value of ≥ 0.70 was considered acceptable. Knowledge items were assessed using Kuder–Richardson Formula 20 (KR-20), which was appropriate for dichotomous variables. Previous studies using similar instruments have reported acceptable reliability coefficients for knowledge, attitude, and practice domains (Balilram et al., 2021). Feedback from the pilot study was used to refine the instrument prior to full data collection.

3.9 DATA COLLECTION PROCEDURES

Following ethical approval and institutional permission, the researcher liaised with departmental heads to facilitate access to participants. Data collection was conducted over a defined period to accommodate varying work schedules. Participants were approached during departmental meetings, ward activities, or professional gatherings to minimise disruption of clinical duties. The purpose of the study was explained to potential participants, and informed consent was obtained prior to questionnaire distribution. Questionnaires, were distributed in paper form electronically, depending on participant availability https://forms.gle/ZJCvuCKeZeQrFeUW6. Participants were given adequate time to complete the questionnaire, and completed questionnaires were returned anonymously using sealed envelopes or secure electronic platforms. Data were collected using both paper-based and electronic questionnaires. The electronic version was administered through a secure online platform, allowing participants to complete the questionnaire at their convenience while ensuring confidentiality.

3.10 DATA ANALYSIS

Knowledge scores were calculated by assigning one point for each correct response and zero for incorrect or "unsure" responses. Total knowledge scores were converted into percentages and categorised into good, moderate, and poor knowledge levels. Attitude and practice items were measured using Likert scales. Mean scores were computed for each respondent, with higher scores indicating more positive attitudes and better practices. These scores were then categorised based on predefined cut-off values. Data were analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise the data. Inferential

statistics, including Pearson correlation and multiple linear regression analysis, were conducted to examine relationships between knowledge, attitudes, and practices. Frequencies and percentages were used for categorical variables, while means and standard deviations were used for continuous variables. Pearson correlation analysis was used to assess associations between KAP domains. Where appropriate, multiple regression analysis was performed to determine whether knowledge and attitudes predict antimicrobial practices while controlling for professional category and years of experience. Statistical significance was set at a p-value of less than 0.05, consistent with similar KAP studies (Oluoma et al., 2022).

3.11 ETHICAL CONSIDERATIONS

Ethical approval was sought from the Bindura University of Science Education Ethics Review Board, the Medical Research Council of Zimbabwe, (MRCZ/B/3157), and the institutional ethics committee of Sally Mugabe Central Hospital. Permission to conduct the study was also obtained from hospital management.

The principle of autonomy was upheld by ensuring voluntary participation and obtaining informed consent. Participants were informed of their right to withdraw from the study at any time without penalty. Confidentiality was maintained by ensuring that no identifying information was collected and that data was stored securely in password-protected files accessible only to the researcher.

The principle of beneficence was observed by minimising potential risks to participants. The study involves professional self-reporting only, and participants were assured that their responses were not used for performance evaluation or disciplinary purposes. Justice was ensured through fair sampling across professional categories. Study findings were shared with relevant stakeholders to support improvements in antimicrobial stewardship and infection prevention practices.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

This chapter presents the empirical findings of the study on knowledge, attitudes, and practices (KAP) regarding antimicrobial resistance among healthcare professionals at Sally Mugabe Central Hospital. The analysis was based on data collected from respondents using a structured questionnaire and processed using the Statistical Package for the Social Sciences (SPSS). Both descriptive and inferential statistical techniques were employed to address the study objectives. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise the socio-demographic characteristics of respondents and their levels of knowledge, attitudes, and practices. Inferential statistics were applied to examine relationships between key variables and to test for statistically significant associations. Although the minimum calculated sample size was 120 participants, a total of 127 completed questionnaires were obtained during data collection, resulting in a slightly higher response rate than anticipated. All valid responses were included in the analysis to improve statistical power and representativeness. The results are presented systematically in line with the study objectives. Tables and figures are used to display the findings, followed by detailed narrative explanations to facilitate interpretation and enhance clarity. Emphasis is placed on linking the results to the research questions while maintaining objectivity and analytical depth.

4.2 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Variable	Category	Frequency (n)	Percentage (%)
Age	20–29	38	30
	30–39	38	30
	40–49	43	34
	50–59	8	6
Gender	Male	24	19
	Female	103	81
Profession	Medical Doctor	34	27
	Nurse	88	69
	Pharmacist	2	2
	Laboratory Scientist	3	2
Years of Experience	<5 years	47	37
	5–10 years	39	31
	11–20 years	31	24
	>20 years	10	8
Formal Training (AMS)	Yes	24	19
	No	103	81
Availability of Guidelines	Yes	73	58
	No	52	41
	Not sure	2	1

Table 4.1Table Demographic Characteristics of Respondents (n = 127)

The table shows the studies demographics. The age distribution indicates that the workforce is largely young to middle-aged, with most respondents below 50 years. This reflects an active and potentially adaptable workforce that is likely to benefit from targeted antimicrobial stewardship interventions. The sample was predominantly female, accounting for over 81% of respondents. This distribution mirrors the professional composition of the sample, where nurses constituted the majority. The dominance of nurses, who represented more than two-thirds of

the participants, is consistent with staffing patterns in most public hospitals and should be considered when interpreting profession-based comparisons.

In terms of professional experience, most respondents had ten or fewer years of service, indicating a relatively early-career workforce. This has important implications, as early-career professionals are typically more receptive to new clinical guidelines and training initiatives. A critical finding is the low level of formal antimicrobial stewardship training, with more than four-fifths of respondents reporting no prior training. This highlights a substantial institutional and educational gap. Although over half of the respondents reported the availability of antimicrobial guidelines, a considerable proportion either lacked access or were uncertain about their availability, suggesting inconsistencies in dissemination and implementation of institutional policies.

4.3 RELIABILITY OF THE INSTRUMENT

Reliability Statistics

Cronbach's Alpha	N of Items
.878	30

Table 4.2 reliability of the instruments

The internal consistency of the questionnaire was assessed using Cronbach's alpha coefficient. The overall Cronbach's alpha for the 30-item instrument was 0.878, indicating a high level of internal reliability. This suggests that the instrument was sufficiently robust and consistent in measuring the constructs of knowledge, attitudes, and practices related to antimicrobial resistance.

4.4 OBJECTIVE 1: KNOWLEDGE ON ANTIMICROBIAL RESISTANCE

4.4.1 DESCRIPTIVE STATISTICS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Knowledge on antimicrobial	127	3.00	10.00	7.1969	1.62344
Valid N (listwise)	127				

Table 4.3 knowledge on antimicrobial resistance descriptive statistics

The mean knowledge score of 7.20 (SD = 1.62) indicates that, overall, healthcare professionals demonstrated relatively high levels of knowledge regarding antimicrobial resistance. This

finding suggests that awareness of AMR and its contributing factors is well established within the institution. However, the observed variability in scores highlights the presence of knowledge gaps among a subset of respondents, which may affect consistency in antimicrobial-related practices. These results are consistent with previous studies conducted in similar settings, which report high awareness but uneven depth of knowledge among healthcare professionals. The variability observed may be attributed to differences in professional training, access to continuous medical education, and varying levels of engagement with antimicrobial stewardship programmes. This suggests that while general awareness is adequate, targeted educational interventions are still necessary to address specific knowledge deficiencies.

4.4.2 KNOWLEDGE LEVEL DISTRIBUTION

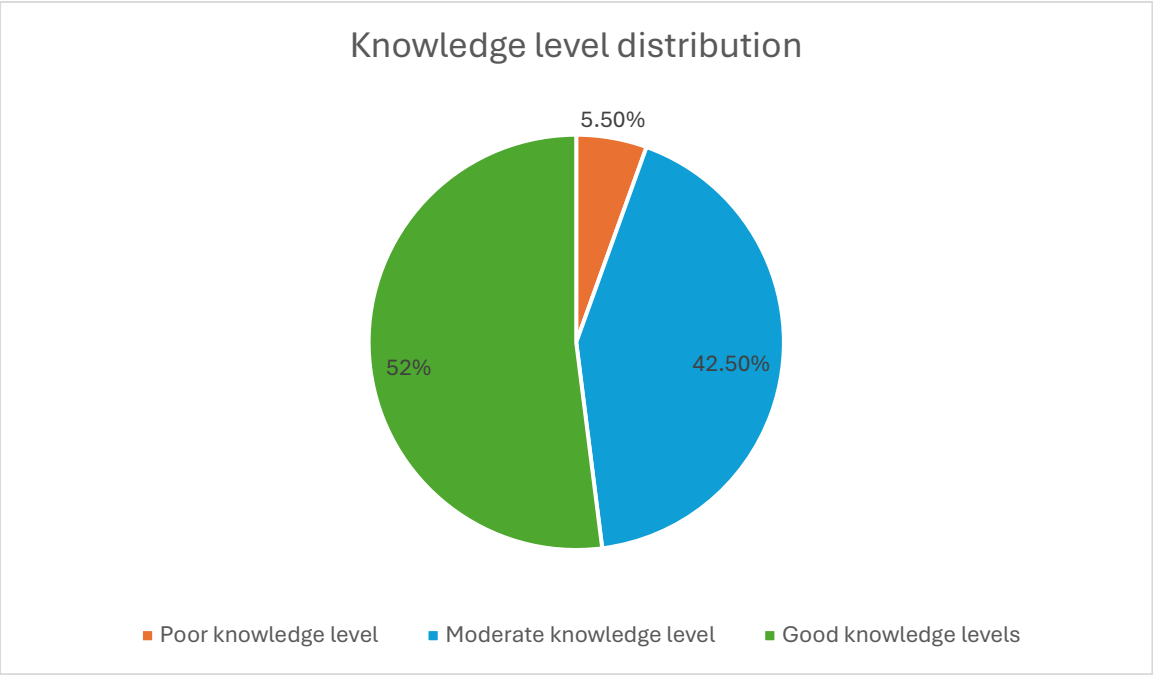


Figure 4.1 knowledge level distribution

52% of the respondents demonstrated good knowledge, while 5.5% of the respondents exhibited poor knowledge. This distribution suggests that basic awareness and understanding of antimicrobial resistance are well established among most healthcare professionals. The presence of respondents with moderate and poor knowledge levels indicates that knowledge is not uniformly distributed across the workforce. This inconsistency may have implications for antimicrobial use practices, as gaps in knowledge can contribute to inappropriate prescribing, dispensing, or administration of antibiotics.

4.4.3 KNOWLEDGE BY PROFESSION

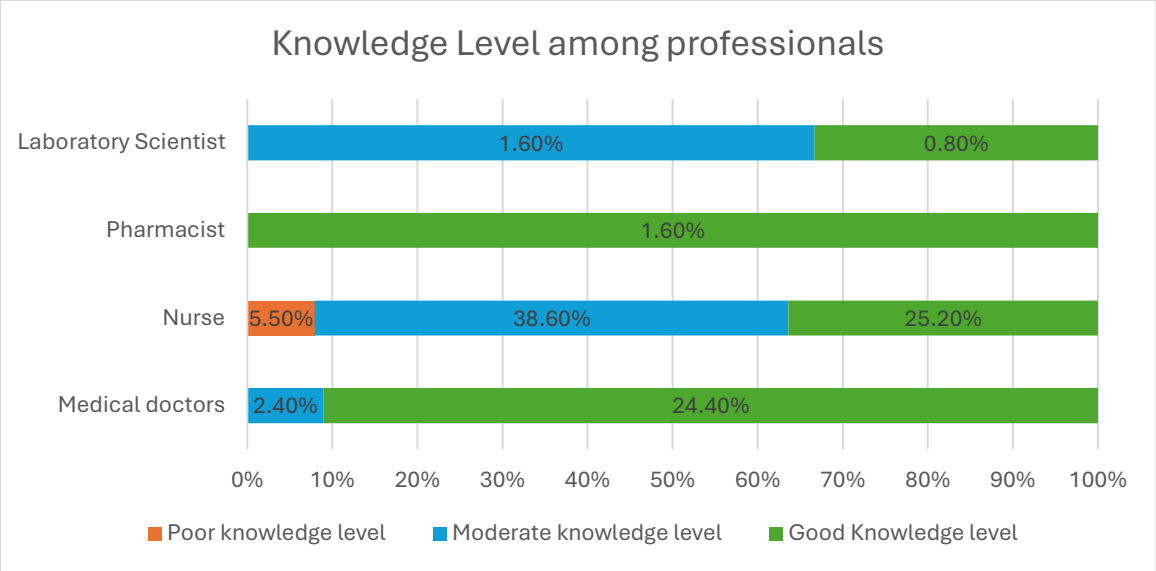


Figure 4.2 knowledge level among professionals

There was clear variation in knowledge levels across professional groups. Medical doctors demonstrated the highest levels of knowledge, with the majority achieving good scores. Pharmacists also showed consistently good knowledge, reflecting their specialised training and direct involvement in medication management. Nurses predominantly fell within the moderate knowledge category, with a small proportion exhibiting poor knowledge. Laboratory scientists were also mainly within the moderate category. These differences highlight variations in training exposure and professional roles, particularly in relation to antimicrobial prescribing and stewardship.

4.4.3.1 KNOWLEDGE DIFFERENCE AMONG PROFESSIONALS

Profession (I)	Profession (J)	Mean Difference (I-J)	Sig.
Medical doctor	Nurse	0.63*	0.000
Medical doctor	Pharmacist	-0.09	1.000
Medical doctor	Laboratory scientist	0.58	0.453
Nurse	Pharmacist	-0.72	0.384
Nurse	Laboratory scientist	-0.05	1.000
Pharmacist	Laboratory scientist	0.67	1.000

Table 4.4 Post Hoc Comparisons of Knowledge Scores by Profession (Bonferroni)

A one-way analysis of variance (ANOVA) was conducted to examine whether knowledge of antimicrobial resistance differed across professional groups. The results indicated a statistically significant difference in knowledge scores between professions, $F(3, 123) = 11.95$, $p < 0.001$. This suggests that professional role influences the level of knowledge among healthcare professionals. To determine which specific groups differed, post hoc comparisons using the Bonferroni test were performed. The analysis revealed that medical doctors scored significantly higher than nurses (mean difference = 0.63, $p < 0.001$). There were no statistically significant differences between medical doctors and pharmacists or laboratory scientists, nor between nurses and the other professional groups. The significant difference between medical doctors and nurses highlights the impact of professional training and role-specific exposure on knowledge of antimicrobial resistance. Differences between other groups were not statistically significant, reflecting the limited sample size or comparable knowledge levels among those professions.

4.4.4 KNOWLEDGE BY EXPERIENCE

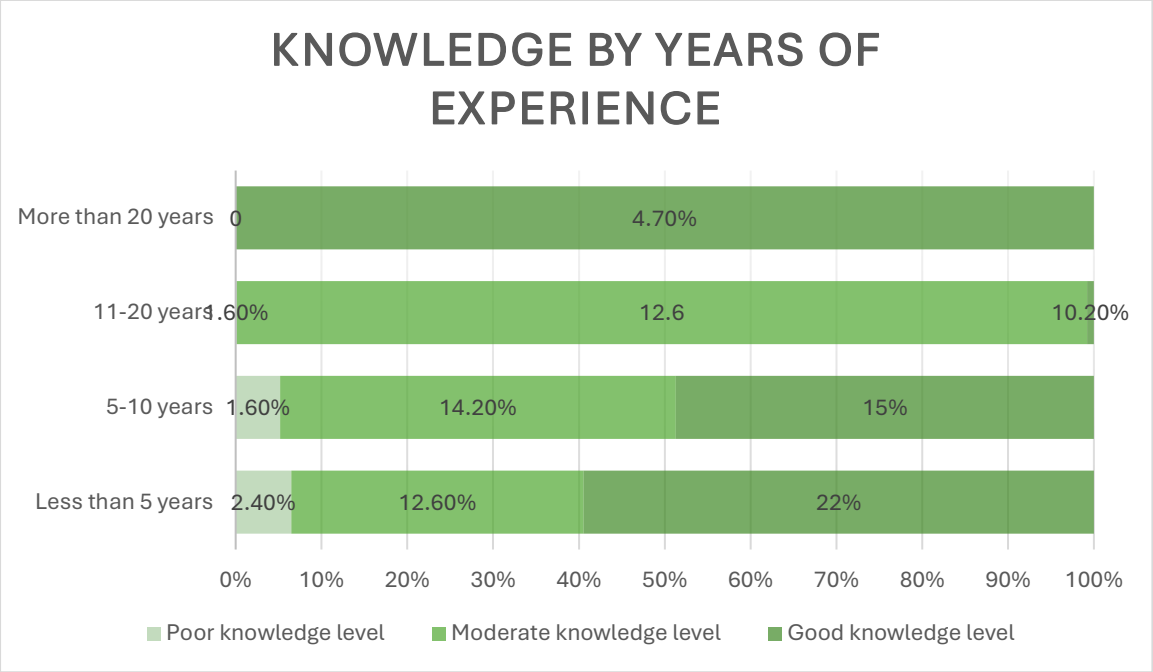


Figure 4.3 knowledge level by experience

Respondents with less than five years of experience had the highest number of individuals with good knowledge (22%) and when compared to the others they had a higher percentage in poor knowledge level. Differences across experience categories were not pronounced, suggesting that knowledge may be more strongly influenced by recent training and education rather than years of clinical practice.

4.5 OBJECTIVE 2: ATTITUDES TOWARD ANTIMICROBIAL RESISTANCE

4.5.1 RESPONDENTS ATTITUDE

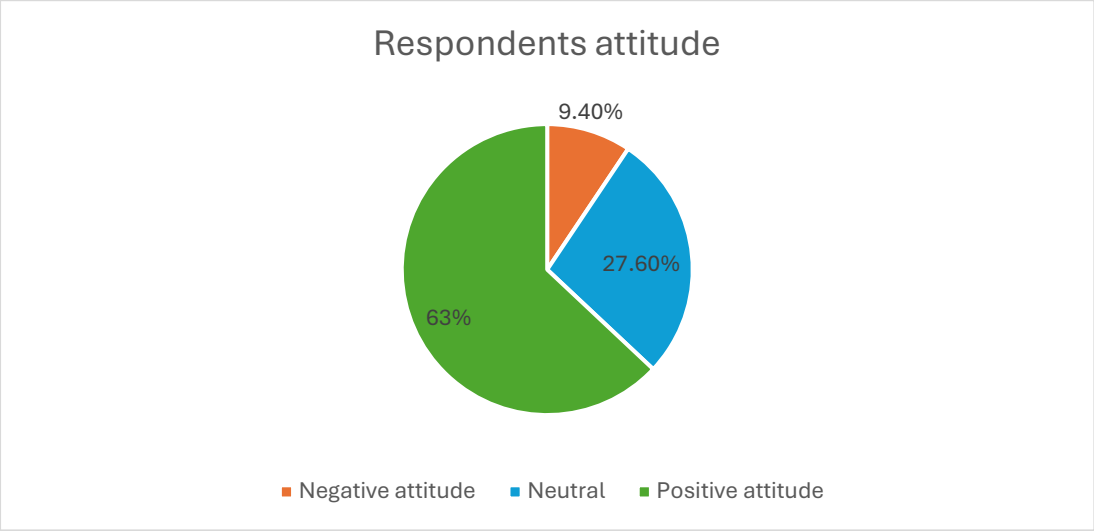


Figure 4.4 Attitude distribution among participants

At least 63% of the respondents demonstrated positive attitudes toward antimicrobial stewardship, indicating a general recognition of the importance of appropriate antimicrobial use. This suggests that healthcare professionals are largely aware of the need to control antimicrobial resistance and are supportive of interventions aimed at improving antibiotic use. However, the presence of some negative attitudes, although limited, is noteworthy. Even a small proportion of negative perceptions may hinder the effective implementation of antimicrobial stewardship programmes, particularly in clinical environments where teamwork and adherence to guidelines are essential.

4.5.2 ATTITUDES BY PROFESSION

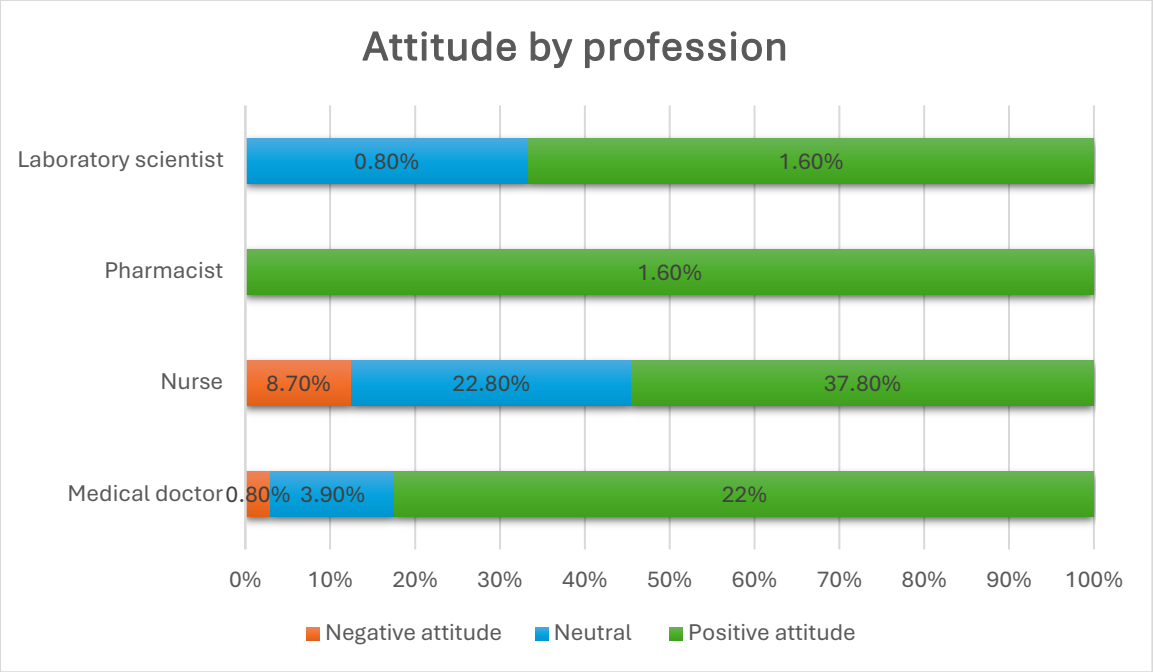


Figure 4.5 Attitude by profession

Medical doctors largely exhibited positive attitudes toward antimicrobial resistance and stewardship practices. Similarly, other professional groups were predominantly positive in their attitudes, indicating broad acceptance of the principles of rational antimicrobial use. In contrast, nurses showed greater variability in attitudes, including most of the negative attitudes recorded in the study. This variation may reflect differences in training exposure, workload pressures, and levels of involvement in antimicrobial decision-making processes. Nurses, while central to medication administration and patient care, may have less direct influence on prescribing decisions, which could affect their engagement with stewardship principles. These findings highlight the need for targeted interventions that address profession-specific challenges, particularly among nurses, to ensure a more uniform positive attitude across all healthcare cadres

4.5.3 ATTITUDES BY EXPERIENCE

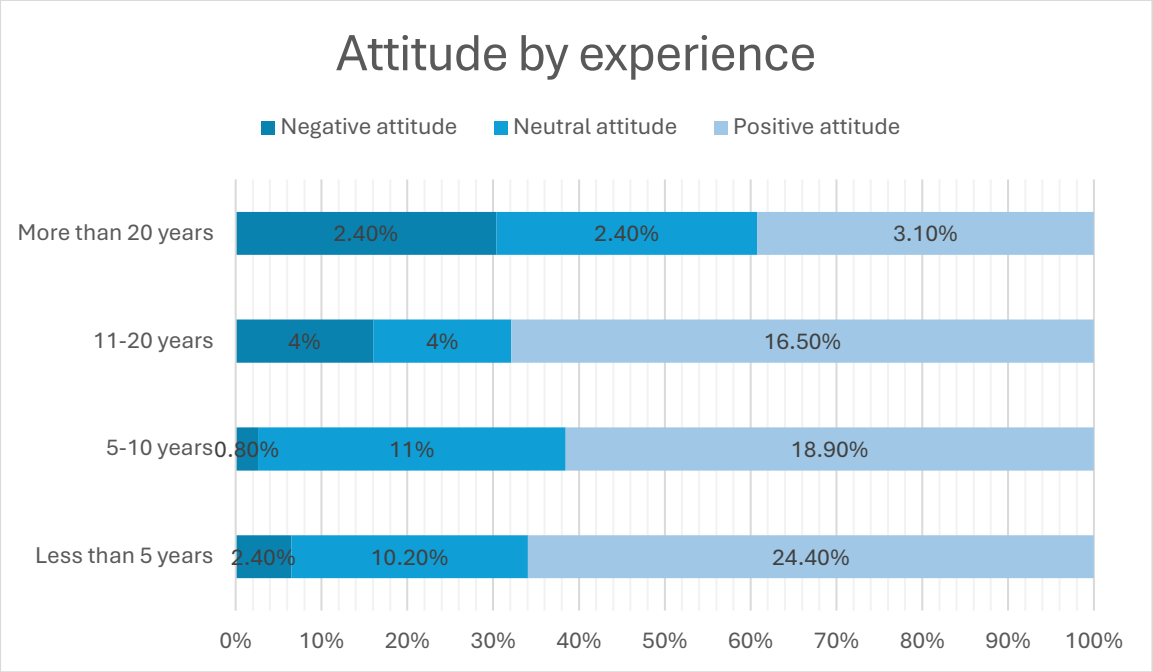


Figure 4.6 attitude by respondent's experience

Respondents with less than five years of experience demonstrated the highest proportion of positive attitudes toward antimicrobial stewardship. In contrast, those with more than 20 years of experience exhibited relatively more negative attitudes. This pattern suggests that less experienced professionals may be more receptive to current antimicrobial stewardship concepts, possibly due to recent training and exposure to updated clinical guidelines. Conversely, more experienced professionals may be less adaptable to evolving practices, potentially due to established clinical routines or resistance to change. Although the differences are not quantified as statistically significant in this section, the observed trend is important, as it may influence the adoption and sustainability of antimicrobial stewardship interventions within the healthcare setting.

4.6 OBJECTIVE 3: PRACTICES RELATED TO ANTIMICROBIAL USE

4.6.1 ANTIMICROBIAL PRACTICE

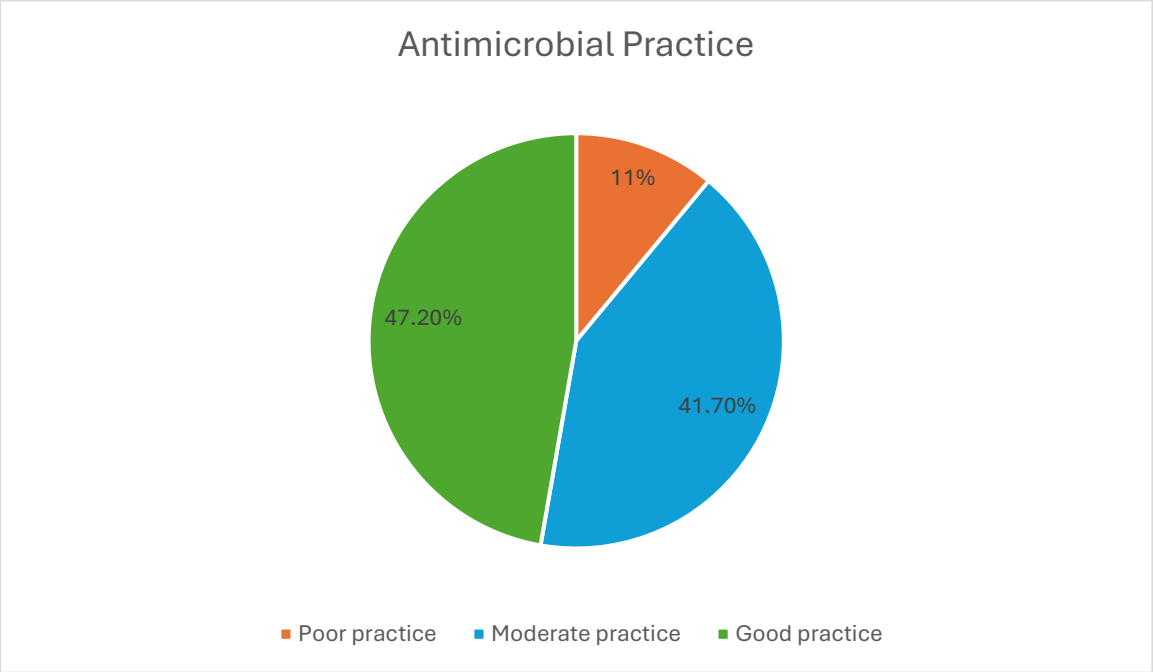


Figure 4.7 antimicrobial practice

Half of the respondents (47.2%) demonstrated good practices, the presence of poor practices in over one-tenth of participants is clinically significant. This result indicates that while a substantial proportion of healthcare professionals adhere to appropriate antimicrobial use practices, there remains a notable gap that could contribute to the development and spread of antimicrobial resistance. The coexistence of good and poor practices suggests inconsistency in the application of antimicrobial stewardship principles. This variability may undermine efforts to control antimicrobial resistance, as even a small proportion of inappropriate practices can have significant consequences for patient outcomes and infection control within the hospital setting.

4.6.2 ANTIMICROBIAL PRACTICES BY PROFESSION

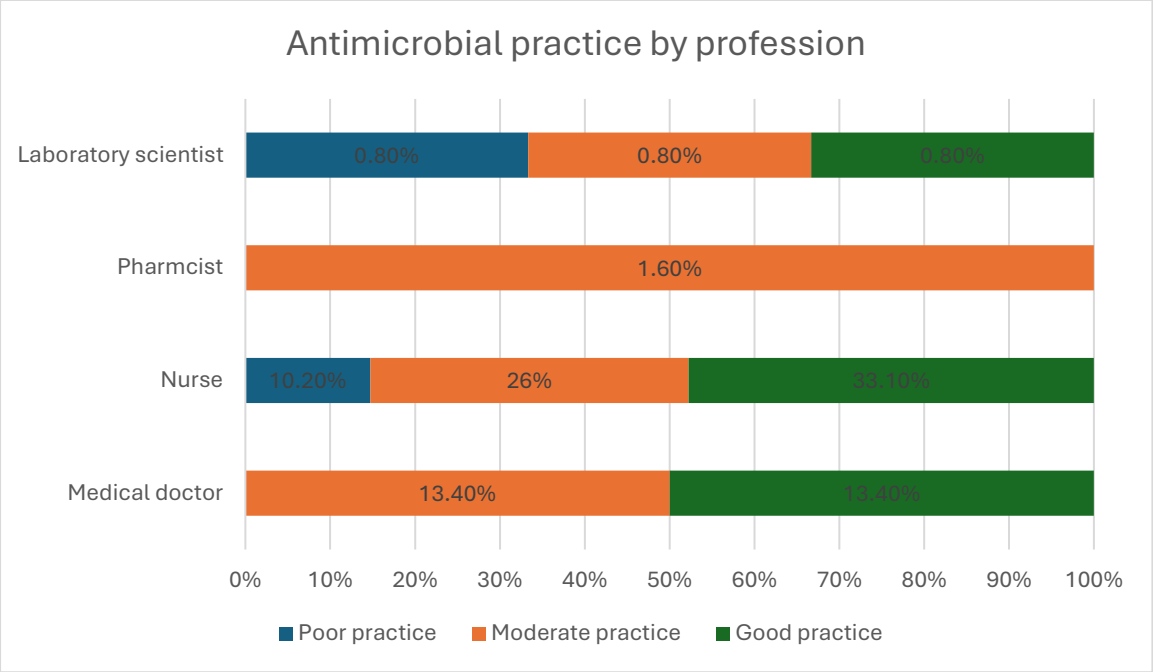


Figure 4.8 Antimicrobial Practices by Profession

There were observable differences in practices across professional groups. Some professional categories demonstrated relatively better adherence to appropriate antimicrobial use practices, while others showed a higher proportion of poor practices. These differences may be attributed to variations in roles and responsibilities related to antimicrobial use. For example, professionals directly involved in prescribing or reviewing medications may be more aligned with recommended practices, while those primarily responsible for administration may have less influence over decision-making processes. The variation in practices across professions highlights the importance of a multidisciplinary approach to antimicrobial stewardship. Ensuring that all healthcare workers, regardless of role, are adequately trained and engaged is essential for achieving consistent and effective practice.

4.6.3 Antimicrobial Practices by Experience

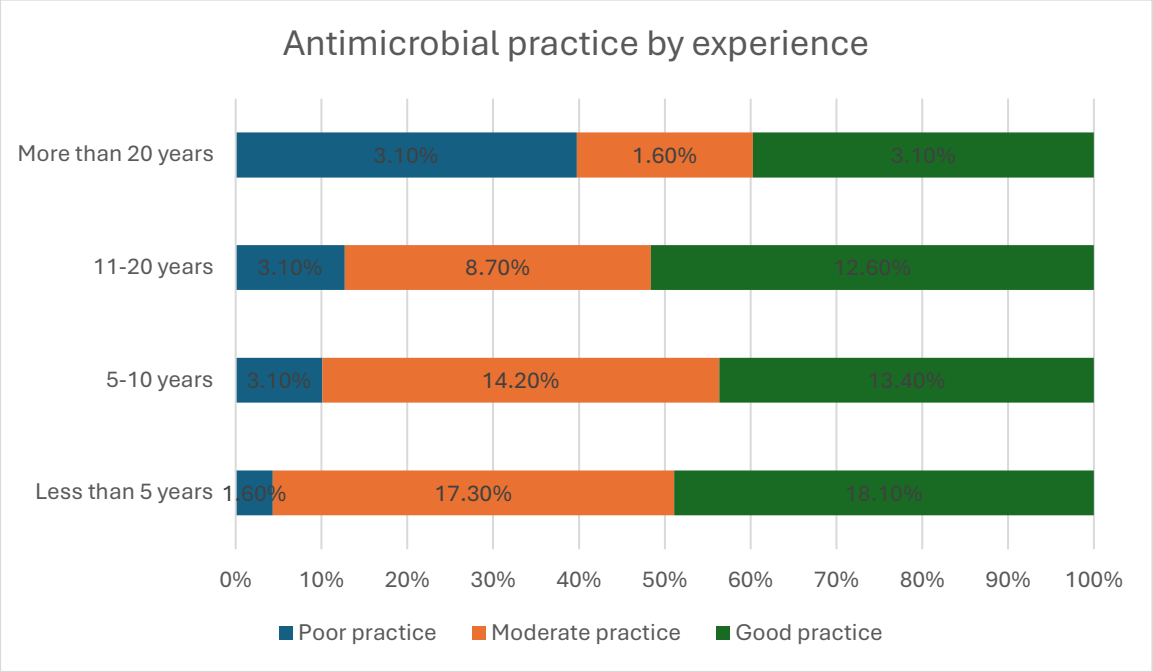


Figure 4.9 Antimicrobial Practices by Experience

Differences in practice patterns were also observed across levels of professional experience. While some categories demonstrated better adherence to recommended practices, others showed a higher occurrence of poor practices. This variation suggests that experience alone does not necessarily translate into optimal antimicrobial practices. Instead, adherence to appropriate practices may depend more on continuous professional development, access to updated guidelines, and institutional support systems. The results emphasise the need for ongoing training and reinforcement of antimicrobial stewardship principles across all levels of experience. Without consistent updates and supervision, variations in practice may persist, potentially compromising efforts to control antimicrobial resistance.

4.7 OBJECTIVE 4: RELATIONSHIP BETWEEN KNOWLEDGE, ATTITUDES, AND PRACTICES

4.7.1 CORRELATION ANALYSIS

Variables	r	p-value	Interpretation
Knowledge vs Attitude	0.227	0.010	Weak positive (significant)
Knowledge vs Practice	-0.007	0.936	No relationship
Attitude vs Practice	0.449	<0.001	Moderate positive

Table 4.5 correlation between knowledge, attitude and practice

The analysis revealed a weak but statistically significant positive relationship between knowledge and attitudes, indicating that increased knowledge is associated with slightly improved attitudes. However, knowledge showed no significant relationship with practice, suggesting that knowledge alone does not translate into behavioural change. In contrast, attitudes demonstrated a moderate and statistically significant positive relationship with practices. This indicates that healthcare professionals with more positive attitudes toward antimicrobial stewardship are more likely to engage in appropriate antimicrobial practices. These findings highlight attitudes as a critical determinant of behaviour.

4.8 PREDICTORS OF ANTIMICROBIAL PRACTICES

4.8.1 Model Summary

The multiple linear regression model explained 23.3% of the variance in antimicrobial practices ($R^2 = 0.233$), indicating a moderate level of explanatory power.

4.8.2 Model Fit

The overall model was statistically significant ($F = 9.256$, $p < 0.001$), confirming that the included variables collectively contribute to predicting antimicrobial practices.

4.8.3 Regression Coefficients

Variable	Beta	p-value	Interpretation
Knowledge	-0.158	0.069	Not significant
Attitude	0.461	<0.001	Significant predictor
Profession	-0.131	0.132	Not significant
Experience	-0.035	0.670	Not significant

Table 4.6 regression coefficient table

4.8.4 Interpretation

The linear regression analysis identified attitude as the only statistically significant predictor of antimicrobial practices ($\beta = 0.461$, $p < 0.001$). This indicates that for every unit increase in attitude score, there is a corresponding improvement in antimicrobial practice. In contrast, knowledge, professional category, and years of experience were not statistically significant predictors of practice. These results suggest that improving knowledge alone may not be sufficient to change behaviour. Instead, interventions aimed at strengthening positive attitudes such as fostering a culture of accountability, enhancing institutional support, and promoting multidisciplinary collaboration may be more effective in improving antimicrobial practices. This has important implications for antimicrobial stewardship programmes, which should incorporate behavioural change strategies alongside educational interventions.

4.9 SUMMARY OF THE RESULTS

This chapter presented the results on knowledge, attitudes, and practices regarding antimicrobial resistance among healthcare professionals at Sally Mugabe Central Hospital. Overall, the results indicate that while respondents demonstrated generally good knowledge and largely positive attitudes toward antimicrobial stewardship, these strengths did not consistently translate into optimal practices. Variations were observed across professional groups and levels of experience, with medical doctors and pharmacists demonstrating higher knowledge levels, while nurses exhibited greater variability, particularly in attitudes and practices. Inferential analysis further confirmed that professional category significantly influences knowledge levels, highlighting the role of training and scope of practice in shaping antimicrobial resistance awareness. Despite the relatively high levels of knowledge and positive attitudes, the presence of inconsistent and, in some cases, poor practices underscore a

critical gap between knowledge and implementation. This gap suggests that knowledge alone is insufficient to ensure appropriate antimicrobial use and points to the need for strengthened institutional support, continuous professional development, and targeted stewardship interventions. These findings provide a comprehensive basis for the discussion in the next chapter, where they are interpreted in relation to existing literature and their implications for policy and practice are explored.

CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter provides a critical discussion of the study findings on the knowledge, attitudes, and practices (KAP) regarding antimicrobial resistance (AMR) among healthcare professionals at Sally Mugabe Central Hospital. The findings are interpreted in relation to the study objectives and situated within global, regional, and Zimbabwean contexts. The chapter goes beyond description to explore underlying factors influencing observed patterns, including behavioural, institutional, and systemic determinants. It further outlines the study's contribution to knowledge, presents conclusions, discusses implications for practice and policy, acknowledges limitations, and offers recommendations for future research and antimicrobial stewardship interventions.

5.2 DISCUSSION OF FINDINGS

5.2.1 KNOWLEDGE OF ANTIMICROBIAL RESISTANCE

The study demonstrated that healthcare professionals possessed generally high levels of knowledge regarding antimicrobial resistance, with a mean score of 7.20 (SD = 1.62). While this suggests that awareness of AMR is well established, the variability in knowledge levels across professional groups highlights important inequities in knowledge distribution. Consistent with global and regional literature, high awareness does not necessarily reflect depth of understanding, particularly in areas such as antimicrobial stewardship principles and resistance mechanisms. In the context of Sally Mugabe Central Hospital, the high knowledge levels may be attributed to ongoing infection prevention and control (IPC) programmes, increased global attention to AMR, and the availability of institutional treatment guidelines. However, these findings must be interpreted cautiously within the Zimbabwean healthcare context, where access to continuous professional development and updated training is often inconsistent. The observed differences in knowledge between doctors, pharmacists, nurses, and laboratory scientists reflect structural and professional dynamics within the healthcare system. Medical doctors and pharmacists, who are directly involved in antimicrobial prescribing and management, are more likely to engage with AMR-related information. In contrast, nurses despite being central to patient care and medication administration—may have fewer opportunities for formal training in antimicrobial stewardship. This disparity reflects broader systemic issues, including role delineation and limited interdisciplinary training.

Importantly, the presence of moderate and poor knowledge among a proportion of respondents suggests that knowledge gaps persist despite overall awareness. In resource-constrained settings such as Zimbabwe, these gaps may be exacerbated by limited access to updated clinical guidelines, restricted training opportunities, and heavy workloads. This finding underscores the need for targeted, context-specific educational interventions that go beyond general awareness to address practical knowledge deficits across all professional groups.

5.2.2 ATTITUDES TOWARD ANTIMICROBIAL RESISTANCE

The study found that most healthcare professionals demonstrated positive attitudes toward AMR and antimicrobial stewardship, with 62% exhibiting favourable perceptions. This reflects a general recognition of the seriousness of AMR and the importance of appropriate antimicrobial use, which is essential for the success of stewardship programmes. However, the presence of less favourable attitudes among certain groups, particularly nurses and more experienced professionals, reveals important behavioural and contextual dynamics. In hierarchical healthcare settings such as Sally Mugabe Central Hospital, nurses may perceive antimicrobial stewardship as primarily the responsibility of prescribers, limiting their sense of ownership and engagement. This highlights the influence of professional roles and institutional culture on attitudes. The results indicates that less experienced professionals exhibited more positive attitudes suggests that recent training and exposure to updated guidelines play a critical role in shaping perceptions. Conversely, more experienced professionals may rely on entrenched clinical practices and may be less receptive to change. This reflects a common challenge in clinical settings, where behavioural inertia and reliance on experiential knowledge can hinder the adoption of new practices. In the Zimbabwean context, additional factors such as high patient volumes, limited resources, and pressure to initiate treatment quickly may further influence attitudes toward antimicrobial use. Healthcare professionals may prioritise immediate patient outcomes over long-term resistance considerations, particularly in settings where diagnostic uncertainty is high. This underscores the need for interventions that not only improve knowledge but also address perceptions, motivation, and professional identity in relation to antimicrobial stewardship.

5.2.3 PRACTICES RELATED TO ANTIMICROBIAL USE

Despite good knowledge and positive attitudes, the study revealed that antimicrobial practices were inconsistent, with only about half of respondents demonstrating good practices. This

disconnect between knowledge, attitudes, and behaviour is a well-documented phenomenon in antimicrobial stewardship and highlights the complexity of translating knowledge into practice. In the context of Sally Mugabe Central Hospital, several systemic and institutional factors contribute to suboptimal practices. Limited access to timely and reliable diagnostic services may necessitate empirical prescribing, increasing the risk of inappropriate antimicrobial use. Additionally, high patient loads and staffing constraints may reduce adherence to guidelines, as healthcare professionals prioritise efficiency over protocol compliance. Behavioural factors also play a significant role. Fear of patient deterioration, diagnostic uncertainty, and perceived expectations from patients or colleagues may drive unnecessary or prolonged antimicrobial use. These factors are particularly relevant in resource-limited settings, where the consequences of delayed treatment can be severe. The variation in practices across professional groups further emphasises the need for a multidisciplinary approach. While prescribers play a central role in antimicrobial decision-making, nurses and pharmacists are critical in ensuring appropriate administration, monitoring, and review of therapy. The findings suggest that antimicrobial stewardship efforts must engage all healthcare professionals and address both individual and systemic barriers to optimal practice.

5.2.4 RELATIONSHIP BETWEEN KNOWLEDGE, ATTITUDES, AND PRACTICES

The study findings challenge the traditional linear assumption of the KAP model. While knowledge was positively associated with attitudes, it did not have a significant direct relationship with practices. In contrast, attitudes demonstrated a moderate and statistically significant association with practices. This suggests that knowledge alone is insufficient to drive behavioural change. Instead, attitudes reflecting beliefs, perceptions, and motivation play a more critical role in influencing clinical behaviour. In the context of this study, healthcare professionals who perceive AMR as a serious threat and view stewardship as part of their responsibility are more likely to engage in appropriate practices. The lack of association between knowledge and practice may be explained by contextual barriers, including limited resources, institutional constraints, and organisational culture. Even well-informed healthcare professionals may be unable to implement best practices in environments that lack the necessary support systems. These findings highlight the need for a shift from purely educational interventions to comprehensive strategies that address behavioural and systemic determinants of practice. This includes fostering a culture of accountability, enhancing teamwork, and strengthening institutional support for antimicrobial stewardship.

5.2.5 PREDICTORS OF ANTIMICROBIAL PRACTICES

The regression analysis identified attitude as the only statistically significant predictor of antimicrobial practices. This finding has important implications for the design of antimicrobial stewardship interventions. The significant role of attitude suggests that behavioural factors, such as perceived responsibility, risk perception, and motivation, are key drivers of practice. Healthcare professionals who value antimicrobial stewardship and recognise its importance are more likely to adhere to recommended practices, regardless of their level of knowledge. The lack of significant association between knowledge and practice reinforces the limitations of traditional training approaches that focus primarily on information dissemination. Similarly, the absence of significant effects of professional category and years of experience suggests that behavioural and contextual factors outweigh demographic characteristics in determining practice. These results emphasise the need for behaviourally informed interventions that target attitudes and organisational culture. Strategies such as audit and feedback, peer influence, leadership engagement, and reinforcement of accountability may be more effective than knowledge-based training alone.

5.3 CONTRIBUTION TO KNOWLEDGE

This study contributes to the growing body of literature on antimicrobial resistance in low- and middle-income countries by providing context-specific evidence from a major tertiary hospital in Zimbabwe. It highlights the critical role of attitudes in influencing antimicrobial practices and challenges the assumption that improving knowledge alone is sufficient to drive behavioural change. The findings underscore the importance of addressing behavioural and systemic factors in antimicrobial stewardship and provide a foundation for designing targeted interventions within similar healthcare settings.

5.4 CONCLUSIONS

The study concludes that while healthcare professionals at Sally Mugabe Central Hospital possess adequate knowledge of antimicrobial resistance and demonstrate positive attitudes toward stewardship, these strengths do not consistently translate into optimal practices. The findings reveal a significant gap between knowledge and behaviour, driven by a combination of behavioural, institutional, and systemic factors. Attitude emerged as the most important determinant of antimicrobial practices, highlighting the need for interventions that go beyond knowledge enhancement to address motivation, perceptions, and organisational culture. The

study emphasises that effective antimicrobial stewardship requires a comprehensive approach that integrates education, behavioural change, and institutional support.

5.5 IMPLICATIONS FOR PRACTICE AND POLICY

The results have several important implications:

- Antimicrobial stewardship programmes should incorporate behavioural change strategies, including audit and feedback, mentorship, and leadership engagement.
- Training programmes should focus on practical application and decision-making rather than theoretical knowledge alone.
- Institutional systems, including access to diagnostics, availability of guidelines, and supervision mechanisms, must be strengthened.
- A multidisciplinary approach should be adopted to ensure active participation of all healthcare professionals in antimicrobial stewardship.
- At policy level, there is a need to strengthen national frameworks for AMR surveillance, training, and stewardship implementation in resource-limited settings.

5.6 RECOMMENDATIONS

5.6.1 RECOMMENDATIONS FOR PRACTICE

- Implement targeted antimicrobial stewardship training programmes focusing on behavioural change and practical application.
- Strengthen enforcement and accessibility of antimicrobial prescribing guidelines.
- Establish routine antimicrobial use audits with structured feedback to healthcare professionals.
- Promote multidisciplinary collaboration, particularly enhancing the role of nurses and pharmacists in stewardship activities.
- Improve access to and turnaround time of diagnostic services to support evidence-based prescribing.

5.6.2 RECOMMENDATIONS FOR POLICY

- Develop and enforce institutional antimicrobial stewardship policies aligned with national AMR strategies.
- Integrate antimicrobial stewardship into mandatory continuing professional development programmes.
- Strengthen investment in laboratory infrastructure and AMR surveillance systems at national level.

5.6.3 RECOMMENDATIONS FOR FUTURE RESEARCH

- Conduct qualitative studies to explore behavioural and institutional barriers to appropriate antimicrobial use.
- Expand similar studies to other healthcare institutions in Zimbabwe to enhance generalisability.
- Evaluate the long-term impact of antimicrobial stewardship interventions on prescribing practices and resistance patterns.

5.7 LIMITATIONS OF THE STUDY

This study has several limitations that should be considered when interpreting the findings. The cross-sectional design limits the ability to establish causal relationships between knowledge, attitudes, and practices. The use of self-reported data introduces the possibility of social desirability bias, which may result in overestimation of good practices. Additionally, the study was conducted in a single institution, which may limit the generalisability of the findings to other settings. The small sample sizes in certain professional groups may also affect the robustness of subgroup comparisons. These limitations suggest that the actual level of appropriate antimicrobial practices may be lower than reported and highlight the need for further research using mixed-methods and longitudinal designs.

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APPENDIX A

INFORMED CONSENT FORM

Principal Researcher:
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Title of the Study: Knowledge, Attitudes and Practices Regarding Antimicrobial Resistance Among Health Care Professionals at Sally Mugabe Central Hospital

Introduction

You are invited to participate in a research study that aims to assess knowledge, attitudes and practices regarding antimicrobial resistance and antimicrobial stewardship among health care professionals at Sally Mugabe Central Hospital. Before you decide to participate, it is important that you understand why the research is being conducted and what your participation will involve.

Purpose of the Study

The purpose of this study is to evaluate the level of knowledge, attitudes and practices related to antimicrobial resistance among doctors, nurses, pharmacists and other relevant health professionals. The findings will help identify knowledge gaps and inform future antimicrobial stewardship interventions.

Procedures: If you agree to participate, you will be asked to complete a structured self-administered questionnaire. The questionnaire will take approximately 15–20 minutes to complete. No identifying personal information will be collected.

Voluntary Participation: Participation in this study is entirely voluntary. You may decline to participate or withdraw at any time without penalty or negative consequences to your employment or professional standing.

Risks and Discomforts: There are no anticipated physical or psychological risks associated with participation. The study involves answering professional knowledge and opinion-based questions only.

Benefits: While there may be no direct personal benefit, your participation will contribute to improved understanding of antimicrobial resistance awareness and may help strengthen antimicrobial stewardship programs at the hospital.

Confidentiality: All responses will be anonymous. No names, staff numbers or identifying information will be recorded. Data will be stored securely and accessible only to the researcher. Results will be presented in aggregate form.

Ethical Approval

The study will be submitted for approval to the relevant institutional ethics review committee and the hospital administration before data collection begins.

Questions or Concerns

If you have any questions about this study or your rights as a participant, you may contact the Principal Researcher using the details above.

Consent Statement

By signing below or by completing and returning the questionnaire, you confirm that you have read and understood the information provided and voluntarily agree to participate in this study.

Participant's Signature: _____

Date: _____

Researcher's signature_____

Date _____

APPENDIX B

QUESTIONNAIRE

Title: Knowledge, Attitudes and Practices Regarding Antimicrobial Resistance Among Health Care Professionals at Sally Mugabe Central Hospital

Instructions to Participants

- Please answer all questions honestly.
- Do not write your name or any identifying information.
- Tick (✓) the option that best represents your answer.
- The questionnaire will take approximately 15–20 minutes to complete.

SECTION A: DEMOGRAPHIC AND PROFESSIONAL INFORMATION

1. Age Group

   ☐ 20–29 ☐ 30–39 ☐ 40–49 ☐ 50–59 ☐ 60 and above

2. Gender

   ☐ Male ☐ Female ☐ Prefer not to say

3. Professional Category

   ☐ Medical Doctor ☐ Nurse ☐ Pharmacist ☐ Laboratory Scientist

   ☐ Other (Specify): _____

4. Years of Professional Experience

   ☐ Less than 5 years ☐ 5–10 years ☐ 11–20 years ☐ More than 20 years

5. Department/Unit: _____

6. Have you received formal training in antimicrobial stewardship?

   ☐ Yes

   ☐ No

7. Does your department have antimicrobial prescribing guidelines?

   ☐ Yes ☐ No ☐ Not sure

SECTION B: KNOWLEDGE ON ANTIMICROBIALS AND ANTIMICROBIAL RESISTANCE

Please indicate whether the statement is True, False, or Unsure.

Statement	True	False	Unsure
1. Inappropriate use of antibiotics contributes to antimicrobial resistance.	☐	☐	☐
2. Broad-spectrum antibiotics increase the risk of resistance development.	☐	☐	☐
3. Viral infections should routinely be treated with antibiotics.	☐	☐	☐
4. Poor infection prevention practices contribute to antimicrobial resistance.	☐	☐	☐
5. Antimicrobial stewardship programs help reduce resistance rates.	☐	☐	☐
6. Culture and sensitivity testing guides appropriate antibiotic selection.	☐	☐	☐
7. Stopping antibiotics early once symptoms improve reduces resistance.	☐	☐	☐
8. Resistant bacteria can spread from person to person.	☐	☐	☐
9. Hand hygiene plays a role in reducing antimicrobial resistance.	☐	☐	☐
10. Combination antibiotic therapy always prevents resistance.	☐	☐	☐

SECTION C: ATTITUDES TOWARD ANTIMICROBIAL RESISTANCE AND STEWARDSHIP

Please indicate your level of agreement with each statement.

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

Statement	1	2	3	4	5
1. Antimicrobial resistance is a serious problem in this hospital.	☐	☐	☐	☐	☐
2. I feel personally responsible for preventing antimicrobial resistance.	☐	☐	☐	☐	☐
3. Antimicrobial stewardship should be mandatory in all departments.	☐	☐	☐	☐	☐
4. I am confident in my ability to prescribe/dispense antibiotics appropriately.	☐	☐	☐	☐	☐
5. Overprescribing antibiotics is a problem in this hospital.	☐	☐	☐	☐	☐
6. Regular training on antimicrobial stewardship is necessary.	☐	☐	☐	☐	☐
7. Hospital management adequately supports antimicrobial stewardship.	☐	☐	☐	☐	☐

8. Restricting certain antibiotics improves patient outcomes.	☐	☐	☐	☐	☐
9. Multidisciplinary collaboration improves antibiotic use.	☐	☐	☐	☐	☐
10. I would support stricter antibiotic control policies.	☐	☐	☐	☐	☐

SECTION D: PRACTICES RELATED TO ANTIMICROBIAL USE

Please indicate how often you engage in the following practices.

1 = Never 2 = Rarely 3 = Sometimes 4 = Often 5 = Always

Statement	1	2	3	4	5
1. I follow hospital antibiotic guidelines when prescribing/dispensing.	☐	☐	☐	☐	☐
2. I request culture and sensitivity testing before starting antibiotics (where applicable).	☐	☐	☐	☐	☐
3. I review antibiotic therapy once laboratory results are available.	☐	☐	☐	☐	☐
4. I document indication for antibiotic use in patient records.	☐	☐	☐	☐	☐
5. I participate in antimicrobial stewardship activities.	☐	☐	☐	☐	☐
6. I educate patients about proper antibiotic use.	☐	☐	☐	☐	☐
7. I consult colleagues when uncertain about antibiotic choice.	☐	☐	☐	☐	☐
8. I adhere to infection prevention and control measures.	☐	☐	☐	☐	☐
9. I report suspected antimicrobial resistance cases.	☐	☐	☐	☐	☐
10. I de-escalate therapy when clinically appropriate.	☐	☐	☐	☐	☐

Thank You

Thank you for your participation. Your responses will contribute to improving antimicrobial stewardship practices at Sally Mugabe Central Hospital.