Research Proposal

The importance of antibiotics in health and social care

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Module:

Abstract

Antibiotics are essential in the current healthcare systems as they have reduced morbidity and mortality due to bacterial infections. Nonetheless, their usage and consumption have led to the evolution of antibiotic resistance or AR, which is ranked as a severe public health concern. Therefore, the purpose of this study is to have an understanding of antibiotics in the context of health and social care to assess the options to enhance the proper use of antibiotics and reduce the threat of AR. The research design adopted is qualitative in nature, and data was collected through a random sampling technique from patients and healthcare practitioners. This will enable the researcher to gather firsthand information and feelings through interviews on practices of antibiotics and resistance. In the case of data analysis, the thematic analysis will be used in developing themes concerning antibiotic misuse, effectiveness in stewardship, and behaviours. The anticipated findings include a lack of knowledge regarding antibiotics, antimicrobial prescription patterns, and policy deficits. The findings of this study have broader implications or applicability to broad public health, the field of health policy, and antimicrobial stewardship initiatives to improve antibiotic control and instructions.

Contents

1. Introduction

1.1. Research Background

Today, antibiotics are one of the cornerstones of modern medicine, significantly reducing morbidity and mortality associated with bacterial infections. After the discovery of penicillin by Alexander Fleming in 1928, antibiotics have proved to be one of the crucial tools in health and social care, in the prevention of infectious diseases, the improvement of surgical results, and the general health, well-being of patients with chronic ailments (Kourkouta et al., 2018). Ikuta et al. (2022) reported that in 2019, bacterial infections were reported to have caused 7.7 million deaths, therefore contributing to 13.6% of the global mortality rate, highlighting the significance of antibiotics. Antibiotics are especially important for such people as the elderly, people with weakened immunity and those with chronic diseases. According to CDC reports, 55.7 % of patients were prescribed antibiotics in 2010 during their hospital stay, showing the necessity of antibiotics' role in the hospitals (Scott Fridkin et al., 2014). In addition to the direct personal effects on health, antibiotic affects society in general by controlling epidemics and decreasing medical costs. For instance, early administration of antibiotics has been evidenced in the efficient reduction of sepsis mortality rate by 50% within the Intensive Care Units (CDC, 2019).

However, the development of antibiotic resistance (AR) is a severe threat to public health in the modern world. According to WHO, in the year 2019, Antimicrobial Resistance (AMR) was directly fatal to 1.27 million individuals and contributed to the mortality of 4.95 million people (WHO, 2023). Moreover, overuse and misapplication of antibiotics in health care facilities and in animal feed have led to the emergence of multiple drug-resistant germs, hindering treatment guidelines and thereby prolonging stay in health facilities, increasing the cost of treating diseases and, above all, increasing mortality rates. According to the statistics provided by the Centers for Disease Control and Prevention, antibiotic-resistant infections amount to over 2.8 million per year on average in the United States and cause at least 35,000 deaths (Redfield & Khabbaz, 2020). These statistics show a high prevalence of antimicrobial use, hence the increasing necessity to find ways how to promote the effective utilisation of antibiotics in health and social settings.

1.2. Justification/Rationale

Antibiotic resistance has become a major threat to global health since it raises the challenge of addressing patient care, impacting healthcare costs and public health (WHO, 2023). Both in clinical and community practices, antibiotics have been prescribed and used prematurely and

inappropriately, resulting in the emergence of drug-resistant bacteria to standard treatments. To address this problem, it is necessary to conduct an evaluation of antibiotic stewardship programs, policies that are implemented in health and Social Care, and the campaigns that are created, implemented and disseminated in the public domain.

1.3. Statement of the Problem

Antibiotics have been quite effective in combating infections though the use and perhaps misuse have played a role in the emergence of more resistant pathogens, and consequently reduced effectiveness of medical interventions. Thus, the purpose of this research is to assess the usage of antibiotic in the health and social care industry and steps taken to tackle the risks of antibiotic resistance. The research will involve the assessment of the antibiotic utilisation, heath care policies and the existing antimicrobial stewardship programmes to ensure sustainable antibiotic use to prevent the emergence of resistance while delivering adequate effective therapy.

1.4. Research Aim and Objectives

1.4.1. Research Aim

To examine the role of antibiotics in health and social care and propose strategies for optimising their use while mitigating the risks of antibiotic resistance.

1.4.2. Objectives

1. To assess the impact of antibiotics on patient outcomes, healthcare practices, and disease management in health and social care settings.
2. To analyse the factors contributing to antibiotic resistance, including prescribing practices, patient adherence, and healthcare policies.
3. To evaluate existing antibiotic stewardship programs and propose recommendations for enhancing antibiotic use in healthcare and community settings.

2. Literature Review

2.1. The Impact of Antibiotics on Patient Outcomes and Healthcare Practices

Antibiotics have played a crucial role in improving patients' outcomes and constructing the overall healthcare system. Administration of antibiotics is highly recommended especially in conditions such as sepsis whereby prompt treatment is vital. Weinberger et al. (2020) noted that for every delayed hour in the administration of antibiotics to patients who have septic shock; mortality rate increased by 1.8 %. Research also stipulated that timely use of antibiotics in sepsis cases is crucial in counteracting death statistics (Im et al., 2022). However, with the repeated

utilisation and even improper application of antibiotics, the formation of antibiotic-resistant bacteria has become a problem to manage. Van Hecke et al. (2017) established that antibiotic resistance leads to an increase in patients' illness burden within the community, as well as the potential for increased workload in primary care. In response to this, different initiatives of the antimicrobial stewardship programs (ASPs) have been adopted in order to manage the use of antibiotics. A systematic review and meta-analysis noted that ASPs are advantaged in decreasing requirement for antibiotics both within and beyond the hospital (Ya et al., 2023).

2.2. Factors Contributing to Antibiotic Resistance and Its Implications

Resistance to antibiotics is one of the medical problems that originate from a number of factors affecting the whole world. One of the main causes is the excessive and irrational consumption of antibiotics in human medicine. According to the National Institute of Allergy and Infectious Diseases (NIAID), increased use of antimicrobials, especially in health facilities, makes the environment favourable for the emergence of resistant organisms (NIAID, 2011). For instance, the World Health Organisation states that improper use and overuse of antimicrobials are contributing factors to emergence of resistance (WHO, 2023). Another highly influential factor is Agricultural practices as well. Most attention has been directed towards the use of antimicrobial agents in animals which are reared for human consumption like poultry, pigs and cattle (Hosain et al., 202). Moreover, environmental factors further exacerbate AR. The release of antibiotics and resistant bacteria into water bodies, soil, and waste systems facilitates the spread of resistance genes (Endale et al., 2023).

Furthermore, the effects of AR are striking and pervasive. Resistance to antimicrobial agents results in severe diseases, longer stay in the hospitals, higher hospital charges, and increased mortality profile. For instance, Europe has linked AMR with more than nine billion euros per year in terms of health costs (Dadgostar, 2019). According to National Geographic, WHO has indicated that current drug-resistant pathogens are capable of rendering several vital procedures impossible, such as chemotherapy for cancer and surgeries (WHO, 2023).

2.3. Evaluating Antibiotic Stewardship Programs and Strategies for Optimising Antibiotic Use

Effective ASPs are critical in the management of antibiotic usage and in preventing antimicrobial resistance. As shown in the systematic review published in JAMA Network Open, ASPs lead to a decrease in antibiotic consumption across both hospital and non-hospital

environments, which in subsequent manners leads to a reduction of the resistance and beneficial effects in patient outcomes (Ya et al., 2023). Likewise, another study published in the Journal of Antimicrobial Chemotherapy pointed out that ASPs not only contribute to barring the prescription of unnecessary medicines but also minimise the Antibiotic-associated adverse outcomes like Clostridium difficile infection and antimicrobial toxicity (Huang et al., 2022). Additionally, CDC (2024) states that ASP models implemented in hospitals, especially those spearheaded by pharmacists and involving other health care professionals, have been very useful.

In addition, conducting research on Antimicrobial Resistance and Infection Control, it was concluded that ASPs progressively result in reduced infection incidences and prevent the misuse of antibiotics, bringing about a high percentage of cost reduction in healthcare (Nathwani et al., 2019). Nonetheless, several challenges are encountered in the application of ASPs in low-resourced environments. Ya et al. (2023) suggest that many ASPs in developing countries still do not have adequate regulatory structures, essential health facilities and qualified human resources to support them. As established, ASPs are effective in improving antibiotic use and prevention of resistance; therefore, there is a need to promote ASP implementation worldwide and address a number of constraints affecting resource implementation.

2.4. Theoretical Framework

The theoretical assumption in this particular study involves the use of Germ Theory of Disease and Health Belief Model (HBM) theories. Such theories give a sound background knowledge concerning the use of antibiotics within care facilities and worker's health, the threat of the antibiotic resistance, and the significance of prudent administration of antibiotics.

2.4.1. Germ Theory of Disease

Antibiotics are utilised in the treatment of diseases through the Germ Theory of Disease, which is the foundation of antibiotic therapy. According to Gaynes (2023), the germ theory affirms that the origin of infectious diseases is microorganisms, especially bacteria. The theory brought about the development of antibiotics, which address bacterial infections in a bid to decrease morbidity and mortality. Schmiege et al. (2020) state that antibiotics have become popular in medical practice because they have been observed to enhance surgical outcomes, decrease the incidence of secondary infections, and check the spread of diseases. However, the same theory also reflects versatility of bacteria that develop resistance structures through genetic mutations and

pressure from overuse of antibiotics. This has raised the need for the proper use of antibiotics to ensure their efficacy is not compromised in future.

2.4.2. Health Belief Model (HBM)

HBM offers a psychological approach to understanding the rationality of antibiotic use considering people's perception about their health. Accordingly, a person's decision to take antibiotics is influenced by their perceptions of susceptibility to diseases, severity of illness, perceived benefits of treatment, and perceived constraints to accessing treatment (Lin et al. 2020). For example, people who consider themselves susceptible to infections can pressure their doctors into prescribing antibiotics even where they are unnecessary, such as in viral diseases. People who do not believe in the severe consequences of antibiotic resistance may not adhere to the guidelines, resulting in misuse. Moreover, people's belief that antibiotics effectively cure illnesses promptly influences antibiotic utilisation and pressure on healthcare workers. Consequently, patient education could be insufficient, there may be misconceptions about side effects, medical access could be a challenge, and this may lead to self-medication or non-compliance. HBM is useful in the development of public health interventions to increase awareness of the right use of antibiotics and dispel existing beliefs that may be counterproductive in the fight against antibiotic resistance (Jeihooniet al. 2018).
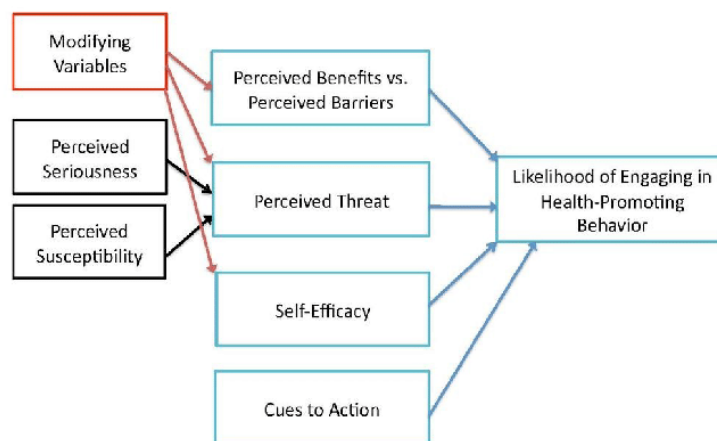

Figure 1 The Health Belief Model (Zin et al. 2017).

2.4.3. Application to Research

Regarding the importance of antibiotics in health and social care, the Germ Theory of Disease supports the notion but at the same time highlights the issue of bacterial evolution towards

the development of resistance. The Health Belief Model gives an insight into the behaviours of patients that lead to misuse of antibiotics, hence the need for awareness creation and policies. With the help of both these theories, the current research will evaluate how antibiotic use can be effective and not lead to the development of resistance through education, stewardship programs as well as policy changes.

2.5. Literature Gap

Despite extensive research on antibiotic use and antimicrobial resistance, several gaps remain. Few of the researchers describe the medium- and long-term results of Antibiotic Stewardship Programs (ASPs) and their sustainability, in particular in low-resource settings (Jinks et al., 2022; Pokharel et al., 2019). Further, while there is valuable literature regarding healthcare providers' prescribing behaviours, there is a scarcity of information on patients' behaviours, especially concerning the role of attitudes and beliefs in contributing towards the irrational utilisation of antibiotics. It means that despite a constant focus on antibiotic resistance as a widespread public health issue, the theory and practice of attitude change regarding this problem remain insufficiently researched especially in non-Western communities (WHO, 2023). Moreover, there is a lack of health studies relating to antibiotic resistance in low- and middle-income countries, even though a large part of the global population lives in these regions (Ramay et al., 2020). Lastly, existing studies mainly provide information from general and medical fields, with less reference to social and environmental contexts, which may contribute to resistance development. Filling these gaps is important for global antibiotic stewardship.

3. Methodology

3.1. Research Design

Research design can be characterised as qualitative, quantitative, or mixed which depends on the purpose and objectives of the research. Quantitative research confirms relationships between two or more quantitative variables while qualitative research gathers and analyses non-numerical information on the experiences, behavior and opinion of people (Ishtiaq, 2019). The use of both quantitative and qualitative research methods, known as mixed-methods, ensure that the research analyse the research question fully and have an all-inclusive understanding of the problem under investigation. Hence, the research design adopted for this study is qualitative given that the focus is on people's impressions and their behaviour in relation to the use of antibiotics. Holloway & Galvin (2023) define qualitative research as being essentially useful for investigating complex health practices because it permits understanding of situational and individual tendencies.

Compared to quantitative methods which use measuring instruments, qualitative research enables one to have the freedom to capture perceptions and reasons regarding the subject matter in a more naturalistic manner (Lim, 2024). Therefore, for the present research, a qualitative research design is appropriate because the focus of the study will be views of patients, expectations of healthcare providers as well as effects of antibiotics stewardship protocols. To understand why people abuse antibiotics, various factors, including beliefs, health-care access as well as social factors, cannot be quantified but rather need to be analysed. Moreover, antibiotic resistance is not only a knowledge-based problem but also a context-related issue related to cultural attitudes and systems of the healthcare setting; therefore, qualitative designs are more useful for uncovering sources of the problem and suggestions for solutions.

3.2. Data Collection Method

In research, data collection is divided into two types, known as primary and secondary, which are used for different aims. Primary data collection involves obtaining data directly from the sources, while secondary data collection entails data that has already been collected by other people through other means (Sileyew, 2019). Primary research is essential when working on new or emerging theories where the data collected is fresh, timely, and provides a good match for the goals of the research (Creswell & Hirose, 2019). This research employs a primary research approach because it aims to gather original information on antibiotic usage and resistance. Primary data will be collected through semi-structured interviews and focus group discussions with

healthcare professionals, pharmacists, and patients. The justification for the use of primary data collection is due to the reason that it involves the collection of fresh information from firsthand sources regarding antibiotic use, perception and decision-making processes among individuals. Since patient compliance, doctor prescribing practices, and public health literacy are key players in the misuse and rise of antibiotic resistance, it is vital to solicit direct feedback from the patients.

3.3. Sampling Strategy

Sampling techniques are summarised into probability and non-probability sampling. Probability sampling allows for an equal opportunity to select one person over the other from the target population, making it fitting for obtaining generalisable results. In contrast, non-probability sampling involves the use of subjective criteria for sample selection, although this can bring bias into the research; it can be advantageous because it permits sampling from a population of interest (Arbale & Mutisya, 2024). In this study, the researcher uses random sampling, which is a form of probability sampling, so that the subjects are chosen randomly, thus increasing the validity and reliability of the research (Alabi, 2017). Random sampling is known for minimising some of the influential sources of biases, making it easier to get more credible results that reflect those of the whole population (Arbale & Mutisya, 2024).

Hence, the use of random sampling is especially justified in this study since the purpose of this research is to look into the attitudes of both healthcare workers and patients towards antibiotic utilisation and resistance. Since misuse of antibiotics is witnessed across all demographics and professions, a random selection of participants ensures that the study samples have a diverse composition. This will ensure that information on antibiotic practices and resistance obtained from the people will be more general and applicable to public health interventions and policy changes.

3.4. Data Analysis

Based on the type of data that is being collected, data analysis methods may be classified as quantitative or qualitative. Quantitative analysis entails measuring relationships and characteristics of phenomena numerically, while qualitative analysis looks at patterns, values, and experiences by analysing non-numerical information (Creswell & Hirose, 2019). In qualitative study, thematic analysis is one of the common methods of data analysis that helps in identifying and categorising patterns found within the text (Braun & Clarke, 2024). The method used in this study is thematic analysis that aligns well with the interview and focus group discussion in light of antibiotic use and resistance. Thematic analysis helps a researcher to capture a number of

occurrences within participants' accounts and, therefore, to achieve a better understanding of behavioural drivers of antibiotic use. Compared to other forms of qualitative analysis such as content analysis that operationalises key terms and phrases, thematic analysis encompasses broader themes, intent and views (Braun & Clarke, 2024).

3.5. Ethical Considerations

To address participant rights and research integrity, this study follows ethical principles and guidelines. All the participants will be asked to sign the consent form that shows they understand why the study is being conducted, what is going to be done and their freedom to quit at any time. To uphold the principles of participant's rights, their identity will not be revealed, and the information collected will be stored safely to avoid use by unauthorised personnel. Participant safety will be emphasised to minimise any physical or psychological harm as a result of participation in the research process. If any personal information is brought into the discussions, such as the use of antibiotics or healthcare experiences, the discussion will be conducted with courtesy and sensitivity and appropriate support every time. From a broader perspective, the research will be in complete compliance with the institutional and legal requirements on ethical clearance from an appropriate body as informed by the guidelines of the University and GDPR.

4. Implications and Contributions to Knowledge

4.1. Impact or Expected Contribution to Knowledge

This study will also offer valuable information on the frequency of antibiotic prescriptions, factors influencing antibiotic resistance and the efficiency of stewardship interventions. The research will establish more widespread knowledge gaps among patients concerning the need for antibiotics and the dynamics of external factors that affect prescriptiveness among healthcare professionals. Also, the study is expected to reveal a knowledge deficit among the public and another system failure in the stewardship of antibiotics. The potential effects for the field are vast. The findings of the study can be applied in formulating policies, health-related measures, and educational campaigns targeting the irrational use of antibiotics. Through recognising behavioural and systems factors, specific knowledge campaigns could be implemented to enhance patient compliance and healthcare workers' practices. In addition, it may improve understanding of administering intravenous antibiotics, helping create better adapted antibiotic stewardship programs for various health-care facilities. The study is also important for the

allocation of resources with reference to public health, medical education and government policies and therefore can play a role in reducing antimicrobial resistance in the world.

4.2. Conclusion

This research proposal has identified the role of antibiotics in health and social care, factors influencing antibiotic resistance, and the significance of better stewardship. The qualitative research design with thematic analysis will allow the study to capture the real-life experiences of patients and heath care providers thus better understanding of antibiotic usage behavior. In that respect, this study is of considerable value, as it contributes to the improved understanding of antibiotic stewardship and sheds light on the aspect of responsible antibiotic use in patients in the future health care policies. Modern treatment options are facing one of the most pressing problems – antibiotic resistance – and this study provides a realistic and highly needed approach to rational use of antibiotics. From these findings, strategies and educational practices can be made to thwart any potential barriers to these antibiotics and provide sustainable treatment for future generations.

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Appendices

Appendix A: Interview Questions

1. Can you describe your understanding of antibiotics and their role in treating infections?

2. What factors influence your decision to use antibiotics, whether prescribed by a doctor or self-administered?

3. In your experience, what are the common reasons for antibiotic misuse or overuse in healthcare settings or the community?

4. How do you think antibiotic resistance impacts healthcare and patient treatment

5. What strategies do you believe could help improve responsible antibiotic use among patients and healthcare providers?

6. Have you encountered any challenges in following antibiotic prescriptions or adhering to antibiotic stewardship programs? If so, what were they?