Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/0ceq9x35

AWARENESS AMONGST SERVICE PROVIDERS AND PATIENTS REGARDING THE USE AND DISPENSE OF ANTIBIOTICS A CROSS-CITY ANALYSIS IN PAKISTAN

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ABSTRACT

The main objective of this study is to create awareness among service providers and patients regarding the use and dispensing of antibiotics in different cities in Pakistan. This study was qualitative, and semi-structured interviews were conducted to collect data regarding antibiotics. The study has been conducted in big cities in Pakistan. The population for this study consisted of all pharmacies and government and private hospitals. The study's sample size is 14 participants, 07 healthcare providers, and 07 patients. The study used thematic content analysis, a technique that finds and analyses themes or patterns in a data set. Four (4) themes and sixteen (16) sub-themes were identified based on past literature. The main themes include **Participants attitude** (self-medication & attitude toward antibiotic use), **Participant's knowledge** (antibiotics knowledge, Antimicrobial Stewardship awareness, knowledge of antibiotics resistance & risk awareness), **participant's practices** (appropriate antibiotics consumption, healthcare professional consultation, pharmacy practices, dispensing antibiotics without prescription & guidance to patients) and **Suggestions for rational dispense and use of antibiotics** (prescriber must not prescribe unnecessary antibiotics, Antibiotics have separate regulations, have moral fear for non-prescription antibiotics and put the responsibility, need community-based awareness programs, healthcare providers must look twice at the antibiotic's prescription & the pharmacist must educate people). Data and responses of participants were visualized with the help of a cloud diagram. A codebook was created to understand the complete picture of themes and sub-themes of this study. The

majority of participants lacked sufficient understanding of antibiotics and their resistance. At the end, recommendations were given for the rational dispense and use of antibiotics.

Keywords: Antibiotics, resistance, attitude, knowledge and practices

INTRODUCTION

The great medical discovery of the twentieth century may have been the development of antibiotics for use in clinics. Antibiotics not only treated infections but also paved the way for many contemporary medical treatments, such as treatment for cancer, organ transplantation, and open cardiac surgery. Unfortunately, improper usage of these beneficial substances has led to a sharp increase in antibiotic resistance, making many illnesses practically incurable. A steady rebirth of interest in antibacterial research and development is being driven by legislators' acknowledgment of the threat that a post-antibiotic period poses to the health of people and their commitment to provide greater grant funds (Hutchings, et al., 2019). This study explored the awareness amongst service providers and patients influences antibiotic dispensing and use.

BACKGROUND OF STUDY

Antibiotics are frequently used medications in contemporary medicine. It wasn't always like this. People have been looking for solutions to treat illnesses since ancient times. It was believed that molds, dyes, and even heavy metals would be useful in healing (Gould, 2016). The processes of prescription and administering antibiotics do not fully adhere to the accepted recommendations. Without legal prescriptions, cross-city analysis i.e. pharmacies, was often used to prescribe and dispense antibiotics. Additionally, a greater proportion of antibiotics were prescribed rather than being self-medicated, and individuals were more likely to turn to self-medication as a low-cost means of treating their illnesses (Imtiaz, et al., 2017).

Therefore, protecting antibiotics is a major responsibility shared by physicians, the general public, and chemists. Despite the perception that antibiotic use was declining, people were typically well-informed about antibiotic resistance and overuse. Despite this, some people thought that demand for antibiotics, noncompliance, and over-the-counter dispensing remained an issue. However, many thought that the public was more receptive to unconventional tactics, including postponing the prescription of antibiotics. Regarding their responsibilities as patient educators in increasing knowledge and awareness, general practitioners and chemists were equally excited (Saleh, et al., 2022).

The beliefs and views of patients, the behaviors and attitudes of healthcare personnel, and environmental circumstances all have an impact on the prescriptions written by medical practitioners. Prescriptions written by medical professionals are based on several factors, including the patient's features, prior experience prescribing antibiotics, the severity of the disease, the existence of a bacteria-related infection, the affordability and accessibility of medication, and experimentation. Additionally, they don't know much about the usage of antibiotics and don't tell patients much about it either. Patient-related characteristics included inadequate information of antibiotic usage and resistance, lack of understanding of antibiotic use, as well as demand for a specific antibiotic.

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of pharmaceutical corporations and pharmacies, and an overworked healthcare sector were cultural factors that led to the prescription of antibiotics. Although they are aware of issue of antibiotic resistance, medical practitioners do not feel that they have any responsibility for it. Rather, the overworked system, neighborhood pharmacies, drug reps, and patients are held accountable. Combating antibiotic resistance requires a multi-sectoral, comprehensive strategy (Kagoya, et al., 2021).

Most of the pharmacists knew that antibiotics are often recommended, that allergies might occur, and that patients shouldn't stop taking antibiotics if their symptoms are getting better. These pharmacy technicians had a fair awareness of antibiotics and how to utilize them (Mustafa, et al., 2022). Particularly in less regulated health systems like India, antibiotic abuse is pervasive and fuels the rise in antibiotic resistance. Even though they participate in significant portions of primary medical treatment, informal providers differ in terms of their expertise, attitudes, and methods. Conflict between information and practice among conventional doctors, low awareness and knowledge of the uses and functions of antibiotics among private health practitioners are the main causes of antibiotic resistance (Nair et al., 2019).

STATEMENT OF PROBLEM

The discovery of antibiotics is very significant and makes the revolution in medical research which effectively lowers the morbidity and death rates associated with bacterial infections that could not be treated previously. However, the misuse of antibiotics is very common in Pakistan, which resultantly promotes the development of antibiotic resistance, particularly in less regulated healthcare systems. In Pakistan, both patients as well as pharmacists have limited awareness and knowledge about antibiotics. According to Lindberg et al. (2017), medical professionals frequently prescribe antibiotics for severe infections such as the upper respiratory tract even though there is clinical proof of the opposite. Pakistan is a country where antibiotic misuse in patients and dispensation with prescription by pharmacists is prominent. Patients, pharmacists, and people associated with healthcare settings need to be educated about the proper use of antibiotics, this job can be performed by healthcare professionals and doctors (Markovic-Pekovic et al., 2017 & Cadogan & Hughes, 2021). This study has explored the awareness of the use and dispense of antibiotics amongst service providers and patients in Pakistan.

RESEARCH QUESTION

The study tried to find out the answer to the following questions:

How does awareness amongst service providers and patients affect the use and dispense of antibiotics in different cities of Pakistan?

OBJECTIVES OF STUDY

The main objectives of this study are given below:

1. To explore stakeholder’s awareness of antibiotic use and dispense in different settings of Pakistan.
2. To observe how the service providers and patient’s relationship influences antibiotic dispense and use.
3. To identify the drivers of antibiotic use and potential solutions to address the appropriate use and dispensing of antibiotics.

THE RATIONALE OF STUDY

Misuse of antibiotics is an international problem, and especially in backward areas of Pakistan where there are few health facilities, the issue is likely to get worse. Since antibiotics can save lives, these are prescribed to more than fifty percent of hospitalized patients. A cross-sectional study conducted in Lahore, Pakistan, discovered that 95% of antibiotics were given out without a doctor's prescription (Saleem, et al., 2020). Antibiotic abuse and dispense can have serious effects in

addition to being linked to antibiotic resistance. Poor antibiotic use negatively affects patients' health, increases personal expenses, and lowers patient quality of life, all of which have an adverse effect on patients' lives. Furthermore, according to Atif et al. (2020), it puts a cost on medical facilities. Therefore, the study aimed to explore the awareness of service providers and patients regarding rational use of antibiotics, antibiotic resistance, prescribing practices and factors associated with these practices.

SIGNIFICANCE OF STUDY

The discovery of antibiotics, the 19th century has been known as the "Golden Age"; yet, however, this period was short-lived as a consequence of the emergence of numerous resistant diseases (Akhund et al., 2019). Antibiotics have been suggested to be life-saving medications. According to Khan and Fang (2021) antibiotic resistance has been considered as a long-lasting issue. The 21st century has seen a sharp increase in antibiotic resistance, which is mostly caused by inappropriate use and unjustified prescription. It is now a significant global health risk, particularly in developing nations. Since antibiotics are one of the most commonly given drugs, there is a significant risk of medication misuse. Approximately 20 to 50 percent antibiotic prescriptions are not appropriate for the patient (Ahmed et al., 2020). Some of the main causes of antibiotic resistance include inadequate infection control measures, the overuse or underuse of antibiotics, and the accessibility of medications available without a prescription. The study explored the link between service providers and patients regarding awareness of the use and dispense of antibiotics in the environment of different cities of Pakistan.

LITERATURE REVIEW

Antibiotic misuse and excess usage constitute a major worldwide issue. The discovery of novel antibiotics has stopped, despite the rise in resistance to old antibiotics. A worldwide public health concern is antibiotic resistance, which is mostly caused by the widespread use of these medications. Both qualified and untrained workers from a variety of industries utilize antibiotics at the retail industry, such as in pharmacy and drug stores, in medical facilities, and farms. These employees have distinct financial incentives and work within national regulatory frameworks. Training & education, review by peers and assistance, preauthorization of specific antibiotics by infection specialists, improved tools for diagnosis, and the application of resistance profile can all help prevent improper utilization of antibiotics by workers in healthcare industry (Tangcharoensathien et al., 2018).

Among the most affordable, life-saving medications that also help people live longer is an antibiotic. But the fast rise in antibiotic resistance undermines the effectiveness of antibiotics, and when paired with the dearth of newly developed antibiotics (or antimicrobial combination) with novel mode(s) of action, Antibiotic resistance is regarded as a serious danger to world health. The overuse of antibiotics is a major factor contributing to Antibiotic resistance. Antibiotic resistance is rapidly increasing due to the overuse of antibiotics, which is widely recognized as a threat to world health, growth, and stability. Antibiotic resistance is primarily caused by volume of antibiotics used generally, but unreasonable antibiotic use—which is impacted by a number of interrelated factors—also plays a significant role (Machowska, & Lundborg, 2018).

Antimicrobial resistance is largely caused by the inappropriate consumption (misuse) of antibiotics, which raises morbidity, mortality, and expenses. As a result, numerous initiatives to emphasize its significance and lessen the overuse of antibiotics have been launched in various nations and countries. In order to lower the development of antimicrobial resistance in the years to come, the Worldwide Pharmaceutical Federation advises chemists to enhance the way they dispense medicines (Markovic-Pekovic, et al., 2017).

In community pharmacies, giving out antibiotics without a prescription was a regular occurrence. The medical circumstance, the safety and effectiveness of antibiotics, patients requesting antibiotics by title, emergency situations, regular customers, pharmaceutical company promotions, time and

cash savings, brand medications, and subpar healthcare services were all factors that influenced chemists' opinions regarding dispensing antibiotics without a prescription. Furthermore, little understanding of antibiotic resistance and ignorance of antibiotic stewardship resulted in improper distribution practices. According to Alkadhimi et al. (2020), community chemists have a negative opinion about giving out antibiotics lacking a prescription. One of the most worrying problems in contemporary medicine is antibiotic resistance, which is a result of improper antibiotic usage in the community (Bianco et al., 2021).

The use of antibiotics without caution might lead to selection pressure to appropriate bacteria, which is one of the main factors driving the development and dissemination of resistance to antibiotics. Numerous studies conducted globally have shown that community chemists have a critical role in promoting the responsible use of anticoagulants (Gajdacs, et al., 2020).

It is significant to highlight that states and healthcare facilities differ greatly in their knowledge of and practices around the prescription of antibiotics. Therefore, policies and actions particular to states or healthcare centers are advocated. Increased campaigning efforts, policy & advisory documents, stewardship initiatives, and the creation of a surveillance system to track antibiotic resistance could all help achieve this. This could be helpful in identifying current developments and assisting healthcare professionals in supporting standards for best practices. Furthermore, it is imperative that healthcare personnel receive ongoing training as well as education by worker-specific interactions, and that interventions based on behavior change concepts and models be developed (Chukwu, et al., 2021).

Antibiotic overuse that is not justified includes self-medication, treating illnesses that are not bacterial, and prescribing antibiotics at the wrong dosage. The overuse of antibiotics has led to a sharp rise in antibiotic resistance, which is directly related to this. This tendency has been linked to higher mortality, longer hospital stays, worse health outcomes, and higher costs to both patients and the government. An important contributing factor to inappropriate antibiotic use is a lack of awareness about antibiotic use. Reviewing the availability of antibiotics in pharmacies is necessary (Mboys, et al., 2018).

Antibiotic dispensaries and the utilization of antibiotics without proper prescription from authorized medical professionals are widespread in nations with lax pharmaceutical laws and where sensible use is not prioritized. Due to its dependence on incorrect indications, dosing mistakes, and lack of prior treatment microbiologic evaluation, this approach is a major contributor to the emergence of antibiotic resistance (Koji, et al., 2019).

The dispensing practices in community pharmaceutical retail shops are influenced by the knowledge as well as attitudes around the rational use of antibiotics. But in nations with low resources, proof is limited. Although the majority of patients possessed suitable information and attitudes regarding the usage of antibiotics and resistance to antibiotics, there are still gaps in fundamental knowledge as well as attitudes (Belachew, et al., 2022).

In many contexts, there is a lack of guidance regarding how to make best use of antibiotics for prevalent diseases. The AWaRe framework which is based on the danger of developing antibiotic resistance linked with the usage of various antibiotics is heavily emphasized in the book's specific instructions on the empirical use of antibiotic in the model list. According to Zanichelli et al. (2023), the book emphasizes the use of first-line Access antibiotics or refraining from antibiotic treatment where it is the patient's safest course of action.

The most often used medications are antibiotics, whose use increased by 46% globally from 2000 to 2018. According to their advised usage, antibiotics are divided into three different groups by the World Health Organization i.e. access, watch, & reserve. The last two categories are more likely to result in antibiotic resistance (Browne et al., 2021).

As antibiotics are used inappropriately, resistant forms of bacteria are evolving more quickly and becoming less effective. One of the main causes of improper antibiotic usage, specifically in low and middle-income economies, is self-purchasing of antibiotics, especially for viral diseases. Particular problems exist in nations like Pakistan. In order to inform future policy, it is necessary to

evaluate the numbers of self-purchasing that are now occurring, particularly for reserves antibiotics. Just 3.1% of the 353 pharmacies & medical stores that were surveyed refused to dispense antibiotics; with 96.9% of them dispensing antibiotics without requiring prescription medication (82.7% at need level 1 and 14.2% at need level 2). Ciprofloxacin (22.1%) was the antibiotic that was prescribed the most often.

Unexpectedly, antibiotics from the reserve group were additionally given out and dispensed without a prescription. Just 25.2% of patient contacts involved pharmacy workers advising patients on the usage of antibiotics, while just 11.0% had pharmacists asking about past use of other medications (Saleem et al., 2020).

Antibiotic resistance is primarily caused by the readily accessible supply of antibiotics, which puts pressure on doctors as well as pharmacists to provide and distribute antibiotics for circumstances that are primarily self-limited. Infection rates are also fueled by inadequate sanitation and living circumstances in many nations with lower or middle incomes (Sakeena, et al., 2018).

Antibiotic resistance rates are increased in several nations where medicines are widely available over-the-counter in medical supply stores and neighborhood pharmacies. This is particularly the case when antibiotics are prescribed for viral diseases like coughs or colds. In general, public behavior such as pressuring chemists to dispense antibiotics for mostly viral infections, along with a shortage of diagnostic resources and subpar medical professional practices, are contributing to an expansion of selling of antibiotics without giving a prescription, particularly in developing nations (Auta et al., 2019).

Since community pharmacists frequently serve as among the first medical professionals that individuals consult in low- and middle-income nations, where accessibility is a major concern due to often inadequate financial resources to visit a doctor as well as buy medications, community pharmacists have a significant stake in decreasing the unsuitable dispensation of antibiotics which are without prescriptions (Zawahir, et al., 2019).

The primary distribution route for antibiotics is through community pharmacies. 573 pharmacy sellers (91.7%) replied to the study; all of them were men as well as 44.0% of them were between the ages of 31 and 40. 51.1% of the respondents said they were authorized to dispense non-prescription antibiotics, and about 81.5% of respondents said this is frequently done in local pharmacies. 69.3% of respondents said this contributed to the rise in antibiotic resistance. The majority of respondents (79.1%) thought that this approach encouraged the inappropriate use of antibiotics, and half (52.2%) thought that antimicrobial resistance was a problem for public health. Merely 34.5% of participants suggested that patients seek medical advice before utilising antibiotics, and 61.8% believed that their medication dispensation methods decrease the financial strain on patients. The percentage of pharmacy shopkeepers who said they knew enough about using antibiotics was roughly 44.9%. Staff members' lack of awareness is linked to the dispensation of antibiotics that are not prescribed. It is important that this improper behavior be stopped right away (Aziz et al., 2021).

The national drug strategy of Pakistan prohibits completely the selling of antibiotics without a prescription, and pharmacists are only allowed to sell any kind of antibiotic with a valid prescription from a licensed physician (Aziz & Fang, 2019). Pharmacists were well-versed in antibiotics. Regarding Antimicrobial stewardship program, there were certain differences in community chemists' beliefs and methods. Creating tailored interventions will be essential to close these gaps and enhance community pharmacists' views and practices on Antimicrobial stewardship program in the present setting (Sarwar, et al., 2018). One of the primary worldwide reasons of antibiotic resistance is the irresponsible utilization of antibiotics. Buyers were found to be unaware of and to utilize antibiotics improperly. The public needs to be educated and made aware of the issue of antibiotic resistance immediately (Khan, et al., 2020).

Although national regulations have banned the practice, the sale of nonprescription antibiotics is quite common. Antibiotics were distributed without a prescription in large quantities when the fictitious client asked for any kind of treatment to ease their pain. Regulators must move quickly to

address the concerning practice of pharmacies and medical outlets in Hazara Division distributing antibiotics without seeing a prescription. Furthermore, the pharmacy staff did not ask about the patient's past prescription history, drug reactions, or prescription suggestions when responding to fictitious consumers. Distribution of antibiotics without a prescription is a complex issue in the society. A comprehensive and comprehensive approach is needed to deal with this problem and strengthen regulations to ensure the prudent use of pharmaceuticals (Ahmad, et al., 2022).

Qualitative research indicates that the main causes of antibiotics being prescribed without a prescription could involve the absence of pharmacists at community drug stores, lax enforcement of rules and regulations pertaining to the dispensation of antibiotics, and insufficient oversight on the distribution of antibiotic medicine. The majority of the time, one antibiotic was supplied at the needed level, indicating the dispensers' willingness to distribute antibiotics and other drugs without prescriptions in the study (Zapata-Cachafeiro, et al., 2019).

A key factor in the rise of antibiotic resistance is public knowledge of the use of antibiotics. During cross-sectional investigation, the general Punjabi population in Pakistan was assessed for knowledge, attitudes, as well as practices. The practice of using antibiotics without a proper prescription was assessed, and data on respondent demographic data, knowledge, and attitudes regarding antibiotic use were gathered using a 50-item survey. Out of the 2106 individuals who answered questionnaires, 35.4% felt that antibiotics might treat viral diseases, and 47.5% said they work well for the flu and common cold. Antibiotic self-medication accounted for nearly 60% of the respondents' responses. Self-medication habits were substantially linked to married individuals, those with greater understanding of antibiotic use, those who had ever bought antibiotics without proper prescription, and those who store drugs at home.

One of the main causes of treatment failure, the rise in antibiotic resistance, as well as a high frequency of side effects globally is irrational medicine use. The goal of the research was to evaluate drug use trends at the second-level medical hospital in Pakistan, using a combination of extra parameters and basic drug use indications from the World Health Organization and INRUD. 3.37 prescriptions for medications were written down on average for each meeting. The ages of patients had a positive correlation with poly pharmacy. Generic names have been prescribed for a mere 4.8% of the medications. Antibodies were frequently used (41.5%). But the percentage of inject able medications (12.3%) remained within the ideal range. Important elements of a prescription, such as the diagnosis, dose type, mode of administration, and length of treatment, were often absent. The National Essential Drug List accounted for 87% of all prescribed medications. In the hospital's pharmacy, 80 percent of all recommended medications were accessible. Just 20% of the medications had the proper labels, and just 30% of the people receiving them have the proper dosage data (Abbas et al., 2021).

Physicians who do not follow a logical prescription and dispensing pattern run a serious danger to patient safety and waste medications. The purpose of the study was to assess the prescription and dispensing practices at a few chosen fundamental medical centers in Pakistan. The Worldwide Network for the Responsible Use of Drugs and the World Health Organization has collaborated to offer the fundamental indicators needed to setup and analyze prescribing practices. Using these variables, the study was carried out in 2018 at 14 Primary Health Units, 3 Rural Health Facilities, and 3 local pharmacies. The study venues were selected randomly, accounting for a total of 600 prescription events that were gathered retrospectively. The study's findings showed that 2.751 medications were administered on average. 41.15% of prescriptions were written for generic medications. Steroids, injections, and antibiotics accounted for 7.68%, 16.05%, and 48.6% of the total percent. 75.08% of the medications that were prescribed came from the Basic Drug List. The mean duration of the discussion was 2.699 minutes. A distribution time of 1.479 minutes was average. Our findings indicated that healthcare facilities had a high average quantity of prescription pharmaceuticals, a high prescription rate for antibiotics, a low prescribing rate for generics, and a low average consultations and dispense time (Siddique et al., 2020).

A key contributing factor to the ongoing worldwide public health concern of antibiotic resistance is the overuse and irresponsible use of antibiotics. In basic health care environments, strategies to enhance the prescriptions and dispensing of antibiotics are necessary (Rocha, et al., 2022). Governments and hospitals are addressing the worldwide healthcare issue of antibiotic resistance mainly through antimicrobial stewardship. In line with national and worldwide antimicrobial stewardship aims, this should decrease prescription figures, prevent unnecessary prescribing, and enhance the usage of antibiotics. According to McCloskey et al. (2023), the majority of antibiotic prescriptions in general practice in the UK are written for patients who have lung and urinary problems, accounting for 22.7% as well as 46% of the total prescriptions, accordingly.

Due to a variety of aggravating variables, resistance to antibiotics has become an international health issue and crisis. This has resulted in a variety of setting-specific infectious agents recording high level of resistance, leading to outbreaks with greater mortality as well as morbidity. The epidemic has been more prevalent in countries with low to middle incomes recently. In order to identify the origins and consequences of antibiotic resistance and offer recommendations for remedies in the context of Pakistan, the study examines the body of existing knowledge. The online databases that were used to find the information for the narrative evaluation were searched using terms. Science Direct & PubMed are two examples of the databases used for finding the information. Websites like the World Health Organization and the CDC were also utilized to obtain relevant data. Each source was chosen based on how well it fit the review's objectives and was relevant. The three main layers of causes—under-regulation, over-prescription & self-medicating and absence of medical stewardship—are separated into details in this assessment. When the COVID-19 pandemic and the unpredictable treatment response that followed are taken into account, this becomes even more serious because the pandemic increased already the extent of usage. These elements have set off a series of events that include, but have not been restricted to, a marked rise in pathogenic antibiotic resistance to first-line antibiotics. If not addressed, antibiotic resistance is a severe and expanding problem that will have unfavorable personal, regional, and national effects. It is imperative to enhance current programs, make investments in cutting-edge treatments and drug research, and fortifies regulatory frameworks and procedures in order to mitigate and reveres this tendency (Mirha et al., 2024).

The successful management of infections has been severely impacted by the rise in antibiotic resistance worldwide, which has had an influence on costs, morbidity, as well as mortality. Pakistan is included in this. It must be compulsory to conduct antimicrobial monitoring in order to continuously monitor the prevalence of bacteria resistant to drugs and the consequences for future empirical prescription practices. The rise of multidrug-resistant bacteria in Pakistan has limited the available antibiotic alternatives. This necessitates taking immediate action, such as launching antimicrobial stewardship initiatives to improve the prudent prescription of antibiotics. While awaiting culture findings, this entails deciding on suitable empirical treatment as part of established recommendations, in accordance with the World Health Organization's EML and AWaRe book. In addition, there are also steps being taken to decrease the improper prescription of antibiotics and counteract the growing risk of antibiotic resistance.

A major public health problem now is the rising antimicrobial resistance and declining effectiveness of the antimicrobials already on the market. Through a variety of initiatives, the antimicrobial stewardship program guarantees the proper use of antibiotics and reduces the occurrence of resistance. Pre-worldwide knowledge, attitude, as well as practice scores for the participants showed that 90.3% of HWs (with the exception of doctors) had excellent knowledge, 81.5% showed a positive attitude, & 72.3% showed good practice. In addition, there is a difference in knowledge ratings between nurses and doctors in both the before and after phases, with men scoring higher than women. Given that education is the foundation of the antimicrobial stewardship program, which mean it is essential to maintain efforts in HWs' continuing educational program in order to promote broad knowledge and its compliance (Afzal, et al., 2024).

RESEARCH METHODOLOGY

The research methodology is a tough aspect of the study that needs in-depth knowledge and investigation to provide clear explanations that helps the completion of the project. The aim of the study is to improve the buying behavior of antibiotics and to gain insight into antibiotic usage which will help in developing evidence-based policy interventions**.** This study explored the level of awareness among pharmacists regarding antibiotics dispensing and document the antibiotics buying behavior of walk in customers, as well as the adherence of SOPs regarding antibiotics dispensing. In-depth interviews were conducted for this study. This chapter presents the whole process on how the study was done systematically. It includes research design, context of the study, research participants, sampling, tools of research, semi structured interview, data analysis, ethical considerations.

The qualitative method was employed to analyze the data and to draw a conclusion. This method has been chosen due to its flexibility and feasibility. Since the qualitative method helps the researcher to have a thorough study and deeper understanding of things and phenomena. According to (Daston et al., 2004). Qualitative research findings are profoundly descriptive, giving a complete picture of the phenomena being studied.

This was a qualitative study that employed semi-structured interviews to uncover participants' awareness regarding antibiotic use and dispense along with recommendations. Semi-structural interviews are useful tools, especially for exploratory studies. The study design offers several advantages such as the ability and flexibility to thoroughly examine the knowledge, experiences, and purpose of the participants on a specific subject. The interview schema contained 12 questions from pharmacists and 12 questions from patients/clients. In a profound conversation (face-to-face in-depth interviews) with the consumers, awareness amongst Service Providers and Patients regarding the use and dispense of Antibiotics were assumed to determine. The interviews had been designed and conducted at the site of each pharmacy, and a place was reserved in the waiting area to ensure complete easiness for interviewers and patients of private and government hospitals. All interviews were carried out in the Urdu language for the given population's convenience. It took approximately 20–30 (minutes) to complete each interview. For recording interviews, a voice recorder was utilized, and the recording had been kept and saved confidentially.

CONTEXT OF STUDY POPULATION

The study has been conducted in Pakistan. The population for this study consisted of all pharmacies and government and private hospitals in big cities. The sample size of the study is 14 participants, 07 pharmacists and 07 clients/patients.

According to (Creswell & Creswell, 2017), the sample size for a case study would be one, whereas the sample size for an interview would be between 2 and 40. Using a high sample size might be challenging and produce unreliable results since qualitative sampling necessitates recording the particular information from each respondent. Also, collecting and analyzing qualitative responses takes a lot of time, and transcribing of each respondent's point of view just makes the study work longer.

SAMPLING TECHNIQUE

The researcher conducted interviews with pharmacists and patients/clients of pharmacies and hospitals. According to (Rai & Thapa, 2015), A variety of non-probability sampling strategies are included under the umbrella term "purposive sampling." The choice of the units to be researched (such as individuals, cases or organizations, events, or bits of data) depends on the researcher's judgment. When compared to probability sampling approaches, the sample under investigation is typically fairly small. (Patton, 2005) point out that, Purposive sampling aims to choose data cases whose study will shed light on the research questions. There are several approaches to selecting information-rich cases on purpose. Each strategy's logic serves a specific purpose. So, the sample of the study will purposive sampling.

INSTRUMENTATION

The researcher conducted semi-structured interviews with participants in qualitative research in an effective way to provide data that can be analyze to address the research questions. Individual semi-structured interview conducted with participants from pharmacies and hospitals. In such way total number of 14 interviews conducted from the population.

According to (Stuckey, 2013), Semi-structured interviews, unlike structured interviews, must adhere to strict guidelines. Their application is reliant on how the respondent reacts to the researcher's questions or topics. By taking a cue from the qualitative debates research field, scholars contend that the researcher is required to present the subject with certain themes reflecting the concerns under investigation, wherein one is to investigate the topics that the interviewee is comfortable with. So, the researcher used semi-structured interview for the well exploration of opinion and perceptions of respondents regarding the topic.

For this research the researcher developed a series of interview protocols and use tape recorder that posed to participants individually, with the assurance that their responses would be kept confidential. Each interview lasted about half an hour. Open-ended interview questions helped to structure the conversation in terms of the study's objectives. Examples of interview questions used in this study are; questions from pharmacists, do you dispense antibiotics only on prescription? If yes, what is the process (explain). If no, please explain the process. How do you handle patients who ask for antibiotics without prescriptions? Please explain the process (share examples), and questions from patients/clients When physicians prescribe you antibiotics, do they give you information regarding their proper usage? please share your experiences? Do you know that you always have to finish the entire course of antibiotics or not? if yes, who told you? if no, how many tablets/capsules do you use?

The interview protocol developed from an emerging conceptual framework identified from the research literature. Semi-structured interview may encourage two-way communication and allowing for a discussion with the participants rather than a straightforward questions and answer format.

PILOT TESTING

Before conducting interviews with the participants, the researcher performed a pre-test and pilot test to set the directions and time frame and also to resolve language issues if any. The researcher has taken experts' opinions and made minor changes based on the professional's comments.

ETHICAL CONSIDERATION

Researchers may face ethical issues during the data collection process. The Researcher tried to solve the issues and considerations had been made. The following are the ethical considerations used by the researcher during the study:

INITIAL CONSENT

Before going to collect data from respondents the researcher conducted informal meeting with pharmacists and hospital administration and patients/clients to get their willingness.

ANALYSIS

The theme analytical technique proposed by Braun and Clarke (2006) was employed to conduct the analysis. According to Braun and Clarke (2006), there were various phases related to the data analytics procedures from their themes method, including knowledge of the data, initial code construction, thematic searches, subject evaluations, identification as well as naming of themes, and developments of report. First, audio files were attentively listened to, accurately transcribed, and then transcribed from Urdu to English as part of the data familiarization process. For the purpose of validating the translation process, a forward & reverse transfer technique was tried on a set of transcripts and was determined to be dependable (Bowen, 2008). Open coding was used to create the basic codes for the study's objectives. The coded data was condensed to create themes and sub-

themes. Every author looked at the subjects included in their final theme. Regular research group discussions allowed for the cross-checking and conclusion of the emergent ideas. Utilizing the qualitative analysis of data software (NVIVO-19) package, word cloud visualization and data codlings were performed.

RESULTS

A total of 14 in-depth interviews were performed with an average time frame of 26.9 minutes. In total, n = 40 respondents were contacted, 20 were deemed unsuitable for participation, and 6 declined to take part in the research. In the end, this study had 14 people.

DEMOGRAPHICS

Most of the participants were males with age between 26 and 39 years (mean age of 36.4 years). The demographic characteristics of participants are described in detail in Table 1 presented below:

Table 1: Demographic information of participants

Participants	Age	Education	Gender	Category
Participant 1	35	Masters	Male	Patient
Participant 2	28	Bachelors	Female	Patient
Participant 3	26	Masters	Female	Patient
Participant 4	29	Bachelors	Male	Patient
Participant 5	45	Masters	Male	Patient
Participant 6	42	Bachelors	Male	Patient
Participant 7	46	Masters	Male	Patient
Participant 8	41	Masters	Male	Pharmacist
Participant 9	39	Masters	Female	Pharmacist
Participant 10	37	Bachelors	Female	Pharmacist
Participant 11	29	Masters	Female	Pharmacist
Participant 12	36	Masters	Male	Pharmacist
Participant 13	41	Bachelors	Male	Pharmacist
Participant 14	36	Masters	Male	Pharmacist

WORD CLOUD DIAGRAM

A Word Cloud is a graphic depiction of the number of words found in a document, an interview, or other types of data that have been gathered. Word frequencies are an important concept in Word Cloud, and the researcher's ability to fully comprehend and analyze. Therefore, word frequency affects how you perceive both the program's words and their graphic representation. Word clouds according to Friese, Soratto, and Pires (2018), are great exploration tools for getting to know your data.

Data and responses of participants were visualized with help of a cloud diagram. The frequent words include use and dispense of antibiotics, antimicrobial resistance, dispensing antibiotics by pharmacists and course utilized by patients (Figure 4, word cloud diagram).

Figure 1: Word cloud diagram depicting the use and dispense of Antibiotics amongst Service Providers and Patients

THEMATIC ANALYSIS

Thematic analysis is a research method used to identify and interpret patterns or themes in a data set; it often leads to new insights and understanding (Elliott, 2018). The thematic analysis was employed. Four (4) themes and sixteen (16) sub-themes were identified based on past literature. Each theme discussed in detail includes Participant' knowledge, attitude, practice, and rational dispense and use of antibiotics. Figure 2 represents the four major themes as mentioned above.

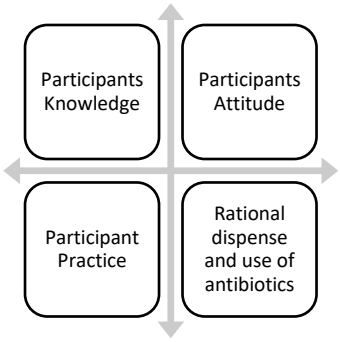

Figure 2: Main themes of depicting the use and dispense of Antibiotics amongst Service Providers and Patients

Figure 3: Theme 4: Suggestions for rational dispense and use of antibiotics

Theme 1: Participants Attitude

This is the attitude of participants regarding the dispense and use of antibiotics. This is the first main theme of this study. These respondents have shown their concerns about the irrational use of antibiotics. The population frequently used antibiotics without the knowledge and awareness of antibiotic and antimicrobial resistance. It has two sub-themes, attitude towards antibiotic use and self-medication. The details of the sub-themes are given below.

Sub-theme: Attitude toward antibiotic use

Most of the patients are not aware of the side effects and risks associated with misuse of antibiotics and there is the attitude of self-medication and they do not complete the course of medicine recommended by their doctor. The Patient replied, **"But many times, I left the course of medicine incomplete"** (Participant 4), **"Mostly, I complete it. But sometimes I left the course incomplete when I feel better"** (Participant 6).

Sub-theme: Self-medication

The self-medication is high in both pharmacists and patients. They replied about self-medication, **"I have self-medicated myself because I have a little knowledge about it"** (Participant 3), **"I tried to self-medicate myself", "Sometimes I self-medicate myself and use antibiotics like azomox in fever and use Augmentin in the sore throat"** (Participant 5), **"Yes, I use antibiotics myself**

without doctor advice when I needed especially in common cold and chest infection" (Participant 7). Figure 4 depicts the First main theme, Participant's attitude with sub-themes Attitude towards antibiotic use and self-medication:

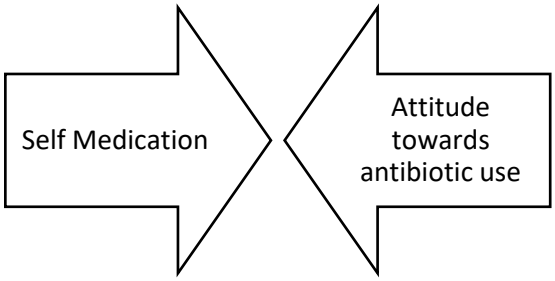

Figure 4: Theme 1: Participants' attitude towards antibiotics

Theme 2: Participants Knowledge

The Participants' knowledge is the second main theme of this study. This is the Knowledge of participants regarding the dispense and use of antibiotics. The sub-themes of Participants knowledge are Antibiotics Knowledge, Antimicrobial Stewardship Awareness, Knowledge of antibiotics resistance and Risk awareness. Figure 3 showed sub-themes of Participants knowledge.

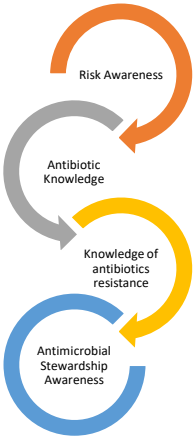

Figure 5: Theme 1: Participants' knowledge

Sub-theme: Antibiotics Knowledge

First, it was determined how much the interviewees knew about the usage and dispensing or antibiotics and what is their level of knowledge about these terms and medicines which are frequently used by them. The respondents were asked questions about basic knowledge of antibiotics. Most of patients have very less knowledge and awareness about antibiotics and antimicrobial resistance but pharmacists have basic knowledge. As per their knowledge, "No I have not complete knowledge, (Participant 4)" and "I had no awareness about finishing the entire course, usually I do not use complete course" (Participant 7), "Actually, each antibiotic has a different duration, affection, and different spectrum against the specific bug. Different antibiotics are used for different drugs" (Pharmacist 3) and "Yes, I know the difference, and for example, a patient asks and demands antibiotics which are used for bacterial cleanse, but if we go into symptoms, that paints an entirely different picture correlating to the treatment of viral infections" (Pharmacist 5).

Sub-theme: Antimicrobial Stewardship Awareness

This is the awareness of participants regarding antimicrobial resistance program employs tactics and initiatives to minimize the overuse of antibiotics and encourage the use of medicines that are less likely to favor resistant microbes. To check the awareness of respondents about Antimicrobial

Stewardship questions were asked respondents, most patients and some of the pharmacists were unaware of this program but most pharmacists knew about it, **"No, I have no idea" (Participant 4), "Antimicrobial stewardship (AMS) is a coordinated activity among healthcare professionals, including pharmacists, physicians, and nurses. Its goal is to rationalize antibiotic use and minimize resistance development. Multiple strategies are employed based on the specific setting to ensure effective application".**

Sub-theme: Knowledge of antibiotic resistance

This is the knowledge of participants regarding antibiotics resistance which is a capacity of bacteria to fight against the effects of antibiotics. To check the knowledge of respondents about antibiotic resistance questions were asked but most of the respondents especially patients had no idea about it. They replied, **"No, I do not know" (Patient 6) and "Antimicrobial resistance, which occurs due to the misuse of the antimicrobials" (Pharmacist 1). But most of the Pharmacists have its basic knowledge.**

Sub-theme: Risk awareness

This is the awareness of participants regarding the risks and side effects associated with the irrational use of antibiotics. Most patients are aware of the side effects of antibiotics. They replied, "Yes little bit, But I don't know so much about side effects and risks" (Participant 4), "I am not aware of the risks associated with self-medicating with antibiotics. (Participant 7).

Theme 3: Participants' practices

This is the third main theme of this study. This is a common practice of participants regarding dispense and use of antibiotics. The processes of prescription and giving antibiotics do not fully adhere to the accepted recommendations. Without legal prescriptions, pharmacies were often used for the distribution and prescription of medicines or antibiotics. Furthermore, a greater proportion of antibiotics were prescribed rather than self-administered, and individuals were more likely to turn to self-medication as a low-cost means of treating their illnesses (Imtiaz, et al., 2017).

Sub-theme: Appropriate antibiotic consumption

The practice and use of antibiotics by participants were associated with their previous medical conditions or their post-illness storage of medications. When several respondents went to see the doctor for treatment, they were told to purchase their prescription medications at a certain pharmacy or drugstore. Mostly participants used antibiotics with the advice of experienced pharmacists or outlet nearby because this is cost effective way. Six respondents replied, "No, I do not request the physician about antibiotics", "There is no need for a doctor every time" (participant 2), and "(I have left medicine many times" (participant 4). Most of the respondents replied that they did not complete their antibiotics course as per advice of doctor. Mostly pharmacists and pharmacies did not dispense antibiotics on prescription.

Sub-theme: Healthcare professional consultation

The physician does not give proper information to respondents especially in government hospitals because of the rush of people. Most of the respondents used antibiotics without the consultation of a doctor. They replied, "No. Physicians usually do not guide me about the antibiotics but When I come in the community or retail pharmacy, they properly guide me about its dosage and time, but physicians do not provide full information", "I usually do not request to physicians for antibiotics but I contact to a pharmacy and got antibiotics according to" (Participant 7), "The doctors prescribe antibiotics also without proper questioning the patient" (Participant 13).

Sub-theme: Pharmacy practices

Most of pharmacy technicians knew that antibiotics are often recommended, that allergies might occur, and that patients shouldn't stop taking antibiotics when their symptoms are getting better. These pharmacy technicians had a fair awareness of antibiotics and how to utilize them but people left the course incomplete (Mustafa, et al., 2022).

Sub-theme of Pharmacy practices: Dispensing antibiotics without prescription

Most of the respondents believed that antibiotics should not be dispensed without a prescription, "And as a community pharmacist, it is our role that we should not dispense this over the counter, only rely on the proper prescription" (Participant 9), "No, it is dispensed without a prescription, upon patient demand", "As there is no restriction in our country and in pharmacies to dispense antibiotics without prescription, e.g. if a patient comes post-OP and demands Augmentin, it is to be dispensed without any questions" (Participant 12).

Sub-theme of Pharmacy practices: Guidance to patients

The respondents believed that in Pakistan it is based on demand and supply from the customers, it's unfortunate that there is no check and balance if it's needed by the customers or not, this system of antimicrobial dispensing relies only on the demand of a customer if he/she visits a pharmacy, the antimicrobial will be dispensed to them. "Pharmacy owners treat pharmacies as businesses so they have ensured that we have to dispense if the customer asks and pays for it", "We ask customers why they require antimicrobials, and if they tell us the symptoms which are not classified as antimicrobial treatment then we guide them that they do not need antibiotics. But if they insist then we dispense them no questions asked" (participant 13). Figure 6 shows the sub-themes of Participants' practices regarding antibiotics.

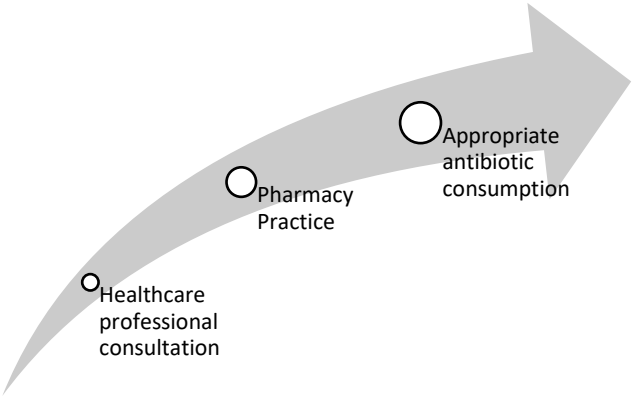

Figure 6: Participants practices regarding antibiotics

Theme 4: Suggestions for rational dispense and use of antibiotics

This is the fourth and last main theme of this study. These are the suggestions given by participants regarding rational dispensing and use of antibiotics. The respondents of this study have given some suggestions for the rational dispense and use of antibiotics which are given one by one in detail below.

Sub-theme: A prescriber must not prescribe unnecessary antibiotics

The respondents suggested that doctor and pharmacist must not prescribe unnecessary and they suggested "When we are dispensing antimicrobials we are doing weight based dosing, renal dosing, hepatic dosing, so it is necessary to look through the patient's demographics, and we dispense them the medicines according to it" (Participant 2), "And as a community pharmacist, it is our role that we should not dispense this over the counter, only rely on the proper prescription" , "So, as a community pharmacist, it is very important that we promote the rational use of antibiotics in order

to avoid the antimicrobial risk" (Participant 10), "Yes, we do educate them on its proper use, e.g. if on the prescription, B.D dose is written or even T.D dose is written, we explain it to them like they have to take the B.D dose one in the morning and one in the evening 12 hours apart in the whole 24hrs, and the T.D dose they have to have 3 doses 8 hours apart in the complete 24hrs of the day" (Participant 11), "Mostly over the counter, customer pays and expects the drug, so it has to be dispensed (Participant 14).

Sub-theme: Antibiotics have separate regulations

The respondents are in the view that it is responsibility of government to strictly implement the rational and legal use of drugs especially antibiotics. The government should make a separate policy and regulation for antibiotics. The respondents suggested, "but in the case of pharmacists, there are many countries that are giving pharmacists' rights to dispense antibiotics, to prescribe and then dispense antibiotics for milder diseases" (Participant 10), "There are no SOPs which are followed, we guide them where needed, the dispensing depends on the patient's demand" (Participant 13).

One way to reduce the overuse of antibiotics is to enforce a policy that is swiftly put into effect. Three of the participants knew a lot about the current policies of the government. Respondents said they didn't think the government followed its policies since it didn't put the new ones into effect. Healthcare professionals developed barriers to hinder the introduction of new regulations as well as policies each time governments tried to do so.

Sub-theme: Have moral fear for non-prescription antibiotics and put the Responsibility

According to respondents, there should be moral fear for non-prescription antibiotics and responsibility may be fixed on pharmacy owners and strict regulation should be made. They replied and suggested, "Pharmacy owners treat pharmacies as businesses so they have ensured that we have to dispense if the customer asks and pays for it" (Participant 13).

Sub-theme: Need community-based awareness programs

Almost all the respondents agreed that there should be a community-based awareness program regarding the rational use of antibiotics and their resistance. The suggested, "Yes, definitely I would love to learn about AMS" (Participant 3), "Yes, I am interested" (Participant 4), "Yes, I am interested to learn", (Participant 5), "Yes, I have interest to learn about AMS as a student of pharmacy".

Sub-theme: Pharmacists must look twice at the antibiotic's prescription

The respondents especially pharmacists agreed and suggested that pharmacists must carefully observe the prescription advised by the physician or doctor, "The patients who ask for antibiotics over the counter are not given any priority, we refer them to the consultant, we make sure that they get a prescription, and then they are dispensed with the antibiotics" (Participant 9), "As it is our Hospital's Policy 'No Anti-microbial dispense without proper Prescription", we dispense antibiotics only on proper prescriptions" (Participant 10).

Sub-theme: The pharmacist must educate people

It was suggested by respondents that besides community awareness programs, it is the responsibility of healthcare professionals and pharmacists to educate people to create awareness about the rational use of antibiotics. They suggested, "Yes, it's a part of our counseling process, when we dispense the antibiotics to the patients, we briefly educate them about the proper usage of the medicines to ensure that no over-dosage or under-dosage occurs and the desired effect is achieved" (Participant 9), "Yes, we educate the patients about its proper use, duration, and how to take it" (Participant 10).

DISCUSSION

The main purpose of this study was to analyze the awareness among Service Providers (Pharmacists and pharmacies) and Patients regarding the use and dispense of Antibiotics; a Case Study. The findings of this study are also supported by previous studies.

Antibiotics are among the most often given drugs, there is a significant chance that they will be abused (Ahmed at al., 2020). In many contexts, there is a lack of guidance for the proper use of antibiotics for common medical conditions, and using different antibiotics can increase the chance of developing antimicrobial resistance (Zanichelli et al., 2023). Antibiotic resistance is a result of frequent antibiotic abuse, particularly in less controlled health systems. Even though they participate in significant portions of primary healthcare, informal providers differ in terms of their expertise, attitudes, and methods (Nair et al., 2019). Dispensing practices at community pharmacy shops are influenced by understanding and attitudes on sensible antibiotic usage (Belachew, et al., 2022).

As self-medication was a less expensive way for individuals to address their health problems, self-medication became increasingly common (Imtiaz, et al., 2017). Increased awareness of the usage of antibiotics, having ever bought antibiotics having no prescription, and keeping antibiotics in the home were all strongly linked to self-medication behaviors. The Punjab population as a whole has a high rate of improper antibiotic use (Gillani et al., 2020). Both General practitioners and pharmacists were enthusiastic about their roles as patient educators in raising knowledge and awareness (Saleh, et al., 2022). This behavior is influenced by several factors, including clinical, patient, environmental, and cultural factors, such as patient demand and expectations, knowledge and awareness, and Antibiotics provider attitudes and characteristics (Saliba-Gustafsson, et al., 2019).

Governments and health care systems are addressing the global healthcare issue of antibiotic resistance mainly through antimicrobial stewardship. In line with national and worldwide AMS aims, this should decrease prescription numbers, prevent unnecessary prescribing, and enhance the usage of antibiotics (McCloskey et al., 2023). When organisms such as parasites, fungi and viruses stop responding to antimicrobial medications, it's known as antimicrobial resistance (WHO, 2023).

The beliefs and views of patients, the behaviors and attitudes of healthcare personnel, and environmental circumstances all have an impact on the prescriptions written by medical practitioners. Prescriptions written by medical professionals are based on several factors, including the patient's features, prior experience prescribing antibiotics, the nature and extent of the disease, the existence of a bacterial infection, the cost and accessibility of medication, and the results of the trial as well as errors. Additionally, they don't know much about the usage of antibiotics and don't tell patients much about it either. Patient-related characteristics included inadequate information of antibiotic usage and resistance, lack of awareness of antibiotic use, as well s a demand for a specific antibiotic (Kagoya, et al., 2021). Enhancing health literacy and monitoring the sale of antibiotics in retail pharmacies require interventions (Gillani, et al., 2020).

Table 2 given below is a code book of themes and sub-themes of this study with its compete description which will be very helpful to understand the rational use of antibiotics.

Table 2: Code book of Themes, sub-themes and its description

Name	Description
Participants' attitude	This is the attitude of participants regarding dispense and use of antibiotics
Attitude toward antibiotic use	This is the attitude of participants regarding the dispense and use of antibiotics in their daily life
Self-medication	This is the use of medicines and antibiotics without the advice of a

Name	Description
	physician or doctor
Participants knowledge	This is the Knowledge of participants regarding the dispense and use of antibiotics
Antibiotics Knowledge	This is the knowledge and awareness of participants regarding the rational use and dispense of antibiotics
Antimicrobial Stewardship Awareness	This is the awareness of participants regarding antimicrobial resistance program which employs tactics and initiatives with the goal of minimising the overuse of antibiotics and encouraging the use of medicines that are less likely to favor resistant microbes.
Knowledge of antibiotic resistance	This is the knowledge of participants regarding antibiotic resistance which is the capacity of bacteria to fight against the effects of antibiotics
Risk awareness	This is the awareness of participants regarding the risks associated with irrational use of antibiotics
Participants practices	This is the common practice of participants regarding the dispense and use of antibiotics
Appropriate antibiotics consumption	These are the practices of the participants regarding awareness of appropriate consumption and usage of antibiotics
healthcare professional consultation	This is the practice of participants to use and dispense antibiotics without consulting a physician and without a prescription.
Pharmacy practices	This is the practice of pharmacy regarding the dispense of antibiotics without prescription and giving proper awareness of antibiotic resistance to people
dispensing antibiotics without a prescription	This is the practice of pharmacists to dispense antibiotics to people without a prescription
Guidance to patients	This is the practice of pharmacies and doctors to proper guidance to patients regarding the rational use of antibiotics
Suggestions for rational dispense and use of antibiotics	These are the suggestions given by participants regarding rational dispense and use of antibiotics
A prescriber must not prescribe unnecessary antibiotics	This is a suggestion from participants that doctors should avoid prescribing unnecessary antibiotics
Antibiotics have separate regulations	This is the suggestion from participants that antibiotics must be regulated with separate regulations for their irrational use
Have moral fear for non-prescription antibiotics and put the responsibility	It is the moral responsibility of Pharmacists and Prescribers to avoid misuse of antibiotics otherwise strict action may be taken against them especially dispensing antibiotics without proper prescription.
Need community-based awareness programs	Community-based initiatives and programs may be arranged to raise awareness about the safe use of antibiotics and the responsible disposal of left-over or expired medications
Pharmacists must look twice at the antibiotic's prescription	The Pharmacists must first confirm the prescription and look twice at the prescription of antibiotics before dispensing so that résistance may be avoided
The pharmacist must educate people	Experts in medicine, chemists, and doctors instruct patients on how to use medications, offering advice on appropriate dosage, possible adverse effects, and interactions with drugs.

CONCLUSION

This study analyzed the awareness of the use and dispense of Antibiotics among Service Providers and Patients. The study used thematic content analysis which is a study technique that finds and analyses themes or patterns in a set of data; which often results in fresh perspectives and knowledge (Elliott, 2018). Four (4) themes and sixteen (16) sub-themes were identified based on past literature. Each theme discussed in detail includes the Participant's knowledge, attitude, practice, rational dispense, and use of antibiotics.

The majority of research participants knew what an antibiotic was, but they lacked sufficient understanding of how to use them. The responders, however, were unable to fully understand what resistance was. Although there was a generally positive attitude among the participants, improper antibiotic use was determined to be significantly influenced by self-medication, sharing medications, not having a prescription, and storing antibiotics at their homes.

The participants frequently used antibiotics improperly. It was also noted that they did not follow the complete course of treatment. The participants advised that the lack of qualified individual, heavy fees associated with doctor visits, needless medications, and prompt enforcement of current policies and regulations be addressed. Improper use of antibiotics has been connected to a number of factors, including lack of information, lack of health care services, a improper training of pharmacist, and easily availability of antibiotics. To address the issue of antibiotic resistance is main problem and community awareness program must be started and people must be educated by government, health care professional and pharmacists.

LIMITATION AND FUTURE STUDIES:

The current study has some limitations also. First of all, the researcher has collected data from pharmacies and patients; consequently, the results of this study cannot be generalized and applied to all of Pakistan. The sample size of this study is small. The respondents are well educated and health care facilities are available as compared to rural and backward areas of Pakistan. However, this study is valuable and beneficial for the government, policymakers, pharmacies, the general public, and patients. This study will provide information and awareness about the rational use of antibiotics to avoid antimicrobial resistance.

The scope of this study will be extended to the whole of Pakistan with a larger sample size especially rural areas and tribal areas where the population has less knowledge about antibiotic dispense and use. More themes and variables may be added such as literacy and cultural aspects may be included in future studies.

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