Use of Antibiotics: As a Social and Legal Dilemma

(A Multi-sited Ethnography)

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Formal Declaration

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Final Approval of Thesis

This is to certify that we have read the thesis submitted by Mr.Sohail Ahmed. It is our judgment that this thesis is of sufficient standard to warrant its acceptance by the Quaid-i-Azam University, Islamabad for the award of the Degree of M.Phil in Anthropology.

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Sohail Ahmed

DEDICATION

This thesis is dedicated to my parents and their endless love, support, and encouragement. I thank my parents for making this dream happen and giving me strength.

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ABSTRACT

Pakistan ranks third position in consuming antibiotics among low- and middle-income countries. This multi-sited anthropological thesis, entitled "Use of Antibiotics: As a Social and Legal Dilemma" explains governmental concerns and the medical community's response regarding policies and their implementation along with sociocultural interaction for appropriate usage of antibiotics in Khairpur Mirs, Sindh. The main argument of this thesis is to explain the tendency of addressing the issue of overuse of antibiotics with the help of medical teachings and policies along with their implementation at the community level. In addition, this research provides cultural interface, medical practices, and their attributes in the usage of antibiotics. The selected locales were three cities of Sindh Province i.e., Khairpur, Karachi, and Hyderabad. A sample of 58 respondents was selected for the data collection from which 22 respondents were selected through purposive sampling to explore the required data from the knowledgeable people related to the research objectives and the remaining 36 respondents through snowball sampling which allowed me to access those participants that were not accessible without references i.e., authoritative personalities, unlicensed doctors, quacks, etc. The methodology employed for the data collection included Participant Observation, in-depth interviews, short interviews, Focused Group Discussions (FGDs), and case studies. The research provides a holistic perspective to understand the belief in the practice of antibiotics such as sociocultural determinants, medical teaching, and policy makers' way of problematizing the global threat of antimicrobial resistance caused by direct or indirect consumption of antibiotics. The findings of the study suggest that despite the alarming issue of antibiotic resistance globally, the medical teachings are still not serious about dispersing proper knowledge about antibiotics usage, antibiotics resistance, and the policies and programs to curb antibiotics resistance. The study also observed that various socioeconomic and cultural determinants influence antibiotic consumption such as self-medication, over-the-counter purchase, economic constraints, time limitations, limited access to healthcare facilities, etc. Furthermore, semiotics, sociolinguistics, doctors' professional or scientific gaze, and cultural incompetency encourage people to overuse and misuse antibiotics. The medical professionals, pharmacists, and healthcare sectors are driven by economic interests which often contribute to excessive antibiotic consumption.

***Key Words**: Antibiotic, Antibiotic Resistance, Medical Curricula, Practitioners, Policies, Socio-cultural Determinants.*

LIST OF ACRONYMS

AR	Antibiotic Resistance
AMR	Antimicrobial Resistance
AMRP	Antimicrobial Resistance in Pakistan
ASP	Antibiotic Stewardship Program / Antimicrobial Stewardship Program
ASIP	Antibiotic Stewardship Initiatives in Pakistan
CME	Continuous Medical Education
DDD	Defined Daily Dose
DRAP	Drug Regulatory Authority of Pakistan
DWO	Dosti Welfare Organization
EDM	Essential and Other Medicines Division
FAO	Food and Agriculture Organization
GEC	Global Education Campaign
GIMS	Gambat Institute of Medical Science
GPs	General Practitioners
HEC	Higher Education Commission
IBMS	Institute of Basic Medical Sciences
LMICs	Low and Middle-Income Countries
MDRO	Multi-drug resistant organism
MMIDSP	Medical Microbiology and Infectious Diseases Society of Pakistan
MRL	Maximum Residue Limits

MS	Medical Superintendent
NAP	National Action Plan
NCH	National Council for Homeopathy
NCT	National Councils for Tibb
NHSRC	National Health Services Regulations & Coordination
NIH	National Institute of Health
OCT	Over the counter
PAHO	Pan American Health Organization
PHRL	Public Health Reference Laboratory
PMDC	Pakistan Medical and Dental Council
PNC	Pakistan Nursing Council
SHCC	Sindh Health Care Commission
SMA	Self-Medication with Antibiotics
SmPC	Summary of Product Characteristic
XDR	Extensively Drug-Resistant
WAAW	World Antimicrobial Awareness Week
WHO	World Health Organization
WOAH	World Organisation for Animal Health

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CHAPTER 1

1. INTRODUCTION

Antibiotics are no doubt in most cases life saviors in many ways. However, misuse of antibiotics and antibiotic resistance is a significant and one of the most dangerous healthcare issues in the world (Ember & Ember, 2004). Globally both developed and underdeveloped nations are facing this challenge. The use of antibiotics in medical practice is a critical issue that must be investigated and addressed using an ethnographic approach. The most significant and crucial anthropological topics for investigation in the contemporary age are those related to health, drugs, education, social welfare, bioethics, the government and its programs and policies, urban-to-rural development and collaboration, legal crisis, the environment, and humanitarian assistance (Tauber & Zinn, 2014). The current study aims to highlight the issue of misuse of antibiotics in medical teaching premises and the role of government in addressing the alarming dilemma of antibiotic resistance through legislation, policies, programs, curricula, and cultural campaigns. This study further aims to address the socio-economic and cultural determinants influencing antibiotic consumption in clinical and community settings.

Antibiotics are the modern form of medicine or drug used to treat bacterial infections (anti-bacterial). Antibiotic penicillin was discovered first by Sir Alexander Fleming in 1928 (Kalvaitis, 2008). Antibiotics are used to prevent and cure bacterial infections among humans, animals, and agricultural industries. Antibiotics are used for disease therapy of livestock, infection prevention, animal growth promotion, and in agricultural industries. Consequently, antibiotic resistance and drug-resistance pathogens in humans have increased globally (AMIS, 2020). According to the World Health Organization, excessive use of antibiotics leads to a surge in new severe infections, side effects, and changes in bacteria which eventually causes antibiotic resistance among the population. Hence, its use must be controlled and should not be used for seasonal diseases or viral infections (WHO, 2020). According to World Health Organization (2020), antimicrobial resistance has the potential to affect people at any stage of life. AMR occurs naturally but is facilitated by the inappropriate use of medicines, including using antibiotics for viral infections such as flu, cold, or sharing antibiotics (WHO, 2020). Excessive use of antibiotics leads to antibiotic resistance as resultant of bacteria change. Antibiotic resistance is rapidly increasing worldwide in both Low and Middle-Income

Countries (LMICs) and rich countries. Numerous efforts are being made to lessen the impacts of the excessive use of antibiotics globally.

As aforementioned, the use of antibiotics is a global public health issue, particularly in third-world countries. Pakistan ranks third position in consuming antibiotics among low- and middle-income countries (Torumkuney et al., 2022). Hence, antibiotic overuse and misuse are serious issues in Pakistan. In the absence of hospital services, antibiotic drugs provide first-hand or first-aid to patients (Roien et al., 2022). Antibiotics were given to lessen the effects of viruses and pain until patients could be taken to hospitals. However, at present time it is commonly used for most diseases and is routinely prescribed by doctors. The ecosystem is impacted by the improper use of antibiotics in addition to human health. Antibiotic usage is pervasive not just in human medicine but also in agriculture, with livestock, poultry, and pesticides being used on food-producing animals and birds. Hence, it is a valuable topic for research. Pharmaceutical firms, independent physicians, and other medical stakeholders share a close social link; they rely on one another and pursue their vested interests at the expense of the public good and patients.

The use of antibiotic drugs increased the ratio of harmful diseases, and antibiotics should not be used for seasonal infections, such as flu, cough fever, cold, sore throat, and so on, as well as other viral diseases. Antibiotic overuse adds to a surge in new severe infections and side effects (WHO, 2020). Lack of understanding and awareness in the community are the main causes of the overuse and abuse of antibiotic medications. A lot of reasons lead to excessive use and abuse of antibiotics at clinical, pharmaceutical, or community levels. Lack of understanding and awareness is one of the most prominent causes of overuse and abuse of antibiotic medications. Besides this, numerous other factors contribute to the development of antibiotic resistance, such as irresponsible antibiotic prescription, inappropriate product promotions, injustice and inequality in health equipment allocations, corruption, politicians' involvement, and insincerity with health-care professions. It is against medical ethics for any doctor to prescribe unnecessary medicines, however, in our society, doctors commonly prescribe antibiotics for viral and seasonal infections even if they are not for these conditions. Doctors must provide care for both the present and future generations, hence it is against bioethics and medical ethics for any doctor to prescribe an unnecessary antibiotic or to do so out of vested or self-interest. It is the responsibility of the government and other health-related departments to investigate and hold accountable unskilled and unregistered medical

professionals and pharmaceutical vendors. Similarly, it is the professional responsibility of medical and pharmaceutical teachers to problematize and address the issue of inappropriate use of antibiotics, provide guidelines and education, and organize training sessions and seminars to educate students about antibiotic side effects. Increasing rates of multidrug-resistant (MDR) bacterial infections in low and middle-income countries (LMICs) including Pakistan made infection prevention and control (IPC) and antibiotic stewardship policies essential parts of the healthcare system (Atif et al., 2021).

World Health Organization (2018) proposed recommendations to control and prevent the impact of antibiotic resistance. It encouraged policy makers to robust national action plans to deal with this issue and improve its monitoring or surveillance. These policies were not only meant to develop the policies but also strengthen them and ensure their implementation. Moreover, health professionals were urged to the infection prevention programs by improving hygiene and sanitization of individuals and the instruments being used. Promotion and training of proper prescription or distribution were supposed to be done according to proper guidelines given by WHO. Furthermore, the need to be aware of patients about rational and irrational use of antibiotics, their side effects, and infection prevention. The need for investment in research and development of new antibiotics, vaccines, diagnostics, and other tools by the healthcare industry was also made prominent (WHO, 2018b).

Although advanced and innovative antibiotics are being made globally, however, the new antibiotics are also not very effective for antibiotic-resistant infections. In this scenario, WHO took some initiatives to tackle this issue as a global action plan on antimicrobial resistance or antibiotic resistance in 2015. This global action plan aimed to work on five objectives i.e., awareness, better surveillance, prevention of infections, optimized use of antimicrobial drugs, and a sustainable investment in this project (WHO, n.d.). Furthermore, World Antimicrobial Awareness Week (WAAW) is being held annually since 2015 on 24 November as a global campaign to raise awareness and encourage healthcare systems to control and prevent antimicrobial or antibiotic-resistant diseases. Global Antimicrobial Resistance Surveillance System (GLASS) was also launched in 2015 by WHO as a pillar of the global action plan and antimicrobial stewardship strategy (Sirijatuphat et al., 2022). The Global Antibiotic Research and Development Partnership (GARDP) was initiated in 2016 by WHO with the collaboration of the Drugs for Neglected Diseases initiative (DNDi) to improve private and public partnerships for research development and to develop new treatments (Balasegaram

& Piddock, 2020). In March 2017, the Interagency Coordination Group on Antimicrobial Resistance (IACG) was initiated to guarantee the effectiveness of a global action plan in a sustainable way (WHO, n.d.).

Antimicrobial treatments, including antibiotics, antimalarials, antivirals, and antifungals, are used to treat microorganisms including viruses, bacteria, fungi, and parasites, but they are ineffective against microorganisms that have developed resistance to them. Conversely, as a result of bacterial resistance, antibiotics are not successful in treating bacterial infections (when antibiotics drug does not work on the infections). Antibiotic resistance raises numerous legal and ethical issues, such as who is responsible for and questionable in the development of antibiotic resistance. Many factors contribute to the development of antibiotic resistance, including an irresponsible attitude toward antibiotic prescription, inappropriate product promotions, injustice and inequality in health equipment allocations, corruption, political ruler involvement, and insincerity with professionalism. Approximately 80% of antibacterial components enter the human body from livestock and animals, as well as through shared cosmetics (Kalvaitis, 2008).

1.1 Statement of the Problem

The growing usage of antibiotics is a grave plight for humanity and other species. There is a wide gap between the consumption of microbial and awareness about its excessive use. Due to different socio-economic backgrounds among the population, policies, and programs developed to tackle this issue are not giving fruitful results. The teaching regarding proper use of antibiotics and their disposal plays a vital role in medical or pharmaceutical practice. The absence or lack of proper training or teaching leads to numerous health problems. It is an important issue and policy-based research in the health sector in Pakistan which needs to be addressed through an ethnographic approach.

This anthropological study aims to explore the usage of antibiotics, socio-economic and legal gaps in the boundary of policies and programs, gaps in medical pharmacy curricula, and the role of government in the advocacy of proper use of antibiotics. Moreover, the researcher explores the loopholes in medical and pharmaceutical academia or curriculum and their practice among professionals.

1.2 Objectives of the Study

The main objectives of this research as followed:

1. To identify the policies and programs related to the usage of antibiotics and their implementation
2. To examine how medical and pharmaceutical teaching address the use of antibiotics
3. To explore sociocultural and economic determinants influencing antibiotic consumption
4. To investigate the role of medical practitioners and health administrators in antibiotic resistance

1.3 Definitions of Key Terms

The key terms used in the document according to their operationalization in the study are defined below.

1.3.1 Health Administrator

Health administrations refer to the management and organization of health-related services, facilities, and programs. They play a crucial role in ensuring the well-being and health of a society by implementing public health strategies and primary health care operations. (Roland & Moleki, 2016). An administrators' duty is to shape the policy that runs the facility and improve the patients' experience.

1.3.2 Antibiotics

Antibiotics are made from micro living organisms that are effective for determinant microorganisms such as bacteria, viruses, parasites, and fungi. It is a medicine that is manufactured by living organisms that are detrimental to other microorganisms to fight against bacterial infections among living beings such as humans, animals, plants, etc. (Britannica, 2019).

1.3.3 Misuse of Antibiotics

It refers to the unregulated usage of drugs without any prescription people purchase medicine from community pharmacies and use it as a self-medicine (Sulis et al., 2020). It shows a lack of control of government authority and a lack of proper knowledge about the misusage of medicines. The researcher has used adverse consumption of antibiotic drugs without the prescription of a doctor.

1.3.4 Overuse of Antibiotics

Overuse of antibiotics refers to improper and excessive usage of antibiotic medicine is a risk for human beings because that kills bacteria and is useful for infectious diseases (Sulis et al., 2020). Otherwise, antibiotic usage generates bacterial resistance which is harmful. Antibiotic was a significant invention of the 20th century it was widely used in 1940 but after two decades in 1960 excessive use of antibiotics led to antibiotic resistance. In other words, it refers to the extreme utilization of antibiotic medicine especially when they are not needed.

1.3.5 Antimicrobial Resistance

The maximum and malign use of antibiotics generates antibiotic resistance as many dangerous bacteria gradually get the ability to survive exposure to antimicrobial agents and they become ineffective in the future (Saleem et al., 2018).

1.3.6 Policy

A policy is a set of ideas or a plan of action for certain situations that have been officially approved by a group of people, an organization, or a government (Cambridge Dictionary, 2019).

1.3.7 Program

It refers to a group of activities or a series of instructions that is to be achieved (Cambridge Dictionary, n.d.).

1.3.8 Curriculum

A curriculum is a guide or standard plan that is necessary for teaching and learning for students to practice and gain competency in the subject and applied learning skills. Its structure, organization, and concepts are designed to improve student learning and facilitate instruction. It must include the objectives, methods, materials, and assessments required to successfully support instruction and learning (RIDE, 2021).

1.3.9 Medical Practitioners

Medical practitioners are those individuals who have skills, jobs, and work in the medical field. They are also known as medical doctors or doctors. They diagnose mental or physical injuries,

diseases, or disorders and treat them by prescribing medicine or any other required treatment (UCAS, n.d.).

1.3.10 Pharmacy

It is a shop of medicine or hospital dispensary which prepares, preserves, and dispenses medical drugs (Hartley & Krantz, 2017).

1.3.11 Side Effects

Side effects are the adverse and undesirable impacts of any drugs including antibiotics or medical treatment on the health of people who appear after consuming drugs or getting treatments (NCI, 2011).

1.3.12 Infectious Diseases

Infectious diseases are disorders caused by microscopic organisms i.e., bacteria, fungi, viruses, parasites, etc. It also refers to viral and bacterial diseases which are communicable that spread through any source (Baylor College of Medicine, 2016).

1.4 Significance of the Study

This anthropological study would help to understand the overuse and misuse of antibiotic medicine, and this study will be fruitful in the future because this empirical study would help to reduce the quantity of antibiotic usage of the medicine. Most people have no awareness and knowledge about infectious diseases, which increase through the overuse of antimicrobial drugs, so through this research study community will decrease the use of antibiotics.

The majority of health-related academia and clinicians do not consider to misuse of antibiotics as a medical ethics issue. This study will help to examine and evaluate weaknesses and gaps and also help to redesign new policies and medical curricula concerning antibiotics. The research being anthropological would help to find out more about the usage and mistreatment of antibiotics and bioethical problems in the usage of antibiotics. The present research will be focusing on medical academic teaching/curriculum, policies legislations, and programs launched combat to the misuse of antibiotics. Above mentioned variables are the biggest current issue in public health, bioethics, and medical anthropology.

The researcher chose this topic because it is one of the most demanding issues in the world today. There are multiple contributors behind this phenomenon such as medical teachings, policymakers, clinicians, and government, as well as health-related institutions and pharmaceutical industries, which sell irregular and unnecessary drugs and the government has no policies or checks and balances in place. The excessive consumption of this vulnerable innovation is a major cause of the increasing ratio of mortality and morbidity. Doctors are habitually prescribed unnecessary antibiotics because during the degree time not been guided properly and trained.

1.5 Thesis Outline

This section discusses the overall structuration of the research document. The first chapter introduces the research topic and problem statement. It further states the research objectives with an explanation of the important key terms and their operationalization in the research. Lastly, it elaborates on the significance of the research in future studies and policy makers.

The second chapter discusses the general problematization of the research objective incorporating existing literature into the argument to find out gaps in previous studies and to fill those gaps in the present research. The chapter begins with a general discussion about antibiotics, their uses, and classifications, and then moves on to its contribution to prevailing antibiotic resistance globally to some global and national policies to curb this issue globally. This chapter lays a foundation and directions for the remaining research.

The third chapter aims to discuss two important parts of the research i.e., research setting and research methodology selected and employed throughout the research. This includes required details of the area profile of locales, research methods, and techniques including data collection methods, sampling, data analysis technique, ethical considerations, and challenges encountered during the research.

Chapters four, five, six, and seven deal with the findings of the research. The fourth chapter discusses antibiotic resistance as a legal and policy dilemma. The fifth chapter highlights and discusses the sociocultural drivers and determinants of antibiotic consumption and misuse such as community-level knowledge about antibiotics, self-medications, over-the-counter purchase of drugs, behavioral factors, sociolinguistic influences, lack of cultural competency among practitioners, dietary patterns, and case study etc. The sixth chapter deals

with the discussion of medical practices considerations in the malpractice of antibiotics. This includes drivers of antibiotic resistance, the role of public and private hospitals concerning antibiotic consumption, medical drug stores, antimicrobial resistance, attitudes and practices in laboratory settings, knowledge of practitioners, the role of healthcare administration, and relevant case studies.

The seventh, and last chapter of the findings, discusses the phenomenon of integrating medical teachings to address misuse of antibiotics. It includes the discussion about antibiotics and concerning policies in the medical curricula, extra-curriculum activities regarding the appropriateness of antibiotics, attitudes of medical teachers concerning policies of antibiotics, medical students' perspective on antibiotics and their policies, bioethics, and issue of antimicrobial resistance in the course of clinical ethics. The last chapter demonstrates the summary, conclusion, recommendations, and suggestions for future studies and policy makers to curb the issue of antibiotic resistance globally.

CHAPTER 2

2. LITERATURE REVIEW

This chapter discusses the general problematization of the research objective incorporating previous literature into the arguments. The major agenda of this chapter find out gaps in previous studies and to fill those gaps in the present research. Initially, the origin of antibiotics, their classifications, and their sources are discussed. The discussion then moves on to the issue of antibiotic resistance, the policies and plans implemented or launched nationally and globally such as the Global Action Plan, Antimicrobial Stewardship Program, Pakistan Antimicrobial Resistance Network (PARN), allopathic system rules etc. The issue of antibiotic resistance will also be reviewed through an anthropological lens. Moreover, the significance of knowledge of the proper use of antibiotics, their policies, and antibiotic resistance among practitioners and students will also be discussed. Lastly, the sociocultural practices influencing antibiotic consumption will be discussed briefly to problematize the issue.

2.1 Antibiotics and their Categories

The word “antibiotic” was coined by joining the prefix “anti” which means against, fighting, or killing, and the Greek word “bios / biosis” which means life. In a literal sense, the term antibiotics mean Life-killing or against life (*Antibiotic*, n.d.). Antibiotics can be manufactured in one of two major ways. Initially, it was produced naturally via organic compounds in living microorganisms. The compounds produced by micro-organisms that were toxic to other micro-organisms were taken out for production (Denyer et al., 2004). Later, the antibiotics evolved in production via biological origin synthetically in laboratory settings. Either way, antibiotics are used to kill or hinder the development of germs. The first ever antibiotic, Penicillin, was discovered accidentally from the soil-inhabiting fungus “*Penicillium notatum”.* The first-ever trial of antibiotics (Penicillin) on human beings was conducted in 1940 (Schlegel & Zaborosch, 1993; Denyer et al., 2004).

2.2 Classifications of Antibiotics

Antibiotics are generally classified into two main types with different classification modes. Firstly, it is classified according to its spectrum of activity, which means the number of organisms affected by it. It is categorized either on a narrow or broad spectrum of activity.

Narrow-spectrum antibiotics are more specific in their impact and only affect gram-negative[1] bacteria. Whereas, broad-spectrum antibiotics are inhibiting a wider range of bacteria and affect both gram-positive[2] and gram-negative bacteria. Secondly, it is classified based on the action mechanism of antibiotics i.e., bactericidal antibodies or bacteriostatic antibiotics. Antibodies that target bacteria are bactericidal because they stop the bacterium from making cell walls. Bacteriostatic antibiotics, on the other hand, prevent further bacterial development and flush them out of the body (OMICS, 2019).

As aforementioned, antimicrobial resistance is a severe public health problem that must be addressed immediately (WHO, 2018b). Similarly, antibiotics are over-relied on as an all-cure drug or panacea in China. Consequently, morbidity and mortality from infections are relatively higher in China worldwide. China's hospital budget is less than 20 percent of its expenditure. However, financial compensation is granted for healthcare services and drug sales which unfortunately encourages excessive examinations, unnecessary treatment, and overuse of medicines by routine healthcare services 2006, the Ministry of Health Center for Antibacterial Surveillance (MOHCAS) in China, drug therapeutics committees, and nosocomial infection control measures were initiated in the hospitals for drug and infection control as recommended by World Health Organization (WHO) (Xiao et al., 2013). Due to limited resources, inadequate enforcement, lack of administration, and ineffective implementation plans, all of these policies and initiatives failed to be effective. Xiao et al. addressed the reformed Chinese policies to promote the rational use of antibiotics after a decade of unsuccessful healthcare regulatory actions. The Chinese Ministry of Health (MOH) launched new campaigns and restructured healthcare settings to improve the rational use of antibiotics in 2011 with the help of other healthcare reforms. An administrative target responsibility agreement between the Chinese Ministry of Health (MOH) and local health administration was signed to ensure the enactment of the campaign protocol including the establishment of obligatory administrative strategies for the rational use of antibiotics, setting targets for antibiotic management, and task forces organization. Moreover, to investigate the

[1] Gram-negative bacteria are any of the numerous species with a thin peptidoglycan cell wall, an outer membrane with lipopolysaccharide, and a capsule (Britannica, 2023a).

[2] Gram-positive bacteria are distinguished by their robust peptidoglycan cell walls and a lack of an outer membrane made of lipopolysaccharides (Britannica, 2023b).

matter more thoroughly and enhance accountability to hospital management workers who violate rational use laws, audit and inspection systems were developed.

IMS Health Research data show that the number of antibiotics sold declined along with the percentage of medicine sales (by value) for antimicrobials, which went from 25% in 2011 to 17% in the fourth quarter of 2012. According to data from the Chinese MOH, the proportion of patients with hospitalizations who received prescriptions for antibiotics dropped from 68 percent to 58 percent and from 25 percent to 15 percent. Although many challenges remain to be addressed to assure further advances in AMR control, the Chinese healthcare reform may serve as a suitable model for other countries with similar healthcare systems (Xiao et al., 2013).

2.3 Sources of Antibiotics

There are two main sources of antibiotic consumption among human beings i.e., direct consumption via doctor-prescribed medications or indirect consumption via animal breeding. The doctors often prescribe penicillin, macrolides, and fluoroquinolones to the patients via their medications. However, the main compounds used in animal breeding are tetracycline and sulfonamide, which are then consumed by a human via meat or dairy products consumption (Ghimpețeanu et al., 2022).

Prolonged exposure has been associated with several adverse effects, including those on the immune system, digestive problems as a result of the disturbance of intestinal flora, troubles with the kidneys, and the possibility of carcinogenic implications. Due to the potentially disastrous consequences of antibiotics used via animal breeding and infection preventive activities on human health, maximum residue limits (MRL) have been included in food safety laws (Shaffer, 2018). This reserved the use of antimicrobials for animals by veterinarians as preventive measures and only for the diagnosed infection treatment via proper prescription. It also limited antibiotic or antimicrobial use for human treatments only and prohibited them as breeding agents or growth catalysts for animals.

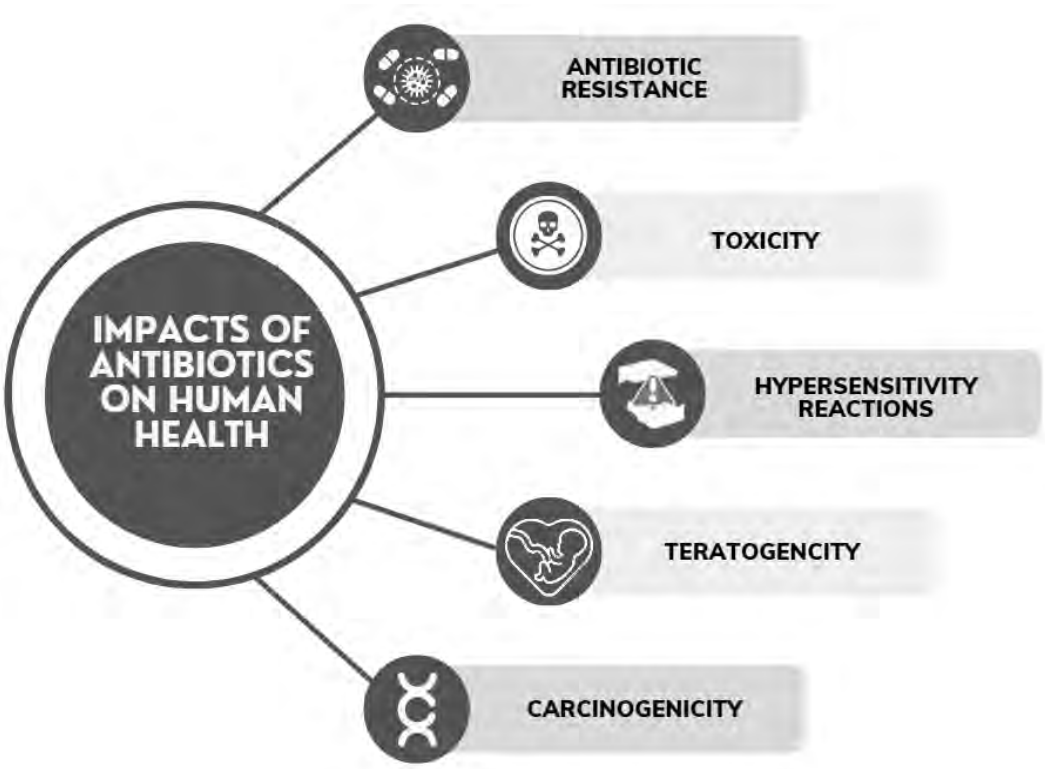

Figure 1: Impacts of antibiotics usage on human health[3]

There are numerous impacts of excessive use of antibiotics on human health. Antibiotic resistance, toxicity, hypersensitivity reactions, teratogenicity, and carcinogenicity are some of the health concerns that have been connected to antibiotic residues in food items (Darwish et al., 2013). These health difficulties have been highlighted in several studies that have been conducted all over the world (Figure 1). As discussed earlier, antibiotic resistance is one of the most prominent impacts of excessive and inappropriate use of antibiotics without proper diagnosis of bacterial infections (Zeb et al., 2022). It also causes toxicity and teratogenicity among humans, especially pregnant women. Teratogenicity can irreversibly modify the growth, structure, or function of the developing embryo or fetus (Aykan & Ergun, 2019). There is also a potential threat of maternal physiological changes, maternal toxicity, and infections during pregnancy. Thus, antibiotics are usually avoided to be prescribed and used by pregnant women (Knothe & Dette, 1986). In addition, hypersensitivity reactions are also a side effect caused by antibiotics misuse. The nonselective eradication of targeted bacteria frequently results in antibiotic hypersensitivity. Diarrhea, nausea, vomiting, rashes, and abdominal discomfort are the most often reported side effects (Jourdan et al., 2020).

[3] Visual representation of impacts of antibiotics usage on human health given in Figure 1 is created from the data extracted from the source. The source of the data is (Darwish et al., 2013).

2.4 Global Action Plan

Antimicrobial resistance jeopardizes the basic foundations of contemporary medicine as well as the long-term viability of an effective global public health response to the persistent danger of infectious illnesses. Every nation is at risk due to the widespread abuse and overuse of these medications in human medicine and food production. Without coordinated and swift action at the global level, the world is heading towards a post-antibiotic era in which common infections can once again become deadly. Alert to this crisis, the World Health Assembly adopted a global action plan on antimicrobial resistance to curb the crisis in May 2015 outlining five objectives, i.e., awareness, surveillance and research, reduction of the cause of infections, optimization of the use of antimicrobial drugs, and creation of a sustainable investment. The main goal of delivering quality-assured, safe, and effective medicines for the treatment and prevention of infectious diseases is accomplished with this strategy.

Global Action Plan documented that Antibiotic over-prescription and misuse of antibiotics cause antimicrobial resistance. Antibiotics have also been reported to kill many of the body's bacteria that help the digestive system. There are many types of bacteria in the human body, some of which are dangerous and some of which are good for health. Overuse of antibiotics adversely affects many of the body's beneficial bacteria and also the continuous intake of antibiotics and other drugs can affect the disease (WHO, 2016). The majority of published initiatives to drive down the use of antibiotics have centered on practice-level education, with the most effective strategies combining patient and clinician education (Gonzales et al., 2008).

For some years, many publications documented globally the reduction of overuse and misuse of antibiotics. They made policies and strategies internationally, nationally, and domestically. In these legislations, numerous institutions such as the government, public health, and health administrations contributed at various levels such as academics. In recent years, many publications around the world have documented the decline in antibiotic overuse and abuse. They formulated policies and strategies at the international, and national levels. Numerous agencies such as government, public health, and various levels of health administration. Furthermore, many awareness campaigns were conducted around the world for the irregular use and distribution of antibiotics. For instance, from 1997 to 2007, with the coordination of twenty-one European countries which emphasized on overuse and misuse of

antibiotics? (We find evidence that public campaigns significantly reduce the use of antimicrobials in the community (Filippini et al., 2012)) The motives of that collective struggle were changing the policies and decreasing the consumption of antibiotics. Any doctor who prescribed unnecessary antibiotics and any pharmaceutical company that distributed irrational medicines faced heavy resistance from those organizations. Moreover, European countries through the social marketing aware communities and brought changes in the medical curriculum. The communal campaigns were the main target to educate physicians and patients. Furthermore, the mass media is the central source in the prevention and formal practice of antibiotics, because every person has easy access to media. Through print media and social media, we can forbid the spreading of unnecessary antibiotics. However, the concept of social marketing in Pakistani media is not very common and it works mainly for commercialization.

World Health Organization established the Action Programme on Essential Drugs in 1981 to help countries implement national drug policies and work towards the judicious use of drugs which was extended in 1998. To expand the program, a department of Essential and other Medicines Division (EDM) to combine WHO's global efforts to promote the quality, safety, efficacy, and accurate information of all medicines with the responsibilities of the former DAP. EDM works with countries, international agencies, NGOs like Médecins Sans Frontières, and other organizations to ensure that people everywhere have access to the essential drugs they need at an affordable price; that the drugs are safe, effective, and of good quality; and that they are prescribed and used rationally.

The purpose of this program is to make medicine favorable for developing countries. WHO aims to develop a healthcare system; it made a list of 200 vaccines and drugs based on cheap prices (Reich, 1987) which was rejected by the policymakers, political authorities, and government officials. Although both doctors and pharmaceutical companies alleged the list to be not good, meanwhile, they began to use the medicines mentioned in the list.

Despite these plans, legal policies, and all the positive steps taken in Sindh province, such as the establishment of an AMR surveillance system and the development of a national action plan, the implementation of the WHO Global Action Plan has been uneven. One of the primary challenges in Sindh province is the lack of awareness about the dangers of antibiotic resistance. the research observed that healthcare officials, like DRAP officials or MS, are unaware of the policies and programs. Moreover, medical and pharmacy students are unaware of such policies and programs. Therefore, education and awareness campaigns are required to

educate the public and healthcare professionals about the appropriate use of antibiotics and the dangers of overuse and misuse. Additionally, there is a need for investment in the research and development of new antibiotics to address the problem of resistance. Another significant challenge in Sindh province is the lack of political will to implement the Global Action Plan. In a lot of cases, the negligence of medical officials is covered and supported by the politicians for their vested interests, relations, and commissions. Political commitment is necessary to address the problem of antibiotic resistance, including the establishment of regulations and guidelines for the appropriate use of antibiotics, the promotion of infection prevention and control measures, and the development of funding mechanisms to support research and development in this area.

Furthermore, there are infrastructure and resource challenges in Sindh province that hinder the implementation of the WHO Global Action Plan. The lack of adequate laboratory facilities, diagnostic tools, and human resources to support AMR surveillance and monitoring activities is a significant concern. Additionally, challenges in accessing appropriate antibiotics, particularly in rural areas, are also a major obstacle. To overcome these challenges, there is a need for greater investment in infrastructure and resources, including laboratory facilities and human resources. Additionally, greater collaboration between the public and private sectors is required to address the problem of antibiotic resistance.

2.5 Antimicrobial Resistance Control in Low and Middle-Income Countries and Asia-Pacific Areas

In Tijuana, another border community, lower-income locals tend to use pharmacies as primary healthcare providers for several reasons, including avoiding the expense of seeing a physician (Schwartz, 2004). Others refer to that region physician prescription is very expensive so therefore people did not go to medical centers. They take medicine from medical stores, although this matter is illegal or forbidden. Countries and nations with fewer economic resources or knowledge are more likely to engage in this practice. In Pakistan country are mass population belongs to the lower class and approximately they porches medicine without description.

Furthermore, Medical anthropology research has drawn attention to cultural, social, political, and economic structures that shape the distribution of disease as well as access to biomedical treatment. Anthropologists have recognized the importance of antimicrobials in

alleviating suffering, and have worked (primarily in Low and Middle-Income Countries (LMICs) to understand how access to and use of essential medicines could be improved (Manderson, 1998)

The Asia Pacific Area (APAC) contains two-thirds of the world's population and ten of the world's poorest countries. The obstacles that prevent AMR control in APAC from progressing are numerous and have an impact on both high-income and Low-to-Middle Income Countries (LMICs). By 2030, 27 of the world's 43 megacities are expected to be located in this region (UN, 2018), and these densely populated cities could act as significant reservoirs for the spread of diseases that are resistant to antibiotics. It is suggested that stakeholders and policymakers should think about creating focused organizations like a regional Center for Disease Control and Prevention (CDC) to complement national efforts and recognize the value of cooperation with international and regional entities. The AMR agenda might be elevated above the national level with the help of a regional CDC, which would also aid nations in more successfully achieving their global health goals. The table given above is issues, recommendations, and target outcomes to improve the surveillance of AMR in the APAC (Yam et al., 2019).

World Health Organization (WHO) suggested strategic framework statements based on AMR objectives (Ministry of National Health Services, Regulations & Coordination, 2018). Firstly, raise awareness and understanding of AMR by using effective communication, instruction, and training. AMR must be made a priority politically at all levels and the government should address this issue on both national and provincial levels by establishing one-health coalitions.

Table 1: WHO Strategic Framework[4]

Issues	**Recommendations**	**Target Outcomes**
Weak Health System	• Increase country capability and capacity to reliably detect the priority pathogens, and link laboratory results to clinical outcomes.	Improved capacity and capability to diagnose, treat, and prevent AMR at

[44] Source: (Ministry of National Health Services, Regulations & Coordination , 2018)

	• Prescribe microbiological culture (particularly blood and urine) appropriately. • Report case-based surveillance report, together with evaluating attributable morality rate for AMR.	all levels of the health system.
The unclear burden of AMR	• Improve surveillance to better describe the burden of AMR. • Better capture and report records of death and other clinical outcomes attributable to AMR. • Develop robust models that are practical and acceptable to policymakers and healthcare providers.	Ability to monitor and evaluate the effects of interventions, and project the impact of AMR using modeling options.
Lack of formal network to address AMR	• Engage policymakers to consider developing an official network for AMR in the region, based on role models developed by European Medicines Agency, such as EARSNET and ESVAC.	Consolidation of resources and efforts across countries to deliver the impactful program at the regional level.
Lack of open access data for global sharing	• Engage with policymakers to make data open-access, such as AMU and AMR surveillance data. • Improve the understanding and utilization of all surveillance data to decide on resource allocation for interventions and to inform the implementation of action plans.	Robust and reliable data to support further policy engagement, monitoring and evaluating the impact of interventions, and research and development.

Moreover, professional training and education must be ensured by the regulatory authorities such as Higher Educational Commission (HEC), Pakistan Medical & Dental

Council (PMDC), Pakistan Veterinary & Medical Council (PVMC), and Pakistan Nursing Council (PNC), Pakistan Pharmacy Council and Agriculture Councils. Secondly, knowledge and evidence base must be promoted and strengthened through research by formulating advisory and research bodies of experts to monitor and evaluate the AMR surveillance network. Thirdly, the incidence of infection must be reduced through the provision of clean water, effective sanitation, and hygiene at the local level, and infection prevention measures in the surveillance of the advisory body. Fourthly, the use of antimicrobial medicines in human and animal health must be optimized by promoting Antibiotic Stewardship. Pharmacies must be trained in AMR and antibiotic dispensing. Moreover, awareness campaigns, including media campaigns, must be promoted for public awareness. ARM must be made compulsory for medical and pharmacy curricula at the beginning level. Finally, an economic rationale for sustainable investment must be developed that considers the needs of all nations, and increase funding for innovative drugs, diagnostic equipment, vaccines, and other interventions. For this purpose, the research on new and re-purposed antibiotics, vaccines, and diagnostic tools must be funded and encouraged by the authorities and institutions.

2.6 Antimicrobial Stewardship Program

The increasing rates of AMR led to the need for the Antimicrobial Stewardship Program (ASP) aiming to endorse and optimized the use of antimicrobials or antibiotics at hospitals and community levels. The term antimicrobial stewardship was coined by John McGowan and Dale Gerding in 1996 (McGowan & Gerding, 1996). Considering antimicrobials as a nonrenewable resource, they highlighted a need to promote rational use by avoiding unnecessary use. A year later in 1997, it was then adopted as a guideline by healthcare institutes and hospitals such as the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA) to avoid AMR (Shlaes et al., 1997). Ever since it has gradually become a worldwide concern of healthcare systems and hospitals. In 1999, programs were developed and implemented in several countries including the United States and Europe led by pharmacists, infectious disease specialists, or clinical microbiology. In 2011, antimicrobial stewardship was optimized and implemented focusing on the correction of 5-Ds given below (Doron & Davidson, 2011):

- Drug
- De-escalation of therapy

- Discontinuation of therapy
- Dose
- Diagnosis

The antimicrobial stewardship program seeks to enhance patient outcomes, lessen microbial resistance, and halt the spread of infections spurred on by multidrug-resistant organisms. Increasing rates of multidrug-resistant (MDR) bacterial infections in low and middle-income countries (LMICs) including Pakistan made infection prevention and control (IPC) and antibiotic stewardship policies essential parts of the healthcare system (Atif et al., 2021). The Medical Microbiology & Infectious Disease Society of Pakistan implemented an antibiotic stewardship program (ASP) in hospital settings after adopting the Global Action Plan (GAP) guidelines released by the World Health Organization in 2016.

2.7 Pakistan Antimicrobial Resistance Network (PARN)

The Pakistan Antimicrobial Resistance Network (PARN), established in March 2007 with a collaboration of the Medical Microbiology and Infectious Diseases Society of Pakistan (MMIDSP), also connects civil society, organizations, public health authorities, and other health-related agencies overcome to the threat of antibiotic resistance and other healthcare-associated infections. The main objective of the PARN is to provide awareness and highlight issues of antibiotic resistance through information sharing and developing a counseling service to help address these issues. The activities of PARN have grown over the past several years, and it now provides a free online course called "Technical Skills for clinical practitioners" to improve antibiotic-resistant testing. Moreover, PARN has contributed to boosting awareness by providing reports and guidelines regarding antibiotic resistance and other infectious diseases (PARN, n.d.). The four main objectives of PARN are given below:

- Providing information and expressing concern on AMR and infections related to healthcare.
- Meetings and seminars were organized to raise awareness among practitioners and in public.
- Giving guidance, discussing events, and disseminating information on antimicrobial testing and infection control related to healthcare.

- Conducting workshops and seminars to improve laboratory practices and lower infections related to healthcare. Treatment guidelines are also provided by the PARN for antibiotic resistance.

These objectives provide a very effective guideline that can assist Pakistan to curb the issue of antibiotic resistance. This also helps the researcher to focus on the points whether these are being practically implemented in the research locale or it is just limited to documents.

2.8 Punjab Health Care Commission Act, 2010

The Punjab Health Commission Act 2010 (PHC, 2010) covers medical negligence by healthcare practitioners who over-prescribe antibiotics. Medical negligence is considered a serious offense under Section 19 of the act. A healthcare professional may be held accountable for medical negligence if the healthcare system lacks the necessary human resources and equipment, despite claiming to have acquired them. In such cases, the healthcare professionals employed by the system may not be able to exercise their skills with appropriate competence. Similarly, a medical or surgical treatment that is not accepted and poses risks to the patient may also be considered medical negligence.

The PHC Act of 2010 is an important legal framework that ensures the accountability of healthcare practitioners who over-prescribe antibiotics (PHC, 2010). It considers medical negligence a serious offense and provides clear guidelines on the conditions that may constitute medical negligence. The act emphasizes the importance of having appropriate human resources and equipment in healthcare systems and ensuring that healthcare professionals exercise their skills with competence. It also highlights the importance of providing medical and surgical treatments that are widely accepted and do not pose undue risks to patients. By holding healthcare practitioners accountable for their actions, the PHC Act of 2010 helps to ensure the provision of safe and effective medical care in Punjab, Pakistan.

The implementation of the 2010 Punjab Health Commission Act (PHC) has faced several challenges. One of the major challenges is the lack of resources and capacity at the district level to effectively enforce the law. Another challenge is the resistance from the healthcare industry and practitioners who are unwilling to comply with the regulations imposed by the law. Additionally, the lack of awareness and understanding of the law among the public, healthcare professionals, and law enforcement agencies has hindered its implementation. There

is also a need for a robust system of reporting and investigation of medical negligence cases, which currently do not exist in many parts of Punjab. Furthermore, there is a need for continuous monitoring and evaluation of the implementation of the law to ensure its effectiveness in addressing the issues it aims to tackle.

2.9 Allopathic System Rules: The Prevention of Misuse in West Pakistan

The Rules of the Allopathic System of misuse prevention in West Pakistan sets out strict licensing requirements for all physicians wishing to prescribe antibiotics in 1968 (GoWP, 1968). It clearly shows that antibiotic prescribing is a serious matter and should only be provided by the practitioners properly prescribed under the law. The regulations outlined the qualifications and licensing requirements for medical practitioners and provided guidelines for the prescription and sale of medicines. The regulations were aimed at ensuring the availability of quality medical care and preventing the misuse of medicines by unqualified practitioners.

2.10 Anthropological Lens for Antibiotic Resistance

Anthropologists began more commonly to document wider social, political, and economic structures affecting, amongst other things, access to medicines for infectious diseases. The inequalities shaping the occurrence of disease as well as access to treatment were increasingly documented. The concept of ‘structural violence’ gained traction in anthropological analyses, referring to the injury caused by inequitable regulations and categories imposed upon people by structural systems or governing institutions (Galtung, 1969).

This text refers to provide an overview of the inequality of social classification by social institutions. For example, if any person in the community belongs to the lower class and has fewer economic resources or has no approach to reach the city, how does he take treatment from medical officials? Therefore, when a patient takes antibiotic medicine from medical stores; the ratio of diseases is increasing day by day because poor people have no strong hygiene system, there are social consequences behind the misuse and overuse of Antibiotics. Therefore, it is the responsibility of government, civil society, and political advocators to play a positive role against the misuse and overuse of antibiotics in society.

Antibiotic anthropological studies have frequently demonstrated that cultural, political, and economic structures, as well as individual beliefs, impact antimicrobial use. Antibiotics may have grown so ingrained in the functioning of our cultures, governments, and economy,

according to some anthropologists, that they have taken on the role of an infrastructure that supports life (Willis & Chandler, 2018). Antimicrobial stewardship and AMR management are social, political, and economic issues. Social scientists, such as anthropologists, can provide insight into how to approach these intricate interactions. To effectively address AMR, a collaborative and interdisciplinary strategy is required. Otherwise, the global community risks enacting policies that may have unforeseen and negative repercussions (Willis & Chandler, 2018).

Represented by defined daily dose (DDD), antibiotic use in humans surged by 65 percent between 2000 and 2015 with India, Pakistan, and China at the top of the highest consumption rates (Klein et al., 2018). Antibiotics are used for disease therapy of livestock, infection prevention, animal growth promotion, and in agricultural industries. Consequently, antibiotic resistance and drug-resistance pathogens in humans have increased globally (AMIS, 2020).

A team of researchers from the Anthropology of Antimicrobial Resistance studied the use of antibiotics in different regions of the world. Malawians were witnessed consuming self-prescribed antibiotics, causing them to go out of stock at public clinics. Zimbabweans dwelling in politically unstable conditions used to consume antibiotics to keep them going and to cope with the unsanitary living conditions. Moreover, Antibiotics were used in Uganda, not just for human use, but also to treat and protect livestock from various diseases and to diminish economic loss. These cases establish the need for interventions addressing the adjustment of political and structural challenges to mitigate global antibiotic reliance (AMIS, 2020).

Anthropologists have presented evidence of consumers' justifications for using medications, even though a "rational use" concept has driven numerous AMR policy initiatives over the past few decades. Mark Nichter's ethnographic research in the Philippines investigates how and why the use of antibiotics as prophylaxis has emerged as the primary way that sex workers and their clients believe they may protect themselves from Sexually Transmitted Infections (STIs) (Nichter, 2001). In situations where sex workers and their customers frequently experience stigma and vulnerability within healthcare institutions, antibiotics were conceived as a type of care that may be self-administered. The goal of the anthropological study is to place the prescription, sale, and trade of medications into regional, international, and political networks of relationships (Willis & Chandler, 2018).

The researcher indicates that the current outbreak of infectious illnesses in the Philippines is caused by the use of antibiotic drugs by sex workers women (Nichter, 2001). Because of the taboo nature of this practice in our society, it is common practice for women to take antibiotics. If a female becomes pregnant before getting married, society will not accept it since it goes against the norms that govern our cultural practices. As the Philippines is such a poor nation, there is a high population density of people working in the sex trade in the Philippines. They use antibiotic medication even if their doctors have not prescribed it for them (Manyau et al., 2022).

2.11 Antibiotic Knowledge among Students and Practitioners

As discussed earlier, proper education and training on antibiotic use and resistance are very essential for medical and pharmacy students as they are the future of the healthcare system. Studies have indicated that inadequate knowledge in Pakistan results in the misuse of antibiotics varying in their choices, posology, duration, overprescribing, and unauthorized sale (Aziz et al., 2021). Besides that, financial compensation for drug sales provided to healthcare institutions is another important factor behind the misuse of antibiotics (Xiao et al., 2013). According to the studies, a gap exists in the training and education of MBBS and Pharm D. students in Pakistan. Mubarak et al. surveyed medical and pharmacy students who lack adequate training and education about antibiotics and are unfamiliar with antimicrobial stewardship. In comparison to medical students, pharmacy students are to some extent more informed. However, both medical and pharmacy students did not find the lecture-based information related to antibiotics practically useful as the curriculum taught was decades old. It is suggested by the studies that early education of medical and pharmacy students makes them vigilant about the optimal use of antibiotics that would avoid malpractices in prescription and its rational use recommended by future medical and pharmaceutical professionals. Mubarak et al. also suggested the upgradation of the curriculum being taught to be more problem-solving and practical to improve their role at the professional level in a community setting (Mubarak et al., 2021). Along with that, a study suggested that the principles of protocol development for antibiotic use in healthcare facilities should be included in the curriculum at the undergrad level (Nathwani & Davey, 1999).

2.12 Sociocultural Practices and Antibiotic Consumption

Humans behave according to the acquired sociocultural environment which is shaped by social institutions and organizations such as politics, economics, family, health care institutions, and other types of social organizations that encourage humans to overuse and misuse antibiotics.

The idea of structural functionalism by Emile Durkheim suggested that human performance is determined by acquired normative order, and every practice is determined by the societal structure (Collyer, 2015). If we apply the same concept to the misuse of antibiotics, we can understand how social institutions, especially health institutions and the government's regulatory bodies, push human beings to consume antibiotics unnecessarily (Aslam et al., 2022). Political systems and parties play a very important role to promote the misuse of antibiotics through their policies, decision-making, and distribution of resources.

For instance, the project entitled Sehat Sahulat Programme, which has been closed by the current (PML-N) regime due to political rivalry was introduced by the previous PTI government under the purpose of universalization of health in Punjab. Similarly, the concept of universalization of health is also defined by the United Nations under the agenda of SDG (Khilji, 2023). The program was designed to provide free-of-cost treatment to 25 million families who are unable to bear the expenditures of medicalization. It has been a tradition in Pakistan to halt previous governments' projections by existing regimes. In addition, this animosity between political parties would be confronted by populations. People are already facing multiple problems due to drastic floods and severe inflation. Moreover, the current government denounced that the project had been closed because the country's assets couldn't bear the cost of this welfare institute anymore, and that doesn't have any other reason. These types of decision makings keep away the population from welfare institutions as mentioned in Article 25 of the universal declaration of human rights (UN, 1948), which Pakistan has ratified, states:

Everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing and medical care, and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control (UN, 1948).

People who do not have access to governmental hospitals due to the dysfunctionality of infrastructure or lack of communication or are unable to afford heavy charges of medical care, such people prioritize purchasing medicine without a doctor's concern. Therefore, welfare programs related to healthcare are more beneficial to reduce the overconsumption of antibiotics. Hence, the need for the provision of healthcare welfare institutions and making them accessible to the general population must be prioritized by government stakeholders (Khilji, 2023).

Human capital is the foundation of sustainable economic growth which is influenced by the decay in their health and wellbeing. Yet, the healthcare sector is one of the most neglected areas in Pakistan in terms of policy and distribution of resources as Pakistan ranks as the lowest spending per capita rate in the world. This negligence is reflected in the allocation of the annual budget for the health care sector in Pakistan. Statistically, the health care budget allocated to the healthcare sector is 2.1 percent of Gross domestic product and 40$ per capita, out of which only 33% is spent by public authority and the remaining is covered by cash on hand (Dar, 2023). The inconsiderate attitude of public authority towards the healthcare sector can be analyzed by the condition of the quality of healthcare services which is continuously decaying. The skyrocketing inflation and increasing poverty worsened healthcare infrastructure, closure of welfare healthcare programs such as the Sehat Card, Sehat Sahulat Programme, etc., and increasing charges of healthcare services limited access to them for the population, especially lower middle class, and daily wagers. This leaves no choice for them than abstaining from getting healthcare services and trying alternate ways of treatment such as over-the-counter purchase of drugs, unnecessary consumption of antibiotics for speedy recovery, use of home remedies, and consulting spiritual healers or quacks. Consequently, the health condition of the patients worsens.

Moreover, the lack of surveillance over private clinics and practitioners aggravates the healthcare systems and increases the healthcare risks. The Labour Force Survey of 2020-2021 reports that 37.2% of medical practitioners in Pakistan do not possess a medical degree and 25% do not even have any academic degree (Dar, 2023). As a result, it increases the risk of antimicrobial and antibiotic resistance among the population as the majority of such doctors prescribe antibiotics and other antimicrobial drugs to treat the symptoms without a proper diagnosis of the disease or infection.

2.13 Theoretical Framework

This section provides an overview of the theoretical frameworks applied in the current research.

Practice Theory

Practice theory emerged from the ethnographic work of Pierre Bourdieu, a French sociologist, in the late 20th century. It is considered a major theoretical text and critique of methods of social science in the field of anthropology and sociology (Bourdieu, 1977). It provides insight to understand the interlink between the social structure and individual actions that produced new social phenomena in society. Its core concepts are habitus, field, and capital. Bourdieu defined habitus as attitudes, dispositions, and behaviors that are engendered in the individual through acquired socialization. The field is defined as a social structure that provides choices and opportunities for individuals or groups to behave in that acquired normative order or organizational vacuum. Moreover, he defined capital as any resources that can be converted into social power or influence such as economic capital, social capital, and cultural capital. These types of capital can be converted into symbolic capital in the societal or contextual recognition and prestige.

These forms of capitals play an important role in the field to construct habitus. Capital is the power of an individual in society social capital is one's social networking, such as doctors, friends, etc., cultural capital is one's education, knowledge, values, traditions, etc., and economic capital is also power that is in materialistic form. Individuals possess capital from the field which shapes the habitus to practice antibiotics. Similarly, economic capital also forms the habitus and practice of the individuals. For instance, lack of economic capital contributes to creating choices for individuals to take medicine without perception, eat unhealthy food, and live an unhygienic lifestyle which causes infections and ultimately leads to the production of antimicrobial resistance. It also restricts individuals to opt of purchasing medications including antibiotics without visiting doctors. Similarly, some doctors overprescribe antibiotics to meet their targets from the pharmaceutical companies to get their set commissions and other incentives. Social capital includes social networks or relations such as friends, family, etc. Doctors also contribute to the excessive use of antibiotics as they often do not have the appropriate equipment to properly diagnose diseases, hence, they treat patients based on their apparent symptoms and prescribe medicines. This leads them to consume antibiotics even for non-bacterial infections or diseases.

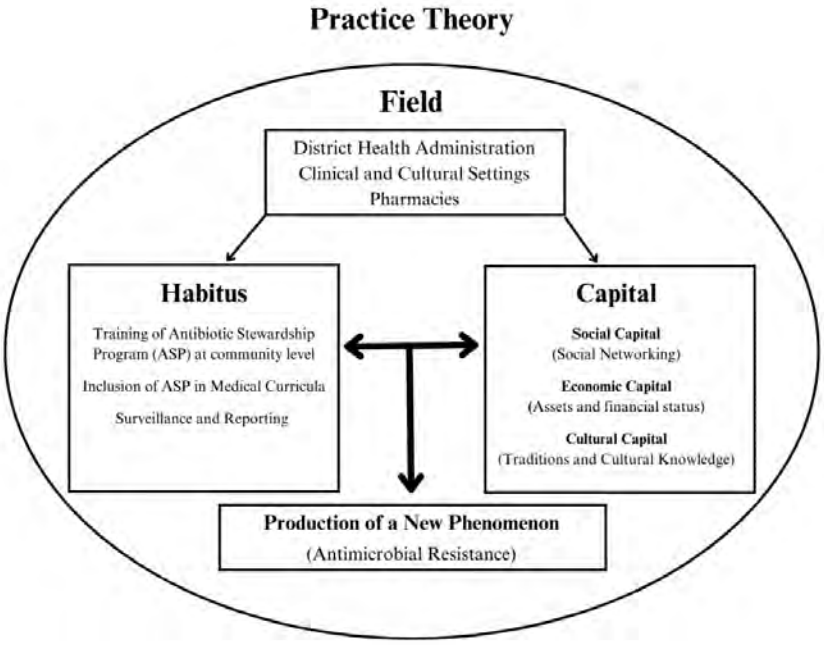

Figure 2: Practice Theory[5]

Social capital in this context is our doctors and pharmacies that popularize the narrative that antibiotics are the cure for all health issues by overprescription and sale of antibiotics without perception. Whereas, cultural capital refers to our cultural knowledge and traditions that shaped the habitus of intervention of family members and elders in the decision-making of medication consumption. Cultural capital such as cultural values and traditional knowledge also encourages individuals to consume antibiotics. Antibiotic consumption in the cultural structure of Khairpur Mirs is very common and considered a cure for all drugs. This shapes the practices and then ultimately produces something as a consequence such as antibiotic resistance among the excessive users of antibiotics. For instance, some people do not allow their women to visit male doctors because it is against their cultural traditions and values. Instead, they bring medicines home for them by indicating the symptoms to the doctors or pharmacies.

Using the lens of this theory, the role of pharmaceutical companies, medical practitioners, medical stores, and policymakers in perpetuating the excessive use of antibiotics leading to the growth of antimicrobial resistance is highlighted. Bourdieu argues in his theory of practice that the structure (field) of society shapes the habitus of the actors and individuals which leads them to a specific practice and produces a new phenomenon. Similarly, in the context of this current research, the field (structure of the society) constructs habitus which

[5] The diagram is created from the discussion of theoretical concepts of 'Practice theory' applied on the current research.

leads the actors to practice antibiotic consumption with or without a doctor's consultation or prescriptions. This leads to the production of antibiotic and antimicrobial resistance among the users. The socio-cultural field plays an important role to practice the misuse of antibiotics and produce new phenomena of antimicrobial resistance and putting it in the paradigm of biomedicine. The socio-cultural construction suggests that gap in the language because they do not understand medical language and believe that antibiotics use for every disease. Sociocultural interventions involve culturally sensitive approaches that respect local beliefs, values, and practices. For example, to care and respect elders and family members in the health care decision-making.

Bourdieu's practice theory enabled me to understand social and medical structures in the production of antimicrobial resistance in the interplay of the field and habitus of the individuals. According to the operationalization of current research, the term habitus refers to the beliefs, attitudes, and perceptions of individuals involved in the practice of antibiotics. Practice is shaped by the field such as health institutions, policy-enforced actors, exclusion of antibiotics stewardship programs from medical curriculum and health care facilities, health administrators, pharmaceutical companies, sociocultural constraints, and medical practitioners' societal infrastructure which are the contributors to the production of antimicrobial resistance disease in Khairpur Mirs.

The permission for medical teachers to practice in private clinics by the government constitutes teachers' behavior that does not address the issue of antimicrobial resistance through extra curriculum activities. The structural domination of clinical orientation due to economic factors allows them not to properly teach the courses like social medicine through which an individual can avoid getting an infection. Furthermore, Pharmaceutical companies, as key stakeholders, contribute to the production of antimicrobial resistance as they act more as competing drug distributors by giving incentives and commissions to the doctors on overprescription of various drugs including antibiotics. Additionally, medical practitioners also play a significant role in shaping inappropriate antibiotic practices. Their habitus is influenced by economic causes, patients' demands, and health administration's lack of supervision. Moreover, policymakers, as part of the social structure, have the power to shape regulations and guidelines around antibiotic use. However, in this scenario, it is suggested that policymakers and administration are actively working to reduce the phenomenon of excessive antibiotics. For instance, policies related to the antibiotics steward program are not

implemented at the community level including hospitals, laboratories, pharmacies, etc. Moreover, training related to the proper usage of antibiotics and the problematization of AMR is not conducted. The district health government has not formed any system or body to check on the surveillance of whether the medical professionals and other stakeholders in Khairpur Mirs strictly follow the guidelines provided properly or not. This could be due to various factors, including political interests, lack of awareness, or insufficient prioritization of antimicrobial resistance as a public health concern.

Over time, the practice of widespread and inappropriate antibiotic use leads to the emergence of antimicrobial resistance. Bacteria adapt and develop resistance mechanisms, rendering antibiotics less effective in treating infections. This puts human beings in a new biomedical paradigm where once easily treatable infections become more challenging to manage. This research allows me to address the abovementioned issue by challenging the dominant habitus, making the public aware of it and its side effects, and promoting effective precautionary behavior. All of this can be achieved through the implementation of proper guidelines to curb this issue and promote responsible use among individuals and at a community level.

Multi-Factorial Causation Theory

The multi-factorial causation theory of disease is a conceptual framework used to understand the complex interplay of multiple factors behind the cause and development of diseases. It was first proposed by Francis Galton in the late 19th century (Galton, 1897). It opposes the idea that diseases are caused by a single factor i.e., biological, and argues that there are multiple factors behind the development of any disease such as biological, genetic, environmental, social, political, behavioral, lifestyle, etc. This theory provides a pivotal lens for developing disease prevention, control, and treatment strategies for a specific population by understanding underlying factors as root causes of diseases.

The multifactorial model of disease provides critical insight to understand the etiology of disease holistically instead of solely relying on biological or genetic factors. This model tends to understand the nature of the disease in the context of sociocultural, political, economic, and exercise of power behind the causes of disease. The research observed that there are multiple factors behind antimicrobial and antibiotic resistance such as sociocultural incompetency in the clinical settings, unskilled practitioners, economic causes, lack of interest

in health management, and medical academics to address the issue of antimicrobial resistance. One of the contributors to increasing antimicrobial resistance is unskilled practitioners who prescribe antibiotics for every health condition even though scientifically it is only used for bacterial diseases. Moreover, pharmaceutical companies persuade doctors and pharmacies to sell medicine over needed and they are selling it for incentives. The inappropriate knowledge of doctors and laymen about the proper usage of antibiotics and their consequences is also one of the contributing factors. There are multiple policies and programs related to the appropriate usage of antibiotics but due to the lack of interest of health officials and government, these are not being applied properly in the Khairpur Mirs. Thus, the health and local communities do not have the proper knowledge. Lack of surveillance is another factor as doctors do not maintain monthly or weekly reports of antimicrobial resistance cases and the type of antibiotic generation resistance causing antimicrobial resistance. The most important factor is medical teaching which does not address this issue through and my research observed that policies and programs like antimicrobial stewardship programs and national action plans are not incorporated into medical curriculum. The current research focuses on the multi-factorial causation behind antibiotic resistance caused by the excessive misuse of antibiotics.

CHAPTER 3

3. RESEARCH SETTING AND METHODOLOGY

This chapter is divided into two parts. The first part discusses the research setting and the second discusses the research methodology employed for data collection for the research. As the research is conducted in a multi-sited locale inclusive of Khairpur Mirs as a central locale, and Karachi, and Hyderabad as secondary locale. The details of Khairpur will be discussed in detail including its geography, historical background, population, climate, settlement patterns, education, health infrastructure, and income sources of the population. However, the second part discusses the research methodology employed while conducting the research including

3.1 Research Setting

Before the discussion of the research methodology and findings of the research, it is necessary to understand the historical and structural dimensions of the research locale. This section deals with the various socioeconomic, demographical ecological, and cultural dimensions of the research locale.

3.1.1 Locale

This section provides an overview of the research locales of the study. The current study is based on multi-sited ethnographic fieldwork. The concept of multi-sited ethnographic fieldwork was introduced by George E. Marcus (Marcus, 1995) which incorporates ethnographic fieldwork in multiple locales or sites. It allowed me to analyze sociocultural determinants of health and antibiotic consumption, the role of healthcare providers and knowledge providers of medical or pharmaceutical fields, and the impact of health policies across multiple locations.

The central locale for data collection is Khairpur Mirs from where all data collection has been conducted from this location except the interviews related to curriculum and teachings addressing the overuse and misuse of antibiotics, issue of miss-consumption of antibiotics, and antibiotic resistance.

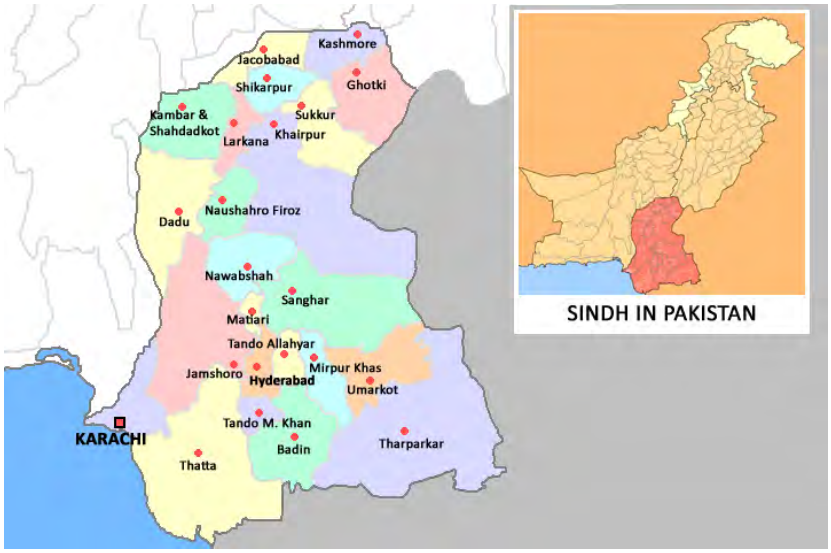

Figure 3: Map of Sindh, Pakistan[6]*- Source: Pakistanalmanac.com*

The locale of the current study is the cities of Khairpur Mirs, Karachi, and Hyderabad located in Sindh, the southern part of the country. The primary or foundational locale of the study is Khairpur Mirs as most of the participant observation (PO), in-depth interviews, short interviews, and Focused Group Discussions (FGD) were conducted there, hence, it has been discussed in detail. However, interviews were also conducted in Karachi and Hyderabad.

The interviews were only conducted at Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro-Hyderabad and Shaheed Zulfikar Ali Bhutto Institute of Science and Technology from Karachi. I conducted interviews from these universities because I wanted to document the concern of different medical education institutes addressing the issue of overuse and misuse of antibiotics. I selected just one university, Shaheed Zulfikar Ali Bhutto Institute of Science and Technology because it is a public health institution and also very popular. I decided to explore how the curriculum of the public health department of the university, a public university, addresses the issue of antibiotics.

3.1.1.1 Khairpur Mirs

[6] Image is taken from https://pakistanalmanac.com/sindh-khairpur/

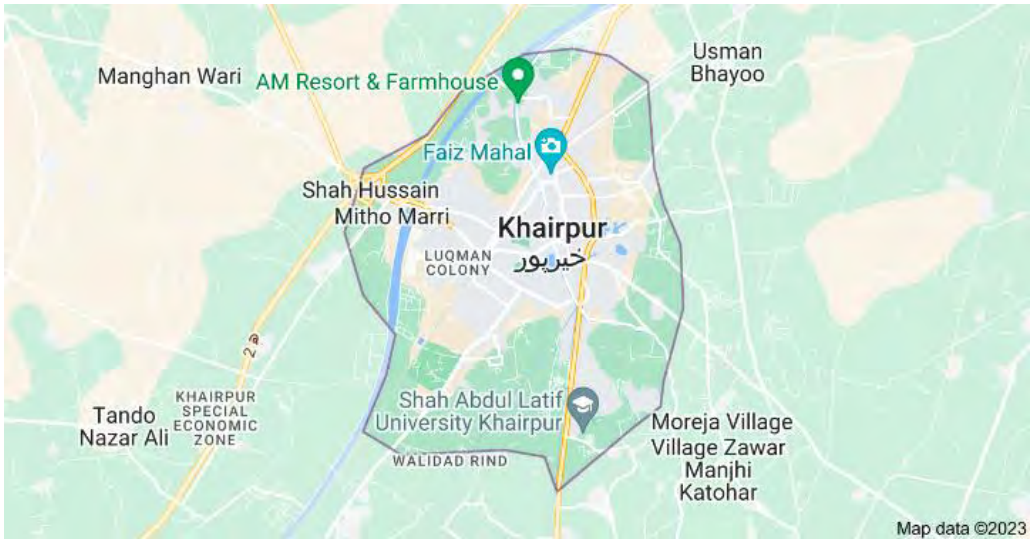

Figure 4: Map of Khairpur[7] *- Source: Google Map*

Khairpur Mirs is a small city located in the Northern part of Sindh, Pakistan. Khairpur is the third biggest district by area as far as the region and the fifth-most crowded district of Sindh territory in Pakistan. Khairpur is additionally called Khairpur Mirs and it is situated in the Sindh area, south-central Pakistan.

Geography

The Khairpur Mirs has an area of 15,910 square kilometers and has eight (8) Tehsisls/Taluka i.e., Khairpur, Gambat, Kingri, Sobodero, Kot-Diji, Nara, Thari Mirwah, and Faiz Gang, and seventy-six (76) union councils (*Khairpur*, n.d.). The city lies along the Khairpur East Waterway, 11 miles (18 km) south of the Indus River. It lies between 26° 09′ and 27° 42′ North latitudes and 68° 10′ and 70° 10′ East longitudes. Furthermore, it shares boundaries with the regions of Larkana, Shaheed Benzeerabad, and Sukkur. National Superhighway (N-5) meets the city of Khairpur with an all-out length of 60km in the region (Britannica, 2013). The district is bounded on the North by Shikarpur and Sukkur districts, on the East by India, on the South by Sanghar and Nawabshah districts, and on the West by Nawabshah and Larkana districts.

Historical Background of Khairpur

It is a place of tremendous historical significance for the subcontinent. The district's history dates back to 3300 BC when the ancient Kot Diji—one of the oldest civilizations known to history—was a thriving civilization in the region. The historical background of the district Khairpur Mirs is very rich and archaic. Before 1783, Sindh was ruled by many rules like an Arab, Soomra, Samma, Mughal, Argon, Turkhan, Afghan, and Kalhora. Back in 1783 to 1955, Mir Sohrab Khan Talpur established his control over Sindh, establishing the capital at Burahan,

[7] Image was taken from Google Maps

which was renamed Khairpur in 1786 (Ahmed, 2010). The Talpurs came from Iran and belonged to the Bloch tribes (Britannica, 2013).

After the partition of the subcontinent Khairpur until separate state and it was integrated into Pakistan in 1955. The headquarter of district Khairpur Mirs is Khairpur city. There are many cultural heritage spots and tourist sites in the region, such as the Kot-Diji fort, Faiz Mahal, Sheesh Mahal, Kot-Diji archeological site, and also hills. Furthermore, Khairpur is also known as the place of shrines as many progressive and rational Sufi saints, who are a symbol of peace, such as Sachal Sarmast, Rohal Faqir, Badil, and Mehdi Sain belonged and lived there (Britannica, 2013).

Population

According to the 2017 census, the overall population of the district is 2,405,190 with an average annual growth rate of 2.34% and a population density of 151 persons/km^2 (PBS, 2017). The rural settings population is higher than the urban; in the urban are 777,006 and in the rural are 1,628,484. Furthermore, in the region is the ratio of sex males 1,240,254, females 1,163,826, and transgender is 110. The male population is higher than the female population in Khairpur. Moreover, the average household size in Khairpur is 5.83 (Britannica, 2013).

Climate

The atmosphere of Khairpur is normally that of the upper Sindh environment. There are two types of seasons around the year hot and cold. May, June, and July are the hottest months, the minimum and maximum temperatures during this period are about 420C and 270C, correspondingly. And the other hand February, January, and December are the coldest months of the year, and in this period, temperatures are maximum and minimum 250C and 70C, separately. The probable yearly rain in the district is 5.47 inches (139 mm) (*Khairpur*, n.d.). Furthermore, the climate of the Khairpur district is almost the same around northern Sindh. The summers are very hot and dry, the winters are short and cool, and it's dry and mostly clear year-round. Over the course of the year, the temperature typically varies from 46°F to 112°F and is never below 40°F or above 117°F. From 21 April to 28, July is the hottest weather, and December to February is the coolest season of the region. And close to July to August is here rainy season (Britannica, 2013).

Education

The education condition of the district is normal and it has eight positions about education rate between the districts of Sindh province. For the comparison of urban and rural settings, the urban is a higher ratio of literacy than the rural. In urban are approximately 64%; for the male

is 79% for the female it is 48% in the rural area 48%; for the female is 27% and for the male is 68%. Furthermore, in the district are 3,149 primary-level schools, 184 middle schools, 60 secondary schools, and 17 higher secondary schools. In the district are many other private education sectors. Similarly, in Khairpur are various types of universities and colleges such as Ghulam Muhammad medical college, Khairpur Medical College, Gambit medical college, Shah Abdul Latif Bhitai University, and also Khairpur technical college and Mehran University Khairpur (RSU, 2014).

Health infrastructure of District Khairpur Mirs

The health structure of district Khairpur has the most prominent number of basic health Units and the second-most important number of rural health spaces in the Sindh province. The high number of Provincial Health Communities is because Khairpur has the second highest number of Talukas and usually rural health is set up in each Taluka. The PSLM[8] 2006-07 notes that in urban zones 82% and in rural regions 70% of patients consult private healthcare centers**.**

Similarly, there are no health facilities for women and newborn children, the concept of community health or public health, or focus on medical ethics in rural areas. In the district is more private hospital than government. Furthermore, in rural settings, female is not access to get prenatal and post-natal care from health facilitators. 58% of urban and 36% of rural ladies get pre-birth care from a usual health administration. 59% of urban and 24% of village ladies get Tetanus Toxoid injections. However, eighty-three percent of deliveries in rural and sixty-seven in urban territories happen in homes usually within the sight of some family member/neighbor ladies or midwife. 27% of urban and 23% of ladies get post-natal consideration from a formal health office. Moreover, in the district are eight Hospitals, Dispensaries seventy-five, nine Rural Health Centers, eleven T.B Clinics, seventy-seven Basic Health Units, and also five Maternal and Child Health Centers (*District Khairpur*, 2023).

Settlement Patterns

In region has almost permanent settlements and modern structures. Here for the most part houses are made with bricks, mud bricks, wood, mud, iron, bamboo, and blocks. But in regional cities, housing is different from village settings (Ahmed, 2012). Moreover, the places of wealthy individuals in towns are built with blocks and bricks with limestone plaster. Populace individuals with a normal lower efficient class constructed their homes with *katchi (unbaked)*

[8] PSLM stands for Pakistan Social and Living Standards Measurement Survey provides Social and Economic indicators in the alternate years at provincial and district level.

mud blocks and mud. Here are sufficient planning arrangements for drainage, airing, and lighting (*Khairpur*, n.d.).

The houses for the most part comprise four to six rooms, one corridor (*Verandah*), a toilet, and a kitchen. In village settings, one room is additionally given for the most part to each house as a guest room (*Oataq*) and in town, visitor houses are separate and away from homes. As well the houses in towns are organized of *katchi* (Unbaked) bricks and protected with timber, wood reeds, and grass. The yards are surrounded by a fence of thorny brambles (RSU, 2014). These are built haphazardly and not in reduced squares. The poor workers and peasants live in huts prepared of reeds and protected with grass. There is little settlement of hygiene and drainage in village territories.

Income Sources

The primary source of earning for the people in the city is the commerce of different natures and small-scale industry, while in rural territories agriculture is the core of the economy. In rural regions, individuals keep domesticated animals in their homes to fulfill basic needs like butter, milk, and yogurt, and in emergencies, they sold animals (Ahmed, 2012). Furthermore, in the district, many people worked at crash plants and daily wages. In urban settings, most people have small-scale businesses and many in both urban and rural have a job (*Khairpur*, n.d.).

3.2 Research Methodology

Research methodology is a guide to research from the very first step to the final ending. A methodology is a tool and technique used during research. It gives researchers a framework to fit the research process. The methodology is the systematic knowledge and logic in the use of the ways, each scientific study has its techniques of gathering fact data. The Anthropological fieldwork, therefore, includes several research tools in its tool kit. The tools in anthropology involve relatively little in the way of hardware and gadgetry but require great sensitivity and self-awareness on the part of the investigator (Pelto & Pelto, 1978). The study is a multi-site ethnography that employs qualitative data collection methods, tools, and techniques in multiple locales. The use of this methodology helps to collect comprehensive and in-depth information about the research objectives.

3.2.1 Methodology

This multi-sited ethnographic study has been conducted in multiple locales to incorporate more in-depth information about the concerning research objectives. The selected locales of the study are Khairpur Mirs, Karachi, and Hyderabad, the cities of Sindh province. The data collection of this research has been done by conducting in-depth interviews, short interviews, focused group discussions (FGDs), and participant observation in the selected locale. The data has been collected from medical and pharmaceutical educational institutes, professional teachers, faculty members, students, and patients. Moreover, doctors, public health specialists, and district health administration have also been consulted for data collection. To collect data, the researcher will be using different methodological tools which are the following:

3.2.2 Sampling

The sample of the study included medical practitioners, medical teachers and students, pharmaceutical teachers and students, medical officers, health care administrators, medical store owners, pharmacists, and patients.

3.2.2.1 Sample Size

The sample size of the research was of total 62 respondents including 24 students, 8 teachers, 11 medical practitioners, 6 medical store owners or pharmacists, 2 medical superintendents, 5 medical officers, 5 patients, and 1 peon of a medical superintendent.

3.2.2.2 Sampling Techniques

Sampling is also an important method for any research as it is a nearly impossible and time taking activity to collect data from every member of a community. Hence, a sample is selected to represent the selected community. The basic idea behind the sampling is to select and choose a certain number of respondents and key informants representing the community to provide proper and in-depth information about the research objectives.

I employed this technique in my fieldwork because the selected location has a large population that cannot be fully used as a sample. Hence, a small portion of the population is selected through purposive and snowball sampling techniques to represent the larger population. The purposive sampling technique was employed to select some respondents according to the objectives, requirements, and purpose of the study. Furthermore, to get access to more relevant respondents, the snowball sampling technique was employed. The total

number of participants through purposive sampling was 26 and the remaining 36 were selected through snowball sampling technique.

3.2.2.3 Purposive Sampling

Purposive sampling is a non-probability sample that is chosen given the qualities of a populace and the target of the investigation. Purposive sampling is otherwise called judgmental, particular, or subjective sampling (Bernard, 2017). The sample of the research was selected according to the purpose of the research objectives. A total of 26 participants were selected through the purposive sampling technique. The sample included medical practitioners, medical teachers and students, pharmaceutical teachers and students, medical officers, health care administrators, medical store owners, pharmacists, and patients as they suited my research purpose.

3.2.3 Snowball Sampling

Snowball sampling is a non-probability sampling method which is also known as the chain-referral sampling technique. In this method, the respondents assist the researcher in referring and providing information about more respondents with similar traits which cannot be found easily (Nikolopoulou, 2022). The respondents, especially the key informants, referred the respondents. Total 36 participants were selected through the snowball sampling technique.

3.2.4 Rapport Building

Rapport building is a compulsory and initial technique to use in field research to establish comfortable relationships with key informants and the respondents. As a researcher, going into a new community or locale to extract a native's authentic and reliable point of view and required information is not an easy task. Interacting with strangers and inquiring about something in detail often makes people suspicious and uncomfortable. In such cases, respondents often feel reluctant to be interviewed or observed. This technique creates a friendly environment that makes them feel easy and free to express themselves and provide in-depth information about the research. Being a Sindhi, it wasn't as difficult to build rapport with the locals as it would have been for someone belonging to some other lingual or ethnic background. Speaking and interacting with the locals in their language, Sindhi, made it much easier and the respondents felt easy to talk to me.

3.2.5 Key Informants

A key informants are the individuals who belong to that local community and have a close relationship or understanding with the respondents, where the researcher works residing in the domains of his studies. It is a non-observational technique that is another source of getting information.

Key informants are the main source of collecting data about a particular concern in any culture. I had a total of 5 key informants who assisted me in reaching out to the respondents. Initially, I had one key informant, Professor Dr. Furkh, age 44. He is my family friend. Dr. Furkh is teaching community medicine subject in Khairpur Medical College and he practices in the evening part-time in the private clinic. He also assisted me in my MSC research as well. During my fieldwork, I contacted Dr. Mujeeb Ur Rehman, age 42, who was already my Facebook friend for a very long time. I befriended him and followed him on Facebook because of his critical understanding of the field of medical sciences. Despite that, I did not meet him face to face before. For the data collection of my current thesis, I had to go to the district health officer Khairpur Mirs and fortunately, I saw him there but due to an appointment with the district health officer, I was unable to meet him. After one day I texted him on messenger to which he replied after a few hours and since then our bond has been stronger. Later, he also became my key informant and assisted me in my research.

Moreover, Naveed Ahmed, a 27-years old medical store owner, also assisted me as a key informant in my research. We are familiar with each other since my childhood. He allowed me to do participant observation in his medical store and also introduced me to other medical store owners and some doctors. I was able to interact with the customers and observe their buying behaviors, over-the-counter purchase, self-medication, antibiotic consumption, etc. It helped me to interview some patients as well. Dr. Majid Ali, Dr. Majid, 32 years-old, provides services as a doctor at Taluka Hospital Kot Diji. He is my family friend and has assisted me by introducing me to other doctors who provide services in both governmental and private hospitals in Khairpur Mirs. Lastly, Mr. Sheraz Hussain, a 24-year-old Sociology student at Punjab University, has a strong social networking having many friends in different fields including medical students from different medical universities and colleges. During my fieldwork, he referred and introduced some medical students who then participated in FGDs later.

All the key informants introduced me to a lot of respondents and provided me access to some healthcare administrative offices and healthcare institutes to which they were already

familiar and had a reputation. Without the key informant, it would have been very difficult to meet the respondents, especially health care administrators, medical officers, senior doctors, and senior lecturers and professors as they often feel reluctant to be interviewed by random people. A researcher often needs a good informant as a cultural broker between respondents and to create a quick and easy rapport with the respondents.

3.2.6 Interviews

This is also a very important and basic technique of data gathering. In this method, people are interviewed face to face. This method is used to get deep and reliable information and local perception of the people. Russell Bernard mentioned informal interviews in his book, "Research Methods in Anthropology", that the researcher just tries to remember conversations heard during the course in the field and requires constant jotting and daily sessions (Bernard, 1995). For the data collection, I conducted a total of 43 interviews inclusive of 19 in-depth interviews and 24 short interviews. The average time for in-depth interviews was 30 minutes to an hour, whereas, the average time for short interviews was 10 to 30 minutes. This method was very effective for exploring in-depth detail of research goals. Moreover, the interviews conducted were in an informal tone and trilingual, i.e., Sindhi, Urdu, and English, according to the comfort level of the respondents to make the respondents feel comfortable and enable them to express themselves freely in the language they are most comfortable with.

3.2.7 Semi-Structured Interview Guide

Semi-structured interviews include a short list of 'guiding' questions that are supplemented by follow-up and probing questions that are dependent on the interviewee's responses (DeJonckheere & Vaughn, 2019). The semi-structured interview guide was created before the fieldwork which consisted of all the important questions to be asked for the data collection and to explore my research objectives. The guide was not strictly followed but the general nature of the questions in the interviews or FGDs were as per the guide. The semi-structured interview guide has been attached in the appendices section at the end of the document.

3.2.8 Focus Group Discussions

Focused Group Discussion (FGD) is a technique that allows researchers to collect data from multiple individuals or respondents at once in each discussion session (Eeuwijk & Angehrn, 2017). It allows the respondents to discuss the research topic or issue floated among the group

members. It also enables the researcher to verify the information collected from the group members by cross-verification or triangulation through probing. Hence, not only does the data get verified but also allows the researcher to collect data from different dimensions and viewpoints. For the data collection of this research, I conducted three Focused Group Discussions (FGDs) in medical educational institutes. The first FGD[9] included total five students (all MBBS students) from Khairpur Medical College, the second FGD included eight students (four MBBS and four pharmacology students) from Khairpur Medical College, and the third FGD included six students (two MBBS and four pharmacology students) from Gambat Institue of Medical College (GIMS), also known as Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat, Khairpur Mirs.

3.2.9 Participant Observation

Participant observation is the essence of anthropology which reduces otherness and retains oneness between the researcher and the community of his research. Participant observation is an ethnographic research method that involves the entrance of researchers into the field or the community of research and fully immersing themselves into that culture by spending an extensive time period to be a part of that social setting or group and get social acceptance (Jorgensen, 2020). This involves data collection through observation of social interactions, behavioral patterns, and practices in a natural setting.

I conducted participant observation in Khairpur Mirs to understand the population's patterns of antibiotic consumption and their perspectives on the use of antibiotics and antibiotic resistance. I spent 3 months from November 2022 to January 2023 in the field. I did participant observation in a medical store in Khairpur Mirs to observe the antibiotic purchasing patterns of the local community to understand the causes of antibiotic resistance such as self-medication and over-the-counter purchase and the factors behind those causes. Moreover, I also did participant observation in multiple clinics and hospitals in Khairpur Mirs. Specifically, I used to visit a clinic for almost 3 months to build rapport and to understand the diagnosing patterns, treatment, and prescription patterns of doctors. This allowed me to understand the native's perspective and

3.2.10 Secondary Sources

[9] FGD stand for Focused Group Discussion

It is very difficult for researchers to collect all the data from primary sources. In Anthropology most of the information is collected through primary sources via participant observation, FGDs, interviewing, etc. However, the information is also collected through secondary sources that include the Internet, newspapers, Magazines, journals, books, articles, and various related organizations already working on the topic. The data for this research was also collected from the above-mentioned secondary sources.

3.2.11 Field Notes

Fieldnotes are the qualitative approach used by the researchers conducting qualitative research or ethnographies to note down or write observations during participant observation, FGDs, or interviews (Tenzek, n.d.). The field notes method is used by the researcher to note downs every important piece of information seen and noticed during the research work. The writing of field notes allows the researcher to brush up on the events and mode of discussion made with the respondents and common people that will be workable and informative during thesis writing. All the data gathered in the field, by using different methods, will be written systematically to analyze them. I also wrote fieldnotes during my fieldwork in a diary which later helped me during the transcription of interviews, documentation, and analysis of the data collected.

3.2.12 Audio Recording

Audio recording is also one of the techniques used by researchers to store and preserve the audio data collection taken during fieldwork for future use (Polunin, 1970). The researcher uses this technique when he gets into some important conversations with key informants and other community members. During interviews, the researcher mostly records the data by using a voice recorder, with the use of this technique. As a researcher, I collect sufficient and required data without any difficulty. For the audio recording, I will use a mobile phone as it is more convenient than the actual voice recorder.

3.2.13 Photography

The camera is one of the major items in Anthropology's luggage (Polunin, 1970). Direct preservation of the event is possible only through photography. Photography enables the researcher to draw attention to the different scenes and references and offer it as a part of field research. It also helped me in perceiving the condition described. I have used photography throughout the fieldwork as a non-verbal mechanical to pick up and capture informal facts

about the lives of people and the locality. Photography is the main part to get the pictorial evidence. I had taken some photographs of locales and participants during interviews and focused group discussions.

3.2.14 Case Study Method

A case study refers to detailed knowledge about any individual or case. The case study method is a very reliable approach to understanding complex issues through the analysis of an individual's case. This method allows the researcher to collect broad information about the community and certain issues (Priya, 2020). I employed this method to include some in-depth detail of a certain individual's case or issue through their experiences.

I have included five case studies related to different healthcare issues and practices in terms of antibiotics usage in Khairpur Mirs. This includes a case study of a medical store owner, a patient misdiagnosed by a doctor, maltreatment of patients by quack practitioners, malpractice by a doctor, and misusage of dermatologists and patients with skin issues. The above-mentioned case studies provide a detailed account and process through which antibiotics are misused by both doctors and patients through sociocultural intervention.

3.2.15 Data Analysis

Data collected during field work has been analyzed through thematic analysis in qualitative research without the usage of any type of software. The thematic analysis refers to organizing and categorization with labels as per the identified patterns from the disjuncture of ideas or information collected throughout the fieldwork with the help of different sources such as interviews, archives, or phenomenological intervention from the selected locale.

It includes 6 steps such as familiarization of data, coding, theme development, theme reviewing, categorization and labeling of themes, and documentation (Braun & Clarke, 2006). The process of analysis started with going through and getting familiar with all the data collected. I transcribed interviews and other information collected through the observation of the relevancy of objectives and their subthemes, basically sub-themes or subheadings have been a reflection of research objectives. The acquired information from the targeted stimuli for data collection has converted into some codes which were then connected in particular patterns to create themes. In addition, the researcher focused on the similarities between the ideas during the creation of the themes. The themes were then reviewed and categorized with labels based

on research objectives and subheadings. Lastly, all the themes were documented in detail incorporating all the identified patterns and data collected. The thematic analytic argument of my thesis revolves around the premises of policies regarding the usage of antibiotics, how medial teaching problematizes the usage and the issue of overuse and misuse of antibiotics, and social determinants in the inappropriateness of antibiotics.

3.2.16 Ethical Considerations

Ethical considerations are a very important aspect of anthropological research. It includes multiple dimensions which also depend on the research topic (Salmon, 1997). Before interviewing the participants were introduced to the research topic and the objectives of the research were explained to them to make sure that they are aware of the nature of the research. Verbal consent was taken from the respondents before conducting interviews or focused group discussions. The consent also included permission to record the interviews or take photographs when required. The interviews were conducted according to the availability of the respondents. Although most of the respondents allowed me to use their actual names and positions in the documentation, however, pseudonyms are used in documentation to protect their identity and maintain anonymity. Similarly, the identifiable information such as names of hospitals, clinics, laboratories, or medical stores was anonymized to maintain their integrity.

3.2.17 Problems Faced during Research

During my field work, I encountered multiple problems as a researcher. I had to conduct interviews from different health sectors including medical teachers, administrative officials, laymen, medical stores, and both types of clinician's quacks, and certified and licensed doctors. The way of their communication and professional gaze was entirely different from each other, especially the administrative officer's professional insight was power oriented. It was very hard for me to take appointments for the meeting of administrative authorities such as the district health officer, medical superintendent, and drug inspector. Convincing medial teaching staff was also a task for me because most of the teachers were not merely academicians as most of them were also practicing in private clinics or hospitals due to which they were not able to stay on the university campus after the classes and had to go to their clinics right after their classes. I did not visit them just once to conduct interviews, I had to visit multiple times for interviews because of their busy schedule. I visited the district health officer 7 times but he still did not meet me until I approached him through one of my family members. Fortunately, using my

family contacts, I got an opportunity to meet him thrice on different dates. Another challenge that I had to face was with a quack dentist. He was approached with the help of one of my key informants. Initially, he agreed to give an interview. However, while conducting the interview he doubted my intentions as I was asking about his career and he was not a licensed and certified dentist. He thought that I will complain about his illegal and unlicensed clinic. Hence, he reacted rudely and told me to leave the clinic. I had to leave the clinic. Later, he contacted my family and mentioned that if I get stuck in any type of problem Sohail, I will be responsible for it and will have to face the consequences.

Moreover, I encountered another disappointing challenge while contacting and interviewing a Medical Superintendent (MS). Initially, he gave me an appointment as per his schedule but after multiple unsuccessful appointments, he called me to his office from the waiting area for the meeting. However, when I just entered the office, his peon loudly stated "Sahib is crossing the road now, you can meet him". The peon was referring Sahib to one of the regional politicians. After hearing this, MS left the office without caring about the fact that I have been called for the meeting and all of the meetings had been canceled by him for many days when he finally took time for the interview, he is leaving without even saying a word to me. This behavior was very disappointing as I had already wasted a lot of days for one interview because of his lack of professionalism. Later, I was told by one of his acquaintances that he has been appointed to this position by that regional politician. Similarly, one of my respondents from Gambat medical collage made me wait for him many times even though I was already familiar with him because of my key informant, Dr. Mujeeb Rehman. Despite that, he did not give me time for the interview for many days. After my repetitive visits, he was convinced to meet me for my interview. He is still in contact with me.

CHAPTER 4

4. USAGE OF ANTIBIOTICS AS A LEGAL AND POLICY DILEMMA

Antibiotic resistance poses ethical considerations owing to the substantial and unjust implications of certain actions and policies. This chapter aims to highlight antibiotic resistance as a legal and policy dilemma. This chapter focuses on the legal context of the irrational use of antibiotics and other types of drugs and also some provincial and national policies to curb the dilemma of antibiotic resistance. The policies and legal acts which have been discussed in this chapter are the antibiotic stewardship programs (ASPs), antimicrobial stewardship program, world antimicrobial awareness week, national action plan, Drug Regulatory Authority of Pakistan (DRAP)[10], Pakistan Medical and Dental Council[11] (PMDC) code of ethics for practice medical and dental practitioners, and Sindh Health-Care Commission (SHCC).

4.1 Antibiotic Stewardship Programs and Antimicrobial Stewardship Programs

Antibiotics Stewardship Programs (ASPs) aim to combat and curb the misuse and overuse of antibiotics globally by educating the community, general practitioners, policymakers, and administration as well (Dellit et al., 2007). In March 2014, the Medical Microbiology and Infectious Diseases Society of Pakistan (MMIDSP) introduced Antibiotic Stewardship Initiative in Pakistan (ASIP) which operated nationally (Atif et al., 2021). ASIP conducted workshops and various other awareness events throughout Pakistan. From September 2015 to May 2016, a survey was conducted about the opinions about the ASIP initiative in Pakistan. The Survey included 757 general practitioners (GPs), pediatricians (child specialists), and other clinicians. Of the responses collected, nearly 51%, including 392 respondents, thought the initiative would be useful, and 65.4%, including 495 respondents, suggested that Antibiotic Abuse and Antimicrobial Resistance (AMR) in Pakistan can be contended by these programs (GARP & CDDEP, 2018). As per the results of this survey, the respondents proposed different

[10] DRAP was established in 2012 under the Drug Regulatory Authority of Pakistan Act, 2012 as the primary regulatory body for drugs in Pakistan. It operates under the DRAP Act 2012 and the National Health Service, Regulatory and Coordinating Division (DRAP Act 2012, 2012). For further details, visit: https://www.dra.gov.pk/

[11] The Pakistan Medical and Dental Council (was established in 1962 to regulate medical and dental education, as well as the practice of medicine and dentistry in Pakistan (The Drugs Act 1976, 1976). See details in: https://www.pmdc.pk/

notions about the prevention of antibiotic resistance in Pakistan which are listed below (InpaperMagazine, 2020):

Percentage of Respondents	Suggestions by GPs, pediatricians, and clinicians
20.2%	ASPs can cull antibiotic abuse and misuse
19.4%	National and local antibiotic policies to regulate and ban the use of over-the-counter antibiotics.
14.5%	Public awareness initiatives to educate doctors and the general public about the implications of antibiotic usage.
12.5%	Continuous Medical Education (CME) sessions for health practitioners
8.9&	Before prescribing antibiotics, a thorough history, examination, and diagnostic testing to be performed
8.3	Adoption of particular antibiotic guidelines for infectious illness treatment

Table 2: ASIP Survey Results (2015-2016)[12]

Another survey conducted during January 2016 – April 2016 by MMIDSP in 11 major city hospitals including 5 private and six public hospitals demonstrated alarming and concerning results of quality metrics (GARP & CDDEP, 2018). The results represented that none of the public hospitals but all of the private hospitals had some form of ASPs. In five private hospitals 18 infectious disease physicians existed but there was not even a single ID specialist in public hospitals. There of the private hospitals were involved in carrying out targeted APS activities and none of the public hospitals were involved in such activities. These results indicated the alarming situation of public hospitals and better services of private hospitals as compared to public hospitals (GARP & CDDEP, 2018). The Antibiotic Stewardship Program (ASP) is the foundation of initiatives aimed at curbing antibiotic overuse and abuse in healthcare facilities and promoting the appropriate management of antibiotic resistance and infectious diseases around the world. The project works worldwide under the

[12] Source: (GARP & CDDEP, 2018)

coordination of the World Health Organization. However, it took too long to be initiated in Pakistan (Atif et al., 2021).

After the launch of the Antibiotic Stewardship Initiative in Pakistan (ASIP) in March 2014, several antimicrobial stewardship programs were also initiated by MMIDSP activities such as a talk, workshops, weekly seminars, ASP Rounds' policies and strategies launch, and awareness campaigns. Similarly, the ASPs aim to change the behavior and perceptions of the population related to antibiotic prescription and consumption. In Pakistan, the MMIDSP initiated building regional hospital-based antimicrobial stewardship programs in 2014 (Hayat et al., 2020). Antimicrobial Stewardship Programs are the main agenda for rationalizing antibiotic use, improving the quality of care, reducing the rate of antimicrobial resistance, as well as reducing the medical costs concerned with the implementation of antimicrobial resistance. The overuse and misuse of antibiotics contribute to the development of resistance in microorganisms, which can cause life-threatening infections.

To address this issue Antimicrobial Stewardship Programs made several key points merit considerations (CDC, 2019). These include the need for an evaluation of antibiotic usage, the promotion of better practices for prescribing and dispensing antibiotics, and the enhancement of patient outcomes and healthcare quality. Additionally, reducing excessive healthcare costs, prolonging the lifespan of current antibiotics, and mitigating the adverse economic effects of antimicrobial resistance (AMR) are important considerations.

One critical aspect of addressing antibiotic resistance is the development of healthcare professionals' capacity to use antibiotics rationally by providing guidelines. Policies and strategies that promote rational antibiotic use are also essential. Equally important is the need to educate the general public about antimicrobial resistance. Various programs, such as community, hospital, and academic-based initiatives, can be implemented to raise awareness of this issue. Moreover, efforts to minimize the further growth, selection, and spread of antimicrobial resistance are paramount. Such initiatives will help to ensure the effectiveness of antibiotics in treating infections in Sindh. In light of these considerations, it is clear that concerted efforts are necessary to combat the growing threat of antibiotic resistance globally.

Unfortunately, Pakistan has encountered several significant challenges in implementing effective antimicrobial stewardship programs. Medical practitioners, in particular, have demonstrated a lack of appropriate knowledge and understanding regarding the rational use of

antibiotics and the issue of antimicrobial resistance. These issues were observed during the author's fieldwork, which revealed a notable lack of community-based knowledge regarding antimicrobial stewardship programs. In addition, instances were identified in which medical practitioners were found to be uncertified or unlicensed individuals practicing medicine illegally.

It was also noted that few healthcare professionals, including MBBS doctors, medical experts, and academic professionals, possessed a sound understanding of antimicrobial stewardship programs, with the majority displaying limited to no knowledge of this critical issue. These findings suggest a significant knowledge gap among healthcare professionals and community members alike in Sindh, Pakistan, regarding antimicrobial stewardship programs and rational use practices. This knowledge deficit must be addressed through targeted education and awareness-raising initiatives to improve antimicrobial stewardship practices and mitigate the adverse effects of antimicrobial resistance in Pakistan. Nayab Ali, a 32 years old medical doctor practicing in a private clinic, stated:

> **I have never heard about antimicrobial stewardship programs during my entire career.**

According to Ashraf Baladi, a 28 years old regional coordinator at Sehat Kahani, the organization operates across Pakistan and provides telehealth services to patients. Patients share their health issues, and doctors diagnose and prescribe medication online. Baladi also clarified that antibiotics are prescribed through Sehat Kahani, but the organization has not received any guidelines, notifications, or directives from authorities regarding policies, programs, or guidance for addressing antimicrobial resistance.

Similarly, Sarfraz Memon, a 22 years old third-year MBBS student at Gambat Medical College, reported that he has not attended any seminars, lectures, or campaigns related to antimicrobial resistance or antimicrobial awareness during his three years of medical education. These observations highlight the lack of awareness and education among healthcare providers and students in Pakistan regarding the critical issue of antimicrobial resistance. This knowledge gap underscores the need for targeted education and awareness-raising initiatives to improve antimicrobial stewardship practices and mitigate the adverse effects of antimicrobial resistance in Pakistan.

The implementation of Antimicrobial Stewardship Programs (ASPs) involves multiple stakeholders, including healthcare providers, patients, and policymakers. The first step is to assess the current prescribing practices of antibiotics and develop guidelines for appropriate antibiotic use based on local resistance patterns and evidence-based medicine. Education on appropriate antibiotic use and alternative treatments for conditions that do not require antibiotics is crucial for healthcare providers and patients. Monitoring and feedback mechanisms should be included in ASPs to identify areas for improvement and provide ongoing education and training. Policymakers can provide support through regulatory and financial incentives for appropriate antibiotic use and investing in research and surveillance. Overall, the implementation of ASPs requires a coordinated effort from all stakeholders to preserve the effectiveness of antibiotics for treating infections in the future.

However, the implementation of antimicrobial stewardship programs (ASPs) in Khairpur Mirs, Sindh, faces several challenges, including a lack of awareness and education among healthcare providers and patients on appropriate antibiotic use. Antibiotics are often prescribed for conditions where they are not effective, contributing to antibiotic resistance. Additionally, the absence of clear guidelines and monitoring mechanisms can lead to variations in prescribing practices, making it difficult to identify areas for improvement. The lack of regulatory and financial incentives also hinders the implementation of ASPs. Despite these challenges, some hospitals and clinics have started implementing ASPs, and there is growing awareness of the importance of appropriate antibiotic use among healthcare providers and patients. Policymakers can play a crucial role by providing regulatory and financial incentives and investing in research and surveillance to combat the growing threat of antibiotic resistance. Overall, the implementation of ASPs in Khairpur Mirs is an essential step toward preserving the effectiveness of antibiotics.

4.2 World Antimicrobial Awareness Week

World Health Organization endorsed “World Antibiotic Awareness Week” at the Sixty-eighth World Health Assembly in 2015, which was retitled in 2020 as "World Antimicrobial Awareness Week" (ReAct, n.d.). This awareness campaign is celebrated annually from 18 to 24 November. The main goal of the week is to reduce antibiotic misuse and overuse, as well as to optimize antibiotic use while popularizing knowledge and raising awareness about antibiotic resistance around the world at both the medical and non-medical levels.

Figure 5: World Antimicrobial Awareness Week's Slogan

In 2021, a global color campaign entitled “Will you "Go Blue for AMR"?” was held. This campaign was celebrated not only in organizations but also on individual and community levels. Individuals were encouraged to wear blue while participating in the WAAW events and also transforming their social media profiles into blue color during this week. Moreover, individuals and organizations were also motivated to post their or group photos in blue using a hashtag ***#AntimicrobialResistance*** and ***#WAAW*** to create a trend of awareness campaign over the internet and social media (FAO et al., 2020). Organizing an awareness event at the community level was encouraged not only to aware people but also to highlight the community’s concerns and commitments to address Antimicrobial Resistance. The theme of the campaign changes annually bringing to fill all the gaps of the previous year’s campaign. However, the slogan remains the same “Antimicrobials: Handle with Care”. The theme of this awareness week in 2022 was based on the united actions of all to prevent it. This theme was entitled “Preventing antimicrobial resistance together” calling for a cross-sectoral collaboration from all the sectors to minimize and prevent AMR not only among human beings but also for animals, plants, and the environment as AMR affects all. Pan American Health Organization (PAHO) with the collaboration of the UN environment program, World Health Organization (WHO), World Organisation for Animal Health (WOAH), and Food and Agriculture Organization of the United States (FAO) published a guideline for the WAAW campaign to curb AMR globally. The campaign guide instructed some actions to be followed globally to minimize AMR. The recommended actions include improving the infection prevention measures in health care facilities, farms, and food processing facilities, ensuring access to clean water, sanitation, and vaccines, implementing improved and finest practices in food and agricultural production, and minimizing contamination and pollution through proper waste and sanitary disposal. These actions are intended to prevent the spread of infectious diseases and minimize the use of antibiotics, thereby reducing the likelihood of developing AMR.

Overall, the guide serves as a useful resource for policymakers, healthcare providers, and other stakeholders to implement evidence-based interventions to combat AMR. The success of these interventions depends on the collective efforts of all stakeholders and the adoption of a One Health approach that recognizes the interdependence of human, animal, and environmental health. The Seminar, arranged on World Antimicrobial Awareness Week

(WAAW) under the theme of "Preventing Antimicrobial Resistance Together", was a collaborative approach organized by Khyber Medical University's Institute of Basic Medical Sciences (IBMS), Public Health Reference Laboratory (PHRL), Dosti Welfare Organization (DWO), and Global Education Campaign (GEC). On that occasion, panelists stressed the significance of antibiotics drugs and the increasing cases of Antimicrobial Resistance (Report, 2022). Meanwhile, they stated that antimicrobial resistance is a metabolic phenomenon that occurs when diseases caused by bacteria, viruses, fungi, and other parasites resist medication hence affecting maladies. Furthermore, they demonstrated that antimicrobial agents are not affecting infectious diseases due to antimicrobial resistance and that's why the rate of morbidity and mortality proliferated. Now it's very difficult to treat infectious diseases and future generations might not have drugs for infectious maladies.

Rahmatullah Solangi is a 52 years old district health officer in District Khairpur Mirs and also a part-time doctor practicing in his private clinic. Upon asking about antibiotics, related policies, programs, and Antimicrobial Awareness Week, he expressed a lack of information about the subject. He denied WHO guidelines being shared with them about antibiotics resistance, the antibiotics steward program, or Antimicrobial Awareness Week. He expressed

> **WHO did not approach us about it, and no agents, advocates, or notification was sent to us regarding Antimicrobial Awareness Week. How are we supposed to know about these things if the WHO does not approach us for that purpose? These activities do not come under the position of District Health Officer that's why I'm unaware of these things. It is not the responsibility of the doctors to make the people aware or conduct training and seminars related to antibiotics resistance, the antibiotics steward program, or World Antimicrobial Awareness Week.**

Additionally, not only has he denied being aware of any guidelines regarding antibiotic use, antibiotic resistance, or antibiotic stewardship programs, but he has also denied participating in antimicrobial awareness campaigns throughout his entire medical career. It was astonishing to learn that a person who is not only a doctor but also a senior health officer is uninformed of issues that have been addressed and emphasized globally for years. Despite being in an administrative position, he was not only aware of AMRP, ASPs, NAP, and WAAW,

but he did not consider it his responsibility to educate doctors or the general public about these global issues.

Dr. Safiullah Mahesar, a 37 years old doctor serving as the District Focal Person of the Emergency Cell and District Coordinator of Supplemental Immunization Activities, acknowledged that antibiotics resistance is a pressing global concern and that numerous instances of antibiotics resistance have been identified in the city of Khairpur. However, he expressed his disappointment in the fact that doctors and other relevant authorities do not prioritize this issue. Although he knows the medical aspects of antibiotic usage and its resistance, he was unaware of policies and programs related to antibiotics and their prevention launched by the World Health Organization (WHO), such as the Antibiotics Stewardship Program, National Action Plan, or Antimicrobials Awareness Week campaigns. Moreover, he has never been involved in any seminars, campaigns, activities, or training sessions conducted by WHO officials. He shared similar sentiments with the District Health Officer in District Khairpur Mirs, who had also not been informed or addressed by any WHO personnel about this issue. As a researcher, it was observed that no banners, charts, or posters related to antibiotic resistance were displayed on the premises of both district offices. Both officers were not fully aware of this global issue and did not consider it their responsibility.

Ashraf Baladi, a 28 years old regional coordinator at Sehat Kahani (E-health or telehealth), stated that they did not celebrate World Antibiotics Awareness Week and had no information about policies introduced by the World Health Organization regarding the proper use of antibiotics. It emphasizes the need for increased awareness campaigns and education initiatives related to the proper use of antibiotics to prevent resistance. The text also underscores the role of the World Health Organization in launching policies and programs related to antibiotic resistance and prevention.

4.3 National Action Plan

The threat of antimicrobial resistance is emerging as a global health crisis that could kill 10 million people annually by 2050. WHO launched a global action plan to combat antimicrobial resistance at the 68th World Health Assembly in 2015. This global action plan has been endorsed by all countries, including Pakistan, the world's sixth most populous country and expected to become the fourth most populous country by 2050. The first follow-up was the development of a National Strategic Framework for Containment of Antimicrobial Resistance,

which was implemented in Pakistan's National Action Plan to Combat Antimicrobial Resistance (NHSRC, 2017). The Government of Pakistan has established a cross-sectoral core antimicrobial resistance committee aiming to identify key stakeholders and policy-making experts, do current state of antimicrobial resistance analysis, and prepare policy and recommendations documents (NHSRC, 2017).

Pakistan also completed a joint external review process of evaluating the International Health Regulations and the Global Health Security Agenda to assess priority areas for action to combat antimicrobial resistance (Tribune, 2017). The Pakistan National Institute of Health is the custodian of antibiotic resistance surveillance in Pakistan due to its participation in the Global Antimicrobial Surveillance System. However, due to a lack of local resources allocated to antimicrobial resistance and the possibility of underfunding by the Pakistani Ministry of Health and donors, these initiatives have not been emphasized (Saleem et al. al., 2018). The WHO mission report states that Pakistan is well prepared to detect, prevent and respond to internal and external health threats that could threaten the country's population and endanger travel and trade. Although Pakistan is a cosigner and complies with the International Health Regulations, despite some extensions it still has to fulfill important core functions (Tribune, 2017).

A newly formulated National Action Plan for Antimicrobial Resistance Action Plan (NAP) was presented by Pakistan's Ministry of National Health Services, Regulations, and Coordination to the World Health Organization (GOP, 2017). On that occasion, several bodies contributed like the agriculture sector, veterinary officials, and representatives of health. The National Action Plan (NAP) is a strategic vision for preventing the overuse and misuse of antibiotics in Pakistan (Saleem et al., 2021). The plan includes several key strategies for addressing this global health concern. One of the key strategies is to conduct awareness programs and seminars to educate the public about the unnecessary use of antibiotics. This will help people understand the potential dangers associated with overuse and misuse of antibiotics. The National Action Plan (NAP) acknowledges the significance of improving surveillance mechanisms to track diseases and establish new policies for antimicrobial resistance (AMR) prevention. This measure will aid in identifying new diseases and tracking the emergence of antibiotic-resistant strains. In addition, the NAP highlights the need to improve healthcare settings, agriculture, food, animal health, environment, and community, as these endeavors can assist in reducing the spread of antimicrobial-resistant infections (Saleem et al., 2021).

Furthermore, the NAP emphasizes the implementation of updated controls on the use of antimicrobials in human and veterinary medicine. The plan recommends the use of prebiotics in animal food to promote livestock growth and provide suitable alternatives. Moreover, the NAP recommends integrating AMR into all public health research agendas, including vaccine research.

The NAP also underscores three crucial points to prevent the misuse and overuse of antibiotics in Pakistan. The first is to recognize the urgent need to curtail over-the-counter and over-prescription of antibiotics. Secondly, the plan emphasizes the promotion and enforcement of initiatives to improve infection control in healthcare settings. Finally, systematic training and research in medical curricula on the rational and formal use of antibiotics are essential for effectively combating AMR. Hence, it must be integrated into the curricula. By implementing the strategies outlined in the NAP, Pakistan can effectively address the overuse and misuse of antibiotics and combat the growing threat of antimicrobial resistance (Saleem et al., 2021).

According to the National Action Plan (NAP), there are many weaknesses in the health structure in Pakistan. A practitioner does not have any health professional skills and there is a lack of laboratories. In every country, health policies are of paramount importance for progress and social change, and those policies play a vital role in the reduction and rejection of any social issues. Pakistan's provincial and federal governments are negligent about the informal and excessive use of antibiotics.

The government has not introduced any strict policies about antimicrobial resistance. As the researcher is working in the district of Khairpur Mirs, numerous clinical practitioners prescribe antibiotics (the fourth and third generation of antibiotics). Both community and medical officials have no awareness of antibiotics; physicians prescribe only for the sake of business and patients do not wait for a long time for treatment. In district Khairpur Mirs, the researcher observed that 90% population has no idea about antimicrobial resistance. In this region, civil society members and the educated population of the city have not conducted any awareness campaigns or seminars against the over and misuse of antibiotics.

According to the report of the national action plan, '50% of Pakistanis population is used to self-medication'. In Khairpur Mirs mass population, purchases medicine by self-risk, district government does not take any legal action against this burning issue. In addition to drug resistance and pathogen overgrowth, many other problems arise from antibiotic misuse (Malik,

2020). The overuse and misuse of antibiotics create many diseases, like weakness of the immune system Rheumatoid, arthritis, diabetes, asthma, and anxiety disorder. Antibiotics affected many body friend's bacteria (GOP, 2017).

This report on Pakistan's national Action plan indicates that in Pakistan majority of private clinical practitioners prescribed medicine irrationally, and they gave 3 to 4 antibiotics per patient. Same in this research area, the researcher observed that the doctors prescribed antibiotics for every health condition although this practice is illegal and against the health policies. Doctors prescribe unnecessary antibiotics because antibiotics give quick relief to patients and after that, the OPD of the clinic increases day by day.

Adequate diagnostic facilities are lacking, especially in basic health centers and tertiary hospitals. This encourages the administration and facilitates the use of antibiotics without culture susceptibility or sensitivity testing (Hayat et al., 2020). The challenge of unlicensed practitioners and health management is a significant issue in the realm of research. Additionally, the prevalence of antimicrobial resistance can be attributed to a lack of knowledge and proper equipment among physicians. In many areas, clinical health practitioners are not equipped with proper diagnostic instruments, which leads to a culture of prescription without proper diagnosis. This trend is reflected in the majority of doctors in Khairpur Mirs who prescribe drugs without laboratory tests, and who are often unlicensed practitioners lacking certification. These challenges highlight the importance of developing strategies to promote evidence-based practices among healthcare providers, including education and training programs, the provision of adequate resources and equipment, and the strengthening of regulatory frameworks to ensure that health management is conducted safely and effectively.

The issue of antibiotic resistance poses significant challenges globally, and Pakistan is no exception. One of the major obstacles to combating antibiotic resistance in Pakistan is the lack of awareness among the general public about the appropriate use of antibiotics and the risks associated with their misuse. This lack of awareness can lead to over-the-counter sales and self-medication, which can promote the development of antibiotic resistance. Another challenge is the inadequate infrastructure, resources, and trained personnel available to effectively implement AMR prevention and control measures, particularly in rural areas. The poor regulation and enforcement of regulations on the sale, distribution, and use of antibiotics may further exacerbate this challenge, leading to the overuse and misuse of antibiotics.

Moreover, the limited availability of new antibiotics also poses a significant challenge. The development of new antibiotics has slowed down, and there may be a limited number of effective antibiotics available for treating resistant infections. The spread of antibiotic-resistant strains of bacteria facilitated by international trade and travel also makes it challenging to control the emergence and spread of resistant infections. Inadequate surveillance systems for monitoring the occurrence and spread of resistant infections may lead to delayed detection and response to outbreaks. Therefore, it is essential to address these challenges through a multi-sectoral approach involving the government, healthcare providers, pharmaceutical companies, and the general public to combat antibiotic resistance in Pakistan effectively.

Overall, the implementation of the NAP in Khairpur Mirs has made some progress in addressing the issue of AMR. However, there is a need for continued efforts to strengthen the surveillance system, reinforce IPC practices, promote the rational use of antibiotics, and raise public awareness of the importance of responsible use of antibiotics.

4.4 Legal Context of Irrational Use of Antibiotics and Other Types of Drugs

It is widely accepted that the administration of antibiotics should be approached with great care and responsibility by medical professionals. A thorough examination of the legal framework at a global level, however, reveals a lack of comprehensive legislation governing the use of antibiotics, particularly in developing nations. Providing advice on the use of antibiotics to patients and animals, as well as conducting antibiotic susceptibility tests without a genuine need, is considered a violation of human rights in a civilized society and is the obligation of the state to regulate.

In Pakistan, it is observed that a significant proportion of general practitioners prescribe antibiotics without conducting microbial diagnostic tests. This highlights the need for strict measures to be implemented in the form of minimal prevention in antibiotics and antibiotic sensitivity tests. The absence of such measures not only promotes the overuse of antibiotics but also contributes to the development of antimicrobial resistance. The implementation of regulations to guide the proper use of antibiotics by medical practitioners is imperative to mitigate the risk of antibiotic resistance, particularly in countries where there is a lack of an adequate legal framework governing antibiotic use.

However, the enforcement of regulations related to the use of antibiotics is weak, and there are few legal consequences for healthcare providers who prescribe antibiotics without proper diagnosis or for patients who use antibiotics without a prescription. This has led to the widespread overuse and misuse of antibiotics, contributing to the emergence of antibiotic resistance. At the provincial level, each province has its drug regulatory authority, responsible for implementing national drug regulations and monitoring drug use. However, the capacity of provincial drug regulatory authorities varies widely, and many lack the resources and trained personnel to effectively regulate drug use.

Overall, the legal context of irrational use of antibiotics and other types of drugs in Pakistan is characterized by weak enforcement of regulations, lack of legal consequences for non-compliance, and inadequate capacity of regulatory authorities to effectively monitor and regulate drug use. Addressing these legal challenges is crucial to combating the spread of antibiotic resistance and promoting the rational use of antibiotics in Pakistan. The Drugs Act of 1976 serves as the primary legal framework in Pakistan regulating the use of antibiotics and drugs (The Drugs Act 1976, 1976). This Act regulates the import, manufacture, sale, and distribution of drugs, including antibiotics, within the country.

4.4.1 Drug Regulatory Authority of Pakistan (DRAP)

To ensure quality control, the Act mandates that all drugs must be registered with the Drug Regulatory Authority of Pakistan (DRAP) before they can be imported, manufactured, or sold. It establishes Drug Courts with the authority to try offenses related to the manufacture, import, sale, and distribution of drugs, including antibiotics (The Drugs Act 1976, 1976). These courts can impose penalties such as fines, imprisonment, and revocation of licenses for drug manufacturers and distributors found guilty of violating the Act. At the national level, the Drug Regulatory Authority of Pakistan (DRAP) is responsible for regulating the sale, distribution, and use of drugs, including antibiotics. Established in 2012 under the Drug Regulatory Authority of Pakistan Act, 2012, the DRAP replaced the Federal Drug Control Authority as the primary regulatory body for drugs in the country. It operates under the DRAP Act 2012 and the National Health Service, Regulatory and Coordinating Division (DRAP Act 2012, 2012). DRAP, primarily governed by the Drugs Act, of 1976, is authorized to license drug manufacturers and importers, approve drug products for marketing, and enforce regulations related to the quality, safety, and efficacy of drugs in Pakistan (The Drugs Act 1976, 1976). The DRAP is responsible for enforcing penalties for violations of drug regulations through the

Drug Courts established under the Drugs Act, 1976, which have the power to impose fines, imprisonment, and cancellation of licenses for guilty drug manufacturers and distributors (The Drugs Act 1976, 1976).

The Drug Regulatory Authority of Pakistan (DRAP) is responsible for regulating the drug sector at the national level and improving health facilities across the country. However, the legal implementation of the DRAP in Pakistan is facing several challenges, including corruption, lack of resources, lack of staff, and lack of funding, which limit its ability to regulate drugs and antibiotics effectively. Furthermore, the over-the-counter availability of antibiotics and other drugs without a prescription poses a significant challenge and encourages self-medication, leading to the irrational use of antibiotics and other drugs and contributing to antibiotic resistance. Another factor that has affected the implementation of the DRAP Act is the lack of resources and capacity within the regulatory authority. The regulatory authority is responsible for enforcing the act, but it has faced challenges due to limited resources, inadequate infrastructure, and low levels of institutional capacity. During the fieldwork, the officials from the Khairpur Drugs Regulatory Authority criticized the government and political groups. A respondent, a middle-aged official of the Khairpur Drug Regulatory Authority, cited

> **There are eight talukas in Khairpur district but only one drug inspector is on-duty for all talukas. Despite that, the government failed to take responsibility even for the transportation expenses such as car and fuel. How can one person manage the current rate of inflation all by himself without any support from the government?**

The lack of resources and capacity within the regulatory authority is a failure of the authorities as the needs of the communities, especially marginalized communities, have not been adequately prioritized by the government.

Moreover, the officials have pointed out that political leaders defend drugstores and support their unethical practices of keeping and selling expired drugs or fake medicines. The prevalence of corruption in the district is exemplified by the official's admission of taking bribes from medical stores in exchange for support, and the existence of many unregistered medical stores, especially in Khairpur Mirs.

Even though activities such as selling expired drugs, dispensing over-the-counter drugs, employing untrained drug practitioners, and operating unlicensed medical stores and laboratories, are against medical ethics, they are still common in Pakistan. Additionally, the official responsible for regulating the drug sector in the Khairpur Mirs district seems to be unaware of the ethical considerations of drug distribution and professional responsibilities.

Shahid Ali[13], a 30 years old drug inspector, has highlighted the political influence of the Drug Regulatory Authority as a fundamental reason for promoting antimicrobial resistance and misuse of antibiotics. He has also expressed his surprise at the lack of official awareness events or debates about the threat posed by antibiotics, despite working in the field for seven years.

4.4.2 Pakistan Medical and Dental Council - Code of Ethics for Practice Medical and Dental Practitioners

In addition to the Drugs Act of 1976, the Pakistan Medical and Dental Council (PMDC) has been established to regulate medical and dental education, as well as the practice of medicine and dentistry in Pakistan (The Drugs Act 1976, 1976). The PMDC's code of ethics is an essential document that sets out the standards of professional conduct for healthcare professionals in Pakistan. The PMDC also sets standards for medical education, including the appropriate use of antibiotics and drugs in clinical practice. The PMDC has the authority to take disciplinary action against medical practitioners found guilty of violating the ethical and professional standards set by the council. The Ethics of Practice for Medical and Dental Practitioners sets out the ethical standards that physicians must follow during their practice (PMDC, 2011). Section 9 of the Code calls for the proper use of medicines, and physicians are encouraged to never forget that the life and safety of their patients depend on vigilance, competence, and fairly practice.

The practice of medicine and dentistry is a noble profession that demands ethical and honest conduct from practitioners. Physicians and dentists must provide fair and honest services to their patients, maintain professional integrity, and be free to choose whom they work with and schedule services for their patients. All physicians or dentists must practice medicine prescriptions following fair and honest practices. This means that they must uphold

[13] Pseudonym has been used instead of the read name to protect the real identity of the respondent and maintain anonymity.

professional ethics and standards while providing medical care. Physicians and dentists must provide accurate diagnoses, recommend appropriate treatments, and avoid any conflicts of interest. By adhering to fair and honest practices, healthcare practitioners can build trust with their patients and contribute to their overall well-being.

Physicians or dentists must be free to choose whom they see and work with and to schedule and arrange professional services for their patients. The life and health of patients depend upon the abilities and care of healthcare professionals. Healthcare practitioners must prioritize the needs of their patients above all else and provide timely and appropriate care. If a patient is in urgent need of treatment or diagnosis and the treatment is not accessible, the doctor or physician should find a suitable alternative capacity to advise the patient.

Moreover, medical and dental practitioners must be prepared to respond to the needs of the patients as per their moral and professional ethics. It is appropriate for a doctor or dentist to encourage a patient to seek medical care from another doctor or physician only in the case of an emergency. However, the medical or dental practitioner must first treat the patient themselves unless they believe it is inappropriate to provide professional services to a patient or if a patient has a condition that is not within their expertise. Rejecting treatment to a patient is not normally acceptable unless there is a justifiable reason for it. The responsibilities of healthcare practitioners towards their patients are crucial, and any deviations from these ethical standards can lead to negative outcomes for the patients and the healthcare system as a whole. By upholding professional ethics and standards, healthcare practitioners can ensure that patients receive the best possible care and treatment.

However, the researchers observed that the implementation of this code of ethics in Sindh province is challenging due to various factors, including lack of awareness, limited resources, cultural and social barriers, and corruption. Lack of awareness is one of the most prominent challenges in the proper implementation of this code of ethics in the healthcare community. Many healthcare professionals in Sindh are not fully aware of the PMDC's code of ethics and their obligations under it. This can lead to a lack of compliance and substandard care. Healthcare facilities in Sindh often lack the resources and infrastructure needed to provide high-quality care, which can make it difficult to adhere to the principles of the code of ethics. In some parts of Sindh, there are cultural and social barriers that can make it challenging to provide care that aligns with the PMDC's code of ethics. For example, some patients may be reluctant to discuss certain health issues due to cultural norms or stigmatization. Moreover,

corruption is a significant problem in Pakistan's healthcare system, including in Sindh province. This can make it difficult to enforce the PMDC's code of ethics and hold healthcare professionals accountable for any violations. To ensure the code of ethics is effectively implemented, policymakers and healthcare authorities in Sindh need to address these challenges and provide the necessary support and resources to healthcare professionals.

4.4.3 Sindh Health-Care Commission (SHCC) Act 2013

The Sindh Health-Care Commission (SHCC) Act was passed by the Sindh Assembly in 2013 (Provincial Assembly of Sindh, 2014). The primary aim of this act was to regulate and register various healthcare institutions, including private hospitals, maternity homes, dental clinics, laboratories, and homeopathic clinics. The act was intended to reduce the prevalence of quackery in healthcare, which includes the practice of unaccredited medical practices by the Pakistan Nursing Council (PNC), Pakistan Medical and Dental Council (PMDC), National Councils for Tibbs (NCT), and National Council for Homeopathy (NCH) (Provincial Assembly of Sindh, 2014). The act emphasizes the importance of surveillance and oversight of healthcare systems to ensure ethical practices in medical and healthcare institutions. It applies to various medical and healthcare institutions, including private or public clinicians, non-profit organizations, charitable clinics, trust hospitals, para-national, and voluntary medical organizations. Additionally, the act requires that medical facilities must obtain a license to operate. The act also emphasizes the importance of ethical considerations in healthcare systems, including medical malpractice. In cases where patients die or suffer injury due to a lack of surveillance or unreasonable prescriptions for vested interests, the act holds healthcare providers accountable.

Although the act aims to reduce quackery and ensure ethical practices in healthcare institutions, emphasizes the importance of surveillance and holds healthcare providers accountable for medical malpractice, ensuring that patients receive safe and effective medical treatment. However, this research observed that these legal acts are only in the documentation and are not implemented practically in Sindh, especially in Khairpur Mirs. The prominent reasons behind the lack of implementation are the lack of awareness of such policies in healthcare facilities and communities, lack of surveillance on the regulation and implementation processes, and lack of monitoring over authorities responsible for the implementation of these policies. Moreover, unskilled health practitioners and quackeries are

also one of the reasons behind the rapid growth of antimicrobial resistance as they often prescribe antibiotics unnecessarily.

4.5 Conclusion

In light of the above discussion, it is evident that authorities are not fulfilling their responsibilities despite the dilemma of antibiotic resistance in Pakistan. Although there are numerous national, provincial, and international policies made to curb this issue not on the national level but also international level, however, these policies are in most cases only in text form and there is no implementation of those policies. Moreover, during my fieldwork, I observed that most of the practitioners and medical professionals did not consider tackling the issue of antibiotic resistance as their responsibility. They blamed World Health Organization to be responsible for the negligence and lack of awareness related to this issue. They claimed that the WHO did not share any guidelines or notifications related to the policies. Furthermore, there is a lack of surveillance and assessment in Pakistani medical institutes and healthcare establishments.

In conclusion, the issue of irrational use of antibiotics and drugs in Pakistan is a significant public health concern that contributes to the rise of antibiotic resistance. While there are legal frameworks in place to regulate the use of antibiotics and drugs, the implementation of these policies faces several challenges and limitations. Lack of awareness and education among healthcare professionals and the general public, along with the over-the-counter availability of antibiotics and drugs without a prescription, encourages self-medication and exacerbates the problem of antibiotic resistance. The limited resources of the DRAP and the PMDC also pose a significant challenge to the effective implementation of the legal framework. To address this issue, there is a need for greater awareness and education, stricter enforcement of the legal framework, and increased investment in the resources of the DRAP and the PMDC to promote the responsible use of antibiotics and drugs in Pakistan. It is clear that authorities have not fulfilled their responsibilities in tackling the issue of antibiotic resistance, and there is a lack of surveillance and assessment in Pakistani medical institutes and healthcare establishments.

CHAPTER 5

5. INTEGRATING MEDICAL TEACHING TO ADDRESS MISUSE OF ANTIBIOTIC

This chapter discusses the current condition and significance of medical curricula regarding the inclusion of knowledge of antibiotics and related policies into the syllabus. Initially, it discusses the integration of policies related to antibiotics in medical curricula. In addition, the discourse of practicing extra-curriculum activities in medical teaching institutes to promote awareness related to the proper use of antibiotics has been discussed. Moreover, the attitudes and knowledge of medical teachers and the perspectives of students concerning policies on antibiotics are elaborated. Lastly, the discussion includes bioethics and clinical ethics concerning the issue of antimicrobial resistance in medical curricula.

5.1 Antibiotics and Concerning Policies in the Medical Curricula

The over and misuse of antibiotics cause antimicrobial resistance, which is deemed a threat globally. World health organization has made many policies and introduced global and national strategies to cope with the growing rate of antimicrobial resistance and the justified use of antibiotics. Similarly, Pakistan has also launched some strategies and programs like antimicrobial stewardship, antibiotic stewardship program, and national action plan. These policy-based programs aim to select correct diagnoses, and appropriate usage of antibiotics, prevent infectious diseases, and localize the knowledge of those policies and implement them on a community level.

Drug Regulatory Authority Pakistan introduced guidelines for healthcare professionals to reduce the burden of antimicrobial resistance and appropriate usage of antibiotics in light of antimicrobial resistance programs (DRAP, 2021). This policy aims to educate healthcare practitioners, medical teachers, and students. It emphasizes ensuring that antimicrobial stewardship is covered in all clinical specialty training programs (Atif et al., 2021). Educate medicine, pharmacy, dentistry, nursing, and midwifery students about appropriate antimicrobial use. A practical emphasis should be a part of this training as part of an inter-professional approach. Even it strongly suggested Introducing lessons regarding antimicrobial resistance programs in primary and secondary education.

Unfortunately, policies and strategies are not implemented adequately in Pakistan due to a weak assessment and monitoring system and a lack of interest among policymakers and administrative authorities. Although medical academia and its curriculum are fundamental parts of the medical community, despite that, there is a lack of focus concerning such policies and programs. According to the views of the teaching staff, none of the courses added to the academic curricula addresses those policies or programs in most Pakistani medical colleges or universities. A respondent, a 41 years-old lecturer in a reputed medical university of Khairpur district, expressed his views concerning the curricula of the medical university and stated

> **We have to follow and teach according to the provided outline because, in the end, the exams would only be conducted related to the given course outline.**

Most teachers stick to the outline and only teach the topics mentioned in the course outline. They do not put extra effort into teaching something, not in the outline but necessary for their professional career. Additionally, another respondent said that the curricula of medical universities and colleges are more clinical and practical-oriented rather than focusing on policy and societal orientations. One of the factors behind this is that the specialists hired in medical educational institutes do not have specialization related to policies. Moreover, the policymakers or health-related administration do not conduct training or seminars on the strategies or policies regarding antimicrobial resistance to aware professionals and students.

Dr. Hassan, a 36 years old permanent teacher of community medicine at a medical university in Karachi, mentioned that most medical educational institutes' medical curricula are outdated and many essential topics that need to be addressed are omitted. He added that the courses are designed technically, such as treatment and recovery of disease through clinical patterns instead of community medicine. The research observed that the teaching faculty members blamed authorities responsible for designing medical curricula for not including such essential topics. They mentioned that the teachers have to follow the given outline while teaching. Bakhat Ali Ansari, a 51-years old senior teacher and Head of the Department of Community Medicine at a medical college in Gambat, criticized the irresponsible behavior of the teaching staff and the authorities as well. He mentioned that most teachers are not interested in teaching anything beyond the course outline because of the outline and their knowledge. According to him, teachers can teach extra necessary content on their behalf for the sake of the betterment of the future of the students. Still, they prefer not to do it as they have insufficient

knowledge about new policies and strategies regarding the proper usage of antibiotics or prevention of antibiotic resistance nationally and globally.

5.2 Extra-Curriculum Activities Regarding Appropriateness of Antibiotics

The learning experience of student life does not rely on the curriculum or the books; it also includes extra-curriculum activities in their academic experience. As aforementioned, medical teaching in Pakistan is not policy-oriented and focuses primarily on the clinical side. In this case, extra-curriculum activities are the dominant and easier way to popularize knowledge concerning optimized usage of antibiotics and related policies introduced globally and nationally. Various activities, such as seminars, campaigns, training, workshops, and conferences, can be conducted in educational institutes to address such alarming global issues. Through such extracurricular activities, both the teachers and students could be engaged in addressing issues regarding antimicrobial resistance.

Nevertheless, the current research observed that renowned medical colleges and universities in Khairpur, Sukkur, and Larkana lack interest in engaging students in current health-related issues, policies, and programs. The teaching staff has insufficient knowledge and is not updated about new health-related policies and programs. Little to no extra-curriculum activities are conducted in the educational institutes addressing the alarming issue of antibiotic resistance, prevention, and treatment.

A Rajab Ali, a 24 years-old final year medical student, shared that most of his teachers, along with the teaching profession, practice in both private and government clinics or hospitals simultaneously. He added

> **How would a person who teaches in the morning and practices as a doctor in the evening find time to conduct activities beyond the provided outline? I have not witnessed any event or campaign arranged to address policy-level information on proper usage of antibiotics, control and prevention of antibiotic resistance, and policies or programs launched to curb this issue globally or nationally.**

The study observed that one of the factors behind the lack of extra-curriculum activities at the academic level is the teachers' priorities. The academic faculty prioritize their career and money over the proper training of their students for their future professions. They prefer to

practice as a doctor in their spare time from their teaching schedule to earn extra money. They practice part-time in private clinics or hospitals. Hence, they do not get time to train the students beyond the curriculum and course outlines. Besides extra-curriculum activities, no visual awareness via posters, guides, or pamphlets regarding antimicrobial resistance or concerning strategies for the proper use of antibiotics was made visible in the buildings of the medical universities and colleges. Some teachers mentioned that extra-curriculum activities concerning optimizing the use of drugs and ways of diagnosing had been conducted in the past but did not address the concerns related to antibiotics and their policies.

5.3 Attitudes of Medical Teachers Concerning Policies of Antibiotics

Teachers of medical institutions have different narratives according to the usage of antibiotics and their policies and programs introduced to reduce the burden of antimicrobial resistance or fair use of antibiotics and their integration into the medical curriculum and activities. Teachers follow course outlines while teaching, usually designed by the authorities such as the Pakistan Medical Dental Council (PMDC), Higher Education Commission (HEC), and vice-chancellors of medical universities and colleges. Medical curricula do not address the issue of antimicrobial resistance. Such problems can be problematized by teaching courses in pharmacology and pharmacy because these are the main courses related to medicine and its usage. The study observed that the medical curriculum in medical universities and colleges focuses on clinical, technical, and biomedicine courses and disregards the courses addressing health problems in social and behavioral aspects.

Similarly, the discourse of antibiotics has been paid a lack of attention in the medical and academic curricula. In addition to that, the policies related to antibiotics are not preferred to be taught to the students. As a result, they are unaware of the antibiotics stewardship program, antimicrobial stewardship programs, and national action plans.

Moreover, they did not have any idea about the antibiotic awareness week. Gulzar Usman, a 47 years old professor and Head of the Department of Community Medicine at a renowned university in Jamshoro, mentioned that they teach about their university's social models of health. However, concerning medicines, only the usage and proper dosage are introduced, and the topics related to antibiotic resistance and its importance at the policy level are not addressed in the course outline. ASPs, AMSPs, and NAP are not included in the curricula by the Higher Education Commissioner (HEC) and Medical Dental Council (MDC).

Moreover, he mentioned that the dilemma is that the students are unaware of policies and programs, and teachers and healthcare professors also have insufficient knowledge.

The nature of the course of community medicine is contextual and situational because health-related policies and dilemmas vary from society to society; therefore, it can be interpreted accordingly. Another respondent, a lecturer of Public Health at a medical university in Karachi, stated that the discourse of antibiotics is being taught in the courses of community medicines because the model of community medicine addresses policies, programs, events, advocacy, social marketing, and sociocultural activities to cope with diseases. However, it depends upon the teachers how they decode these subjects. Additionally, he mentioned that in the university where he is teaching, many seminars, training, and related events to address the issue of antibiotic resistance in Pakistan are conducted annually. Antibiotics Awareness Week was also celebrated this year (2022) by the university to aware students, teachers, and others.

Dr. Mujeeb Ur Rehman, a 42 years old lecturer at a renowned medical university, highlighted that the inappropriate use of antibiotics is strongly associated with a lack of knowledge about their policies and strategies among students because they are the country's future doctors. Despite that, they are not being educated about these issues and their role in preventing them during medical degrees. Additionally, he expressed that better awareness and knowledge of antibiotics-related policies, programs, and strategies like antibiotic stewardship programs among medical students and teachers can help to reduce the over-consumption of antibiotics.

Professor Dr. Furkh, a 44 years Head of the Department of Community Medicine at a medical college in Khairpur mentioned that although the antibiotics stewardship program and national action plan for antibiotics are part of medical teaching institutions at every level. However, these programs are not implemented properly due to a lack of interest by policymakers and enforcement institutions. Even though teachers are aware of these policies, they are not part of their curriculum. He suggested that these should not only be added to national and international guidelines to improve the usage of antibiotics but also be implemented.

He mentioned that antibiotics usage and infection prevention control discourses are part of public health and medical research issues that have not been adequately researched in academia as research is concentrated on the clinical side. According to him, the problem does

not lie in the teachers at medical institutes but in the healthcare structure, as antimicrobial resistance is not deemed a problem in Pakistan. Most private nursing colleges run with the motive of earning money rather than working to educate students. Health regulative authorities are also not focused on maintaining checks and balances in these institutions. Regarding policy, our findings indicate a need to enact legislation to introduce ASPs into Pakistan's medical and healthcare teaching setting.

Furthermore, Pakistan's National Action Plan on antimicrobial resistance must be taught at every medical teaching institution. While in practice or professional career, there is a dire need for training and involvement of teachers and students in antibiotic stewardship programs to minimize the surge of antimicrobial resistance. Small to large-scale seminars must be held regularly to teach students. However, education alone will not suffice; antibiotic prescription guidelines and local antibiograms must be provided at every medical teaching institute. The teachers of medical institutes are not interested in teaching these policies in their curriculum due to various factors. One of the reasons is that they are not solely committed to the teaching sector as a full-time job but are also practicing in private clinics due to the lack of time and interest in the upgradation of their knowledge related to academics and policy, which is a routine among most of the doctors in developed countries as they keep reading and learning about new research and policies related to healthcare.

Qurban, a 34 years-old psychology teacher at a renowned university, suggested that psychology teachers have been teaching the biopsychosocial approaches to treat illness in the social model of health around the world. However, Pakistani teachers are more focused on teaching physiological or biomedicine approaches during medical-related degrees. Hence, very few universities in Pakistan concentrate on those biomedical approaches to teaching students throughout graduation and merely taught in the master programs of public health. Moreover, the biopsychosocial approach suggests that diagnosing patients through biological, psychological, and sociocultural contexts is more important than focusing only on biological or physical appearance.

It is essential to teach students about these things along with the policy and strategies concerning antibiotics in Pakistan as the MBBS doctors treat every disease, including psychiatric issues of health, in which they are not specialized in. Globally healthcare settings imply all three of the approaches mentioned earlier. Furthermore, patients often misuse drugs as they do not get properly diagnosed by doctors and take the medications themselves as per

their previous knowledge about the medicines. It is deemed that if future doctors are educated properly through those approaches, then the issue of antibiotic resistance may decrease. Finally, he mentioned that this perspective had elicited a focus on patients' behavior, individual experiences, and the sociocultural and economic conditions of maladies instead of focusing only on biologics or genetic factors and victim blaming.

Professor Dr. Furkh, a 44 years-old professor and HOD[14] of Community Medicine at a medical college in Khairpur, shared that the course outline is designed by the Higher Education Commission (HEC), Pakistan Medical Dental Council (PMDC), and Vice Chancellor of the medical university. The course outlines of the MBBS degree did not include the topics related to the use and misuse of antibiotics or its related policies and programs, which the WHO has launched to optimize the usage of antibiotics globally. He added that no one with a specialization related to the Antimicrobial Stewardship Program among the institution's faculty, and no training or campaigns are being held related to World Antimicrobial Awareness Week. Most faculty members and teaching staff are unaware of the policies and programs of antibiotics introduced by WHO. Consequently, the students are also unaware of the severity of these issues. Furthermore, he expressed his concerns about future generations and mentioned:

> **Doctors have used antibiotics for almost 5 or 6 generations for many minor diseases, which is very harmful to present and upcoming generations.**

Additionally, he mentioned that the monitoring, surveillance, and weekly or monthly reporting of antibiotic resistance cases are not being conducted. No one is taking any action against it, as most administrative positions are appointed through political involvement.

5.4 Medical Students' Perspective on Antibiotics and their policies

The use of antibiotics in hospitals or community settings will be led by medical and pharmacy students, who will be among the future healthcare practitioners in the field where antibiotics are practiced. That is why their information and knowledge are concerned regarding the usage of antibiotics, antimicrobial resistance, and new global and national policy-based problems. If they are trained and educated throughout the undergraduate degree, they could select a way of

[14] HOD stands for Head of Department

pattern appropriately. Contrarily selected local research observed that these types of education are not prioritized during undergraduate studies.

Dr. Javed Kerio, a 38 years old teacher at a renowned medical college in Gambat, mentioned that introducing an elective course on the proper use of antibiotics and antibiotic resistance can have a significant educational impact on medical students as it would improve their knowledge, perception, and attitude toward this important global issue. The course can provide students with a comprehensive understanding of the biology and epidemiology of antibiotic resistance, including the mechanisms by which bacteria develop resistance and the factors that contribute to its spread.

In addition to improving students' technical knowledge, the course can also change their perception of the issue by highlighting the gravity and urgency of the problem. It can help students understand the potential consequences of antibiotic overuse and misuse, both for individual patients and for public health (El-sokkary et al., 2023). By exposing students to case studies and real-world examples of antibiotic resistance, the course can provide a practical, hands-on education that enriches their understanding of the issue.

El-sokkary et al. in their study on the importance of teaching antibiotic prescribing etiquette as an elective course to medical students highlighted that after taking the optional course on proper antibiotic prescription, medical students' knowledge, views, and attitudes regarding prescribing antibiotics have improved. Elective classes could be an opportunity for students to grasp the gravity of the issue, take a stand based on the facts, and accept responsibility for the issue of antibiotic resistance (El-sokkary et al., 2023). Addressing such topics in academics can have a positive impact on medical students' attitudes toward antibiotic use. By emphasizing the importance of responsible and ethical use of antibiotics, the course can encourage students to prioritize the appropriate use of antibiotics in their future practice. This includes considering alternative treatments when appropriate, carefully weighing the benefits and risks of antibiotic use and following guidelines for an antibiotic prescription. By shaping students' attitudes towards responsible antibiotic use, the course can help ensure that future healthcare professionals make informed decisions that prioritize patient safety while reducing the spread of antibiotic-resistant infections.

Usman Ali, 22 years-old third-year student of MBBS mentioned that he had not attended a single seminar, lecture, or campaign related to antimicrobial resistance or

antimicrobial awareness event in his MBBS degree's three years. He also expressed that although he has been taught about the clinical and social models of health, the clinical model has been focused more than the social model of health. He further explained that he has never witnessed teachers teaching about coping strategies for the misuse or overuse of antibiotics. He was only taught about the dosages of all drugs in the courses related to medicines or pharmacy instead of focusing on the related issues and policies.

Similarly, I conducted three Focused Group Discussions (FGDs) in medical educational institutes. The FGDs[15] included total five (all MBBS students) from Khairpur Medical College in the first FHD, eight students (four MBBS and four pharmacology students from Khairpur Medical College) in the second FGD, and six students (two MBBS and four pharmacology students) in the third FGD from Gambat Institue of Medical College (GIMS), also known as Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat, Khairpur Mirs. During these focused group discussions, all the students[16] were aware of antibiotics in general, and their sources of information were their academic degrees, books, and lectures. Most of them stated that they are only taught about antibiotics, their types, dosage, classifications, generations, merits and demerits, and the side effects of over and misuse. Most of the students learned these things in their pharmacology and physiology courses. Most of them also knew about antimicrobial and antibiotic resistance. However, some students were unaware of it. As per their discussions, most students were genuinely aware of these topics. However, few students did not know about antibiotic resistance despite their claim of being aware. For instance, one of the students called antibiotic resistance a disease, and another student called it a bacterium; both of them did not know its cause.

Most students were unaware of the global policies to prevent or control antibiotic or antimicrobial resistance, and those who were aware had little information about them. While probing about the international policies or programs and national policies and clinical strategies, most students mentioned the general information about antibiotics and their dosage. Only three out of nineteen students mentioned policies such as tetanus vaccinations, FDA policies, TB resistance programs, and WHO programs. None of the students knew national policies to prevent or control antibiotic or antimicrobial resistance.

[15] FGD stand for Focused Group Discussion
[16] The details of the FGD participants are mentioned in the sample sheet.

Interrogating about the antimicrobial stewardship program during three focused group discussions, only two students knew a little about it. Only a few of the students were aware of World Antimicrobial Awareness Week. However, only two of the FGDs participants had attended events or campaigns related to World Antimicrobial Awareness during their academic degree. This attitude of medical students indicated that medical academia is not problematizing the threat of antimicrobial resistance. Moreover, students' academic engagement concerning antimicrobial resistance was disappointing. Only one out of six students from different semesters said I conducted an assignment on antimicrobial resistance. That assignment was conducted under the supervision of a community medicine subject. Another significant cause observed in both medical institutions is that the research subjects were not on priority, and it was just part of community medicine. Surprisingly, there is no one research specialist. As such, there is a need to understand and add new policies and strategies regarding antibiotic use at an academic level and report the factors that drive the behavior of misusing antibiotics.

5.5 Bioethics

Bioethics focuses on the principles of proper and improper behaviors that guide medical research and practice among humans and animals. Bioethical principles are applied in academia, hospitals, health institutions, pharmaceutical companies, and private health sectors. Bioethics or medical ethics had integrated into medical curricula worldwide since 1970, but only 4% of American medical institutions initially offered formal courses. By 1994 in America, Bioethics and medical ethics syllabi were integrated at every level of medical teaching institutions as compulsory subjects. Before the 21st century, medical education in Pakistan primarily focused on technical and scientific aspects of healthcare, with limited attention given to ethical and social issues. However, with the increasing globalization of medicine and the growing recognition of the importance of ethical considerations in healthcare, there has been a growing movement to incorporate bioethics into medical education and healthcare institutions in Pakistan. The members of the medical community trained in America imported contemporary bioethics in Pakistan during mid of the 1980s (Gilbert, 2012). Similarly, in 2002, the Pakistan Medical and Dental Council's code of ethics mandated that medical ethics must be taught in medical teaching institutions at every level in Pakistan. However, unfortunately, except in one private medical college, bioethics is not a formal component of the medical curriculum at any undergraduate or graduate medical institution due to a lack of interest of enforcement authorities of the Health and Higher Education Commission.

Biomedical innovations and biotechnology intervention in human beings carry the interdisciplinary subject of bioethics, which originates from philosophy. It addresses issues of health caused by the technology and biomedical treatment process, ensures fair treatment, and avoids misconduct in medical practice by doctors and clinicians. It further defines ethical ways of diagnosing and examining the rules that define proper and good conduct between physicians and patients. This theory of bioethics is applied in every healthcare sector. The Pakistan Medical and dental council (PMDC) suggested in 2002 that code of ethics (bioethics) must be taught to all private medical and government colleges or universities. Training to medical practitioners about medical ethics should be conducted because those are future servants of health and must be included in the medical curriculum. The primary purpose of this code of ethics is to educate and aware both the community and physicians and ensure a careful attitude towards the decisions and dialogues of patients (PMDC, 2002). Similarly, antibiotics and other medicines are also biomedical substances frequently consumed by humans. Hence, the overuse of antibiotics and other medicines arises many bioethical questions. The current issue of antimicrobial resistance can be addressed and prevented by problematizing such issues and regulating bioethics at medical professional and educational levels.

Current research observed that courses related to bioethics or medical ethics are not taught throughout the MBBS programs in most medical colleges and universities of selected locale. In a few institutes, some minor or general courses related to bioethics or medical ethics are offered to first- and second-years students. However, the attendance of students in those courses is very low. A respondent, a teacher at a medical university, shared the reasons behind the low presence of students in such courses. He mentioned that the universities often do not make students accountable for their low attendance in general or theoretical courses and focus more on clinical or medical courses. This lack of accountability creates an image of the course as unnecessary for a professional career and clinical practice among students.

5.6 Addressing the Issue of Antimicrobial Resistance in the Course of Clinical Ethics

Clinical ethics is a sub-discipline of bioethics that forces fairness in clinical practice and doctors' sincerity toward current and future patients. For instance, if doctors overprescribe for self-interest or do not conduct good practice for personal reasons, it would be considered malpractice and act against clinical ethics. The inclusion of courses related to clinical ethics in

the medical curriculum throughout the MBBS degree is one of the ways to reduce antimicrobial resistance as it would define ethical rules of prescription and care of a patient's life in a clinical environment.

Tom Beauchamp and James Childress created the four principles of healthcare ethics in 1985, which provide guidelines for medical professionals during practice and apply to any condition in every medical practice (Page, 2012). The four principles of ethics in health care include justice, beneficence, non-malfeasance, and autonomy (Beauchamp & Childress, 2019). The correlation between the medicinal value and the adverse effects of prescription medications could be an example of beneficence. It is more relevant for the prescription of antimicrobials.

The principle of non-maleficence refers to the obligation of not harming anyone or even avoiding the least harm possible to achieve a beneficial outcome (Jahn, 2011). It describes the choice between the immediate advantage of anti-infective treatment and the likely lack of future therapy for that patient. This term could also be used in principle for providing antibiotics with clinical prophylactic treatment, perhaps a right in the future. The principle of autonomy indicates an ethical concept that respects an individual's independence and capacity in decision-making. Doctors may recommend the best for a patient, explaining scientific judgments through clinical observation, expertise, and often psychosocial factors. However, they have to protect their privacy, respect the final decision of patients, obtain consent for their interventions, and ensure delivery of the truth about patients' conditions, treatments, or other necessary information (Jahn, 2011). Doctors' attempt to influence clinical autonomy, especially in the cases when they feel that some interventions in the decision of the choice of therapy or treatment for a specific patient or illness would benefit them monetarily, reflects that the doctor does not endorse restrictive legislation.

Moreover, beneficence encourages the moral obligation to make decisions and act to provide benefits to others and balance the benefits and risks of others. For instance, it includes protecting others' rights, preventing harm to others, assisting individuals with disabilities, and rescuing people if needed. The principle of justice refers to the obligation of practitioners to equitably distribute benefits, risks, costs, and resources according to an equal share, need, effort, contribution, and merit (Jahn, 2011). For instance, Justice in decisions such as risk and benefit, appropriate allocation of limited resources and new therapies, and following the relevant laws and regulations before making decisions. This ethical element stresses doctors'

justice, fair dealing, and honesty in prescriptions could be helpful to safeguard the upcoming generations from infectious diseases, especially antibiotic resistance. Additionally, human dignity, confidentiality, privacy, and patient rights are some of the other ethical principles or guidelines established and followed in most professional organizations (Jahn, 2011).

Dr. Bakhat Ali, a 51-years old senior teacher and Head of the Department of Community Medicine at a medical college in Gambat, defined clinical ethics as good conduct and behavior between patients and clinicians. The practitioner is accountable and responsible for all his acts with the patient in a clinical environment. Being a doctor is a great responsibility of taking care of, protecting, and educating patients. They can save the health of present and future generations. He stressed that doctors must be conscious of their actions. Clinical ethics is also concerned with the challenges of patient care. Concerning antibiotics or other antibacterial drugs, doctors must be careful about dosage and avoid overprescribing. Overprescribing unnecessary drugs for economic or personal interest is unethical according to the bioethics code of conduct. Moreover, treating patients as clients instead of responsibility and treatment without proper diagnosis is an injustice to patients and against clinical ethics. Doctors must be transparent in terms of the availability of proper health care and diagnosis equipment and must recommend another doctor to the patient if they do not have enough equipment to diagnose or treat them properly.

During the field, respondents expressed different narratives related to addressing the issue of antimicrobial resistance through academic courses in general medical or predominantly clinical ethics. Nouman Malik, a 34-year-old teacher of Pharmacology, stated that in the medical university he teaches, there is no one with a specialization in bioethics, even though it is a part of the pharmacology course as it introduces the students to proper drug usage and the necessity to prevent drug resistance for future generations. Amir, a 31 years-old lecturer of community medicine, indicated that the bioethics course had not been added to the medicine course either. During the discussion, he suggested that adding this course could reduce the burden of antimicrobial resistance because students, who will be future doctors of the country, are unaware of bioethics or clinical ethics. He expressed

> **The medical students, who have the country's future in their hands, are unaware of the important dilemmas of the medical or pharmaceutical profession.**

Kazim Raza, 64 years old former Medical Superintend (MS) of Kot-Diji mentioned that safety and care for future generations is a fundamental bioethical instrument. Our decisions in the present, policies, and actions are accountable for the future of the next generation. Antimicrobial resistance is not only a concern for the current generation but also a considerable risk for the future generation. Dr. Mujeeb Ur Rehman, a 42 years old lecturer at a renowned medical university, stated

> **Many people died due to infectious diseases in the pre-antibiotic era, and I think we will witness the disasters of the post-antibiotic period very soon.**

Moreover, he said that inventing a drug takes years of research and effort. It is not developed in a short time but takes many years. One of the great examples is the time taken to find an appropriate treatment during the Covid-19 pandemic. Scientists and pharmacists had to go through a lot of research and trials to invent a vaccine to cure Covid-19. Meanwhile, the world lost millions of lives without treatment. Furthermore, he expressed concerns and stated that the present population must control the misuse of antibiotics and antibacterial drug production.

The over and misuse of antibiotics could be addressed through academic bioethics courses by highlighting the proper usage of antibiotics and problematizing the issues of antimicrobial resistance to educate future doctors regarding this global public health dilemma. Amir, a 31-year-old teacher of community medicine, said that medical ethics courses were taught in first and second-year MBBS degrees as a minor course. Nevertheless, students do not attend medical ethics and community medicine classes because they think these subjects are not directly a part of the clinical practice. Even teachers and administrative authorities of medical teaching are not interested in making the students and teachers follow this course properly. Nouman Malik, a 34-years old teacher of pharmacology, mentioned that the assessment and marking scores or points of quiz, assignments, or exams of these courses is not done properly. In a few cases, even the lectures are held depending on students' choice. Despite that, teachers give good grades to all the students. The research observed that not only the students but also the teachers are not interested in teaching such subjects. The administration is also not interested in enforcing medical teaching institutions to put efforts into including the philosophical and social determents of health courses in the medical curricula. This reflects the academic administration's lack of interest and responsibility in the quality assurance of

education provided in the institutes, especially in theoretical courses like bioethics or clinical ethics.

The academic courses of bioethics and clinical ethics in medical degrees help prevent antibiotic resistance by educating future healthcare professionals on the responsible and ethical use of antibiotics. These courses emphasize the importance of avoiding the overuse and misuse of antibiotics, which can contribute to the development of antibiotic-resistant bacteria. They also educate students on the principles of informed consent, patient autonomy, and the weighing of potential benefits and risks when prescribing antibiotics. Additionally, these courses may cover topics such as the global public health implications of antibiotic resistance and the need for stewardship of this precious resource. By having a solid understanding of these ethical and practical considerations, medical professionals can make informed decisions that prioritize patient safety while also reducing the spread of antibiotic-resistant infections.

5.7 Conclusion

In conclusion, the study observed that the medical curricula are designed by the collaboration of authorities such as the Pakistan Medical Dental Council (PMDC), Higher Education Commission (HEC), and vice-chancellors. Despite the significance of the proper knowledge of antibiotics, the teaching faculty deny it to be their responsibility to update and disperse the proper knowledge of antibiotics to their students. The teachers prefer not to put some extra effort to aware students of antibiotic policies as even they have insufficient knowledge about new policies and strategies regarding the proper usage of antibiotics or the prevention of antibiotic resistance. Moreover, the priorities of teachers are different than the improving quality of academics or curricula which results as one of the factors behind the lack of extra-curriculum activities at the academic level. The academic faculty prioritize their career and money over the proper training of their students for their future professions. The study also observed that most of the medical universities and colleges located in the study locale do not address the issue of antimicrobial resistance in the medical curricula. Even it strongly suggested Introducing lessons regarding antimicrobial resistance programs in primary and secondary education. Medical teaching in the selected locales focus more on physiological or biomedicine approaches during medical-related degrees. Hence, very few universities in Pakistan concentrate on those biomedical approaches to teaching students throughout graduation and merely taught in the master programs of public health. Moreover, the biopsychosocial approach

suggests that diagnosing patients through biological, psychological, and sociocultural contexts is more important than focusing only on biological or physical appearance. This lack of accountability creates an image of these important issues as unnecessary for a professional career and clinical practice among students.

The inclusion of courses related to bioethics, medical ethics, or clinical ethics in the medical curriculum throughout the MBBS degree is one of the ways to reduce antimicrobial resistance as it would define ethical rules of prescription and care of a patient's life in a healthcare environment. The over and misuse of antibiotics could be addressed through academic bioethics courses by highlighting the proper usage of antibiotics and problematizing the issues of antimicrobial resistance to educate future doctors regarding this global public health dilemma. Unfortunately, policies and strategies are not implemented adequately in Pakistan due to a weak assessment and monitoring system and a lack of interest among policymakers and administrative authorities. Moreover, the monitoring, surveillance, and weekly or monthly reporting of antibiotic resistance cases are also not being conducted. Despite that, no action against it has been taken by the authorities as most administrative positions are appointed through political involvement.

CHAPTER 6

6. SOCIOCULTURAL DETERMINANTS OF ANTIBIOTIC CONSUMPTION

This chapter aims to explore the impact of socio-cultural and economic determinants influencing antibiotic consumption. This includes the exploration of societal attitudes, beliefs, and practices in the usage of antibiotics. This chapter examined societal attitudes and practices that persuade individuals living in the selected locales to consume antibiotics without consulting health care professionals such as over-the-counter purchase and self-medication. Furthermore, the behavioral patterns and indirect consumption of antibiotics via dietary patterns have also been discussed.

6.1 Sociocultural Drivers in the Practice of Misuse of Antibiotics

Antibiotic resistance and misuse of antibiotics is a phenomenon that is driven by some social, cultural, behavioral, and economic factors. Scrutinizing the sociocultural drivers of antibiotic consumption and misuse will play an important role in gaining contextual understanding and addressing these issues in the future. Saffiullah Mahesir, a 37-year-old WHO coordinator, mentioned some important cultural factors contributing to the overuse and misuse of antibiotics in Sindh Khairpur Mirs such as self-diagnosing, including economic constraints, time constraints, and limited access to healthcare facilities.

Economic constraints: Individuals who encounter economic challenges may opt for self-diagnosing and self-medication as a cost-saving measure. It can be burdensome for some of the community members to seek professional medical help and advice, especially those who belong to lower-income class families. As a result, people try to self-diagnose the healthcare issues and acquire antibiotics without consulting doctors to heal their illness immediately considering it a more affordable option. One of my respondents replied when I asked the question why you are getting medicine without consulting a doctor, he said I went into a basic health unit that is nearby my village but they gave just Panadol tablet after the checkup and I got that medicine however still I have symptoms of fever and I can’t afford to visit private clinics even the junior doctors charge minimum four hundred to five hundred and I’m daily wages labor and I earn five hundred per day and Friday is also off due to pray.

***Time constraints*:** Busy work schedules, household responsibilities, or limited availability of healthcare providers may prevent individuals from seeking medical consultation timely. As a result, they may choose to self-diagnose and self-medicate with antibiotics to alleviate their symptoms quickly, avoiding the inconvenience of lengthy wait times or multiple appointments. Doctors practice in multiple hospitals or clinics which often leads to mismanagement of time and makes them arrive late at the clinic or hospital. As a result, the patients also prefer not to waste their time while waiting for the doctor and self-medicate.

Adnan Tariq, a 21-year-old medical student, shared his experience in the context of time mismanagement, he mentioned that he had to go with his mother to Sukkur's famous hospital for her routine checkup. After entering the hospital, he took a token number and began waiting in a congested waiting area of the hospital along with his mother. Firstly, there was no sitting area in the waiting room. After waiting for more than long three hours, the doctor arrived at the hospital. Surprisingly, no one from the management or patient problematized the issue or asked about the reason for his late arrival.

Limited Accessibility to Healthcare Facilities: Inadequate healthcare infrastructure, geographical remoteness, or a lack of nearby healthcare facilities may pose challenges in accessing medical care timely for the community members. To avoid the requirement of long-distance traveling and incurring additional costs contribute to self-diagnosing and self-medication with antibiotics. The research observed most people misuse antibiotics due to the unavailability of health care facilities and they need to go long distant for treatment.

The abovementioned factors provide valuable insights into the cultural and contextual reasons behind self-diagnosing and its association with antibiotic overuse and misuse in Sindh Khairpur Mirs. It highlights the importance of the socio-cultural and economic dynamics that influence healthcare-seeking behaviors within the community. Acknowledging these factors, healthcare accessibility can be improved along with the quality of healthcare services. Moreover, some further interventions and policies to address economic barriers and promote responsible antibiotic use through awareness can be developed. This can also emphasize the significance of professional medical consultation among the public which would address the issue of antibiotic resistance.

6.2 Community-level Knowledge about the Usage of Antibiotics

The behavior, attitudes, beliefs, and awareness of the general public in any community are as important as it is for professionals and practitioners. The establishment of proper awareness, behaviors, and attitudes at a community level and among the general public and patients is very essential to curb the issue of overuse and misuse of antibiotics or antimicrobial resistance and optimize their use. These can only be exerted by the contribution of healthcare professionals and practitioners in their adherence to the medication regimen. The general public and patients are advised as followed by the drug regulatory authority of Pakistan (DRAP, 2021):

1. To seek information from clinicians, doctors, or any other healthcare providers about proper antibiotics and antimicrobial usage, their resistance, and adverse side effects of over-dosage.
2. Use these medications as per the dosage regimen provided by the doctor and do not use them without a prescription.
3. Avoid using any antimicrobial being prescribed to someone else without consulting doctors even if they have the same disease, and avoid purchasing antimicrobials without a prescription.
4. Dispose of or return all the leftover antimicrobials and antibiotics to the pharmacies, local collection, or local disposal regulations.

Despite the guidelines being provided to every sector including the general public and patients, people are unaware of these issues and guidelines. As in most developing countries, even in Pakistan, antibiotics can be purchased without a prescription, even though this is both unethical and illegal. Antibiotics are consistently accessible on demand from medical facilities, pharmacies, and roadside stores. The current study observed that among all of the drug consumers, only a few customers purchase the drugs with prescriptions and the rest of them try to purchase them without prescriptions.

Since medicines are often unavailable in government healthcare facilities and pharmacies, people are urged to purchase from unlicensed vendors. In addition, drug vendors usually have no to little knowledge of the required dosage regimen, indications, side effects, or contraindications. Pharmacy raps and drug distributors are almost medically untrained and they try to convince potential buyers to purchase the drug even if it is not necessary. These sub-inhibitory antibiotic regimens influence the selection of resistant bacterial strains.

Antibiotics use in Khairpur is underestimated as the motives for self-medication and antibiotic overuse by laypersons are similar to those for clinical exploitation by health

professionals. In Khairpur, individuals afflicted with seasonal disease are usually acknowledged as having taken at least one antibiotic before a hospital visit. The number of patients who self-medicate is likely to be higher since some patients are often reluctant to admit to having taken antibiotics before visiting a hospital.

Some common cultural beliefs and typical misconceptions include the following. Firstly, people think that antibiotics are treatable for all symptoms, antibiotics may heal various disorders, including acidity, stomachaches, diarrhea, or migraines. The misuse of antibiotics frequently becomes integrated into the local culture; antibiotics are consumed to prevent diarrhea after eating suspected contaminated foods or to prevent sexually transmitted infections in the profession of prostitution. Another cause of antibiotic overuse or misuse and selection for resistant bacteria is poor patient and doctor communication. The doctor-patient interactions are often inadequate in Pakistan and the gap in interaction is a symbol of the irresponsible attitude of doctors toward patients. The study observed that patients feared the doctors and they do not communicate with them in detail. Moreover, the local patients of rural areas, including the locale of my research, are often unable to read medicine labels and the instructions manual given with the medicines. Concerning this, Noor Bibi, a 48 years old patient, expressed

> **We (laymen) are unaware of the medical language and the doctors also do not explain our issues in detail. How are we supposed to know why are we getting sick and not being cured by even months of medications? Although my children are studying, they also cannot decode the instructions given with the pack of medicines.**

Additionally, she mentioned that none of the doctors he has been to explained the medicines and their potential side effects and she also did not inquire about these things. Muhammad Ghazi, 33 years old public doctor in Khairpur, mentioned that most of the patients do not care about the details of the medications, they only care about the dosage and the regimen of the medication. The patients often do not care about the information about the cause of their illness. He added that all of these details are shared in detail with those patients who tend to care about these things. A final factor that was examined was that indigent people often discontinue their medications due to their expensive prices, and they tend to purchase incomplete regimens whenever possible and discontinue treatment when symptoms disappear but before the pathogen is eliminated. Similarly, Nayab Ali, a 32 years old doctor practicing in a private clinic stated that many patients get prescriptions from doctors but do not follow the dosage regimen properly and do not complete the medicinal course. He stated that

When a patient discontinues the antibiotic course without completing the prescribed dosage duration, the bacteria remain inside the body. Hence, it raises the chances to strengthen up and become difficult to be killed with the same medicine which was left uncompleted earlier.

There is a lack of guidelines and control in Khairpur Mirs. A medicine distributor sells the customers any medicine they ask for the sake of money. There is no regard for symptoms or safety. A drug distributor in Khairpur Mirs even offered me antibiotics for my sore throat without a prescription and my demand. It is now commonly accepted that most coughs and colds are brought about by viruses and antibiotics agents have no impact on them.

Some of the respondents claimed that the misuse of antibiotics is not only the practitioner's responsibility but also due to the patient's irresponsible behavior. Some patients are so habitual to consume antibiotic medicines that they keep insisting the doctors prescribe them antibiotics as a part of their treatment so that they can get better faster. Patients who cannot financially afford extensive medical treatments want to immediately recover from the illness. Such patients insist that doctors prescribe them antibiotics. Muhammad Ghazi, a 33 years old public doctor, who also practices privately in the evening, mentioned in this regard:

When I practice in the public hospital, I attend to a lot of patients who insist to be prescribed such a medicine that will make them healthy in one dose. They do not want to visit the doctors again as they cannot afford it, especially the daily wagers. Their preference is to be prescribed antibiotics as they think that it will boost their recovery process.

It was observed in the study that the patients in Khairpur Mirs have a particular mindset about the doctors that they are very knowledgeable and well trained, and they cannot be wrong. Such patients usually do not ask the doctors about the medicines they are being prescribed. According to one of the respondents, the more a doctor prescribes the medicine, the more knowledgeable they are considered. One of the respondents, a government doctor also practicing in a private clinic, mentioned that even if the doctors avoid unnecessary prescriptions of antibiotics, the patients insist to do so and assume that the doctor is unaware of the nature of the disease and its cure. Hence, the patients leave the clinic unsatisfied and change the doctor to get antibiotics for immediate relief.

6.3 Self-Medication with Antibiotics (SMA)

Self-medication with antibiotics (SMA) is another important factor contributing extensively to antimicrobial resistance and extensive drug resistance (XDR). It is a very significant issue, especially in developing countries including Pakistan. It refers to the treatment of minor illnesses by individuals by using medications without consulting doctors for their ease and to avoid additional expenses of the fee charged by the doctors. The disease or illness for which people self-medicate is also self-diagnosed, they rely on their past experiences, prior knowledge, or the suggestions of the people around them for the diagnosis of the disease. This allows them to save not only the expenses of the doctors but also the laboratory testing.

Muhammad Ghazi, a 33-year-old doctor, mentioned that eighty percent of individuals prefer self-medication since they cannot afford the high charges of private clinics, and the government hospitals and healthcare facilities do not have enough drugs and they suggest buying them from the market. In addition, the majority of individuals obtain their medication in different ways such as through old prescriptions, drug names, colors, and packets of medicine that are most often used in the community. During the participant observer in a medical store in Khairpur Mirs, I noticed that people also buy medicines without even remembering the names of medicines by explaining the details of the medicines such as the disease for which it is being used, the color of the medicine or a packet, etc. For instance, Hussain Ahmed, a 54-year-old patient, tried to buy Augmentin antibiotic capsules by explaining to the medical store employee about its details. He stated

> **Do you have that antibiotic capsules which come in a *waghrai* (purple) and *Safaid/ Achu* (white) package that is often used for chest infections or to treat wounds with pus?**

The study observed that the influence of social norms and peer pressure is another cultural practice that leads to the overuse of antibiotics in our society. There is a tendency of close kinship ties to parse the discourse of social capital in medical practice. The Social-capital-discourse in many ways compels people to self-diagnose themselves without the help of medical intervention in Khairpur Mirs. Respect and care for consanguineal and social relatives, especially elders' suggestions, is deemed to be a firm norm and value in the research locale. My research observed that the discourse of social capital leads to the misuse of antibiotics with the intervention of close people in the decision-making of medication. People who live in a close kinship system have an emotional attachment to each other. The socio-cultural environment compels people to respect their elders and other people in their surroundings. Our

culture often exerts a lot of importance on following rules and looking for approval from others. This includes judgments and suggestions about medical conditions and their treatments, such as medications, home remedies, or any alternate methods, based on the experiences of their family, friends, or neighbors. A doctor, one of my respondents, shared an experience of one of his patients who got an infection in a foot while harvesting date palms. He visited the doctor after 17 days of getting infected, the doctor shared. Meanwhile, Furthermore, the doctor expressed patient used home remedies suggested by his mates working with him in the harvesting of date palms. He avoided going to the doctor as it was not his hometown and just came to earn in Khairpur Mirs. The patient's foot was in critical condition as the infection started to spread and effect his mobility. The doctor prescribed him three types of antibiotics i.e., Augmentin, cephalexin, and doxycycline for more than a month to treat that wound. The doctor further explained that when the patient got a bit of relief, he stopped taking the medication without completing the medical course recommended by the doctor. This led him to the cause of antimicrobial resistance. Moreover, he stated that it is very common for patients to prioritize treating themselves by their relatives' recommendations instead of visiting hospitals, getting diagnosed, and being treated properly by a doctor. This leads to the inappropriate and excessive use of antibiotics without proper diagnosis among the population. This cultural custom of seeking approval from others and complying with cultural norms can have an impact on how antibiotics are misused.

Moreover, the study observed that the strategies used by people who prefer self-medication to select the medications for a common illness use the old prescriptions given by doctors when they were diagnosed with the same illness before. Along with that, they often use leaflets provided with the medicines describing detailed information of medicine about the correct dosage, side effects, duration, preservation, and precautions. Using the leaflet strategy for self-medication is considered safe by the World Health Organization (Yin et al., 2021). Moreover, some patients search for their diseases and symptoms online over the internet and then purchase the medicines without consulting the symptoms, disease diagnosis, or medicines from the doctors. Despite the use of various strategies for self-medication, it entails many associated risks to the patients or the consumers which cannot be unheeded. Some of the prominent risks are improper drug regimen, excess of the drug dose, mistreatment by using the wrong medicine, misdiagnosis, and combining certain drugs leading to drug interaction. These risks may cause very crucial health hazards to the patients such as a rise in pathogens resistance, prolonged suffering and adverse reactions, antimicrobial resistance, and extensive drug resistance.

Antimicrobial resistance is the most prevalent issue caused by different factors including improper self-medication and excessive use of antibiotics without a doctor's prescription (Nepal & Bhatta, 2018). Self-medication with antibiotics (SMA) has also become considerably common globally. For instance, COVID-19 prevailed as one of the global threats which impacted people around the world who tried to deal with it in different ways such as home remedies, self-medication, herbal treatment, homeopathy, traditional treatments, spiritual healing, etc. Self-medication with antibiotics is also one of the frequently used ways to treat the virus in Pakistan. A study showed that almost 72% of Coronavirus patients were given antibiotics out of which only 8% required antibiotic drugs (O'Reilly, 2020). O'Reilly (2020) refers to COVID-19 as a 'Storm for AMR infections" as it led patients to consume antibiotics. The patients in the research locales believed it to be just a superinfection that could be treated by antibiotics as the symptoms of COVID-19, typhoid, and some other viral infections were the same such as cough, sore throat, runny nose, fever, etc. This unnecessary use of antibiotics became a potential surge in AMR.

Some of the risks of self-medication causing antibiotic resistance the use of antimicrobial agents, anti-inflammatory, multivitamins, gynecological medicines, painkillers, and herbal remedies (Zeb et al., 2022). The potent reasons which encouraged the students to practice self-medication were convenience, cheap sources of medicines, exemption of doctor's fees, lack of availability of medical centers in their educational institutions or hostels, and lack of time to visit a doctor. Another factor that was highlighted by the clinicians was that there is a huge number of patients that undergo self-medication before visiting the doctor. They only visit the doctors when their medical condition worsens.

The lack of strict surveillance, law, and order, and accountability over the availability and dispensation of antibiotics without prescription and limited availability of healthcare facilities, especially public healthcare establishments are also among the major factors behind self-medication with antibiotics (SMA). There is a dire need for governmental policies to be implemented. To manage the crisis collaborative research must be conducted in all relevant sectors. Moreover, the contribution of the general public is also needed through proper awareness initiatives. Finally, they suggest that the development of new drugs is being neglected, it should urgently be taken seriously and worked on.

6.4 Over-the-counter (OTC) Purchase of Antimicrobial Drugs

Drug Regulatory Authority of Pakistan (DRAP) mentioned in its guidelines for the prevention and treatment of antimicrobial resistance that excessive utilization of over-the-

counter medication is one of the major factors of antimicrobial resistance (DRAP, 2021). Many people are purchasing medicine from medical stores without consulting doctors. Shafqat Ali, a 30 years old employee of the Drug Regulatory Authority (DRA), said the over-the-counter sale of the drug is illegal and against medical ethics and it is their duty as drug regulatory authority officials to legally force drug distributors and put on fines

The findings demonstrate that unnecessary over-prescriptions and over-the-counter use of antibiotics occur because pharmaceutical companies intentionally run and fund medical stores and private clinics. The pharmaceutical industries, through healthcare professionals, have persuaded clinicians and pharmaceutical companies to promote corporate medicine. One of the respondents mentioned that although dispensing linezolid drugs without a prescription is illegal, nevertheless it is very easily available over the counter in Pakistan. Easy access to drug stores, lack of time, and financial unaffordability promote over-the-counter consumption of antibiotics.

In rural areas, antimicrobial drugs can be very easily purchased without a doctor's prescription, although this practice is illegal. For instance, a maximum number of people visit their nearby local drugstores, and a minimum was prescribed by certified physicians. Similarly, relatives, friends, wise persons, drug sellers, and quacks encourage buying antibiotics for seasonal infections. They do have not authentic medical knowledge. Before the approach to doctor patients visit local medical stores and consume one to two antibiotics. Moreover, an antibiotic is rapidly acquirable on demand by medical stores, clinics, and pharmacies. On the other side, people have no access to well-trained doctors or government healthcare facilities in their nearby areas. One respondent mentioned that antibiotic is a common culture of our society as they are used for almost every viral or infectious disease. It is also used to prevent sexually transmitted diseases and abortion, especially in the profession of prostitution. One respondent expressed his views when asked about why they purchase medicine without being diagnosed. He mentioned that females are not allowed to visit doctors unless there is an emergency. Thus, men bring medicines for their wives and other female family members.

A drug distributor admitted that he suggests twenty Chloroquine tablets at a time for abortion. However, when I searched the details about these tablets on the internet, I was surprised to know that medically it is used for malaria treatment. Abdul Qayom, a 29 years old drug pharmacist, claimed that different people come and ask for antibiotics. Moreover, he discussed over-the-counter antibiotics purchase and mentioned:

> **When a customer wants to purchase a drug without a prescription, we cannot demand a prescription explanation from them because if we do not sell them that medicine, they will ultimately purchase it from some other medical store.**

The lack of authoritative surveillance is allowing morally reprehensible businesses not only to flourish but also leading the country to a serious threat to public health as the unqualified managers of these drug stores or pharmacies are unaware of the consequences of this irresponsible behavior of dispensing over-the-counter drugs.

6.5 Behavioral Factors Impacting Antibiotic Consumption

The adaptive and cognitive faculties of human beings distinguish them from other species. Their behavior is shaped by acquired normative orders and sociocultural phenomena in any selected environment. Additionally, humans are socio-culturally restricted to communicate regularly inside and outside their community with both human and non-human organisms, including microorganisms like bacteria, viruses, fungi, and other parasites, some of which are beneficial and non-beneficial to our health.

Anthropologists apply the Behavioral Immunization approach to understand illnesses through the lived experiences and behavioral changes of patients in their practices and performances (Singer, 2016). This approach recognizes cultural practices that may persuade a person to participate in rituals that can lead to illness, such as over-dieting, unhealthy food, unclean environments, and interacting with people who have contagious diseases like flu, HIV, AIDS, hepatitis, and others. Furthermore, this approach asserts that human cultural patterns determine the well-being of humans, and urges that biomedical practitioners must consider patient's history before diagnosing them.

A huge number of antibiotics are used for infectious diseases due to the disorder of microbial organisms such as fungi, bacteria, viruses, and parasites. Diffusion of infectious diseases through the behavioral patterns of the individuals that vary from culture to culture such as handshaking, food patterns, societal infrastructure, and gatherings. Micro–organisms' infectious diseases are transmitted in different ways. The most frequent way is the transmission and absorption of physical or breathing agents. Pathogens only get transmitted by touching a dirty surface. Some pathogens became airborne; airborne dispersal promotes the rapid increase of microbial, particularly in crowded spaces.

The aforementioned discussion raises an ethical question for individuals, it is an individual's duty as a responsible citizen to take precautionary measures like isolation in the condition of being affected by infectious and spare harmful pathogens. At the point of sale, raw meat, vegetables, and other eatables can get contaminated with pathogens (Freni, 2021). Poor agricultural water increases many unhealthy products. The market in Khairpur Mirs is full of pollution which also contaminates the food being sold at the roadside food stalls, all the dust from the road and the market goes into the food as it is usually not well-covered by the stall owners. This raises an ethical obligation for the control of food product manufacturers and distributors to ensure the cleanliness of food, the environment in which it is being sold, and the use of hygienic materials. Similar concerns go for the polluted water, while the quality of water generally did on existing structures for public hygiene and sanitation.

Dr. Mushtaq Phul, a 53 years-old doctor practicing in a private clinic, stated that a lack of education and awareness about the proper use of drugs in the community contributes to the growth of AMR. Many people use drugs including antibiotics as per their cultural and traditional patterns. For instance, drinking medicinal syrup from its lid is very common which is not correct. The proper way of taking syrups is using the measurement spoon, which is often available with the syrup bottle, taking it by lid results in excessive intake of the syrup. Moreover, taking medicines at irregular times is also wrong. For instance, a medicine suggested to be taken in the morning must be taken in the morning. It is very common practice to delay the morning dose to afternoon especially among women in rural areas as they prefer to finish their house chores, field, and agricultural work before focusing on themselves. However, they take the night dose in the evening as the people in rural areas prefer to sleep early.

Irrational and inadequate allocation of health equipment, poor surveillance, sanitation, and the worst condition of clinical settings are more questionable for the misuse of antibiotics and antimicrobial resistance risks. There are many ethical issues in the clinic settings like cleanliness, uncertified or illegal drug consumption, and prescription, absence of testing equipment, untrained practitioners, and the use of the same thermometer without sterilizing or sanitizing it. The study also observed that poor clinical infrastructure also causes many communicable diseases. For example, doctors do not wash their hands after checking every patient and check the next patient with unclean hands which results in the transfer of bacteria and infections. Similarly, germs are transferred from one to another individual who drinks water in the same glass used by an infected person in public places including waiting rooms in

clinics or hospitals. Governmental and health administrative bodies are responsible to take steps and emphasize drug distributors not to sell antibiotics without well-trained doctors' prescriptions and making the clinical spaces clean.

6.6 Sociolinguistic and Symbolic Interpretation and Antibiotics Consumption

Hussain Ahmed, a 54-year-old patient at a public hospital, mentioned that sociolinguistic[17] determinants in health-seeking behavior in the overuse and misuse of antibiotics play a crucial role in challenging individual agency and decision-making. He mentioned that whenever he wanted to visit professional doctors, he becomes hesitant because the way they communicate is very rude according to him. Thus, he prioritizes visiting doctors who work in the medical field without possessing any medical degrees because they do not make him feel alienated and make them much more comfortable as they are much politer than others, dresses like local people, and communicate with patients in the local language. While probing, he mentioned that not only he but most of his family and other relatives do not want to go to the professionals for healthcare treatment. He added that asking for further details about the dosage of medicines becomes difficult. Moreover, he even avoids visiting again after a few days as per the doctor's instructions.

6.6.1 Case Study of Symbolic Misinterpretation

Dr. Mehmood, a 67-year-old retired public doctor practicing in a private clinic, shared a case study of a patient about the misuse of medicine due to misinterpretation of a medical prescription. The patient, a woman of age more than 50[18], was uneducated and could not read prescriptions. The patient was diagnosed with malaria during a flood situation in Khairpur back in 2022. She visited a local clinic and the doctor prescribed some medicine and told the visitors (caretaker) that came along with her to revisit the clinic after a week. However, they brought her back within 3 days of the week as her health worsened. The doctor was shocked to see her as he was unable to understand the current situation of the patient. After checking her he asked for the previous prescription and told them to explain the dosage and timing of the medicine. The caretaker shared the routine and dosage of medications which reflected the inappropriate use of medications as she had missed some medicines which were supposed to be taken at

[17] Sociolinguistic determinant refers to the influence of various factors such as age, gender, ethnicity, geographic location, education, occupation, etc. on language use and social roles within a community.
[18] The doctor did not remember the name and exact age of the patient and just remembered her age bracket.

night. After inquiring about the situation, the patient took the medicine out of her bag and showed the lines[19] marked at the back of the sachet of tablets to the doctor and exclaimed with anger that I am taking the medicines as per the requirements (the lines marked on the medicines). The medicine was missing one mark which caused her to miss the night dose. Being unable to read and write, she did not consult the prescription and the family also did not pay attention to it believing that the correct dosage is mentioned on the medicines. This case study examines how semiotic interpretation influences the consumption of medications including antibiotics.

6.7 Cultural Competency to Tackle Antibiotic Misuse

Patients' societal role and sociocultural practices have a significant role in the acquisition of infection. Thus, doctors need to understand their practices before prescribing medicines. Doctors should be culturally competent with the community to better understand the cultural practices of the patients and treat them accordingly.

The doctor admitted his lack of cultural competency[20] during the early days of his practice as a doctor. He mentioned a case of a patient who was diagnosed with infection the diagnosis of patients and expressed one case of infection that was acquired due to cultural practice and that he knows a long time later. The doctor said one of my patients had a sore throat and flu for approximately 3 months. The doctor prescribed him multiple drugs to be consumed multiple times but still his throat was not recovering. During his revisit, the doctor asked him about his dietary pattern and discovered that the patient had been eating cold yogurt regularly before bedtime as it was a routine practice of his family. In addition, the doctor shared that people in rural and agricultural areas tend to get sore throats and allergies during the season of wheat cultivation as it contains a lot of dust. The following cases suggest that a doctor must possess cultural competency of a specific culture they operate within to better understand patients' behaviors and prescribe appropriate treatments. It allows us to have a deeper understanding of the cultural context in which healthcare services are provided and improves healthcare decision-making.

[19] The medical store employees often mark the dosage on the back of the medicine which symbolically represent the number of dosages in a day. The symbolic representation is as following: 1 (once a day), 1+1 (twice a day i.e., in morning and night), 1+1+1 (thrice a day i.e., in the morning, afternoon, and at night).

[20] Cultural competency means being aware of one's culture, beliefs, values, and the similarities and differences with other cultures. The cultural competency in health care describes the ability of systems to provide care to patients with diverse values, beliefs and behaviors, including the tailoring of health care delivery to meet patients' social, cultural and linguistic needs (Rose, 2012).

6.8 The Popularity of Western Medicine and the Demise of Indigenous Healing

Western medicine has become a dominant healing method around the world due to colonial intervention. Although every culture has its ways of treating and curing illness and diseases. Despite that, a majority of the world population believes Western medicines to be the most effective healing method. This universalization of Western medicine is the result of the coalition of various stakeholders such as multi-pharmaceutical companies.

During one of the interviews with the doctors in Khairpur Mirs, a person, 47 years old Fayaz, sitting nearby intervened in the discussion about the use of antibiotics among the population and built a comparison of the current generation and his generation. He mentioned that the use of antibiotics was not so common in his childhood and early adulthood. People used to use alternate options such as folk medical practices or home remedies to heal diseases, wounds, infections, etc. For instance, his mother preferred to apply a mixture of *Makhi* (honey*)* and *Headar* (turmeric*)* on wounds with the help of a simple cotton bandage to heal them. Similarly, if any person got a cold, fever, or flu, the elders would suggest and give *karha/ qehwa*[21] made up of various herbs, spices, fennel seeds, or various other natural ingredients. Moreover, some other folk or ethno medicines such as fennel (saunf), black peppercorns (kali Mirch), cloves (laung) cinnamon or cassia bark (dalchini), cardamom pods (elaichi) were also used for various health issues.

He further stated that people do not believe in such remedies which used to work for us like magic and even believe them to be harmful to health. People in present times believe in Western medicines as a cure for every disease, illness, infection, wound, etc. The doctor added to the conversation that people often consume antibiotics without consulting any doctor. Some common antibiotics which are most commonly misused to heal wounds are Augmentin, Azithromycin, and Velosef.

In light of the aforementioned text, Rosi Braidotti suggested that we live in the post-human era (Braidotti, 2013). The concept of the post-humanism approach suggested that every type of modernity and technological intervention changed the neutrality of human beings. The same rapid progression in the field of medical sciences and biotechnology has not only universalized healing patterns but also devalued the natural way of healing or natural essence

[21] Karha or qehwa is a tea made up of various herbs tea or green tea leaves.

of culture. For example, the prevalence of the antibiotic used for every health issue instead of cultural remedies and folk healthcare practices. Moreover, people metaphorically compare antibiotics with people who have solutions for all issues or people who are flexible and fit in every sociocultural and natural environment. For instance, I overheard two persons talking about the third person who was not available there at the moment. One of them mentioned that he (the third person) is just like antibiotics as he fits into every societal role as antibiotics can fit into any disease or infection and treat them. They metaphorically related him with antibiotics as he was flexible and belonged to many professions such as journalism, teaching, and the business of domestic animals. This comparison was very interesting as they referred to his multiple societal roles with the purpose of antibiotics. This reflected their understanding of antibiotics and their purposes.

6.9 Dietary Patterns and Indirect Consumption of Antibiotics

The global consumption of antibiotics in animals is almost twice that of humans (Arsène et al., 2022). The world's third-largest use of antibiotics is in agricultural production, animal husbandry, and livestock. There are two main sources of antibiotic consumption among human beings i.e., direct consumption, via oral or injecting medications, or indirect consumption via livestock or agricultural products. This has led to a close relationship with animals and plants, i.e., poultry, animal farms, agriculture, etc., which has increased the risk of transmission of diseases from animals to humans, known as zoonotic diseases. Zoonotic diseases are caused by a variety of pathogens, including viruses, bacteria, parasites, and fungi.

Some of the zoonotic diseases are Rabies, Anthrax, Brucellosis, Salmonellosis, Lyme disease, Toxoplasmosis, etc. Dr. Asad Ali, a 39-year-old veterinary doctor in Khairpur, mentioned that there are many factors resulting in the transmission of zoonotic diseases such as direct contact with an infected animal, their bodily fluids i.e., saliva, urine, or feces, animal's environment i.e., soil or water that has been contaminated with an animal's feces, or inhaling droplets from an infected animal. Moreover, consuming food or water that had been contaminated with an infected animal's feces also causes the transmission of zoonotic diseases which can be serious and fatal for humans. He further suggested some important steps prevent zoonotic diseases, such as washing and cooking meat thoroughly, washing hands properly after touching animals or their products, avoiding direct contact with infected or sick animals, or getting vaccinated against zoonotic diseases. Moreover, he also suggested that if someone gets

exposed or infected with a zoonotic disease must visit the doctor and get examined and treated properly. He also expressed:

> **There is a huge population in Sindh, especially rural Sindh, who depend on domestication of animals which makes them more vulnerable to such diseases as they have close contact with a variety of animal pathogens.**

The global trade of animals and animal products and the growth of the livestock industry has intensified animal production as it has increased the favorable chances of disease spread. Moreover, the expansion of human habitats, industrialization, and agriculture has forced animals to live in proximity to humans.

Zulfiqar Ali Mallah, a 42 years old veterinary doctor in Khairpur, mentioned that antibiotics and other prophylactic medications are used for the prevention and treatment of infection and diseases globally that promotes antimicrobial resistance. The use of antimicrobials in the absence of bacterial agents and in treating infections other than bacterial infections is prohibited and considered wrong. In developing or lower-and-middle income countries, the economic factor is one of the reasons why livestock workers use antimicrobials. He further added that the livestock and agricultural sectors are increasingly using antibiotics to increase reproduction and as precautionary measures to avoid infections in advance rather than using them for the treatment of bacterial infections after proper diagnosis.

This induces bacterial resistance among animals, as the bacteria colonize those animals to survive in the environment, which spreads into the later generations through the flow of genes and reproduction. These animals are later consumed by humans which also becomes a cause of indirect consumption of antibiotic agents, thus, induces antibiotic or antimicrobial resistance among humans as well. Many countries like Denmark and Netherlands have strong governmental interventions in banning and controlling antibiotic consumption in food products, the agricultural sector, and animal husbandry farms. This raises ethical obligations and healthcare concerns in veterinary medicine to mitigate the long-lasting effects of antimicrobial resistance not only for animals but humans as well.

Zulfiqar Ali Mallah, a 42 years old veterinary doctor practicing in both animal and human hospitals, stated that the increase in antibiotic use among humans and animals is alarming. Approximately 90% of upper respiratory infections (URTIs) are viral infections that are self-cured without any intervention of medications. However, approximately 70% to 90% of patients with viral URTIs are prescribed antibiotics unnecessarily. He referred to

antimicrobial resistance as ‘Super bug’ which causes thousands of illnesses and deaths every year. furthermore, he added that almost 70% of antibiotics are sold without prescriptions. It is very common to use medicines suggested by others such as friends, relatives, colleagues, neighbors, etc. People suggest to each other the antibiotics or other medications which they had used earlier or seen others using for a specific issue.

Many heavy-dosed antibiotics, such as Erythromycin and Enrofloxacin, are used for animals and agriculture growth productions and to treat infection prevention in poultry and other animal husbandry or farming. Dr. Nasir Ahmed, a 43-year-old MBBS doctor practicing in Khairpur, exclaimed that Celestin antibiotics are commonly used for livestock in Khairpur to treat different animals for gram-negative bacilli due to a disorder of the digestive system. This raises an ethical issue as it left various side effects including restricting the use of colitis among humans which was already limited to usage in pre-operative bowel sterilization. However, it has now become a last-line antibacterial agent in human medicine for treating bacterial infections that produce carbapenems.

6.10 Case Study: Beautification Leading to the Use of Antibiotics

In present times, the cosmetic industry is growing intensively. One of the key factors behind this growth is the dissatisfaction with the image of the physical self and the concept of fitting one’s self according to beauty standards. The social discourse of beauty standards in Pakistan moves around fair skin which is also locally referred to as the ‘gora complex’. A lot of cosmetic companies have launched numerous cosmetic products that claim to make the skin look ‘brighter’, ‘glowing’, and ‘fair’ for women. The obsession with fair skin often leads women to use skin bleaches or formula creams for whitening up their skin. Skin whitening formula creams are made up by mixing different harmful chemical creams to speed up the process of those creams. These creams are supposed to suppress melanin production from the skin. Some of the skin whitening creams also include steroids called corticosteroids. These steroids initially make the skin fairer but later on, they cause pimples, acne, and permanent scaring of the skin. Moreover, they also lead to numerous skin issues such as allergic reactions, skin ulcers, acne, dermatitis, pigmentation, skin peeling, skin thinning, etc. (Azhar, 2021).

Doctors often prescribe antibiotics courses for a few days to 3 months to treat such infections. Sumaira Naseer, 28 years old patient of a private clinic, shared her experience of using skin whitening formula cream and its consequences. She visited a local beauty parlor to get a facial treatment for sun tanning. The parlor owner bleached her face and gave her a formula cream to use overnight for 3 months at least to brighten up her skin. She used it for a

month and got a severe acne breakout and irritation on her skin especially when she used to go in the sun. She went to a private clinic to get treatment for her acne. The doctor recommended an antibiotic course of three months. She got the cure for acne after 3 months long antibiotic treatment.

Dr. Noureen, a middle-aged dermatologist at a public hospital in Khairpur, shared her views that although antibiotics are not for all skin diseases, however, some irresponsible doctors prescribe antibiotics for every skin infection without proper diagnosis whether they are bacterial or not. This might treat the issue temporarily in no time, but it causes antibacterial resistance among individuals. She shared a case of one of her patients who used to bleach her skin every week and applied skin whitening cream every night. She got some mild skin issues and went to a doctor near her home. She wanted to get treated as soon as possible as she was soon to be getting married, hence, wanted her skin clean, glowing, and bright. That doctor gave her some antibiotics to treat her skin condition rapidly. The skin condition initially got better during her medications but she left her taking medicines after completing the medication course, and the skin worsened within a month. The patient then consulted Dr. Noureen about her skin condition and realized that frequent use of antibiotics made her skin resistant to antibacterial agents. The patient used to take antibiotics even for mere pimples, flu, cold, etc. to treat the issues quickly. This reflects that there is little to no check and balance on the ingredients being used in skin and cosmetics products which often leads to harmful effects on the users. This needs urgent action to be taken to improve it.

6.11 Conclusion

In conclusion, antibiotic consumption is widely influenced by the socio-cultural and economic determinants and practices in any community. The beliefs and attitudes reshape our practices; hence, it is the responsibility of the authorities, doctors, and government to aware the public reshape their attitudes and practices related to the consumption of antibiotics. This can result in a decrease in self-medication and overuse of antibiotics without proper diagnosis or consultation with the doctors. Moreover, examining sociocultural factors, such as self-medication, over-the-counter purchase, and the broader sociocultural understanding of health behaviors and the use of antimicrobial drugs, and developing targeted interventions to promote responsible antibiotic use is crucial in addressing this problem. It is also very essential to recognize that sociocultural beliefs and practices vary in different communities. The insights

of the findings also suggest that the promotion of research into antibiotics and interventions must be tailored to specific cultural contexts to be effective.

CHAPTER 7

7. INVESTIGATING ANTIBIOTIC RESISTANCE: PERSPECTIVES OF MEDICAL PRACTITIONERS AND HEALTH ADMINISTRATORS

In this chapter, the factors behind antibiotic prescription and antimicrobial resistance have been discussed in detail. This chapter also discussed the role of different healthcare sectors concerning antimicrobial resistance i.e., public and private hospitals, medical drug stores, pharmaceutical companies, laboratories, practitioners, and health administration. Finally, the chapter includes some case studies concerning misdiagnosis, maltreatment malpractice, and typhoid cases.

7.1 Drivers of Antibiotic Resistance

Irregular and overuse of antibiotics are the primary drivers of antimicrobial resistance. The research has demonstrated that irregular use of antibiotics is common in Pakistan. Malpractice of healthcare substances and practices stem from poor management and bad governance of healthcare facilities. Unreliable and non-standard diagnostic facilities, patient self-medication, easy access to antibiotics, and a lack of knowledge about antibiotic usage policies and programs, their importance, and, implementation are all contributing factors. Generally, drugs are misused by unskilled clinicians and unqualified medical practitioners.

Particularly over and misuse of antibiotics caused ignorance of subjects of community medicine and bioethics meanwhile medical degrees along with dysfunctionality of government hospitals. Furthermore, Behind the prescription of antibiotics are various other reasons, such as the social, economic, weak implementation of laws, lack of clinical skills, and also sincerity of medical professionals towards patients. Occasionally they prescribe antibiotics when they are not sure if an illness is caused by bacteria or a virus and sometimes patients not waiting for test results. So, some patients might expect a prescription for antibiotics.

Many factors result in antimicrobial resistance. Dr. Mushtaq Phul, a 53 years-old doctor practicing in a private clinic, shared some of the reasons that cause antimicrobial resistance which are given below:

1. Medical practitioners prescribe drugs without taking a medical history and testing the patients. These doctors are abusing medicine for personal benefit.

2. Excessive utilization of over-the-counter medication. Many people are purchasing medicine from medical stores without consulting doctors.
3. Bad governance and poor health system, especially in public hospitals, is a major factor resulting in antimicrobial resistance. The reputation of public health care institutes is not a position to be trusted by the public. People prefer private healthcare institutes or clinics over public or governmental institutes. Moreover, he said there is the main reason there is no proper laboratories at both levels government and private and doctors are prescribing medicine without test.
4. There are a lot of quackeries who are practicing in the medical sector yet are unaware of the proper knowledge about drug dosage and time duration
5. Lack of assessment and accountability of health care institutes. There is no little assessment and surveillance in the healthcare sector. A routine of weekly, monthly, or annual reporting to promote check and balance or medicine use in hospitals must be assured. The government is not making clinics, hospitals, medical stores, and laboratories accountable.

7.2 Role of Public and Private Hospitals Concerning Antibiotic Consumption

In most government hospitals, antibiotics are overused and misused as a result of a lack of physicians, inadequate medical diagnostics, a lack of hospital equipment, political involvement, and reckless attitudes on the part of physicians or doctors. Similarly, in government hospital settings, most potential patients were diagnosed and prescribed drugs by nonprofessional practitioners who had little to no expertise in diseases. Nevertheless, they practice like specialists, recommending inappropriate drugs to their patients. Sajjad Ali, a 47-years old peon in the Basic Health Unit (BHU) taluka Kot-Diji, expressed disappointment about the condition of government clinics and stated:

> **The clinic where I am on service does not have any MBBS doctor for the past six months. The patients that come for the treatment are diagnosed by me and a dispenser.**

Dr. Amjad, 32 years-old MBBS doctor at Taluka Hospital Kot-Diji, mentioned that 99% of government practitioners practice in private clinics and prefer private clinics as they are more profitable for them. The general public is so vulnerable that they even cannot access

government laboratories as it is only for source-able and special persons. Moreover, the condition of services in government hospitals which is accessible to the common citizen is very disappointing that every third person is prescribed Panadol and Ponstan syrup. Dr. Muhammad Ghazi, 33 years-old MBBS doctor, shared his expression of distress about the socio-political conditions of the country and stated that it is very evident that most of the drug companies are unqualified and are still working in the mainstream medical industry because they are supported by the politicians, bureaucrats, and business class of the country. He highlighted the need for the arrangement of community-based awareness programs by the government. Another doctor specified that strep throat is a bacterial infection that is treated with the help of antibiotics, but most sore throats are due to viruses, allergies, or other things that antibiotics cannot treat. However, many people with a sore throat prefer to go to a healthcare provider expecting to get a prescription for antibiotics that is not even necessary for them.

Rapid growth in private clinics in Pakistan is symbolized as profit-oriented rather than welfare centric. Greater than needed are private clinics in every corner of the country. In Every town, a greater rate of private clinics even in village settings are many quackeries. According to Pakistan Medical and Dental Council, more than 600,000 quacks are working across Pakistan and one-third of them are practicing in Sindh, according to statistics. Most of them are practicing in the province of Sindh, reported being about 200,000, and around 40% of them are employed in the metropolitan and the country's largest city Karachi (PMDC, 2011). Furthermore, urban, and rural are raising the numbers of quacks in Sindh. Therefore, the health of the province's population, especially those in the low quintile of wealth identified as weak, including poor, critically ill, women, elder, and children are at very serious risk. Khairpur Mirs is full of quacks and other types of uncertified health practitioners also MBBS doctors are very rare in well-being. Here health workers, dispensers, nurses, drug distributors, and veterinary doctors practice in private health settings and they have no proper awareness of the Side effects of antibiotics. They are not trained and educated medically also they have very less knowledge dosage of the drug. For example, the high rate of clinicians prescribing leflox antibiotics for colds.

Dr. Ali Raza, a 64 years-old MBBS doctor and former Medical Superintend (MS) of Kot-Diji Tulka, has retired from his position and is now practicing in his private clinic in the town of Kot Banglo. His brother, who is a primary teacher by profession his absence, his brother is practicing instead of him, and he is a primary teacher by profession in the Sindh

education department. He shared his experience with both government and private hospitals about the usage of antibiotics and the implementation of policies and programs introduced to curb the over and misuse of antibiotics by world health Organizations or other health-related authorities. Over and misuse of antibiotics are not merely causes of doctors' irresponsible behavior but collective issues of policymakers, doctors, policy enforcement institutions even patients themselves he said. Never conducted any policy-based awareness training by any health institution during my MS period or when I was a Doctor of Government even though no anyone took Assessment and monitoring towards usage of antibiotics even not reported cases of antimicrobial resistance properly on both district and tulka levels. Similarly, he said antibiotics are prescribed here for diseases that are viral or seasonal, and it is unjustified to use antibiotics because most of them are cough, Cold/flu, Pain, Fever, Stomachache, Diarrhea, allergy, kidney threat, and other infectious diseases and for those diseases recommended 3rd and 4th generation of antibiotics including "*Amoxicillin, Tetracycline, Trimethoprim-sulfamethoxazole* (*cotrimoxazole*), *Erythromycin*, *Ciprofloxacin*, *Cefadroxil,* and *Cefixime".*

7.2.1 Case Study of a Patient's Misdiagnosis by Public Hospital

Ali Bugti, a 17-year-old boy, shared his case. He shared that he had a fever during the flood in 2022 and he visited the Government Talka Hospital located in Kot-Diji to get treated. He was not taken through the test culture but was given two types of tablets (he did not remember about those tablets). Despite the medications, the boy continuously suffered from fever, headache, and body pain. Ali decided to change the doctor and went to a private clinic with his father. The private doctor suggested he get a laboratory test. The test results in diagnosed malaria disease which was evident that the prior doctor was not treating him correctly as he did not make the patients get tested before prescribing the medicines. These types of mismanagement and mistreatment in government hospitals boost antimicrobial resistance due to the misuse of medical practice. To express his disappointment, he cited

> **I was lucky that I went to the other doctor in time. I am afraid to think about the consequences of this negligence. These doctors should be vigilant while treating the patients because health is not something to be played with.**

Such cases of negligence reflect alarming conditions of healthcare facilities and the overall system which needs to be monitored and improved on priority.

7.2.2 Case Study of Malpractice by a Private Doctor

Shafqat Hussain, a 44-year sold patient, expressed his personal experience with the irresponsible behavior of doctors. He shared that during the monsoon rain of 2022 in Sindh, he got sick and visited a private doctor. The doctor was also practicing in a government setting simultaneously. The doctor diagnosed him as a malarial patient depending on his apparent symptoms, i.e., headache, dizziness, and weakness, without any laboratory test and prescribed him an antimalarial course. Moreover, the doctor did not take his medical history or asked about any medication he has been taking before the visit. At that time, he did not share about his illness and simply gave him the prescription without providing any information about it. When Shafqat checked the details of medicines at home, he realized that the doctor misdiagnosed him as a malarial patient without any laboratory test. He revisited the doctor and inquired about how he has been diagnosed as a malarial patient without any scientific evidence. The doctor tried to convince him of being a malarial patient by talking about his years of experience in the medical setting. Shafqat was not convinced and got tested by the laboratory. The results did not show any symptoms of malaria.

7.2.3 Case Study of Maltreatment of Patients by a Quack Practitioner

Mr. Satar, a 23 years old respondent, is practicing in a private clinic without an MBBS degree. He is practicing on the certificate and license of his uncle. In his clinic, he uses diagnoses patients through his experiences and cultural or traditional patterns which are synthesized by seasonal changes, insects/animals, due to improper or untimely food intake i.e., malaria, typhoid, and diarrhea. He mentioned that he diagnoses the patients from their typical symptoms of these diseases. to illustrate that he expressed

> **If a person gets layers on the tongue, bitter taste, pain in the backbone, joint pain, and high temperature or fever at midnight, he is diagnosed as a patient of typhoid. Similarly, if a person has small dots on the tongue, vomits, body pain, and weaknesses diagnosed as a patient of malaria disease. However, a patient with a normal fever does not get all these types of symptoms.**

Furthermore, he mentioned that he has been practicing for nine years. According to his experience, the cases of Malarial and typhoid are proliferating day by day. During my initial years of practice, seven years ago, malarial patients were diagnosed only once in a lifetime,

and typhoid patients once a year. At that time, the patients usually got healed by one course only. However, these diseases have become stubborn as they have repeatedly been diagnosed in the same patient and one-time treatment is also not effective anymore as it takes a lot of time for the improvement in well-being. Being asked about the treatment and prescription of the medicines without proper medical or pharmaceutical knowledge, he stated

> **Usually, I remember which medicines are given to patients with common diseases like malaria or typhoid, or normal fever. In some cases, I also take suggestions from close connections i.e., relatives and family members who are aware of these things.**

Talking about the issues in the treatments, another respondent mentioned the issues from the patients' end that most of the patients are just concerned about medicines and do not care about food during the medication. To illustrate that he mentioned that patients with typhoid need to take soft and cold food, but people are not cautious, and they keep eating hard and warm food like meat.

7.3 Medical Drugs Stores and Antimicrobial Resistance

According to the report, around 95% of the medical stores and pharmacies in Pakistan are dispensing medical drugs without any unqualified pharmacist, leaving only 5% of the country's pharmacies with qualified pharmacists (News, 2019). Almost 77% of the health budget is used by the public to purchase medicines, despite that Pakistan is ranking 13th number among the countries producing and dispensing spurious drugs. Moreover, approximately more than 15000 pharmacists were recorded as unemployed in 2019 (Omer, 2021). WHO reported around 30-40 percent of the medicines sold in Pakistani pharmacies are counterfeit (Shakeel, 2013). Sindh's drugs testing lab indicated that 18 samples of some prominent and life-saving drugs were fake and had no active pharmaceutical ingredient. Although a drug regulatory authority has been launched in Pakistan, despite that very little situation has improved in the past decade and the state is unmoved by these alarming reports that are being published now and then about the conditions of pharmacies and the drugs being dispensed (Editorial, 2022a). Keeping an eye on the socio-economic conditions of the public, it is not hidden that people cannot afford private healthcare and imported medicines. It is high time to improve the conditions of public health care and pharmacies in the country because this is the sole medium for most of the population. The lack of authoritative surveillance is allowing morally reprehensible businesses not only to flourish but also leading the country to a serious threat to public health as the unqualified

managers of these drug stores or pharmacies are unaware of the consequences of this irresponsible behavior of dispensing over-the-counter drugs.

Drug Regulatory Authority of Pakistan issued guidelines for all of the healthcare sectors to follow to curb and treat antibiotic or antimicrobial resistance in Pakistan (DRAP, 2021). They called Pharmacists the gatekeepers to antimicrobial use. The guideline suggests pharmacists get trained, be aware of the guidelines and related information, and be prudent while prescribing antimicrobials. The pharmaceutical industry is advised to follow some more instructions to optimize the use of antimicrobials. The instructions include the following:

1. To make sure that all of the marketing and promotional activities of doctors, practitioners, or healthcare professionals are according to DRAP Act 2012
2. Ensure that financial incentives within the company are aligned with the stewardship principles outlined above.
3. Monitor resistance and off-label use after the introduction of new compounds under the post-market requirements of the DRAP Act 2012.
4. Collaborate with national and international policymakers and regulators to facilitate the appropriate antimicrobial prescribing, including designing new reimbursement systems, adjusting pack sizes, and other processes related to access and protection goals to support the formulation of policies.

Nevertheless, antibiotic resistance continues to be a global threat as pharmaceutical companies and medical stores are unable to follow the instructions of the authorities and are unable to tackle the challenge to discover new drugs to treat antimicrobial resistance. antimicrobial resistance does not only threaten public health but also entails economic burden (Ventola, 2015). Furthermore, a list of six instructions was also added to the guideline related to monitoring antimicrobial use as mentioned below (DRAP, 2021):

5. Antimicrobials must be dispensed by the provision of a prescription. Exceptions may be considered in particular circumstances of regulated dispensations.
6. Ensure that the dosage, form of dose, storage conditions, and duration of treatment is clearly explained to the patient or the caregiver.
7. Encourage the disposal of leftover antimicrobials and antibiotics disposal.
8. Reporting antimicrobial-related adverse events according to pharmacovigilance guidelines

9. Promote and participate in all levels of public health campaigns and training related to the optimized use of antimicrobials.
10. Advice on contraindications, medication interactions, and food-drug interactions should be given to patients and health providers.

Countries like Pakistan adopted the neoliberal model of governance, they are promoting free marketing which allows everyone to sell for their profit. Similarly, the pharmaceutical industries and their distributors like drug and medical stores also practice according to their profits and benefits. Medicine distributors are unaware of the causes and effects of the overuse and misuse of antibiotics, they do not have any idea that they have become one of the biggest contributors to antimicrobial resistance by selling medicine without a prescription. They do not get trained or educated by the drug regulatory authority about pharmaceutical and medicinal ethics.

The respondents, employees of medical stores, mentioned that the drug regulatory authority or other health officials have never conducted any assessment, surveillance, monitoring, or report related to the performance of medical and drug stores. Along with the negligence and lack of responsibility, the authorities visit these stores after every six months to collect charges of rupees five thousand as a bribe to let medical stores do whatever they want to do. They added that after taking the money, none of the drug inspectors visit them to inspect for almost six months. There are several kinds of medical stores in a particular area such as pharmacies affiliated with public or private clinics, drug-distributing general stores, and unaffiliated medical shops. Respondents indicated that almost 2-3 antibiotics are prescribed per prescription and prescriptions that indicated no antibiotics were rarely found. Most people do not want to see a doctor due to financial reasons or lack of time, so they use the same prescription that is recommended earlier to their family.

Pakistan is a lower and middle income having a neoliberal governance model that places a greater emphasis on private interests than on public goods like health and education. Privatization of the health care system, prevalent pharmaceutical industries, high doctor's charges, heavier laboratories charges, the higher fee of private medical teaching institutions than the government institutions, and their emphasis on clinical treatment and biomedicine orientation rather than social health model or community medicine. Health is seen as commercial rather than welfare by the pharmaceutical companies and their health policy function only as commodities rather than the well-being of the masses.

In the age of industrialization, the medical sector is entirely corporate, and the shareholders of pharmaceutical companies produce more drugs than consumption (surplus). For primarily financial reasons, pharmaceutical customers are trying to explore antibacterial production. Pharmaceutical consumers are looking to manufacture antimicrobials primarily for economic reasons (Chandler & Willis, 2018). Drug manufacturers compete with each other and distribute drugs for personal profits and vested interests. They often do collaborations with doctors and other practitioners for marketing their products.

The findings demonstrate that unnecessary over-prescriptions and over-the-counter use of antibiotics occur because pharmaceutical companies intentionally run and fund medical stores and private clinics. The pharmaceutical industries, through healthcare professionals, have persuaded clinicians and pharmaceutical companies to promote corporate medicine. Dr. Mehmood, a 67 years-old retired public doctor practicing in his private clinic, shared similar information that pharmaceutical companies and big medical stores often try to hire or collaborate with doctors to make sure that the doctors only prescribe the medicines and other medical products of their companies or from their stores. When the patients do so, the doctors get a commission from them. In addition to this, he claimed that he has also been approached by medical stores and pharmaceutical companies, he mentioned

> **They offered me the richest gifts, international tour tickets, cash, and much more for marketing uncertified and unqualified drugs and recommending their medical stores to purchase the medicines.**

During my fieldwork when I visited doctors for interviews, I observed in a few clinics or hospitals that pharmaceutical reps visited the doctors every ten to fifteen minutes. It was acknowledged by a few doctors that these reps visit them for collaboration and for that purpose they provide them the free samples of their medicines for marketing. Furthermore, he stated

> **The relationship between a pharmaceutical company and a doctor is like an industrial and a client. Pharmacy agents offer mega schemes to doctors for drugs and antibiotic consumption from their companies and offer them cars, abroad tickets, and many expensive gifts.**

Private clinicians and drug store employees reported that industries pay rewards in a variety of forms such as home decor, healthcare equipment, clinic furniture, and domestic or international visits, and that multinational companies offer far fewer gifts to practitioners than local and national industries. Some of the personal items that are rewarded as a bribe to the

practitioners and physicians are laptops, mobile phones, air conditioners, clothing, and cars. Similarly, medical equipment firms provided doctors and medical stores with surgical kits, torches, thermometers, diaries, prescription pads, stethoscopes, insulin pumps, breast pumps, and other types of machinery. Moreover, they provided them with home decor, dinner sets, bedding, washing machines, refrigerators, and even homes.

7.3.1 Case Study of Basharat Ali

During the fieldwork, I conducted participant observation in medical stores to observe the behavioral patterns of the customers purchasing medicines, including antibiotics. During that period, I observed various purchasing behaviors of demand and purchase of medicines and interviewed the owner of the medical store, customers, and representatives of pharmaceutical companies as well. I spent almost 3 to 5 hours in one medical store every day for many weeks.

Initially, the medical store owner showed resistance to allowing me to interview him. However, I was able to convince him by explaining to him the nature and purpose of the interview and ensuring the anonymity of the interviewee. Upon interviewing the medical store's owner, 28 years old Basharat Ali admitted that he does not have any degree related to the field of pharmacy or medicine. His store is registered on the degree of an official employee of the Drugs Regulatory Authority. The officer demanded Rs 1 lac from him to let him use his degree for the registration process of the store but using some personal references he got a discount of 60 thousand and paid only 40 thousand for it. He articulated

> **I had to pay 40 thousand to the degree holder to get my store registered on his degree because I had few personal references and contacts who talked to the degree holder and convinced him to give me some discount. However, he takes more than one lac from the store owners to let them use his degree to get registered.**

Furthermore, he gives a monthly commission to the degree holder from the profits made from the medical store. Besides the registration expenses, he had to invest Rupees 250000 for the store and earns 60 to 70 thousand per month now. He shared that anyone can open a medical store and register it by linking with someone else's pharmaceutical degree by paying them some amount of money at the time of registration and sometimes promising monthly commission from the profit generated.

A good relationship between the medical store owners with doctors increases the number of customers and the profit generated as their store gets referred by the doctors. The store owner mentioned that usually the medical store owners also sign contracts with the doctors to make sure that they recommend their medical stores to the patients to purchase their medicines. As a reward, the doctors get paid by the medical store owners. He shared that the doctors in his area are already in contract with other medical stores, so they do not refer his store to their patients.

Medical stores are one of the main gatekeepers between antibiotics and the community. The contribution of medical stores and their employees to the growth of antimicrobial resistance is alarming. The medical store owner, where I conducted participant observation, shared that there are a lot of people in his village who usually do not visit doctors or even medical stores themselves. They send the names of the medicines or call the owners to bring them the medicines they need. He acknowledged that he also delivers medicines (with or without a prescription) himself to the people living around him in his village and gets paid. It does not matter whether the medicine is a normal drug or an antibiotic, the prescription is not demanded by the owner. He shared these details while discussing the profit generated from this business. He was not conscious of the fact that he is admitting to being one of the contributors to growing cases of drug resistance and antimicrobial resistance and was promoting self-medication and over-the-counter purchase.

During the participant observation, Mansoor Ali, a 43 years old person with an infection in his leg came to purchase medicines without a prescription. While the medical store was attending to other customers, I got a chance to speak to him and inquire about his condition and medication. He worked as a laborer in a crushing plant[22] and has a leg infection for a month. He did not visit any doctor to be diagnosed or treated. Upon probing, he mentioned that laborers in the crushing plants often get such infections and other injuries. The laborers often self-treat these infections and injuries as it is part of their job routine. He purchased Velosef[23] and Septran[24] from the medical stores and claimed that these antibiotics are stocked in the plant by

[22] Crushing plant is a setup of various machineries used to crush, screen, and pulverize the materials extracted from quarry (LawInsider, n.d.).
[23] Velosef is an antibiotic used against bacterial infections. It is strictly be avoided to use without the consultation of a doctor and proper diagnosis of the type of infection as it may cause the development of drug-resistant bacteria or antimicrobial resistance (*Velosef*, 2022).
[24] Septran is an antibiotic used to treat various bacterial infections and a certain type of pneumonia. This antibiotic is not recommended to treat viral infections (Dawaai.pk, 2023).

the manager and are frequently consumed by most of the crushing plant laborers. He or the other laborers were not aware of the risks of frequent use of these medicines causing antimicrobial resistance and the development of drug-resistant bacteria.

The statement of labor of the crushing plant was proven true as after a few days a person came and bought different types of first aid kits, painkillers, medicines, and antibiotics including Brufen[25], Panadol[26], Velosef, Augmentin[27], and Septran. When I asked him about the number of medicines he was purchasing, he told me that he is a manager at a crushing plant located nearby and is taking all these things to stock them for the laborers working in the plant as there is no clinic or hospital nearby in the case of emergency and the type of work which is being done there needs these medicines and first aid kit to be available all the time.

Moreover, a customer came and asked for Basoquin[28] tablets by directly mentioning the name of the medicine in front of the store employee. He wanted that medicine for body pain but that medicine is antimalarial. Upon inquiring about why was he taking this specific medicine and not a pain killer, he shared that he always uses this medicine when he gets any type of pain and none of the drug distributors or medical store employees argued or questioned about this medicine. When the customer left and I asked the medical store owner why did not he stop that person from taking the wrong medicine and told him that it is not effective for body pain. He replied that if he did not give the patient that medicine, he would have purchased it from any other drugstore because as per the details he shared with you he seemed to be habitual of this medicine.

Most people wanted to purchase medicines for seasonal illnesses like cough, cold, sore throat, flu, etc. because most people were facing those diseases in the season. Most of them wanted to get medicines without a prescription because according to them, there was no point to go to the doctors as they would also recommend the same medicine and would charge money for prescribing what they already knew. Self-medication saves them both money and time. Some customers sought the medical store employee to suggest them medicines by sharing their

[25] Brufen is a medicine used to treat pain and inflammation (*Brufen*, 2023).
[26] Panadol is used to treat mild to moderate pains and reduce fever (*Panadol*, 2023).
[27] Augmentin Tablet is an antibiotic used to treat bacterial infections and is not effective for viral or fungal infections (*Augmentin*, 2023).
[28] Basoquin is a tablet used to treat malaria which may cause some side effects such as upset stomach, hair loss, skin eruptions, or headache to some patients. Hence it must not be consumed without doctor's consultation (*Basoquin*, 2023).

symptoms. The employee would provide them with some medicines as per his knowledge based on his experience.

The patients purchased the drugs through different means such as with a doctor's prescription, without prescriptions, older prescriptions being prescribed by the doctors for the same symptoms earlier, by displaying empty packets of medicines, and by asking for medicines by names, colors of their packages, or symptoms. Moreover, some patients directly pointed out the medicine boxes placed on the shelves of the medical store because they were unable to remember the name of the medicine. I observed during the period spent in the store that all of the prescriptions brought by the customers which were prescribed by their doctors had recommended antibiotics despite the infection being diagnosed or not. According to the medical store owner, some of the antibiotics[29] which were most excessively purchased and prescribed include:

Medicine	**Formula**	**Purpose / Treatment**
Actual	Triprolidine HCI	Anti-Allergic
Amoxil	Amoxycillin	Wide variety of bacterial infections including infections of the ear, throat, respiratory tract, urinary tract, skin, etc.
Augmentin	Co-amoxiclav	Bacterial infections including infections of the upper and lower respiratory tract, urinary tract, skin and soft tissue, and ear, nose, and throat
Duricef	Cefadroxil	Bacterial infections in various body parts

[29] The details of the antibiotics mentioned in the table are taken from the medical store owner, dawaai.pk, tabletwise.net, Medlineplus.gov, and healthwire.pk.

Ceporex	Cephalexin	lung infections, ENT infections, urinary tract infections, skin, bones, and soft tissue infections, sexually transmitted diseases, gynecological infections, obstetrical infections, and also used in dental procedures
Claritek	Clarithromycin	Wide variety of bacterial infections and also for stomach ulcers when combined with anti-ulcer medicines
Klaricid		
M.Cip	Ciprofloxacin	Variety of bacterial infections such as typhoid fever, respiratory tract infections, infectious diarrhea, sexually transmitted infections, and infections of the skin, bone, joint, and abdomen
Cycin		
Ciproxin		
Lcyn	Levofloxacin	Wide variety of bacterial infections such as urinary tract infections, respiratory tract infections, skin and soft tissues infections, inhalation anthrax, otitis externa, pink eye infection, pelvic inflammatory disease, plague, kidney infection, chronic prostate infection, etc.
Tavanic		
Raylox		
Levoxin		
Septran	Co-trimoxazole	Treats various bacterial infections and a certain type of pneumonia

Table 3: Antibiotics extensively purchased from the medical store and their purposes[30]

These antibiotics were in most cases used for the treatment of viral, fungal, and bacterial infectious diseases by patients and doctors. If the medicine prescribed by the doctor is not

[30] Source: Field data

available in the medical store, the owner or employee would call the doctor and ask for an alternate medicine available in their store. The store owners also convince the customers that the medicine they are asking for is short in all the medical stores in the area and that this medicine is the best alternative available at the time.

There are many cultural factors behind the practice of self-medication other than financial issues or lack of time. For instance, the traditional people in rural areas in Sindh (and other provinces of Pakistan) prefer their women to stay at home to protect their dignity and honor. When their women fell ill, they either take them to lady doctors (if available) or treat their illness by self-medication and purchase medicine for them according to their knowledge or by the recommendation of medical store employees without proper diagnosis of their illness.

The Medical store owner claimed that he has never heard the term antimicrobial resistance before I asked him about it. He did not even know about policies and programs related to antibiotics and never participated in any assessment or monitoring report and never undergone any surveillance by Drug Regulatory Authority or any other health authority. Moreover, he mentioned that he has never seen any drug inspector come for surveillance since he opened his medical store.

7.4 Impact of Laboratory or Test Culture on the Use of Antibiotic

The National Institute of Health (NIH), Pakistan's top public health institute located in the country's capital city Islamabad, published a document entitled "Advisory for prevention and treatment of XDR typhoid" in October 2018 (NIH, 2018). In that advisory document, the upsurge in the number of typhoid cases in the country has been highlighted and a guideline having urgent and essential measures for the prevention and treatment of extreme drug-resistant typhoid has been proposed. Most importantly, it has been suggested that the two tests i.e., "Widal" and "Typhidot", which are widely prescribed for the diagnosis of typhoid, are widely contributing to the rise in extensively drug-resistant (XDR) typhoid fever as these tests have limited sensitivity and specificity. Thus, these tests must be avoided as they might produce an extensive number of false positive results for typhoid (NIH, 2018). It is recommended by the experts to prescribe blood culture tests instead of these two tests for the diagnosis of typhoid (Junaidi, 2022). Despite the issued advisory, these two tests are still being recommended by clinical laboratories and hospitals, especially in flood-hit areas, and the charges for the tests are taken way more than their actual charges. A respondent, a 28 years-old medical store owner,

indicated the hike in prices for typhoid tests in flood-affected areas. He shared his experience of laboratory testing for typhoid and expressed

> **Even in this crucial time (the crisis of flood), people leave no chance to exploit the vulnerable. The laboratories have increased the charges for laboratory tests. I was charged 1000 from a laboratory for the test which was just Rs 150 – 200.**

The exploitation of patients heavily charged by private laboratories in Pakistan is callous (Haque, 2022). Shams Ul Haque, a writer in Dawn newspaper, indicated that the laboratories of most of the government institutes are now and then non-functional due to some strikes being held by the staff. As most of the patients in public or government hospitals are those who cannot bear the expenses of private healthcare institutes, these patients are left with no choice but to get tested by private laboratories. The private laboratories charge way more than the government laboratories which is very upsetting for the patients.

Drug Regulatory Authority of Pakistan (DRAP) issued guidelines on the responsible use of antimicrobials in human health in 2021 (DRAP, 2021). The diagnostic industry, including microbiology laboratories, is directed to be careful and report essential information to curb the misuse of antimicrobials and to optimize the use and selection of antimicrobials in the country. It is also advised to follow all the instructions related to surveillance, collaboration with scientific societies and public health, and support research on the influence of novel diagnostics on antimicrobials and diagnostic cost-effectiveness (DRAP, 2021). Moreover, timely access to laboratory services and transmission of results is also encouraged in healthcare facilities by DRAP. The elements of antimicrobial stewardship programs must be followed in the hospitals and laboratories, also the microbiology laboratory services in acute care hospitals are advised to be provided 24/7 for crucial samples.

Despite all the guidelines issued by the drug regulatory authority, most of the private laboratory managers of Pakistan are not only aware of these guidelines but are also unaware of antibiotic resistance. For instance, I visited a private laboratory located in the town of Kot Bonglo and interviewed a 15-year-old employee of the laboratory, Sarmad, who has been working in that laboratory for five years. he did not have any formal education related to his job and was studying in matriculation. He was taught by his employer (whom he used to call Master) about the working of the laboratory. He mentioned that throughout his five years of career in the laboratory, he never witnessed any training, seminar, or any other event related to antibiotic resistance. Moreover, the laboratory has never been under surveillance or monitoring

by the authority. He acknowledged that none of the antimicrobial or antibiotic resistance prevention, treatment, or diagnosis guidelines were being followed in the laboratory. Moreover, both the employees and the employers of the laboratory were unaware even about antibiotic and antimicrobial resistance.

Lack of quantity and quality of laboratories and unqualified lab practitioners is another major cause behind the overuse and misuse of antibiotics in Pakistan. Although it is necessary to diagnose the history of the disease before prescribing antibiotics, however, this research observed that an excessive rate of antibiotics is being recommended without laboratory testing or diagnosis (Laghari et al., 2017). Laghari et al. (2017) indicated in their study that approximately 93% of the antibiotics being prescribed are done without conducting laboratory test diagnosis. In Khairpur Mirs, one of my field locales, there is a total of four laboratories and two of them are unregistered. In present times, there are numerous medical clinics but those clinics do not have a laboratory services system. Doctors frequently prescribe antibiotics without lab tests or diagnosis as per their knowledge and experience of disease diagnosis. During one of the interviews with the medical store employees, 27 years old Akash Kapoor, a customer bought antibiotics from that medical store with a doctor's prescription. Upon inquiring about his medical history and diagnosis, he shared that he has not been tested by a medical laboratory and stated

> **I have never been prescribed to get tested by a laboratory by a doctor and have been taking antibiotics before as per the doctor's instructions without being tested. What can doctors do? There are no laboratories in or near clinics in my area. Doctors are qualified and know better about these things than me. If a laboratory test was necessary in my case, then he would have suggested doing it.**

In addition to this, he mentioned that the costs and expenses of laboratory tests are not affordable for all as the laboratories charge a lot for each test. There was a difference in opinion among patients and doctors in this regard. An MBBS doctor mentioned that usually whenever a patient is recommended to get tested, they raise the issue of lack of financial affordability for the tests. Hence, the doctors are left with nothing but to prescribe the medicines as per their knowledge.

Antibacterial agents are classified as broad spectrum and narrow spectrum. Broad-spectrum antibiotics are used to help a body to fight against both types of bacteria i.e., gram-positive and gram-negative bacteria, and to kill them. Contrary to this, narrow-spectrum

antibiotics fight targeted bacteria i.e., gram-positive, or gram-negative bacteria. These antibiotics are used to help the body to fight against single bacterial specie. Abdul Qayom, a 29 years old pharmacist, is currently working in a pharmaceutical company. According to him, broad-spectrum antibiotics are used when doctors are unable to diagnose maladies. In such cases, doctors are unable to reach a proper diagnosis of the infection without laboratory tests. However, people are unable to get diagnosed by laboratory tests because of economic instability and limited access to laboratories in both governmental and private sectors.

7.5 Knowledge of Practitioners about the Usage of Antibiotics

The practitioners are ultimately the main contributor and responsible for the rise in antimicrobial resistance as they are the ones who decide to prescribe it in patient care. Explicit growth in the cases of antimicrobial resistance is evidence that the medical community is prescribing antibiotics because they are unaware proper guidance, policies, and concern by the world health organization have been introduced regarding the appropriate usage of antibiotics. Even if they are aware, the policies and guidelines are not being implemented.

The Drug Regulatory Authority of Pakistan's guidelines suggests that practitioners and prescribers must be properly trained and be updated concerning the prescription of antimicrobials and be responsible to aware the patients that are being prescribed with it the consequences of excessive use and antimicrobial resistance (DRAP, 2021). They must be familiar with all the guidelines being issued, and the latest valid summary of product characteristics (SmPC) and should seek advice from specialists before prescribing antimicrobials to the patients.

According to the study, the medical profession is blaming one another while utterly disregarding the urgent problem of antibiotic resistance. All the practitioner participants stated we did not be part of any seminar, workshop, training, and study related usage of antibiotics, and doctors and medical stores said medical representatives are selling drugs, but they never discussed the consequences of over and misuse of antimicrobial resistance. Furthermore, the DRAP suggests that prescribers should diagnose a patient in-personally, samples of the antimicrobials to be taken before the treatment, and avoid viral infections, self-limiting bacterial infections, or colonization without proper clinical testing and diagnostic testing. Moreover, all the host factors i.e., "age, gender, comorbidities (e.g., immunodeficiency), renal and hepatic function, pregnancy, breastfeeding, allergies, presence of prosthetic material, potential drug interactions, body mass index and risk factors for antimicrobial resistance (e.g.,

history of recent antimicrobial use, history of recent travel)" must be considered very strictly (DRAP, 2021).

During the fieldwork, it was observed that doctors excessively practice over-prescription and irrational use of antibiotics which reflects their negligent attitude towards patients' health, lack of professionalism and sincerity towards their responsibilities, and lack of knowledge about guidelines, clinical ethics, and legislation of health. Due to this, practitioners are contributing to the promotion of antimicrobial resistance in patients. A 24-year-old MBBS student, Zain ul Abidin, indicated that many doctors prescribe antibiotics merely for personal interests as they get a commission from pharmaceutical companies and drug stores. He shared an incident of a quack practitioner who prescribed cefixime antibiotic to a baby of age around two years for diarrhea. Cefixime is third generation antibiotic that is used to stop bacteria from creating a cell wall to survive in a body (*Cefixime*, n.d.). The use of this antibiotic may cause various side effects including diarrhea itself which was to be treated by that doctor. Similarly, Muhammad Essa, a 20 years-old second-year MBBS student, shared his experience of visiting a doctor with his brother. He shared that the doctor prescribed Ceftriaxone to a six-year-old baby for vomiting. Although it is used for lower respiratory tract infections, skin, skin structure infections, and bone and joint infections. Additionally, he shared that few doctors in his circle allow their uncertified family members and close relatives to practice in their absence from the clinic. Doctors consciously or unconsciously prescribe unnecessary antibiotics for every viral disease. This inconsiderate behavior and lack of proper medicinal knowledge are alarming. Another respondent mentioned that the prescription of antibiotics is greater in private clinics than in government hospitals due to unqualified doctors and vested interests of doctors. Moreover, he said that he knows unnecessary usage of antibiotics is wrong and also has many side effects.

Dr. Javed Kerio, a 38 years-old child specialist and a teacher at Gambat Medical College, shared that doctors are not problematizing improper conduct of any health activity. A lot of aged doctors and quack practitioners are unaware of new dilemmas of health like antimicrobial resistance. Most of them are target oriented and are prescribing medicines including antibiotics due to the collaboration with pharmaceutical companies or medical stores. Antibiotics can be prescribed for chronic viral maladies like flu, cough, and sore throat but only after a proper diagnosis. In addition to this, he mentioned that it is very commonly observed as a child consultant that some doctors often prescribe Ceftriaxone antibiotics to newborn babies which may cause thalassemia, jaundice (yellowing of the skin or eyes), or weakens their

immune system. Similarly, most professionals prescribe antibiotics and various types of nonsteroidal anti-inflammatory drugs (NSAIDs) for a viral respiratory infection instead of acetaminophen and a combination of decongestants and dextromethorphan. The research observed that antibiotics are commonly prescribed for common and viral illnesses. Although, it seems to be highly efficient and quick to recover the patients, however, the patient might face antimicrobial resistance in the future and also increase the risks of future generations being deprived of antibiotics as they would not be healed through these (scientific innovation) antibiotics due to excessive antimicrobial resistance in the human population. Not only doctors should be careful about it but they should be aware of the patients about side effects of the misuse of antibiotics as well. Unfortunately, the study observed that the practitioners, public health officials, and other relevant authorities are not active in the prevention and treatment of antimicrobial resistance, and the government does not intervein as well.

7.6 Role of Healthcare Administration

Administrative positions are much power oriented instead of patient-centric and they rae not concerned about how clinics are functioning. Moreover, they do not even conduct monthly or weekly assessments or reports regarding the usage of antibiotics and antimicrobial resistance Moreover, they do not know that antimicrobial resistance is declared a global threat by the WHO. During the discussion about the assessment tool of the Antibiotic stewardship program for hospitals, the respondents mentioned that they are not aware of it and added that they did not even receive any official notification about that. None of the respondents agreed to research to get aware of the proper usage of antibiotics.

Karamtullah, a 49 years-old Medical Superintendent, stated that he is not aware of the causes of antimicrobial resistance and the world health organization's concern for proper usage of antibiotics. He denied the evaluation of the issue of proper usage of antibiotics to be his responsibility. Moreover, he added that during his tenure of medical superintendents-ship, he has not witnessed any assessment, awareness program, reporting, monitoring, and surveillance being conducted related to antibiotics.

They did not ever train about the proper use of antibiotics or the side effects of their overdose. A senior doctor shared his disappointment with the irresponsible behavior and lack of professionalism of doctors and mentioned that a lot of the administrative positions of health like district health officer, medical superintendent, or drug regulatory authorities are appointed through political affiliations or bribes, hence they work under their influence. On my visit to a

medical superintendent during my fieldwork, initially, I was refused to give time and was told that he is not free. Nevertheless, I was allowed to interview him after multiple visits. I felt very disappointed to see the irresponsible behavior of that MS as after only five minutes of interview he learned that a local politician has come to meet someone there and left to meet him saying

> **I have shared all that I knew. My relationship with that person is more important than your interview.**

During the interview, Ishfaq Ahmed Soomro, a 53 years old Medical Superintendent (MS), admitted that he has never conducted any clinical assessment proposed by WHO or evaluated any private or government hospitals regarding the prescription of drugs. Rahmatullah Solangi, a 52 years-old District Health Officer articulated

> **Due to our busy schedule, we did not conduct any training or seminars regarding the proper usage of antibiotics in both types of hospitals, medical stores, and laboratories. Even I need to learn about the policies and programs of antibiotics addressing issues of antimicrobial resistance.**

I conducted two interviews with the medical superintendent, they both were unaware of antibiotics-related policies and strategies even though they do not have information about the antibiotics hospital assessment tools because that tool introduced to use antibiotics correctly and combat and reduce the burden of Antimicrobial Resistance. They both reported they never conducted any assessment, monitoring, or survivance and reporting regarding the usage of antibiotics or cases of antimicrobial resistance. The research observed they both did not arrange any seminar or activity to educate the community on how to use antibiotics and how to reduce the threat of antimicrobial resistance.

7.7 Consumption of Antibiotics for Typhoid

Typhoid fever is a rampant public health and government concern in low and middle-income countries such as Pakistan. Typhoid fever is caused by the bacterium salmonella typhoid fever. It is codified by persistent fever, extreme fatigue, headache, vomiting, abdominal pain, and either constipation or diarrhea are some of the other symptoms that can be diagnosed in the laboratory. It is typically transmitted by contaminated food and water, as well as by someone touching their mouth before washing their hands, using a contaminated toilet, and consuming seafood that has been exposed to contaminated urine or litter in water systems. It is also

reported that typhoid is also transmitted in the population practicing oral or anal intercourse with a Salmonella typhi vector or typhoid carrier.

According to the World Health Organization, 11 to 21 million people contract typhoid fever each year and approximately 128-161000 people die from it even when symptoms subside (WHO, 2018a). Communities with inadequate access to sanitation and clean water, and vulnerable populations such as children, are most at risk. More than 200,000 cases of typhoid have been reported from January to October 2022 across Sindh, including the major city of Sindh i.e., Karachi. Almost 70 to 80 percent of the cases reported in Karachi are of extensive drug-resistant (XDR) strain (Editorial, 2022b). Typhoid has been treated with Antibiotics and other Drugs, yet the treatment is getting much more challenging due to the growth in antibiotic resistance. Due to the overuse and misuse of antibiotics, patients' health is unable to recuperate due to an extremely drug-resistant variant (XDR) (Reporter, 2019). Furthermore, it is necessary to apply advanced measures to avoid the widespread overuse of antibiotics in the country if a highly resistant strain is to be prevented.

Antibiotics should not be prescribed for mild infections and the sale of these drugs without a prescription should be prohibited. It is also vital to conduct anti-self-medication awareness campaigns. To reduce the incidence of typhoid and other preventable waterborne diseases, the state must launch large-scale immunization campaigns and increase public access to safe drinking water and sanitary facilities. If the extensively drug-resistant strain is not treated seriously, Pakistan may face a major public health disaster. Experts, notably the WHO, recommend several strategies to combat the threat of all typhoid forms. Many of these are long-term objectives, such as strengthening healthcare facilities, sanitation infrastructure, and providing safe drinking water. However, it has been proposed that young infants must be vaccinated against typhoid fever to combat the disease. Dr. Abdul Hameed Shaikh is a 45 years old practicing doctor at Khairpur Civil Hospital located in Khairpur Mirs. He shared those numerous patients of malaria and typhoid after the 2022 flood in Sindh. The number of patients increased aftermath of the flood due to stagnant water and an increase in pollution. Antibiotic resistance was also reported in the patients who were diagnosed with such diseases and had completed antibiotic courses multiple times. Due to excessive consumption of antibiotics, the patient's symptoms were not being cured by antibiotics anymore.

7.8 Conclusion

In conclusion, the current chapter has demonstrated a complex interplay of medical practices and antibiotic consumption. The findings of this research provide significant insights into the sociocultural practices of antibiotic consumption which include the practices of healthcare providers, healthcare administration, private and public hospitals or clinics, medical drugs stores, and laboratories. It is very crucial to examine the prescribing practices of healthcare providers, including doctors, pharmacists, other practitioners, and medical drug store owners, to understand their contribution to AMR. The findings suggest that proper implementation of policies and procedures, educating healthcare providers and patients with up-to-date knowledge about the risks of AMR, ensuring proper dispersion of antibiotics with a valid prescription, monitoring antibiotic consumption and resistance patterns, and reporting suspected cases of antibiotic misuse or overuse can help to promote responsible antibiotic use. In addition to that, ensuring the availability and accessibility of affordable laboratory tests and focusing on the proper test cultures and their quality may also help healthcare providers to curb AMR.

8. SUMMARY AND CONCLUSION

This multi-sited ethnographic research aimed to explore antibiotic usage, relevant policies, and their implementation, and factors influencing antibiotic consumption in Khairpur Mirs. It also intends to investigate medical institutions and medical curricula in problematizing the use of antibiotics and the related policies in Khairpur Mirs, Karachi, and Hyderabad. The research objectives aimed to demonstrate a detailed account of the consumption of antimicrobial agents in the premises of antibiotics' legal and policy dilemma, sociocultural intervention in the practice of antibiotics consumption in both clinical and home settings, and integration of antibiotics discourse in the medical curriculum. The first objective intended to identify the policies and programs related to the usage of antibiotics and their implementation in multi-sited locales in Sindh, i.e., Khairpur Mirs. The second objective was to examine how medical and pharmaceutical teaching addresses the use of antibiotics in Khairpur Mirs, Karachi, and Hyderabad. The third and last research objective aimed to explore sociocultural and economic determinants influencing antibiotic consumption in the selected locales.

The present study was multi-sited ethnographic research conducted in the multiple geographic locales of Khairpur Mirs, Karachi, and Hyderabad. The use of antibiotics, the implementation of policies related to antibiotics, and the sociocultural and economic determinants influencing antibiotic consumption were explored in Khairpur Mirs. However, the role medical and pharmaceutical teachings play in problematizing the use of antibiotics and its policies is explored from the educational institutes located in the locales of Khairpur Mirs, Karachi, and Hyderabad. The total span of fieldwork was of 3 months from November 2022 to January 2023. The sample size of the research was a total of 58 respondents selected through the purposive sampling technique and snowball sampling technique. For the data collection, a total of 43 interviews inclusive of 19 in-depth interviews and 24 short interviews were conducted along with three Focused Group Discussions (FGDs) in three medical educational institutes located in Khairpur Mirs.

Antibiotic resistance poses ethical considerations owing to the substantial and unjust implications of certain actions and policies. In the fourth chapter, antibiotics resistance as a legal and policy dilemma in the research locale, i.e., Khairpur Mir has been scrutinized. The study explored that although there are numerous policies and programs launched to control and curb antibiotic resistance. However, the policies and programs are not practically implemented in most of the cases in the selected locale. On one hand, the authorities showed a lack of

awareness and interest regarding this and considered it to be the responsibility of the medical practitioners. On the other hand, the medical practitioners considered it to be the responsibility of the authorities to aware the public and practitioners and also to implement the policies nationally. Furthermore, a lack of surveillance and assessment of medical institutes and healthcare establishments was observed in the selected locales. There are some factors behind the lack of policy-level implementation, monitoring, surveillance, and control regarding AMR such as lack of awareness and education among healthcare professionals and the general public, over-the-counter availability of antibiotics and drugs, self-medication, and the limited resources of the healthcare sector and institutions like DRAP and PMDC.

In the fifth chapter, the study also explored some significant insights about the socio-cultural and economic determinants affecting antibiotic consumption and related practices in Khairpur Mirs. The sociocultural attitudes of the common people related to antibiotic consumption are alarming as the practice of over-the-counter antibiotic purchase and self-antibiotic consumption is quite common. The study noted that only doctors are not accountable for the misuse of antibiotics, but the pharmaceutical companies, health administrators, civil society, and policymakers are also accountable for it. Although, there are various factors behind the beliefs, attitudes, and practices of people such as economic, cultural, traditional, social, political, etc. The general public is, in most cases, unaware of the side effects and consequences of such consumption behavior. Besides the direct consumption of antibiotics, humans have been consuming antibiotics and antimicrobials unconsciously indirectly via their food patterns. The massive usage of antibiotics has been increasing in poultry and livestock production of farmed animals and agriculture to enhance production and prevent infectious diseases. Thus, when humans consume these in their food patterns, antibiotic resistance is transmitted into their bodies from these food and dairy products which ultimately harm them and make their bodies resistant to antibiotics and antimicrobials. Some of the factors behind the increase in antibiotic resistance are unnecessary prescription of antibiotics, privatization of healthcare facilities, high charges of private clinics, lack of laboratory testing, rise in the prices of laboratory testing, and inadequate healthcare resources and equipment in public healthcare institutes. Many people go to unskilled practitioners and quacks to get treated due to the lack of economic resources, medical knowledge, and proper knowledge about antibiotics and their side effects. These practitioners and quacks are not certified, in most of the cases in Khairpur Mirs, with any medical education. Medical stores and pharmacies often provide medicines over the counter without any prescription from any medical practitioner. The study analyzed that one of the

factors behind the misuse and overuse of antibiotics is that the mass population uses antibiotics for seasonal diseases. There are no awareness programs or seminars conducted on the community level to prevent the misuse of antibiotics. Healthcare authorities and the government are not taking any practical steps to promote awareness among the general public about this alarming issue. It is also very essential to recognize that sociocultural beliefs and practices vary in different communities.

Furthermore, the sixth chapter examined the complex interplay of medical practices and antibiotic consumption. it was observed that despite all the policies and programs launched for the proper medical practices, the practical implementation of the policies is still something to be worked on a large scale. There are numerous practicing doctors who are unaware of the policies to prevent antimicrobial resistance among the population and prescribe antibiotics undiagnosed even when not needed. The study also observed that the proper implementation of policies and procedures, educating healthcare providers and patients with up-to-date knowledge about the risks of AMR, ensuring proper dispersion of antibiotics with a valid prescription, monitoring antibiotic consumption and resistance patterns, and reporting suspected cases of antibiotic misuse or overuse can help to promote responsible antibiotic use. The study also observed that doctors often prescribe antibiotics without diagnosing patients or recommending laboratory tests, especially when they do not have sufficient diagnosing instruments. This poses a genuine threat and harm to the health of the current and upcoming generations.

Finally, the seventh chapter observed the significance of integrating the issue of antibiotic misuse and antibiotic resistance in medical teaching to address this issue in the selected locales i.e., Khairpur Mirs, Karachi, and Hyderabad. There are various programs and systems envisioned to work on the quality of education, specifically medical and other relevant education, such as the Higher Education Commission (HEC) and Pakistan Medical Dental Council (PMDC). These authoritative systems are also responsible to design the curricula with the collaboration of the head or chairpersons of universities or colleges to teach the students. Medical curricula do not include in-depth knowledge of antibiotic resistance and the related policies launched globally. Bioethics and medical ethics principles are not being implemented while treating patients, although there are various laws and legislations launched for this aspect such as a code of ethics passed by the Pakistan Medical Dental Council (PMDC). These plans are, in most cases, just present in textual form but are not being practically implemented

properly. The teachers and students both are unaware of the policies and their significance which leads to the creation of future practitioners contributing to AMR. This lack of accountability creates an image of these important issues as unnecessary for a professional career and clinical practice among students. The inclusion of courses related to bioethics, medical ethics, or clinical ethics in the medical curriculum throughout the MBBS degree is one of the ways to reduce antimicrobial resistance as it would define ethical rules of prescription and care of a patient's life in a healthcare environment. There is no proper practical monitoring and surveillance system in educational institutes or healthcare centers. Most importantly, the study observed that clinical ethics and medical ethics are being challenged by the practitioners, pharmaceutical industry, and medical stores as they work for their vested interests and do not care about the consequences of their actions on the health of the public. Unfortunately, policies and strategies are not implemented adequately in Pakistan due to a weak assessment and monitoring system and a lack of interest among policymakers and administrative authorities. Moreover, the monitoring, surveillance, and weekly or monthly reporting of antibiotic resistance cases are also not being conducted. Despite that, no action against it has been taken by the authorities as most administrative positions are appointed through political involvement.

8.1 Recommendations and Suggestions

The study observed that the over and misuse of antibiotics could be addressed through academic bioethics courses by highlighting the proper usage of antibiotics and problematizing the issues of antimicrobial resistance to educate future doctors regarding this global public health dilemma. The healthcare authorities and government have to collaborate with the healthcare institutes to ensure public awareness and practical implementation of policies related to proper and monitored use of antibiotics in the selected locales, Khairpur Mirs, Karachi, and Hyderabad. There is an urgent need to improve the monitoring and surveillance in healthcare institutes and medical educational institutes to curb the issue of overuse of antibiotics and AMR. Every culture and society needs bottom-up approach policies to curb the issue. Besides, public awareness is necessary to improve healthcare beliefs, attitudes, and practices on the community level because without that it is not possible to control such healthcare crises. This can result in a decrease in self-medication and overuse of antibiotics without proper diagnosis or consultation with the doctors. Moreover, examining sociocultural factors, such as self-medication, over-the-counter purchase, and the broader sociocultural understanding of health behaviors and the use of antimicrobial drugs, and developing targeted interventions to promote responsible antibiotic use is crucial in addressing this problem. It is also very essential to

recognize that sociocultural beliefs and practices vary in different communities. The insights of the findings also suggest that the promotion of research into antibiotics and interventions must be tailored to specific cultural contexts to be effective. The findings suggest that proper implementation of policies and procedures, educating healthcare providers and patients with up-to-date knowledge about the risks of AMR, ensuring proper dispersion of antibiotics with a valid prescription, monitoring antibiotic consumption and resistance patterns, and reporting suspected cases of antibiotic misuse or overuse can help to promote responsible antibiotic use. In addition to that, ensuring the availability and accessibility of affordable laboratory tests and focusing on the proper test cultures and their quality may also help healthcare providers to curb AMR. Moreover, the government has a dire need to change outdated medical curricula and must add updated discourses to the curricula. This is because of the significance of socialization and content shared with the individuals which teaches the individuals to will grow and react in a specific society. In the realm of socialization, the curriculum has been deemed a crucial component for the set direction of any society. Therefore, educational authorities must integrate updated discourses related to antibiotics and bioethics in the biological or physiological subjects at a medical college and university level.

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10. ANNEXURE

10.1 Glossary

Verandah	Corridor
Oataq	Guest room
Katchi	Unbaked / Fragile
Makhi	Honey
Headar	Turmeric
Saunf	Fennel
Kali Mirch	Black Peppercorns
Lavang	Cloves
Dalchini	Cinnamon or Cassia Bark
Elaichi	Cardamom Pods
Karha / Qehwa	Herbal tea or green tea
Waghrai	Purple
Safaid/ Achu	White

10.2 Interview Guide

Name: _____

Age: _____

Qualification: _____

Occupation: _____

City: _____

1. To examine how medical and pharmaceutical teaching address the use of antibiotics
   1.1. What do you know about antibiotics?
   1.2. Are you aware of the use of antibiotics? Explain.
   1.3. What is the impact of the overuse of antibiotics?
   1.4. Are you familiar with the overuse and misuse of antibiotics are a medical-ethical dilemma? Explain.
   1.5. Who do you think is responsible for the misuse and overuse of antibiotics and why?
   1.6. For what purposes or symptoms do doctors prescribe antibiotics?
   1.7. Do doctors over-prescribe antibiotics without diagnoses? Why?
   1.8. What kind of training is given to medical and pharmacy students?
   1.9. How are these students trained?
   1.10. Is training about antibiotics and their rational use a part of medical or pharmacy curricula?
   1.11. Why is it important to train medical and pharmacy students regarding the use of antibiotics?
   1.12. What are the gaps in the curriculum of medical and pharmacy students?
   1.13. Is the curriculum practical or problem-oriented? How?

2. To identify the role of government and community-level implementation of policies and programs toward the usage of antibiotics
   2.1. What is the role of government and legal implications and pharmaceutical companies behind the use and overuse of antibiotics?
   2.2. How do inappropriate equipment and corruption lead to the misuse and overuse of antibiotics?
   2.3. What is the legislation about the misuse of antibiotics and health standards?
   2.4. How are Institutional bodies responsible for the misuse of antibiotics?
   2.5. What is the role of pharmaceutical agencies in the misuse of antibiotics?
   2.6. What do you know about the policies or programs to control the use of antibiotics?
   2.7. How many awareness movements have conducted the reduction in the misuse of antibiotics?
   2.8. Do you know what the antimicrobial stewardship program is?
   2.9. In your view, how can we implement ASP in the public hospitals of Pakistan?
   2.10. Should we first implement ASP in tertiary care hospitals or basic health units?
   2.11. Could you describe the strategies that are the most useful in implementing hospital ASPs in Pakistan (formulary restriction, prospective audit with feedback, combination of these strategies)?
   2.12. What will be the benefits of implementing hospital ASPs in Pakistan?
   2.13. How will physicians see the implementation of hospital ASPs in Pakistani?
   2.14. Will they have any sort of reservations about its implementation?
   2.15. What are your views about the training of healthcare professionals before the implementation of the hospital ASPs in Pakistan?

3. To explore social and economic barriers in the implementation of policies and programs regarding antibiotics
   3.1. What are the economic reasons behind the misuse of antibiotics?
   3.2. Why do people give importance to over-the-counter prescriptions?
   3.3. Why do some people prefer quacks instead of professionals?
   3.4. In your opinion, what are the barriers to the successful implementation of ASP in Pakistani hospitals (unavailability of trained staff, limited resources)?
   3.5. Are there any other comments you would like to give about antimicrobial resistance or the antimicrobial stewardship program?

10.3 Interview Guide and Probing Questions

Questions	Prompts and Probing
Health Officers	
Introduce your self	Name, qualification, position, rank, years of services
What is your designation in the health department?	How long have you been serving as a health officer?
What is your opinion about the usage of antibiotics?	What do you know about the side effects of excessive use of antibiotics? What is antibiotic resistance? What are the causes of antibiotic resistance?
Do you know antimicrobial resistance is deemed a global threat due to misuse of antibiotics?	From which source did you get this information?
What are the policies and programs about proper usage of antibiotics?	Have you conducted any training regarding usage of antibiotics and its policies? What do you about the global or international policies related to usage of antibiotics? What are the notational policies related to usage of antibiotics?
What is your responsibility as health officer in combat of alarming issue of misuse of antibiotics?	

What are the strategies owned by you as a health officer to curb this issue?	What is your perspective about inclusion of medical community (medical stores, laboratories, clinics, pharmaceutical companies) into policy implementation of the policies? What is the response of the medical community in playing role to implement these policies?
What is legal punishment if anyone prescribes antibiotics unnecessarily?	Have your officers ever got accountable for the misuse of antibiotics? What did he/she face as consequences?
What is your opinion about implementation of these policies and programs?	Is it better option? Is it implemented fully or partially? What factors are interrupting in the implementations of policies and programs?
What steps has been taken by you to combat burden of antimicrobial that is caused by misuse of antibiotics.	How you proliferate policies and programs on community polices Did you conduct any trainings or awareness campaigns relevant to antibiotics resistance?
General Questions	
Introduce yourself	Name, qualification, economic status, health infrastructure
What do you know about antibiotics?	What do you think antibiotics are used for what purposes? For what purposes have you used it?

	Which type of infections can be treated by antibiotics? Name few antibiotics that you have used or seen others
What is the source of information?	Where did you first heard/read about it? Have you ever been told about it by any doctor? Have you ever been told about it by anyone other than a doctor? Do you think it is necessary to get more information about antibiotics?
In which health conditions do antibiotics be prescribed by the doctors?	Which type of infections can be treated by antibiotics? Do you think antibiotics can be used for cold, cough, flu, fever? Have doctors prescribed you antibiotics when you catch a cold? Do you think the use of antibiotics will speed up the recovery of cold, cough and other diseases? Have you ever asked the doctor to prescribe antibiotics when you catch a common cold?
How can/should it be bought?	Can you buy it through over-the-counter? Do you need a prescription for it? Does it require any consultation by a doctor before consuming it?

	How do you buy it?
What is the proper way of consuming it?	At what time is it consumed? For how long can it be consumed? Do you think it is affective for you?
What happens if you do not follow proper instructions?	
What do you do when the issue or symptoms lessen?	Do you stop the use of antibiotics as soon as complaints lessen?
What are the side effects of excessive use of antibiotics?	Have you ever experienced any side effect while using antibiotics? How did you react after witnessing the side effects? Did you continue the use? Did you go to the doctor afterwards? Do you think frequent use of antibiotics will decrease the treatment when using the antibiotic again?
What is the impact of the overuse and misuse of antibiotics?	What is the root cause of abuse of antibiotics? What are consequences of overuse and misuse of antibiotics?
Do you know about antibiotic resistance?	What is antimicrobial resistance? What are its causes? What happens in case of antimicrobial resistance?

	How can it be cured?
Are antibiotics obtainable without interference of a doctor at drug stores or pharmacies (i.e., antibiotics are over-the-counter drugs)	From where do you get antibiotics? Do you need prescription for it? On whose recommendation do you consume antibiotics?
Students	
Tell me about yourself	Name, Age, Qualification, Degree you currently enrolled in, Semester/Year, Department, Institution, etc.
Have you studied topics related proper usage of antibiotics as a part of your academic curriculum?	What topics have you studied related to antibiotics? In which subject or course, you are studying/ have studied about the usage of antibiotics? Is it necessary to establish the course "Rational use of antibiotics" at the university level?
Are you aware about Antimicrobial/Antibiotics Resistance?	What do you know about Antimicrobial/Antibiotics Resistance? What causes antibiotics/antimicrobial resistance?
Are you aware about the global policies to prevent or control antibiotic/antimicrobial resistance?	Which global policies or programs are you aware of? Are you aware about the national policies to prevent or control antibiotic/antimicrobial resistance?

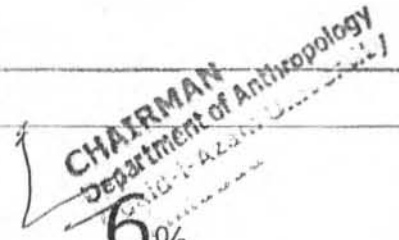
	Which national policies or programs are you aware of?
What do you know about Antimicrobial Stewardship Program?	
Are you aware about World Antimicrobial Awareness Week?	What do you know about World Antimicrobial Awareness Week? How did you get to know about antimicrobial stewardship program? Was the antimicrobial stewardship program part of the curriculum of your academic degree?
Did you ever attend any event or campaign related to World Antimicrobial Awareness Week in your institute?	What are the activities conducted during this week by your institution?
Professionals	
In which medical setting are you practicing as a doctor?	
What is the proper (scientific) use of antibiotics?	
For what purposes do you prescribe antibiotics?	For what symptoms do you prescribe antibiotics? For which diseases do the patients demand to be prescribed with antibiotics?
Are the patients aware about the pros and cons of antibiotics?	What are the main instructions given to the patients about antibiotics?

Do you recommend any specific medical stores while prescribing medicine or you have your own medical store?	
Pharmaceutical companies ever approach you to sell our drugs?	Was it an international or a national company?
Do you prescribe patients to be tested from the laboratory before antibiotic medication?	When do you suggest the patients to be tested from the laboratory?
Who is responsible for overuse and misuse of antibiotics?	Do you aware your patients about the consequences of misuse of antibiotics?
Have you attended/seen patients worsening their medical conditions after self-medication of antibiotics?	If yes, what sort of medical condition were they having? For what purposes patients often self-medicate with the antibiotics?
What are the causes for antibiotics resistance?	What is the impact of antibiotic resistance on the patients? What do patients face in the case of antibiotic resistance? How are patients with antibiotic resistance are treated? What is the impact of increasing cases of antibiotics resistance on future generation? How can we prevent or reduce growing cases of antibiotic resistance?
How can we optimize the use of antibiotics?	

Do you know over-prescription is against clinical ethics?	
What are the legal issues if any doctor is charged with prescribing antibiotics unnecessarily?	Have you seen any doctort accountable for the misuse of antibiotics? What did he/she face as consequences?
Have you ever attended any type of seminars regarding usage of antibiotics?	
Did you receive any guidance or policy-based notification from WHO?	
Did you receive any guidance or policy-based notification from Health Ministry of Pakistan?	
Has any training regarding optimizing the use of antibiotic conducted by your institute?	
Are you aware about the antimicrobial stewardship program?	How did you get to know about antimicrobial stewardship program? Is antimicrobial stewardship program the part of the curriculum that you are teaching? Do you celebrate this week? What are the activities conducted during this week by your institution?

Thesis

ORIGINALITY REPORT



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