Antibiotic consumption, structured vulnerabilities, and networks of survival in Southern Pakistan

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A Critical Ethnography of Antibiotic Consumption in Southern Pakistan

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Abstract

Background: Antibiotic misuse is a significant global health issue, contributing to antimicrobial resistance, particularly in low- and middle-income countries with weak regulatory frameworks. Pakistan ranks third globally in antibiotic misuse, contributing to 300,000 deaths annually due to resistant infections. This study explores the sociocultural and economic determinants of antibiotic misuse in Sindh, Pakistan, focusing on cultural beliefs, economic barriers, and healthcare access issues.

Methods: Data collection methods included participant observation, in-depth interviews, and Kachaharī. A purposive sampling technique was employed to select 24 respondents from a district in the Sindh, including healthcare professionals, pharmacy employees, and local residents. The data was analysed using thematic analysis to identify existing patterns and themes.

Findings: The study found that antibiotic misuse in Sindh is driven by cultural beliefs that antibiotics are a cure-all, economic barriers that limit access to healthcare, and gender norms that restrict women's healthcare decision-making. The widespread availability of antibiotics without prescriptions and self-medication practices were also key factors contributing to misuse. The healthcare system's limitations, including a shortage of medical professionals and high treatment costs, further exacerbated the issue.

Discussion : Key factors fueling antibiotic misuse include cultural misconceptions, economic limitations, gender-based healthcare barriers, and inadequate knowledge about antibiotic resistance. Strengthening regulations on antibiotic sales, improving healthcare access, and implementing culturally sensitive public health education are essential to addressing the problem and curbing AMR.

Keywords: *Antibiotics, misuse, antimicrobial resistance, sociocultural determinants, self-medication, healthcare.*

Introduction

The roles of antibiotics in human healthcare, veterinary medicine, and agriculture are crucial in combating bacterial infections (Zalewska et al., 2021). In livestock, antibiotics are used for disease treatment, infection prevention, growth promotion, and managing agricultural

diseases (Sarkar et al., 2018; Oliveira et al., 2020). However, the antibiotic crisis has intensified due to neoliberal policies that facilitate unrestricted access, including over-the-counter sales, self-medication, and unregulated dispensing, which significantly heighten antimicrobial resistance (AMR) risks (Dutescu, 2020; Ahmad et al., 2022). As bacteria evolve to withstand antibiotics, AMR develops, undermining effective treatments and exacerbating global infectious disease challenges (Antimicrobials in Society, 2020). The WHO emphasizes AMR as a major public health threat of the twenty-first century, urging regulation and policy action (WHO, 2020). Cultural norms further influence medication practices; for instance, women often self-medicate via non-professional providers due to patriarchal restrictions on healthcare access (Habib et al., 2021). In Sindh, open drug markets and unregulated pharmacies facilitate antibiotic overuse without prescriptions (Tangcharoensathien et al., 2018). Tackling this issue requires policies sensitive to socioeconomic and cultural contexts, since misuse stems from social and political structures. Prolonged antibiotic exposure links to resistance, toxicity, hypersensitivity, teratogenicity, and carcinogenicity, often via residues in food (Darwish et al., 2013; Jourdan et al., 2020; Zeb et al., 2022). Antibiotics are categorized under WHO's AWaRe framework as Access, Watch, and Reserve, with each category indicating different usage and resistance risks.

Nonprescription sales in Pakistan aggravate AMR, with resistance rising for antibiotics like Penicillin, Tetracycline, and Ofloxacin (Jabeen et al., 2011). During COVID-19, approximately 72% of patients received unnecessary antibiotics, further fueling resistance (O'Reilly, 2020). Prescribing habits are influenced by provider experience, workload, and international training, yet non-compliance with laws persists due to patient demand (Riaz et al., 2011; Ashraf et al., 2017; Ahmad et al., 2022). Climate change may worsen resistance through increased infection rates driven by higher temperatures, emphasizing the need for global cooperation (Wong, 2024). Strategies like awareness campaigns, education, stewardship programs, and better regulation are vital (Riaz et al., 2011; Sunde et al., 2019; Wall, 2019; Nogrady, 2023). Misuse driven by misconceptions, traditional practices, and ease of access in households also contribute to AMR. Pakistan ranks third among LMICs in antibiotic misuse, causing around 300,000 deaths annually (Ahmed, 2024). Projections suggest that by 2030, antibiotic consumption will rise sharply in developing countries (Klein et al., 2024; Van Boeckel et al., 2015). The WHO reports a 15% increase in antibiotic-resistant infections from 2017 to 2022, which highlights urgent needs for comprehensive intervention to curb misuse and slow AMR spread.

This study explores the sociocultural and economic factors influencing antibiotic miuse in Sindh, Pakistan, an area where such issues have been largely overlooked. It investigates cultural perceptions, economic challenges, and access to healthcare, including traditional medical practices and healthcare disparities that contribute to antibiotic misuse. By examining local attitudes and the economic and structural reasons behind over-the-counter sales and self-medication, the research aims to provide valuable insights for developing culturally sensitive interventions and policy reforms. The findings highlight the need for detailed economic and cultural analysis of antibiotic utilization patterns in Sindh. Furthermore, it investigates the social and behavioral factors that lead individuals to misuse antibiotics, often disregarding medical advice, from a Pakistani cultural perspective.

Methods and Materials

This section offers an overview of the methodology used for data collection, analysis, and interpretation, highlighting the purpose of the study. It is important to note that the data presented in this paper comply with the Standards for Reporting Qualitative Research (SRQR) guidelines and employ the Consolidated Criteria for Reporting Qualitative Studies (COREQ), a 32-item checklist (Tong et al., 2007).

Locale and Participants

The research setting for this study was a district area within Sindh Province, Pakistan, where data collection methods involved participant observation combined with in-depth interviews, followed by Kachaharī sessions (Ali, 2024). While in-depth interviews followed a semi-structured guide for individual perspectives, Kachaharī sessions were unstructured group discussions that captured community norms and collective viewpoints. Both data types were transcribed, translated, and analyzed together using thematic analysis, with insights from Kachaharī used to contextualize and triangulate findings from individual interviews. The research sample consisted of 24 respondents, comprising 10 healthcare professionals, 2 unlicensed healthcare providers, 3 pharmacy employees, 1 laboratory employee, 2 pharmacy customers, and 6 residents. The research included 24 participants, of whom nineteen were male and five were female. The inclusion criteria for participants involved individuals who had direct or indirect experience with antibiotic use, either through their professional roles or as consumers. Exclusion criteria were applied to individuals with limited understanding or involvement with the subject matter. The purposive sampling ensured that the participants were informed and could provide relevant insights into the research questions. A respected

sample selection method allowed researchers to include vital stakeholders. This research included information from healthcare professionals regarding antibiotic treatment prescriptions, as well as collecting sales and purchase data from pharmacy staff and clients, along with self-treatment practices from patients and residents. The research design, which involves diverse participant groups, provides detailed knowledge about antibiotic utilization, as well as resistance factors. Throughout the entire research period, pseudonyms function as substitutes for actual names to guarantee anonymity for participants.

Participants Overview	
Practicing Doctors	10 (8 Male, 2 Female)
Unlicensed Healthcare Providers	2 (Male)
Pharmacy Employees	3 (Male)
Laboratory Employee	1 (Male)
Pharmacy Customers	2 (Male)
Local Residents	6 (4 Male, 2 Female)
Total:	24 Participants (19 Male, 5 Female)

Data Collection

The data collection was conducted during a three-month fieldwork period, from November 2022 to January 2023. For data collection, a total of 24 interviews were conducted, comprising 11 in-depth interviews and 13 informal conversations or Kachaharī sessions with the participants during the fieldwork. The interviews were conducted with the prior consent of the participants, which were then translated and transcribed for analysis by the first author (SA). Each interview lasted between 30 minutes and 90 minutes. The interview guide was structured for consistency as well as cultural relevance and was conducted in the Sindhi language, allowing locals to feel confident and freely share their perspectives. Data saturation was considered achieved when no new themes, categories, or patterns emerged during the

analysis of the interviews. This point was reached after reviewing the 24 interviews, where recurring insights aligned with the study's objectives and scope.

The participant observation was carried out in a pharmacy located in the selected district during fieldwork, where the researcher observed the local population's antibiotic purchasing habits and their interactions with pharmacists. The researcher adopted a passive observer role, spending approximately 40 hours over 12 visits in the pharmacy. Detailed field notes were recorded in a structured journal immediately following each observation period, focusing on interactions, medications requested/purchased without prescription, and conversations between customers and pharmacists. The observation notes were taken and used in the analysis.

To ensure rigor, methodological triangulation was employed through the integration of various data collection methods, including participant observation, in-depth interviews, and informal conversations or kachahri. The data were cross-verified by the remaining three authors, two of whom are proficient in the local language as well as English, to ensure consistency and reliability. Reflexivity was maintained throughout the process to minimise bias and uphold a critical perspective.

Ethics Approval

This study received approval from the Institutional Bioethics Committee (IBC) of Quaid-I-Azam University, Islamabad (ethics approval letter (Reg# 02012113006) is attached as Appendix 1), ensuring compliance with ethical standards for research involving human participants.

Data Analysis

The thematic analysis approach was employed to analyze the data; this methodology involves organizing and categorizing data through the assignment of labels based on patterns identified from the divergence of ideas or information collected during the fieldwork (Braun & Clarke, 2006, 2019). The data obtained were subjected to the following analytical steps: familiarization with the data, coding, development of themes, review of themes, categorization and labeling of themes, and documentation. The interviews, conducted in Sindhi, were translated and transcribed into English by the first author (SA) to facilitate analysis while maintaining cultural and contextual nuances. This was then verified by the second author (IA) since both are proficient in the local language and in English. The first

author (SA) read and re-read the transcribed interview and observation notes to become thoroughly familiar with the data. An inductive coding process was used to categorize significant data. This process was not driven by pre-existing theories, but emerged from the data itself. Initial codes were grouped into themes that were relevant to the research objectives, focusing on key factors such as cultural beliefs, economic barriers, and gender norms influencing antibiotic use. The identified themes were refined through ongoing discussion with co-authors to ensure consistency and relevance. After reviewing the themes, final labels were assigned to each category, and illustrative quotes from participants were selected to highlight the key findings. Reflexivity was an integral part of the analysis process; the researchers engaged in ongoing reflexive practices such as memo writing and peer debriefing to acknowledge and examine their own assumptions, influences, and potential biases throughout the analysis. These reflexive activities helped to promote transparency and credibility, ensuring that the researchers remained aware of how their perspectives might shape the interpretation of the data. The first author manually coded the data, with co-authors reviewing and resolving discrepancies to ensure consistency in theme development. The co-authors (IA and SB) helped to triangulate the data and guide the documentation process of the paper.

Results

Before presenting the findings, a thematic analysis was conducted to identify recurring patterns in the ethnographic data. This analysis revealed several themes that illustrate the complex interplay of sociocultural beliefs, economic constraints, healthcare accessibility, and knowledge gaps. Moreover, gender aspects, self-medication, beliefs and practices, and systemic gaps in antibiotic regulation also emerged as key themes. The research investigation employed participant observations and in-depth interviews, as well as Kachaharī, to establish the main findings about Sindh's irrational medicine use patterns. This section focuses on analyzing specific themes using structural and sociocultural determinants that fuel antibiotic use.

Theme	**Key Finding**	**Illustrative Data / Quote**
Sociocultural Beliefs & Norms	Antibiotics are perceived as a universal 'cure-all' for any ailment, including viral	"One of the biggest misconceptions is that antibiotics can cure every disease; people use them for treating even the

	infections, driven by deep-seated cultural misconceptions.	simplest conditions, such as a cough or a headache." (Dr. Abdul Hadi)
Economic Constraints & Accessibility	High costs of formal healthcare (consultation, tests, transport) make self-medication with cheaper, readily available antibiotics a practical and necessary choice for many.	"We cannot go to see a doctor for every small ailment... it is much cheaper to purchase antibiotics from a nearby store..." (Noor Bibi)
Knowledge Gaps & Misinformation	A widespread lack of understanding about antibiotics, their proper use, and the consequences of resistance leads to inappropriate consumption based on advice from unqualified sources.	"No one has shown or instructed us on how to use these medicines properly; hence, we just apply them in whichever method we deem fit." (Noor Bibi)
Gender Norms & Access Barriers	Patriarchal norms restrict women's mobility and autonomy, leading men to make healthcare decisions for them, often resulting in the purchase and misuse of antibiotics without medical guidance.	"Women in many families are not allowed to visit a doctor even when they are sick. Men purchase medicines... without knowing the right dosage..." (Dr. Javeda Kerio)
Normalization of Self-Medication & OTC Sales	Antibiotics are easily purchased without a prescription due to patient demand, pharmacy compliance, and a lack of regulatory enforcement,	"We sell antibiotics because the customer wants them, and no one is checking on that. If we do not sell, they will buy it from other stores." (Pharmacy Employee)

	making self-medication a common first response.	
Influence of Traditional & Market Practices	1. Traditional: Modern antibiotics are combined with or favored over traditional remedies without proper knowledge. 2. Market: Pharmaceutical marketing and profit incentives actively promote inappropriate antibiotic sales and prescriptions.	1. "In the past, we used natural remedies... but now people have started relying more on antibiotics..." (Fayaz) 2. "We have to sell antibiotics because it is profitable, and no strict rules stop us." (Drug Distributor)
Indirect Consumption & Environmental Drivers	Antibiotics used in livestock and agriculture enter the human food chain (e.g., milk, meat), contributing passively to antimicrobial resistance.	"The antibiotics given to animals will... find their way into the human body through the food they consume." (Dr. Farzand Ali, Veterinary Doctor)
Demographic Variations in Use	Younger, urban populations show slightly better knowledge, but a general lack of understanding and misconceptions are common across all groups.	Highlighted variations in knowledge between age groups and urban/rural residents, underscoring a universal need for targeted education.

Sociocultural Beliefs and Antibiotic Misuse

The findings revealed that many participants considered antibiotics as a universal sure for all infections and diseases. Multiple individuals resort to taking antibiotics when faced with sickness, regardless of its bacterial status, including viral infections as well as illnesses that make them feel unwell but do not involve bacteria. For instance, Abdul Hadi, a 37-year-old biomedical doctor practicing in a private clinic located in Khairpur, said that:

"هڪ عام غلط سوچ آهي ته انٽي بائيوٽڪ هر بيماري جو علاج ڪري سگهن ٿيون، جڏهن ته ماڻهو انهن کي عام مسئلن جهڙوڪ کنگهه يا مٿي جو سور ۾ استعمال ڪندا آهن"

“One of the biggest misconceptions is that antibiotics can cure every disease; people use them for treating even the simplest conditions, such as a cough or a headache.”

Moreover, participants indicated that antibiotics are often used for preventive measures or to avoid illnesses believed to be caused by standard practices, such as consuming contaminated food. Hussain Ahmed, a 54-year-old patient residing in Khairpur, waiting for his appointment at a local private clinic to get treatment for an infection in his leg, shared,

"گهريلو زندگي ۾ اسان انٽي بائيوٽڪ اڪثر معمولي بيمارين جهڙوڪ پيٽ جو سور يا مٿي جو سور لاءِ استعمال ڪندا آهن، جيئن ته انهن کي وڌيڪ خراب ٿيڻ / بگڙڻ کان بچائي سگهجي.

“In our households, we often use antibiotics even for minor issues like stomachache or headache to prevent them from worsening.”

These cultural norms are deeply embedded, reflecting a widespread lack of understanding regarding the specific uses and limitations of antibiotics. Participant observation in a local pharmacy directly supported interview accounts of easy access to antibiotics. The researcher noted numerous instances where customers requested antibiotics by name (e.g., "give me a strip of Augmentin") without presenting a prescription. Pharmacists routinely dispensed these medications without inquiry about symptoms or prior consultation with a doctor, confirming the normalized practice of non-prescription sales described by participants.

Economic Constraints and Accessibility Issues

High healthcare costs and limited access to healthcare facilities also encourage self-medication. Participants highlighted that high costs of consultation fees and diagnostic tests discourage people from seeking professional healthcare services. While obtaining medications from the shops and pharmacies more affordable. Noor Bibi, a 48-year-old resident of Khairpur, expressed her views while purchasing antibiotics from a local drug store,

اسان هر ننڍي بيماريءَ لاءِ ڊاڪٽر وٽ نه ٿا وڃون، جنهن ۾ اسين مبتلا آهيون، ۽ اهو تمام سستو آهي ته ڪنهن ويجهي دڪان تان اينٽي بايوٽڪ دوائون خريد ڪري ۽ ان کي ضرورت محسوس ڪرڻ وقت استعمال ڪريون.

We cannot go to see a doctor for every small ailment that we suffer from, and it is much cheaper to purchase antibiotics from a nearby store and use them every time we feel the need.

The participants emphasized that there are few healthcare facilities, and those available are quite a distance away. Additionally, public transportation is scarce, which discourages residents from visiting doctors and seeking medical attention (Ali & Ali, 2020). For instance, Abdul Qayom, a 29-year-old pharmacist practicing at a local pharmacy, mentioned that

مڪاني ماڻهو ڊاڪٽر وٽ وڃڻ جي بجاءِ، وقت ۽ پئسا بچائڻ لاءِ قريب واري دوڪان تان انٽي بائيوٽڪ خريد ڪرڻ کي ترجيح ڏين ٿا، ڇو ته انهن جو خيال آهي ته اهو وڌيڪ عملي آهي.

the locals have been found to procure antibiotics from nearby stores instead of visiting a doctor, wasting time and money. They think it is more practical.

Community Knowledge and Misinformation

The data from participant observation and interviews indicate that most people lack biomedical knowledge of the consequences of using antibiotics inappropriately, including resistance and other health complications. Noor Bibi remarked,

"ڪڏهن به ڪنهن اسان کي نه ڏيکاريو آهي ۽ نه ئي سمجهايو آهي ته اهي دوائون صحيح طريقي سان ڪيئن استعمال ڪجن، تنهنڪري اسان انهن کي پنهنجي سمجهه موجب استعمال ڪريون ٿا".

“No one has shown or instructed us on how to use these medicines properly; hence, we just apply them in whichever method we deem fit.”

Additionally, there is a tendency to seek advice from traditional healers or unqualified sources, such as friends and relatives, rather than consulting professional physicians and other healthcare providers. Hussain Ahmed, a 54-year-old patient residing in Khairpur, waiting for his appointment at a local private clinic to get treatment for an infection in his leg, shared,

"اسين پنهنجن وڏڙن جون ڳالهيون ٻڌون ٿا ۽ هر بيماري لاءِ اينٽي بائيوٽڪس ونون ٿا، جيئن اهي وٺندا هئا. اسان سمجهون ٿا جيڪڏهن اهي دوائون انهن لاءِ اثرائتيون هيون، ته اهي اسان لاءِ به اثرائتيون ٿينديون".

We listen to our grandparents and take antibiotics for every ailment that we have, as they do. We believe that if it were effective for them, then it would also be effective for us.

Gender Norms and Healthcare Access

Participants highlighted that women face numerous barriers to accessing healthcare services due to cultural and social factors that restrict their mobility. Hence, men are likely to have a say in the health care of female members of the family, for instance, buying antibiotics without a valid prescription or a doctor's recommendation. Dr Javeda Kerio, a 38-year-old child specialist practicing in a public hospital in Khairpur, added,

"ڪيترين ئي خاندانن ۾ عورتن کي، بيمار هجڻ باوجود، ڊاڪٽر وٽ وڃڻ جي اجازت نه هوندي آهي. مرد دوائون، بشمول اينٽي بائيوٽڪس، بغير صحيح مقدار ۽ استعمال جي وقت ڄاڻڻ جي وٺي ايندا آهن".

“Women in many families are not allowed to visit a doctor even when they are sick. Men purchase medicines, including antibiotics, without knowing the right dosage and when to take them.

She mentioned that this often results in the misuse of antibiotics as the patient makes the decisions on medication without consulting a doctor.

Self-medication and Over-the-Counter (OTC) Sales

Observation in pharmacies showed that antibiotics are commonly sold and purchased without a prescription at local drug stores or pharmacies. Vendors often recommend antibiotics for minor symptoms such as the flu, a cold, or a cough. Dr Muhammad Ghazi, a 33-year-old doctor practicing in a public hospital in Khairpur, said:

"مريض ڊاڪٽر وٽ وڃڻ کان اڳ ئي اينٽي بائيوٽڪس وٺن ٿا، ڇو ته انهن جو خيال هوندو آهي ته اهو وقت ۽ پئسا بچائڻ جو بهترين طريقو آهي. هو تڏهن ڊاڪٽر وٽ اچن ٿا، جڏهن انهن جي حالت سنگين ٿي وڃي".

“The patients take antibiotics before visiting a doctor because they think it is time and cost-effective. They visit us when their situation becomes critical.”

Another factor that exacerbates this situation, highlighted by the participants, is the authorities' negligence in banning the sale of antibiotics without a prescription. One of the employees of the local pharmacy in Khairpur added that.

> **گراهڪ اينٽي بائيوٽڪس وٺڻ چاهين ٿا، تنهنڪري اسان انهن کي وڪرو ڪريون ٿا، ڇو ته ڪو به ان جي جانچ نٿو ڪري. جيڪڏهن اسان وڪرو نه ڪريون، ته هو ٻئي دڪان تان وٺي ونڊا".**

> **"We sell antibiotics because the customer wants them, and no one is checking on that. If we do not sell, they will buy it from other stores."**

This has led to more and easier access to antibiotics and thus increased the rate of self-medication and misuse.

Influence of Traditional Beliefs and Practices

Interviews highlighted that traditional beliefs and practices influence the use of antibiotics as people combine modern medicine with indigenous healing practices, using antibiotics alongside conventional remedies. Fayaz, a 47-year-old patient, waiting for his appointment at a public hospital located in Khairpur, reflected,

> **"ماضيءَ ۾، زخم يا زڪام لاءِ قدرتي علاج جهڙوڪ ماکي ۽ جڙي ٻوٽيون استعمال ڪيا ويندا هنا، پر هاڻي ماڻهو غير ضروري طور تي به اينٽي بائيوٽڪس وٺڻ لڳا آهن".**

> **"In the past, we used natural remedies such as honey and herbs for wounds or colds, but now people have started relying more on antibiotics, even when they might not be necessary."**

Power Dynamics and Pharmaceutical Marketing

A seasoned doctor emphasized that the promotion of antibiotics by pharmaceutical companies and the activities of unlicensed healthcare providers selling drugs without a prescription also fuel the use of antibiotics without a prescription. The doctors are bribed with commissions on sales and incentives for increases in sales and prescriptions. A drug distributor, selling medicines within the premises of a private hospital, commented,

> **"اسان اينٽي بائيوٽڪس وڪرو ڪريون ٿا ڇو ته اهو منافعي وارو ڪاروبار آهي، ۽ ڪو به سخت قانون اسان کي روڪڻ لاءِ ناهي. اسان کي مريضن جي گهرجن کي پورو ڪرڻو پوي ٿو".**

“We have to sell antibiotics because it is profitable, and no strict rules stop us. We have to fulfill the patient’s demands.”

Moreover, pharmaceutical companies commonly approach unqualified vendors who have little or no medical knowledge and influence them to administer antibiotics for other than medical reasons, thus promoting their misuse.

Indirect Antibiotic Consumption Through Dietary Habits

A minority of the participants raised the concerns about indirect antibiotic consumption through dietary habits. They mentioned that antibiotics are commonly used in livestock and agriculture in many rural areas, which makes them part of food items such as milk, meat, and vegetables. This incidental use also contributes to the development of resistance to antimicrobial agents in humans. Dr Farzand Ali, a 39-year-old veterinary doctor, practicing locally in Khairpur, said;

"گھٹا ماڻهو اهو سمجهڻ ۾ ناڪام ٿين ٿا ته جانورن کي ڏنل اينٽي بائيوٽڪس، کاڌي ذريعي، کنهن نه کنهن طريقي سان انساني جسم ۾ داخل ٿين ٿيون".

"It is something that many people fail to understand that the antibiotics given to animals will, in one way or another, find their way into the human body through the food they consume."

Differences in Antibiotic Use Across Demographic Groups

The data from interviews and observations highlighted that there is a significant variation in antibiotic consumption among different population subgroups. People of a younger age and those residing in urban areas have a better understanding of the correct time and proper way to take antibiotics than older adults and those living in rural areas. However, a general lack of knowledge and numerous misconceptions about antibiotics were observed, which are common among all the studied demographics, thereby underlining the importance of raising awareness and promoting public health education.

Discussion

The discussion outlines the social, economic, and cultural factors contributing to the overconsumption or irregularized consumption of antibiotics in Sindh. This also emphasizes the need for focused, culturally sensitive approaches to addressing the cultural views and,

equally, the economic and structural power relations embedded in the healthcare system. Applying these strategies may decrease the misuse of antibiotics, encourage appropriate use, and decrease the risks of AMR.

The research indicates that antibiotic misuse in Sindh is a multifaceted problem, as multiple sociocultural factors, economic conditions, and behavioural patterns contribute to its development. The study endorses the multiple variables involved in antibiotic misuse, which agrees with findings from earlier studies in low- and middle-income countries (Bilal, 2016). The results, using the lens of Critical Medical Anthropology (CMA) (Singer & Baer, 2018), reveal the influence of economic precarity, patriarchal system of households, and market incentives on antibiotic practices in the particular healthcare system of Sindh.

Sociocultural Context and Attitudes Toward Antibiotic Use

Regional cultural traditions, alongside popular local practices, significantly impact antibiotic intake rates throughout Sindh. The cultural beliefs about antibiotics as a 'universal' or “cure for all” persist, as it is reinforced by the social structure and healthcare institutional practices. As shown in the research data, this results in mismanagement of diseases and illnesses. For instance, research participant Abdul Hadi believed antibiotics served as a universal solution to fight any medical illness, including viral infections and pain-related conditions. These practices endure not only due to misunderstanding but also because antibiotics carry symbolic weight as trusted remedies sanctioned by medical authorities. Yin et al. (2021) demonstrated in their study that inadequate healthcare education in middle- and low-income nations fosters strong cultural beliefs regarding the proper use of antibiotics.

Public health initiatives across cultures require specialized healthcare education to teach people appropriate ways to eliminate misconceptions about antibiotic usage. Each geographical region develops its healthcare customs based on the prevailing cultural beliefs. Thus, the interventions should align with the community's culture. The entrenched belief, as echoed in the narratives of participants like Abdul Hadi, underscores a need for culturally tailored health education. For instance, mobilizing trusted local public figures within the community, as suggested by Riaz et al. (2011), or other stakeholders, such as local media, to disseminate accurate information, might be more effective than using conventional public health communication. CMA underlines the way in which such beliefs are generated within hierarchical structures of kinship and community relations that cause irrational usage to be socially rationalised.

Economic Factors and Healthcare Accessibility

Economic constraints proved to be the primary driver of self-medication, as participants resorted to purchasing over-the-counter antibiotics to avoid consultation fees and travel costs, and, consequently, the improper use of antibiotics. The study established that people, especially low-income earners, resort to self-diagnosis and/or self-treatment because the cost of seeking professional medical care is expensive. This observation aligns with studies that have identified economic reasons as the primary cause of irrational antibiotic use in LMICs (Riaz et al., 2011).

The lack of affordable and accessible health facilities, particularly in rural areas, is a factor that worsens this issue, as highlighted in Noor Bibi's narrative. Some participants highlighted the economic costs and practical difficulties associated with seeking healthcare, which they believe encourages people to use antibiotics without a prescription. According to Cabral et al. (2024), healthcare policies must lower service expenses while building new facilities for underserved regions to overcome these barriers effectively. The healthcare system can reduce barriers by eliminating consultation fees and improving rural care infrastructure. From the perspective of CMA, this reflects structural violence. The public's ability to seek formal treatment from professionals is restricted because of inequalities in state provisions and healthcare infrastructures, leaving antibiotics as an optimal and practical survival choice. Therefore, economic and cultural drivers do not exist independently, but are reinforced by structural scarcity, which maintains dependence of households upon informal practices and by practices that cultural norms define as acceptable.

Market and Policy Context

Pakistan's fragmented healthcare system, characterised by weak regulation and commercialisation, further exacerbates misuse. Research highlights the interactions between pharmaceutical companies and unauthorised vendors who actively promote antibiotic misuse within the healthcare sector. The inappropriate promotion of antibiotics by pharmaceutical companies and unregulated drug vendors remains a significant issue, as these providers often run as businesses prioritising profit over patient care. Policy failures enable informal vendors to flourish, resulting in a health marketplace where antibiotics are primarily treated as commodities. Misuse becomes normalised through neoliberal logics and regulatory gaps, which reinforce the perception of misuse as a routine part of medical practice rather than recognising it as a deviant act. The research demands enhanced control systems for antibiotic

commercialization and distribution operations. The literature review demonstrates that imposing strict legal restrictions, along with punishment for violators, helps prevent antibiotic misuse (Saleem et al., 2023). Tangcharoensathien et al. (2018) affirm that proper enforcement of surveillance operations and regulations will successfully challenge these regulatory gaps.

Gender Dynamics in Healthcare Access and Decision-Making

Gender specific factors are also found to be important determinants of antibiotic use. The limited autonomy of women in healthcare decision-making was another recurring theme. Multiple participants, including Dr Javeda Kerio, describe how patriarchal social rules prevent women from accessing expert medical care while restricting their movements in society (Habib et al., 2021). Men determine women's healthcare decisions, so they buy antibiotics without medical check-up appointments. This trend highlights why the healthcare field requires gender-specific policies that will address sexual biases stopping women from accessing health services.

WHO (2020) demonstrates how both the education and community engagement of women lead to better health outcomes while decreasing antibiotic misuse behaviors. Awareness campaigns and health education focused on antibiotics, along with promoting responsible self-medication practices, would effectively address this problem.

Policy Recommendations and Interventions

The study's findings demonstrate that implementing comprehensive public health interventions to address antibiotic misuse must move beyond awareness campaigns. Regulations must enforce prescription-only sales with stronger pharmacy supervision and establish budget-friendly health structures that minimize the use of self-medication and unlicensed antibiotics. To reduce reliance on unregulated healthcare providers, accessibility of healthcare services should be expanded through mobile clinics, subsidized services, and telemedicine. A gender-sensitive framework should become a priority for empowering women through healthcare programs that work to eliminate barriers that impede their access to medical care. For instance, empowering female healthcare workers can reduce women’s reliance on male relatives. To address antibiotic misconceptions effectively, the community requires culturally sensitive educational campaigns that educate both healthcare professionals and the public on responsible antibiotic use. Public health specialists, policymakers, and anthropologists need to establish collaborative research efforts focused on structural

determinants. Training for providers and pharmacists is required in order to align prescribing practices with stewardship goals and reduce profit-driven dispensing. Addressing economic barriers that prevent individuals from seeking professional care, such as reducing healthcare costs—including consultation fees and diagnostic expenses—is also vital. Developing targeted educational initiatives, tailored to regional cultural contexts, is essential to improving public awareness of proper antibiotic use. Engaging community leaders, religious figures, and local media can help spread accurate information and promote positive behavioural change. Lastly, community-based programmes focused on enhancing women's health education and empowering women in healthcare decisions are crucial in tackling gender-specific barriers and reducing inappropriate antibiotic consumption, thereby helping to combat antimicrobial resistance.

Limitations

Nonetheless, this study has several limitations that should be noted. The study was conducted in only the selected district of Sindh, which may not have provided an accurate representation of the overall picture or scenario throughout Pakistan. Future research could include a broader geographical study to get even more insight into how antibiotics are misused in the country. Additionally, the study acknowledges that, as a male researcher, only four female participants could be interviewed due to the challenges that Sindh's patriarchal society presents for male researchers to engage with female respondents directly. Furthermore, the study relies on self-reported data, which may be subject to biases, such as recall bias or social desirability bias. Thus, future research may employ survey research methodology in combination with direct observation to provide more objective and detailed confirmations of the findings.

Conclusions

This ethnographic study identifies multiple acknowledged factors contributing to antibiotic misuse, such as cultural influences, economic conditions, knowledge gaps, gender disparities, pharmaceutical marketing tactics, and dietary practices. Antibiotics are often misused as universal remedies for various illnesses, regardless of their cause. They are frequently given as routine prophylactics mainly due to a lack of awareness about proper usage. Economic factors, including the availability, accessibility, and utilization of healthcare services and diagnostic tools, along with high healthcare costs, drive individuals—especially those in rural areas—to self-medicate with antibiotics. The findings show that communities are

increasingly aware of the importance of responsible antibiotic use; however, many prefer to consult unlicensed healthcare providers like friends, relatives, or traditional healers rather than qualified medical professionals. Poor communication between patients and healthcare providers further exacerbates this issue. Gender-specific social and cultural practices also hinder women's access to healthcare, as men often make decisions regarding their healthcare without their involvement. Additionally, pharmaceutical marketing strategies and the sale of antibiotics by unlicensed vendors, such as compounders and chemists, without proper prescriptions, significantly contribute to misuse. The use of antimicrobials in livestock and agriculture, which are consumed indirectly by humans, results in food contaminated with antimicrobial-resistant bacteria. This study enhances understanding of the social factors influencing antibiotic misuse in resource-limited settings and clarifies various socioeconomic, cultural, and behavioral patterns. It demonstrates the need for comprehensive strategies that encompass health promotion, policy reforms, improved healthcare access, and culturally sensitive programs. Furthermore, this research advances medical anthropology by emphasizing context-specific approaches for effective interventions. The findings contribute to the global discourse on antimicrobial resistance, highlighting the importance of targeted actions to promote responsible antibiotic use.

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Disclosure statement

The authors declare that there is no known conflict of interest that might have affected this manuscript.

Ethical Considerations

All research procedures were conducted in accordance with the ethical standards of the Institutional Bioethics Committee (IBC) of Quaid-I-Azam University, Islamabad (letter (Reg# 02012113006) and adhered to the principles outlined in Helsinki, ensuring compliance throughout the study involving human participants.

Data Availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Consent to Participate

We received verbal informed consent from all participants to join this study and they had the opportunity to withdraw at any point of time. The verbal informed was obtained as people in Sindh become suspicious if someone takes their signatures.

Consent to Publish

We received verbal informed consent from all participants to publish the results of this study. The verbal informed was obtained as people in Sindh become suspicious if someone takes their signatures

Clinical Trial Number

Not applicable.

Authors Contribution

Conceptualization, methodology, validation, S.A., I.A., I.U.L., and S.B. and Z.B.; formal analysis, S.A., I.A., and S.B.; investigation, and data curation, S.A,; writing—original draft preparation, S.A. and I.A.; writing—review and editing I.A, S.B.; supervision, I.U.L. First two authors share the first-authorship.

References

Ahmad, T., Khan, F. U., Ali, S., Rahman, A. U., & Ali Khan, S. (2022). Assessment of without prescription antibiotic dispensing at community pharmacies in Hazara Division, Pakistan: A simulated client's study. *PLoS ONE, 17*(2), e0263756. https://doi.org/10.1371/journal.pone.0263756

Alanazi, A., Almuhaya, R., Almohaimeed, M., Alahmari, N., Abdulrahim, N., Basyouni, M., ... & Alqahtani, S. (2023). Impact of antibiotic de-escalation on antibiotic consumption, length of hospitalization, mortality, and cost: A systematic review and meta-analysis. *Pharmacoepidemiology, 2*(4), 289–306. https://doi.org/10.3390/pharma2040025

Ali, I. (2024). Decolonizing methodology: Proposing Kachaharī a socio-culturally acceptable qualitative method. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4941710

Ali, I., & Ali, S. (2022). Why may COVID-19 overwhelm low-income countries like Pakistan? *Disaster Medicine and Public Health Preparedness, 16*(1), 1–11. https://doi.org/10.1017/dmp.2020.329

Ashraf, F., Hafeez, A., Imtiaz, F., Ayub, A., & Imtiaz, H. (2017). Antibiotic dispensing and prescription pattern in pharmacies of Islamabad and Rawalpindi: Pakistan. *International Journal of Collaborative Research on Internal Medicine & Public Health, 9*(5), 683–692.

Barker, A. K., Brown, K., Ahsan, M., Sengupta, S., & Safdar, N. (2017). Social determinants of antibiotic misuse: A qualitative study of community members in Haryana, India. *BMC Public Health, 17*(1), 333. https://doi.org/10.1186/s12889-017-4261-4

Bilal, M. (2016). Self-medication with antibiotics among people dwelling in rural areas of Sindh. *Journal of Clinical and Diagnostic Research, 10*(5), OC08–OC13. https://doi.org/10.7860/JCDR/2016/18294.7730

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis?. *Qualitative research in psychology*, *18*(3), 328-352.

Byrne, M. K., Miellet, S., McGlinn, A., Fish, J., Meedya, S., Reynolds, N., & van Oijen, A. M. (2019). The drivers of antibiotic use and misuse: The development and investigation of a theory driven community measure. *BMC Public Health, 19*(1), 1423. https://doi.org/10.1186/s12889-019-7791-8

Cabral, C., Zhang, T., Oliver, I., Little, P., Yardley, L., & Lambert, H. (2024). Influences on use of antibiotics without prescription by the public in low- and middle-income countries: A systematic review and synthesis of qualitative evidence. *JAC-Antimicrobial Resistance, 6*(5), dlad108. https://doi.org/10.1093/jacamr/dlad108

Dutescu, I. A. (2021). The antimicrobial resistance crisis: How neoliberalism helps microbes dodge our drugs. *International Journal of Health Services, 51*(4), 521–530. https://doi.org/10.1177/0020731420981493

Habib, S. S., Jamal, W. Z., Zaidi, S. M. A., Siddiqui, J. U. R., Khan, H. M., Creswell, J., ... & van den Borne, B. (2021). Barriers to access of healthcare services for rural women—Applying gender lens on TB in a rural district of Sindh, Pakistan. *International Journal of Environmental Research and Public Health, 18*(19), 10102. https://doi.org/10.3390/ijerph181910102

Jabeen, K., Nizamuddin, S., Irfan, S., Khan, E., Malik, F., & Zafar, A. (2011). Increasing trend of resistance to penicillin, tetracycline, and fluoroquinolone resistance in *Neisseria gonorrhoeae* from Pakistan (1992–2009). *Journal of Tropical Medicine, 2011*, 960501. https://doi.org/10.1155/2011/960501

Klein, E. Y., Impalli, I., Poleon, S., Denoel, P., Cipriano, M., Van Boeckel, T. P., ... & Nandi, A. (2024). Global trends in antibiotic consumption during 2016–2023 and future projections

through 2030. *Proceedings of the National Academy of Sciences, 121*(49), e2411919121. https://doi.org/10.1073/pnas.2411919121

Nogrady, B. (2023). The fight against antimicrobial resistance. *Nature, 624*(7990), S30–S32. https://doi.org/10.1038/d41586-023-03912-8

Oliveira, N. A., Gonçalves, B. L., Lee, S. H., Oliveira, C. A. F., & Corassin, C. H. (2020). Use of antibiotics in animal production and its impact on human health. *Journal of Food Chemistry & Nanotechnology, 6*(1), 13–17. https://doi.org/10.17756/jfcn.2020-082

Sarkar, D. J., Mukherjee, I., Shakil, N. A., Rana, V. S., Kaushik, P., & Debnath, S. (2018). Antibiotics in agriculture: Use and impact. *Indian Journal of Ethnophytopharmaceuticals, 4*(1), 4–19.

Riaz, H., Malik, F., Raza, A., Hameed, A., Ahmed, S., Shah, P. A., & Hussain, S. (2011). Assessment of antibiotic prescribing behavior of consultants of different localities of Pakistan. *African Journal of Pharmacy and Pharmacology, 5*(5), 596–601. https://doi.org/10.5897/AJPP11.051

Saleem, Z., Tiyani Milta Sono, & Godman, B. (2023). Concerns with current drug laws regarding the purchasing antibiotics without a prescription in Pakistan; ways forward to assist the national action plan. *Expert Review of Anti-Infective Therapy, 21*(11), 1163–1165. https://doi.org/10.1080/14787210.2023.2260096

Singer, M., & Baer, H. A. (2018). *Critical medical anthropology* (2nd ed.). Routledge.

Sunde, M., Nygaard, M. M., & Høye, S. (2019). General practitioners' attitudes toward municipal initiatives to improve antibiotic prescribing—A mixed-methods study. *Antibiotics, 8*(3), 120. https://doi.org/10.3390/antibiotics8030120

Tangcharoensathien, V., Chanvatik, S., & Sommanustweechai, A. (2018). Complex determinants of inappropriate use of antibiotics. *Bulletin of the World Health Organization, 96*(2), 141–144. https://doi.org/10.2471/BLT.17.199828

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care, 19*(6), 349–357. https://doi.org/10.1093/intqhc/mzm042

Van Boeckel, T. P., Brower, C., Gilbert, M., Grenfell, B. T., Levin, S. A., Robinson, T. P., ... & Laxminarayan, R. (2015). Global trends in antimicrobial use in food animals. *Proceedings of the National Academy of Sciences, 112*(18), 5649–5654. https://doi.org/10.1073/pnas.1503141112

Wall, S. (2019). Prevention of antibiotic resistance – An epidemiological scoping review to identify research categories and knowledge gaps. *Global Health Action, 12*(sup1), 1756191. https://doi.org/10.1080/16549716.2020.1756191

Wong, C. (2024, January 8). Antibiotic resistance is a growing threat — Is climate change making it worse? *Nature*. https://doi.org/10.1038/d41586-023-04077-0

World Health Organization. (2022, December 9). Report signals increasing resistance to antibiotics in bacterial infections in humans and need for better data. Retrieved from https://www.who.int/news/item/09-12-2022-report-signals-increasing-resistance-to-antibiotics-in-bacterial-infections-in-humans-and-need-for-better-data

World Health Organization. (2023, November 21). Antimicrobial resistance. Retrieved from https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance

Zalewska, M., Błażejewska, A., Czapko, A., & Popowska, M. (2021). Antibiotics and antibiotic resistance genes in animal manure – Consequences of its application in agriculture. *Frontiers in Microbiology, 12*, 610656. https://doi.org/10.3389/fmicb.2021.610656

Acronyms

Antimicrobial Resistance (AMR), Low and Middle-Income Countries (LMICs), World Health Organization (WHO), Multidrug-Resistant (MDR), Infection Prevention and Control (IPC), Focused Group Discussions (FGDs), Gambat Institute of Medical College (GIMS), Self-medication with antibiotics (SMA), extensive drug resistance (XDR), Over-the-counter (OTC), Upper Respiratory Infections (URTIs)