

ASSESSMENT OF THE KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS ANTIBIOTICS USE AMONG THE PUBLIC OF DISTRICT LODHRAN

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ABSTRACT

Background: Irrational use of antibiotics is a major contributor to antimicrobial resistance (AMR), particularly in rural areas of Pakistan such as District Lodhran, where low health literacy, over-the-counter availability, and informal medical advice are prevalent. Assessing public knowledge, attitudes, and practices (KAP) is essential for targeted interventions.

Objective: To evaluate the KAP regarding antibiotic use among the general public of District Lodhran.

Methods: A cross-sectional descriptive survey was conducted with 151 adults (≥ 21 years) using a structured, pre-tested questionnaire covering demographics, antibiotic knowledge, attitudes, practices, and doctor-patient interactions. Data were analyzed using SPSS 29.1, and KAP levels were categorized based on standard evaluation indicators.

Results: Most participants were middle-aged (30–39 years, 47.7%), married (62.3%), and had primary or secondary education (78.1%). About 66.9% received antibiotics in the past year, yet only 38.4% completed the full course. Self-medication was reported by 47.7%, mainly for common cold (41.7%) and sore throat (31.8%). Overall knowledge scored 52.4% (poor to moderate), with many participants incorrectly believing antibiotics treat viral infections. Attitudes were poor (49%), reflecting early discontinuation of therapy and reliance on antibiotics for minor ailments. Participants generally trusted doctors, though some noted prescribing due to patient expectations, and pharmacist counseling was moderate.

Conclusion: The study reveals substantial gaps in KAP regarding antibiotic use in District Lodhran. Community-based awareness programs, collaboration with healthcare providers, and stricter regulation of antibiotic sales are needed to promote rational use and reduce AMR. These findings support local and national strategies to improve public antibiotic behavior.

Keywords: Antibiotics, Antimicrobial Resistance, Knowledge, Attitudes, Practices, Lodhran, Pakistan

Introduction

Globally, studies show widespread public misconceptions about antibiotic use and resistance. For example, over 60 % of respondents in Italy and Malaysia believed antibiotics could treat viral infections, and a large proportion discontinued medication

once symptoms subsided (Napolitano et al., 2013; Oh et al., 2011). Research in Saudi Arabia and Indonesia demonstrated that although awareness of antibiotic resistance is increasing, risky behaviors such as self-prescription and keeping leftover drugs remain highly prevalent (Awadh et al., 2017;

Karuniawati et al., 2021). In Bangladesh and Nepal, over-the-counter sales and informal medical advice from pharmacists or family members continue to influence antibiotic consumption patterns (Raihan et al., 2024; Nepal et al., 2019). Despite global awareness campaigns, the knowledge–practice gap remains a consistent finding across most populations.

In Pakistan, the misuse of antibiotics is similarly widespread. Research conducted in Punjab revealed that while many individuals understand that antibiotics are prescription drugs, a significant proportion still obtain them without consulting healthcare professionals (Gillani et al., 2021; Khan et al., 2020). Common misconceptions include using antibiotics for viral infections, sharing medications with family members, and discontinuing therapy early once symptoms improve. These behaviors are driven by limited regulation of community pharmacies, lack of patient counseling, and insufficient public education on antibiotic resistance.

Moreover, the public's attitude toward antibiotics is often shaped by prior personal experience rather than professional guidance. Studies in Saudi Arabia, Kuwait, and Ethiopia show similar trends indicating that antibiotic misuse is a global behavioral issue, not confined to a single region (Awad & Aboud, 2015; Mengesha et al., 2020; Isah et al., 2023). Despite a growing body of international research on antibiotic use, there is limited evidence from rural Pakistani communities, especially in smaller districts such as Lodhran. Previous studies have largely focused on urban populations, healthcare professionals, or university students (Jairoun et al., 2019). However, the general public, who are often the main consumers of antibiotics without prescriptions, remain under-studied.

Another persistent controversy concerns the discrepancy between awareness and behavior. Even when individuals demonstrate adequate knowledge of antibiotic resistance, they may still engage in misuse due to cultural norms, accessibility, or cost factors (Mouhieddine et al., 2015). Hence, there is an urgent need to assess the knowledge, attitude, and practice (KAP) regarding antibiotic use among the general population of District Lodhran to

understand behavioral determinants and design context-specific awareness programs (Aldhafar & Talat, 2016).

Antibiotics have been one of the greatest medical discoveries of the 20th century, saving countless lives by effectively treating bacterial infections. However, their inappropriate and irrational use has become a serious global health concern, contributing to the rapid emergence of antimicrobial resistance (AMR) a threat recognized by the World Health Organization as one of the top ten global health challenges (Antwi, Stewart & Crosbie, 2020). Misuse includes practices such as self-medication, incomplete treatment courses, and using antibiotics without a prescription. These behaviors accelerate the development of resistant bacterial strains, making common infections harder and costlier to treat (Napolitano et al., 2013; Abu Taha et al., 2016).

In developing countries such as Pakistan, over-the-counter availability of antibiotics, limited public awareness, and inadequate regulation exacerbate this crisis (Gillani et al., 2021; Khan et al., 2020). Many individuals believe antibiotics are effective against viral infections like the flu or common cold, reflecting significant knowledge gaps. In rural districts such as Lodhran, these issues are amplified by low health literacy, poor access to professional healthcare advice, and reliance on informal drug sellers. Understanding how the general public perceives and uses antibiotics is, therefore, crucial to formulating effective public health strategies aimed at preventing AMR.

Antibiotic resistance poses a profound threat to public health, potentially rendering common infections untreatable and undermining decades of medical progress (Antwi et al., 2020). Assessing the KAP of the public is a key step in designing effective interventions to curb misuse. This study seeks to identify gaps in public understanding, misconceptions about antibiotic efficacy, and risky practices such as self-medication. The findings will contribute to the development of evidence-based health education campaigns and antimicrobial stewardship programs at both local and national levels (Hu et al., 2018).

District Lodhran represents a semi-urban region of Southern Punjab characterized by mixed literacy levels, limited healthcare access, and unregulated community pharmacies. Investigating public attitudes and practices toward antibiotics in this district provides crucial insight into the behavioral patterns of a typical Pakistani rural population. The study's findings can help inform local health departments, community pharmacies, and public health educators in developing tailored awareness initiatives to promote rational antibiotic use.

Literature Review

Antibiotics remain one of the most important medical discoveries in history, responsible for saving millions of lives since their introduction. However, their inappropriate and excessive use has become a major global public health challenge. The World Health Organization warns that antimicrobial resistance (AMR) is now one of the top ten global threats to human health (Awad and Aboud, 2015).

Research in Italy found that while most people were aware of antibiotics, a large proportion believed these drugs could cure viral infections such as the flu and common cold (Napolitano et al., 2013). Similarly, a study conducted in Malaysia reported that the majority of respondents used antibiotics without prescriptions and discontinued them once symptoms improved (Oh et al., 2011).

In Saudi Arabia, misuse of antibiotics was also found to be widespread, with many people self-medicating or using leftover drugs from previous illnesses (Awadh et al., 2017). In Ethiopia, poor understanding of antibiotic resistance and lack of public education were key contributors to misuse (Mengesha et al., 2020). Meanwhile, in Indonesia, easy access to antibiotics through community pharmacies further increased the risk of resistance development (Karuniawati et al., 2021).

The situation in Bangladesh mirrors these trends, where people commonly self-prescribe antibiotics for minor ailments (Azim et al., 2023). Similarly, community-level studies in Nepal revealed that although awareness of antibiotics existed, practices were still unsafe and inconsistent (Nepal et al., 2019). Research

among university students in China also highlighted that even educated populations frequently misuse antibiotics, indicating a persistent gap between knowledge and practice (Hu et al., 2018).

In Pakistan, misuse of antibiotics has become a pressing issue in both rural and urban areas. A study in Punjab reported that while many people understood that antibiotics are prescription drugs, more than half still purchased them without consulting a doctor (Gillani et al., 2021).

A community-based survey in Khyber Pakhtunkhwa found similar patterns, with self-medication, incomplete courses, and sharing of antibiotics being common (Khan et al., 2020). The lack of strict enforcement of pharmacy regulations has allowed easy access to antibiotics in local markets and drug stores. Studies from other countries have shown comparable outcomes. For example, in Kuwait, people frequently used antibiotics without prescriptions, reflecting global behavioral similarities (Awad and Aboud, 2015). In Ethiopia, a significant portion of the population lacked understanding about antibiotic resistance (Geta and Kibret, 2022). A recent study from Nigeria revealed that limited public awareness contributed to frequent misuse of antibiotics (Isah et al., 2023). These findings suggest that antibiotic misuse is not limited to a single region but rather a widespread public health concern that requires localized research and community education.

The global rise in antibiotic resistance is one of the greatest health threats of the modern era. A population-based survey in Lebanon demonstrated that limited knowledge and overuse of antibiotics contributed significantly to the spread of resistant bacteria (Mouhieddine et al., 2015). In Saudi Arabia, low awareness of antibiotic resistance and the tendency to self-medicate were identified as key factors driving misuse (Aldhafar and Talat, 2016). Similarly, a study in Thailand reported that more than half of the participants purchased antibiotics without professional advice (Sirijoti et al., 2014).

In Indonesia, self-medication was common even among individuals with good education levels (Karuniawati et al., 2021). A study in

Bangladesh found that people often failed to complete prescribed antibiotic courses and stored leftovers for future use (Raihan et al., 2024). Additionally, misuse of antibiotics is not limited to human medicine. Research in Turkey among livestock farmers showed a lack of understanding about antibiotic resistance, leading to widespread overuse in agriculture (Ozturk et al., 2019).

In Pakistan, the issue of antibiotic resistance has become increasingly alarming. Evidence suggests that irrational use of antibiotics contributes to prolonged illness, treatment failure, and the spread of resistant infections (Gillani et al., 2021). A study conducted in the Swat region of Khyber Pakhtunkhwa revealed that more than 70% of participants had poor understanding of antibiotic resistance and were unaware of its global implications (Khan et al., 2020).

In rural communities such as District Lodhran, weak health infrastructure, poor literacy, and lack of healthcare accessibility make the population more vulnerable to irrational antibiotic use. Local drug vendors often sell antibiotics without prescriptions, encouraging self-medication and incomplete treatment courses. The growing misuse of antibiotics in Pakistan mirrors findings from Saudi Arabia and Ethiopia, emphasizing the urgent need for comprehensive awareness programs (Awadh et al., 2017; Geta and Kibret, 2022).

Although several studies have explored public perceptions of antibiotic use in urban centers like Lahore and Islamabad, rural communities have received minimal research attention. Public knowledge and attitudes in rural Pakistan may differ significantly due to disparities in education, income, and healthcare access (Gillani et al., 2021). Community-based research from Saudi Arabia highlights the importance of localized educational campaigns to change public behavior regarding antibiotics (Awadh et al., 2017). Similarly, in Nigeria, raising awareness through community pharmacies was found effective in improving antibiotic use (Isah et al., 2023).

Given these observations, a region-specific study in District Lodhran is necessary to assess the knowledge, attitude, and practice (KAP) of the general public toward antibiotic use and

resistance. The results will provide valuable insights for developing targeted interventions and promoting rational antibiotic use across Southern Punjab.

Methodology

A cross-sectional descriptive study design was employed to assess the knowledge, attitudes, and practices (KAP) regarding antibiotic use among the general public of District Lodhran, Southern Punjab, Pakistan. The study was conducted over a period of six months, from approval of the research synopsis through completion of data analysis and report writing. The study population comprised adult residents aged 21 years and above of District Lodhran, including males and females from diverse educational and occupational backgrounds and from both urban and rural areas. A total of 151 participants were recruited using a non-probability convenience sampling technique, based on accessibility and feasibility. The sample size was calculated using the Cochran formula, with a 93% confidence level, an anticipated population proportion of 65.63%, and an absolute precision of 0.7, resulting in a sample size of 151. Participants were included if they were aged 21 years or above, residents of District Lodhran, willing to participate, and able to provide informed consent. Individuals below 21 years, those unwilling to provide consent, and healthcare professionals, including doctors, pharmacists, and nurses, were excluded to minimize professional bias. Data were collected from households, local communities, and public gathering places in both urban and rural areas.

Data were collected using a structured, pre-tested, close-ended questionnaire adapted from validated KAP instruments used in previous studies, including Awad and Aboud (2015). The questionnaire consisted of five sections covering demographic characteristics (age, gender, education, income, residence, and occupation), practices related to antibiotic use (frequency of use, prescription behavior, self-medication, storage, and sharing), knowledge regarding antibiotic functions, resistance, and effects, attitudes toward antibiotic use and self-medication, and the doctor-patient relationship concerning trust,

communication, and guidance about antibiotic use. The main study variables were knowledge, attitudes, and practices related to antibiotic use. Data were analyzed using IBM SPSS Statistics version 29.1. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics and KAP scores. Knowledge and attitude levels were interpreted according to the questionnaire scoring criteria: excellent (>80%), good (65–80%), average (50–65%), and poor (<50%), based on Ali et al. (2021). Ethical approval was obtained from the Institutional Review Committee (IRC) before data collection. Written informed consent was obtained from all participants, and their privacy, anonymity, and confidentiality were maintained throughout the study. Participants were informed of their right to withdraw from the study at any time without penalty.

Results

A total of 151 adults from District Lodhran participated in the study. The findings are

Table 4.1 Demographic Characteristics of Participants (n = 151)

Variable	Category	Frequency	Percentage
Gender	Male	86	57.0
	Female	65	43.0
Age	21 - 29	46	30.5
	30 - 39	72	47.7
	≥40	33	21.8
Marital Status	Married	94	62.3
	Single	57	37.7
Education	Primary/Secondary	118	78.1
	Intermediate/Diploma	24	15.9
	Bachelor's	6	4.0
	Master's+	3	2.0
Employment	Employed	89	58.9
	Unemployed	38	25.2
	Student	17	11.3
	Retired/Housewife	7	4.6
Residence	Urban	82	54.3
	Rural	69	45.7
Healthcare field	Yes	12	7.9
	No	139	92.1

presented according to participants' demographic characteristics, antibiotic-use practices, knowledge and attitudes, and perceptions of the patient–doctor relationship.

4.1 Demographic Characteristics of Participants

Table 4.1 presents the demographic characteristics of the 151 participants included in the study. Male participants were slightly higher (86, 57.0%) than females (65, 43.0%). Most participants were aged 30–39 years (72, 47.7%), followed by 21–29 years (46, 30.5%) and 40 years and above (33, 21.8%). Regarding marital status, the majority were married (94, 62.3%), while 57 (37.7%) were single. In terms of education, most participants had primary or secondary education (118, 78.1%), while smaller proportions had intermediate/diploma (24, 15.9%), bachelor's degree (6, 4.0%), or master's degree and above (3, 2.0%).

Most respondents were employed (89, 58.9%), followed by unemployed (38, 25.2%), students (17, 11.3%), and retired/housewives (7, 4.6%). Slightly more participants lived in urban areas (82, 54.3%) compared to rural areas (69, 45.7%).

More than half of the participants reported a monthly income below 50,000 PKR (87, 57.6%), while 64 (42.4%) earned between 50,000–100,000 PKR. Most participants rated their health as excellent (92, 60.9%), followed by very good (37, 24.5%) and good (22, 14.6%). Only 12 (7.9%) participants had a healthcare background, whereas the majority (139, 92.1%) belonged to the general public.

Practice of Antibiotic Use

The findings demonstrated several inappropriate antibiotic-use practices among

participants. Two-thirds (101, 66.9%) had received antibiotics during the previous 12 months. Only 58 (38.4%) reported completing their most recent antibiotic course, whereas 93 (61.6%) discontinued treatment before completion. Self-medication was reported by 72 (47.7%) participants. Antibiotics were commonly self-used for common cold (41.7%), sore throat (31.8%), and cough (26.5%). Furthermore, 37 (24.5%) participants reported sharing antibiotics with others. Previous prescriptions were the most common source of antibiotics (55.0%), followed by family members or friends (45.0%). Overall, these findings indicated poor/inappropriate antibiotic-use practices.

Table 2. Key Antibiotic Use Practices Among Participants (n = 151)

Practice Indicator	n	%
Received antibiotics in the previous 12 months	101	66.9
Used antibiotics once during the previous year	94	62.3
Completed the last antibiotic course	58	38.4
Did not complete the last antibiotic course	93	61.6
Discontinued because they felt better	64	42.4
Self-medicated with antibiotics	72	47.7
Self-medicated for common cold	63	41.7
Self-medicated for sore throat	48	31.8
Self-medicated for cough	40	26.5
Shared antibiotics with others	37	24.5
Obtained antibiotics from previous prescriptions	83	55.0
Obtained antibiotics from family/friends	68	45.0
Overall practice level	(50-60%) Poor/Inappropriate	

4.3 Knowledge about Antibiotics

Participants demonstrated an **average level of knowledge**, with an overall knowledge score of **52.4%**. Knowledge was comparatively better regarding the effectiveness of antibiotics against bacteria and the problem of antibiotic

resistance. However, important misconceptions were identified, particularly concerning the use of antibiotics for coughs, colds, and viral infections.

Table 3. Overall Knowledge and Attitude Toward Antibiotic Use (n = 151)

Domain	Overall result	Interpretation
Knowledge regarding antibiotic use	52.4%	Average
Attitude toward antibiotic use	—	Poor

Knowledge was categorized as excellent (>80%), good (65–80%), average (50–65%), and poor (<50%).

Overall, participants demonstrated a poor attitude toward appropriate antibiotic use. Inappropriate attitudes included stopping antibiotics when symptoms improved, obtaining antibiotics from relatives, purchasing

antibiotics without prescriptions, storing antibiotics for future use, and preferring antibiotics for cough and sore throat. These findings indicate gaps in both understanding and appropriate attitudes toward responsible antibiotic use.

4.5 Doctors' Habits and Patient-Doctor Relationship

Participants generally reported a positive level of trust in healthcare providers. More than half agreed or strongly agreed that doctors

explained antibiotic use and provided appropriate guidance. Trust in doctors was also high when antibiotics were either prescribed or not prescribed. However, a substantial proportion perceived that doctors sometimes prescribed antibiotics because of patient expectations. Overall, the findings indicated moderate confidence in healthcare providers, with scope for improving antibiotic counseling and patient-provider communication.

Table 4. Patient-Doctor Relationship and Antibiotic Counseling (n = 151)

Indicator	n	%
Agreed/strongly agreed that pharmacists explain antibiotic use	77	51.0
Agreed/strongly agreed that doctors explain antibiotic use	94	62.3
Trusted doctors when antibiotics were not prescribed	103	68.2
Trusted doctors when antibiotics were prescribed	105	69.5
Perceived that doctors prescribe antibiotics due to patient expectations	96	63.6
Agreed/strongly agreed that doctors carefully consider antibiotic necessity	95	62.9
Overall patient-doctor relationship	—	Moderate confidence/trust

Percentages for the individual indicators represent participants who selected "Agree" or "Strongly Agree."

Discussion

The current study investigated the knowledge, attitudes, and practices (KAP) regarding antibiotic use among 151 participants in the Lodhran district. By comparing these findings with existing literature, we can better understand the behavioral drivers of antibiotic resistance (AMR) in this community.

Unlike some previous regional studies that focused heavily on younger cohorts, this study primarily involved middle-aged adults, with the majority aged 30-39 years (47.7%) and married (62.3%). The gender distribution was relatively balanced, though males (57%) slightly outnumbered females (43%). A significant majority (78.1%) had only primary or secondary education, and most were employed (58.9%).

The predominance of participants with moderate education levels aligns with findings by Karuniawati et al. (2021) in Indonesia and Awad & Aboud (2015) in Kuwait. Furthermore, the accessibility of this demographic in community surveys is consistent with Gillani et al. (2021), who

noted similar participation trends in Punjab, Pakistan. The low representation of highly educated individuals (6% total for Bachelor's and Master's) suggests that public health interventions must be tailored to be accessible to those with basic literacy levels.

A concerning finding was the practice of antibiotic use. While 66.9% of participants had been prescribed antibiotics in the last year, only 38.4% completed their full course. This is significantly lower than the completion rates ideal for preventing resistance. The primary reason for non-adherence was "feeling better" (42.4%), a behavioral determinant also identified by Napolitano et al. (2013) in Italy and Oh et al. (2011) in Malaysia.

Self-medication remains a critical issue, with 47.7% of participants admitting to using antibiotics without a prescription. This mirrors the high rates of self-medication reported by Khan et al. (2020) in Pakistan and Awadh et al. (2017) in Saudi Arabia. The reliance on previous prescriptions (55%) and family/friends (45%) as sources of antibiotics highlights a culture of "medication sharing"

and home storage, similar to patterns observed in Bangladesh and Nepal (Raihan et al., 2024; Nepal et al., 2019).

The overall knowledge score of 52.4% (Poor-Moderate) indicates a "knowledge-practice gap." While 71.5% of participants correctly identified that antibiotics target bacteria, nearly half (47.1%) incorrectly believed they are effective against viruses. This confusion is a global trend, as seen in studies from Kuwait and Indonesia (Awad & Aboud, 2015; Karuniawati et al., 2021).

The misconception that antibiotics speed up recovery from the common cold (48.3% agreement) is particularly problematic, as it drives the demand for antibiotics for viral infections. Interestingly, awareness of AMR as a global threat was relatively high (68.2%), suggesting that while people recognize the *concept* of resistance, they do not necessarily understand the *actions* (like completing a course) required to prevent it. This aligns with findings in Ethiopia by Mengesha et al. (2020).

The attitude score was the lowest among the domains (49%), falling into the Poor Attitude category. Despite half of the participants agreeing that completing a course is important, an equal number (52.3%) indicated they would stop early if symptoms improved. This contradiction suggests that "socially desirable" knowledge does not always translate into personal conviction.

The preference for using antibiotics for minor ailments like a sore throat (48.4%) or a cough lasting over a week (50.4%) reflects symptomatic reliance rather than evidence-based use. Similar trends were noted by Shah et al. (2019) in Nepal, where attitudes were found to be the weakest link in antibiotic stewardship.

Trust in healthcare providers was high, with over 68% of participants trusting their doctor's decision regardless of whether an antibiotic was prescribed. However, 63.6% of participants believed that doctors sometimes prescribe antibiotics simply to meet patient expectations. This phenomenon of "pressure-prescribing" is well-documented in the Middle East and Lebanon (Mouhieddine et al., 2015; Aldhafar & Talat, 2016).

Pharmacists were seen as moderate contributors to patient education, with 51% of participants agreeing that pharmacists explain proper use. This indicates a significant opportunity for pharmacists to act as the "final gatekeeper" in the community. As suggested by Isah et al. (2023), increasing pharmacist-led counseling can bridge the knowledge gap and improve adherence rates in rural and urban settings alike.

Conclusion

In conclusion, this study underscores the urgent need for comprehensive public education, community engagement, and policy enforcement to improve knowledge, attitudes, and practices regarding antibiotic use in District Lodhran. While participants demonstrated some awareness of antibiotics and resistance, significant gaps were observed in correct usage, adherence to prescribed courses, and avoidance of self-medication and sharing practices. Misconceptions such as using antibiotics for viral infections or stopping medication once symptoms improve persist despite partial knowledge. Addressing these gaps through targeted awareness campaigns, collaboration with healthcare providers, and stricter regulation of over-the-counter antibiotic sales can help curb irrational use and reduce the risk of antimicrobial resistance. The findings highlight the critical role of both community education and systemic measures in promoting responsible antibiotic behavior and safeguarding public health.

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