DOI: https://doi.org/10.53350/pjmhs20231709300

ORIGINAL ARTICLE

Knowledge, Attitudes, and Practices Regarding Antibiotic Use for Children Among Mothers Living in Islamabad

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ABSTRACT

Background: The escalating incidence of antibiotic resistance is a critical global health threat, disproportionately affecting developing nations like Pakistan due to the excessive and unnecessary use of antibiotics in children.

Aim & Objectives: This study aims to assess the knowledge, attitudes, and practices regarding antibiotic use among mothers for their children under 10 years of age living in Islamabad.

Methodology: An analytical cross-sectional study was conducted using purposive sampling, involving 246 mothers from various hospital outpatient departments and malls in Islamabad. Data were collected via a self-administered questionnaire and analyzed using SPSS version 23.0 to determine associations using chi-square tests.

Results: Among the 246 participants, 48.37% had poor, 46.34% had moderate, and only 5.28% demonstrated good knowledge of antibiotics. Regarding attitudes, 63.41% exhibited a satisfactory approach, while 51.22% showed good practices. A significant positive association was observed between maternal education and antibiotic knowledge ($p = 0.050$), and between knowledge and practice ($p = 0.002$). Additionally, 38.6% of mothers reported purchasing antibiotics without a doctor's prescription.

Conclusion: Significant misconceptions regarding the indications and use of antibiotics exist among mothers, alongside a prevalent lack of knowledge about antibiotic resistance. Despite some awareness of the associated risks, inappropriate practices like using unprescribed antibiotics persist.

Keywords: Antibiotic Resistance, Knowledge, Attitudes, Practices, Mothers, Pakistan, Self-medication.

INTRODUCTION

Antibiotics are a class of drugs that are prescribed for bacterial infections. Antibiotics are probably one of the most successful forms of chemotherapy in the history of medicine. They have saved many millions of lives and brought the majority of infectious diseases that have plagued human history for centuries under control. Initially, upon their introduction into clinical practice, antibiotics were extremely effective at clearing pathogenic bacteria, leading many to believe that infectious diseases would become a problem of the past and eventually be wiped out from all human populations. However, the emergence and rapid dissemination of antibiotic-resistant pathogens, especially multidrug-resistant bacteria, in recent decades have exposed our limited understanding of the evolutionary and ecological processes within microbial ecosystems. Bacterial resistance is the capability of bacterial cells to prevent the bacteriostatic or bactericidal effects of antibiotics. Noncompliance with recommended and prescribed therapy, which can include self-prescription, incomplete treatment, missed doses, taking sub-optimal doses, and refusing leftover antibiotics, can contribute to the development of antibiotic resistance.

This is a global health concern, particularly in less developed nations where the prevalence of antibiotic-resistant bacteria is high, with South Asia being recognized as a central region for this issue. It has been estimated that more than 70% of antibiotic resistance occurs in the Asia-Pacific region, making antimicrobial resistance extremely problematic for Asian countries[1], with Pakistan, a developing country in South Asia, being particularly susceptible. The prevalence of antibiotic resistance in Pakistan represents a significant regional and global threat, as evidenced by the outbreak of XDR Salmonella in 2016, which demonstrated 100% resistance to fluoroquinolones. A bloodstream infection study showed that 93.7% of resistant isolates were resistant to third-generation cephalosporin, and the prevalence of Metallo-β-lactamase (MBL) was as high as 71%, and Extended Spectrum β-Lactamase (ESBL) was up to 40%[2]. Despite the alarming statistics, there is a dearth of published studies examining the knowledge, attitudes, practices, and determinants of antibiotic use among mothers in Islamabad.

Received on 15-07-2023
Accepted on 15-09-2023

Literature Review: Knowledge regarding the use of antibiotics was tested in different national and international studies. Most of these studies found a lack of knowledge and awareness about antibiotic use.

A cross-sectional study conducted in Peru says that 79% of participants did not know that antibiotics cannot cure viral infections. The largest gap in attitudes was among 80% who said they would not be satisfied if the doctor refused to prescribe it. More than half of the participants reported having self-medicated their child with antibiotics. A positive correlation was observed between knowledge and attitude. Parents who were less than 20 years old were more likely to have low knowledge about antibiotics compared to those aged 40 years or older[3].

A study in Pediatric OPD in India revealed that 49.6% of mothers had moderately adequate knowledge, 92.1% of mothers had moderately favorable attitudes, and 70% of mothers had unsatisfactory practice towards antibiotic use for their children[4]

A cross-sectional study was conducted in Kuala Lumpur, on 320 parents between April and July 2015. Most of the respondents were mothers (74.1%). About two-thirds (69.1%) of the parents had poor knowledge. Only 25.2% and 21.6% of the parents could correctly identify amoxicillin and penicillin as the treatment of children's URTI. However, about two-thirds (67.5%) of the parents were aware of the antibiotic resistance caused by overuse of antibiotics. Only the mother's educational level depicted a significant association with the attitude[5]

An Online Study was conducted among Pakistani Community Pharmacists to promote rational antibiotic use. They revealed that the majority of patients use antibiotics without a pharmacist's consultation; even when they are counseled, they sometimes do turn up for a refill of their antibiotic prescription, and most consumers do not know that metronidazole is an antibiotic and always demand its use, although they may not need it[6].

A cross-sectional study was conducted in an urban Mongolian community to assess non-prescribed antibiotic use for children. Findings indicated a high prevalence of non-prescribed antibiotic use among young children. Of 503 participants, 71% were mothers, 42.3% of caregivers had used non-prescribed antibiotics for their children. Non-prescribed antibiotics were associated with keeping the antibiotics at home[7].

The article reports a cross-sectional survey of 1,505 Malaysian children aged 0-12 years to investigate medicine use patterns, prevalence, and predictors. The study found that 70.6% of children had used at least one medicine in the previous two weeks, with paracetamol, cough and cold remedies, and antibiotics being the most commonly used. The study also revealed that polypharmacy was prevalent, with 38.7% of children using two or more medicines. Factors associated with higher medicine use included younger age, urban residence, higher household income, and having a chronic illness. The article highlights the need for healthcare professionals to promote safe and rational medicine use and the importance of parental education and awareness of medicine safety[8]

The article is about a study conducted to assess knowledge of antibiotic use, misuse, and resistance in the slum community of Karachi, Pakistan. The study was conducted using a community-based cross-sectional survey for six months from January to June 2017. The majority of the 120 participants were males, married, and between the ages of 15 and 30. The results showed a lack of knowledge about antibiotics and the unnecessary, improper use of them. About 73% of the subjects believed that antibiotics were effective in treating both bacterial and viral infections. Additionally, 60.83% of respondents purchased antibiotics with a prescription, 70% were aware of antibiotic adverse drug reactions, and 60.83% stopped taking antibiotics when they felt better. The study concluded that a lack of knowledge and unnecessary or improper antibiotic use may contribute to antibiotic resistance[9]

Rationale: The escalating incidence of antibiotic resistance in Pakistan, largely attributable to excessive and unnecessary use of antibiotics in children, warrants urgent attention. To mitigate this issue, there is a need to closely monitor and address the behavior of mothers, who are often the primary caregivers administering antibiotics to their children. To develop effective and targeted interventions to promote appropriate antibiotic use and prevent antibiotic resistance, researchers must gain a comprehensive understanding of the cultural, social, and economic factors that shape antibiotic use practices. Moreover, it is essential to identify potential disparities or inequities in access to healthcare and antibiotics that may exacerbate antibiotic resistance.

Aim and objectives: The primary aim of this study is to assess the knowledge, attitudes, and practices (KAP) regarding antibiotic use among mothers in Islamabad for their children. Specifically, this study seeks to determine the extent of mothers' foundational knowledge and identify prevalent misconceptions regarding the appropriate indications and side effects of antibiotics. Furthermore, it investigates maternal attitudes toward antibiotic prescription and analyzes their actual self-reported practices regarding pediatric antibiotic administration.

METHODOLOGY

An analytical cross-sectional study design was used. The study duration was from Jan 2023 to June 2023. The study population consisted of mothers from different socio-economic backgrounds living in Islamabad, with children under 10 years of age. The study area included OPDs at PAF Hospitals, PIMS, and Shifa, as well as malls in Islamabad. Convenience sampling was used. The sample size was calculated to be 246, with a 6.25% margin of error and a 95% confidence interval. The data collection tool was a self-administered questionnaire. The questionnaire was filled out by the mothers in the presence of the researchers. Data was analyzed by using SPSS version 23.0

Inclusion and Exclusion Criteria: Mothers residing in Islamabad, Pakistan, with children under 10 years of age who agreed to provide informed consent and participate in the study. Mothers who belonged to the medical profession (Doctors, Nurses) and those who are unable to provide informed consent or participate in the study for any reason (e.g., cognitive impairment, physical ailment, language barrier, etc.).

Ethical consideration: The IRB FMC granted permission to carry out this study. Informed written consent was obtained from the participants before they answered the questionnaire.

RESULTS

The study assessed the knowledge, attitudes, and practices (KAP) of 246 mothers in Islamabad regarding antibiotic use for their children. The majority of the participants were between 30 and 40 years old, identified as housewives, and resided in urban areas of Islamabad.

Overall KAP Scores. The results reveal a significant gap in foundational knowledge: nearly half of the mothers (48.37%) demonstrated poor knowledge of antibiotics, 46.34% had moderate knowledge, and only 5.28% had good knowledge. Despite this lack of knowledge, the mothers generally showed positive behavioral intentions, with 63.41% exhibiting a satisfactory attitude and 51.22% demonstrating good overall practices.

Significant Associations The data analysis identified two statistically significant relationships that explain these outcomes. First, there is a significant positive correlation between a mother's level of education and her knowledge regarding antibiotics (p=0.05). Mothers who were graduates or had higher levels of education were far more likely to have moderate or good knowledge than those with lower levels of education. Second, knowledge directly impacts practice (p=0.002). Mothers with poor knowledge were much more likely to exhibit poor antibiotic practices, whereas those with moderate to good knowledge demonstrated better practical application. Other variables, such as place of residence, did not have a statistically significant impact on knowledge, attitude, or practice.

Concerning Practices: While overall practices leaned positive, specific behaviors linked to self-medication were prevalent. For example, 38.6% of mothers admitted to purchasing antibiotics without a doctor's prescription. Additionally, cultural habits around sharing medications were common, with 47.2% of mothers sharing antibiotics with family or friends, and 44.7% retaining leftover antibiotics at home for future use.

Below are three key tables from the study that highlight the most important statistical associations and specific practices:

This table demonstrates the significant impact of formal education on a mother's understanding of antibiotics (p-value = 0.05)

Table 1: Association Between Level of Education and Knowledge

Level of Education	Poor Knowledge	Moderate Knowledge	Good Knowledge	Total
Under-matric	24	12	1	37
Matric	26	21	3	50
Intermediate	36	26	4	66
Graduate and above	33	55	5	93
Total	119	114	13	246

Table 2 illustrates that a mother's level of knowledge directly influences whether she uses antibiotics appropriately (p-value = 0.002). Table 2: Association Between Knowledge and Practice

KNOWLEDGE LEVEL	POOR PRACTICE	GOOD PRACTICE	Total
POOR	72	47	119
MODERATE	43	71	114
GOOD	5	8	13
TOTAL	120	126	246

Table 3 shows the percentage of mothers engaging in specific behaviors, highlighting issues with self-medication and medication sharing. Table 3: Specific Self-Reported Antibiotic Practices

Practice	Yes	No
Do you complete the full course of antibiotics prescribed for your child?	63.8%	36.2%
Do you follow the instructions for making antibiotics?	82.5%	17.5%
Have you ever purchased antibiotics without a doctor's prescription?	38.6%	61.4%
Have you ever shared antibiotics with someone else (family member or friend)?	47.2%	52.8%
Do you keep leftover antibiotics at home?	44.7%	55.3%

DISCUSSION

Antibiotics are among the most commonly misused medications globally, a trend particularly prevalent in developing countries like Pakistan, where it significantly contributes to antimicrobial resistance and the normalization of self-medication. This cross-sectional study in Islamabad is uniquely significant as it is the first to focus exclusively on mothers, who are the primary caretakers of children under 10 years of age. Our findings reveal a critical gap in foundational understanding: while mothers generally exhibited satisfactory attitudes (63.41%) and good overall practices (51.22%), nearly half (48.37%) demonstrated poor knowledge about antibiotics, with only 5.28% possessing good knowledge. These results are consistent with a pediatric outpatient study in India, which similarly found that while mothers possessed moderately favorable attitudes (92.1%), there were significant deficits in knowledge and practice.

A central sociocultural determinant identified in our research is a significant positive correlation between a mother's level of formal education and her knowledge of antibiotics ($p = 0.05$). The data establish that higher education equips mothers with better health literacy: of 93 mothers with a graduate-level education or higher, 60 demonstrated moderate-to-good knowledge. In stark contrast, 24 out of 37 mothers with an under-matriculation education exhibited poor knowledge. This direct relationship between formal education and responsible antibiotic knowledge aligns closely with findings from a study in Navi Mumbai, India, where 90% of postgraduates scored highly on KAP assessments compared to only 67% of those educated up to high school.

Despite this overarching lack of foundational knowledge, a surprisingly high proportion of mothers were aware of the potential negative consequences of antibiotic misuse. Our study found that 72.2% of mothers were aware that the inappropriate use of these medications can lead to antibiotic resistance. This reflects a higher baseline level of awareness than previous regional research, such as a study in Peshawar, which found that only 51% of parents were aware of the side effects of antibiotics. However, this awareness does not necessarily translate to a correct understanding of when antibiotics should be used. Significant misconceptions persist regarding viral illnesses; 52.8% of mothers agreed that antibiotics treat viral gastroenteritis, and 33.7% believed they treat viral skin infections. This fundamental confusion between bacterial and viral treatments mirrors broader trends, such as a Peruvian study in which 79% of participants did not know that antibiotics cannot cure viral infections, and a Karachi slum community study in which 73% of subjects believed that antibiotics effectively treat both bacterial and viral infections.

Finally, systemic healthcare access and deeply ingrained cultural habits surrounding medication sharing actively undermine proper antibiotic practices. The communal approach to healthcare is evident in the high rates of self-medication: 47.2% of mothers reported sharing antibiotics with friends or family members, and 44.7% keep leftover antibiotics at home. Furthermore, 38.6% of mothers admitted to purchasing antibiotics without a doctor's prescription. Interestingly, this rate of unprescribed purchasing closely parallels the 2017 Karachi slum study, which found that 60.83% of respondents purchased antibiotics with a prescription, implying that nearly 40% bypassed professional medical consultation. The continued ease of acquiring over-the-counter antibiotics facilitates these dangerous self-medication practices, emphasizing the urgent need for strict governmental enforcement of prescription laws and targeted mass media campaigns to educate mothers on the safe use of antibiotics.

Limitations: There are a few limitations of this study. Firstly, it was conducted in a single city, so the results may not be representative of the entire population. Secondly, as with other questionnaire studies, it relies on respondents' honesty and recall. This study took place in an urban setting, where people are usually more literate, have better access to mass media, and may have received more information about antibiotics than in rural settings. Also, it is limited to antibiotic use in children, and further studies may be conducted to evaluate their use in other population groups.

CONCLUSION

This study highlights a critical dichotomy in mothers' use of pediatric antibiotics in Islamabad: while general attitudes towards antibiotic administration are largely satisfactory, there is a profound deficit in foundational knowledge of their appropriate use. Despite a high baseline awareness that inappropriate antibiotic use contributes to antimicrobial resistance, significant misconceptions persist, most notably the erroneous belief that antibiotics are an effective treatment for viral infections.

Crucially, our findings establish that a mother's level of formal education is significantly associated with her understanding of antibiotics, and this knowledge directly dictates the safety of her clinical practices. Because lower health literacy correlates with dangerous, deeply ingrained habits, such as purchasing unprescribed antibiotics, retaining leftover stock at home, and sharing medications with family or friends, awareness alone is insufficient to curb misuse.

To effectively combat the escalating threat of antibiotic resistance in Pakistan, multifaceted interventions are urgently required. These must include the strict governmental enforcement of laws prohibiting the over-the-counter sale of antibiotics without a physician's prescription. Furthermore, public health initiatives and mass media campaigns must move beyond general warnings about resistance; they should specifically target mothers with clear, accessible education distinguishing between viral and bacterial illnesses to promote safe, evidence-based pediatric care.

Recommendations: There should be interaction between health care providers and mothers in the clinical settings. Mass media campaigns can be conducted to educate mothers on the safe use of antibiotics. Strict laws should be enforced by the government to prevent the use of antibiotics without a physician's prescription. Further inquiry into the consequences of this highly prevalent exposure among children will be an important contribution to our understanding of antibiotic use in low-resource settings.

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This article may be cited as: Mazhar M. H., Zafar M. B., Javed M. U., Khalid Z., Mustehsan Z. H., Noreen I., Nawaz A., Anwar M., Knowledge, Attitudes, and Practices Regarding Antibiotic Use for Children Among Mothers Living in Islamabad. Pak J Med Health Sci, 2023; 17(9): 300-302.