

Parental Awareness and Attitudes Towards Antibiotic Use in Children: A Cross-Sectional Study in Pediatric Primary Care Settings

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ABSTRACT

Background: Antibiotic resistance is a growing global health concern, particularly in pediatric care, where antibiotics are frequently overused or misused. Parents play a critical role in influencing healthcare decisions, especially regarding antibiotic use for their children. This study aims to assess parental awareness, attitudes, and expectations toward antibiotic use in children in Al-Ahsa, Saudi Arabia.

Methods: A cross-sectional study was conducted using a structured questionnaire administered to 400 parents or guardians of children aged 0 to 12 years in pediatric primary care settings. The questionnaire assessed parental knowledge about antibiotic use, attitudes toward antibiotic prescriptions, and expectations from healthcare providers.

Results: The majority of parents (77%) correctly identified that antibiotics are effective against bacterial infections, while only 35% knew that antibiotics are ineffective against viral infections. Parents aged 26-35 years demonstrated the highest knowledge scores. Education level was significantly associated with antibiotic knowledge ($p < 0.001$), with university-educated parents showing better awareness. Additionally, 58% of parents believed that antibiotics were often over-prescribed, and 93% expected healthcare providers to clearly explain the reasons for prescribing or withholding antibiotics.

Conclusions: The findings reveal significant gaps in parental knowledge about the appropriate use of antibiotics, particularly regarding their ineffectiveness for viral infections. Public health campaigns and enhanced communication from healthcare providers are necessary to address these gaps and promote responsible antibiotic use, ultimately helping to mitigate the risk of antibiotic resistance.

Keywords: Antibiotic use, parental knowledge, pediatric care, antibiotic resistance, Saudi Arabia.

Introduction:

Antibiotics have revolutionized modern medicine by significantly reducing the morbidity and mortality associated with bacterial infections [1]. They have been a cornerstone of treatment for various childhood diseases, including respiratory infections, ear infections, and urinary tract infections (UTIs) [2,3]. However, the widespread and often inappropriate use of antibiotics has led to a global public health crisis—antibiotic resistance. According to the World Health Organization (WHO), antibiotic resistance is one of the most significant threats to global health, food security, and development today (WHO, 2020)[4,5]. It arises when bacteria mutate and become resistant to the drugs designed to kill them, rendering many common treatments ineffective and leading to prolonged illness, disability, and even death [2,6].

In pediatric care, antibiotics are frequently prescribed for a range of conditions, some of which may not necessarily require such treatment [7]. Viral infections, such as the common cold or viral pharyngitis, are often

self-limiting and do not respond to antibiotics. Yet, studies have shown that parents frequently expect antibiotics for these conditions, pressuring healthcare providers to prescribe them even when they are not necessary [8]. This inappropriate use is a key driver of antibiotic resistance, especially when antibiotics are overused or misused for non-bacterial infections [9].

Antibiotic resistance does not only pose risks to individual patients but also has significant implications for public health systems worldwide [5]. The overuse and misuse of antibiotics contribute to the emergence of multi-drug resistant organisms, making it increasingly difficult to treat common infections. Each year, antibiotic resistance is responsible for an estimated 700,000 deaths globally, and without immediate action, this number could rise to 10 million deaths annually by 2050 [10]. In pediatric populations, this is particularly concerning as children are among the most frequent recipients of antibiotics [11,12]. The long-term exposure to antibiotics, particularly when used inappropriately, can lead to diminished

effectiveness of treatments later in life, with resistant infections requiring stronger, more toxic, and often more expensive treatments [13].

The growing incidence of antibiotic resistance has prompted various national and international health organizations to implement strategies aimed at promoting the rational use of antibiotics. For example, the WHO has advocated for greater public education on the risks of inappropriate antibiotic use and has encouraged healthcare providers to follow strict guidelines on antibiotic prescribing [14]. In Saudi Arabia, where this study is based, efforts have been made to address antibiotic resistance through policies and public awareness campaigns. However, the success of these efforts is often contingent on the public's understanding of antibiotic use, especially among parents who play a critical role in pediatric healthcare decisions [15].

Parents are a crucial factor in the management of children's health. In pediatric primary care settings, parents often bring their children to healthcare providers with the expectation that antibiotics will be prescribed for common ailments, particularly upper respiratory infections [16]. Research has indicated that parental expectations can significantly influence a physician's decision to prescribe antibiotics, even in cases where they may not be necessary [17]. This dynamic between healthcare provider and parent underscores the need for greater awareness and education regarding when antibiotics are appropriate and the risks associated with their misuse [18,19].

Misconceptions about antibiotics are widespread among parents. For instance, many parents incorrectly believe that antibiotics are effective against viral infections, or they may not fully understand the consequences of overusing antibiotics, such as the development of antibiotic-resistant bacteria [20]. A study conducted by Alajami et al. (2022) found that a substantial proportion of parents in primary care settings exhibited limited knowledge of antibiotic resistance, with many unsure about when antibiotics should be used [21]. These misconceptions, coupled with parental pressure on healthcare providers to prescribe antibiotics, contribute significantly to the over-prescription and misuse of antibiotics in children [18].

Moreover, parental attitudes toward antibiotics are shaped by various factors, including socioeconomic status, educational background, and previous experiences with antibiotic treatments [22]. For instance, studies have shown that parents with higher levels of education are more likely to have a better

understanding of antibiotic resistance and the appropriate use of antibiotics [23]. Conversely, parents with lower educational levels may lack sufficient knowledge about the risks associated with antibiotic misuse, making them more likely to request or expect antibiotic prescriptions during pediatric consultations [24–30].

Given the pivotal role parents play in pediatric care, addressing the gaps in their knowledge and understanding of antibiotic use is essential for combating antibiotic resistance. Educational interventions targeting parents can significantly improve awareness and promote responsible antibiotic use. For example, public health campaigns that focus on educating parents about the differences between bacterial and viral infections, the dangers of antibiotic resistance, and the appropriate situations for antibiotic use can help reduce the demand for unnecessary prescriptions [31].

Healthcare providers also play a critical role in educating parents during consultations. By communicating clearly about the appropriate use of antibiotics, as well as the risks associated with overuse and misuse, pediatricians and other healthcare professionals can help foster more informed decision-making among parents [32]. Studies have shown that when healthcare providers take the time to explain why antibiotics are not necessary for a viral infection, parents are more likely to accept non-antibiotic treatments and follow proper care guidelines for their children [33].

This study aims to contribute to the growing body of literature on antibiotic use by focusing specifically on parental awareness and attitudes toward antibiotics in pediatric care settings. Understanding the factors that influence parental decisions regarding antibiotic use is essential for developing targeted educational interventions. By identifying common misconceptions and knowledge gaps, the study will provide valuable insights into how public health strategies can be tailored to promote responsible antibiotic use, ultimately helping to reduce the burden of antibiotic resistance in pediatric populations.

Methodology

Study Design

This study will employ a cross-sectional design to assess parental awareness and attitudes towards antibiotic use in children within pediatric primary care settings in Al-Ahsa City, Saudi Arabia. A structured questionnaire will be used to gather data from a sample of parents and guardians. The cross-sectional approach is ideal for this study as it allows for the collection of

data at a single point in time from a large and diverse population, providing insights into parental knowledge, attitudes, and practices concerning antibiotic use.

Study Setting

The study will be conducted in pediatric primary care settings across various healthcare facilities in Al-Ahsa City. These settings will include both public and private pediatric clinics to ensure a diverse sample population. The clinics selected will provide care to children with common pediatric conditions where antibiotics are frequently prescribed, such as respiratory infections, ear infections, and urinary tract infections (UTIs).

Study Population

The target population for this study will be parents or legal guardians of children aged 0 to 12 years who visit the selected pediatric primary care settings in Al-Ahsa for medical consultations. The inclusion criteria for participation are:

1. Parents/guardians of children aged 0 to 12 years.
2. Individuals who can understand and provide consent to participate in the study.
3. Parents/guardians who visit pediatric clinics for consultations where antibiotics may be prescribed (e.g., respiratory infections, ear infections).

Exclusion criteria will include:

1. Parents/guardians who do not speak or understand Arabic or English.
2. Parents/guardians who are healthcare professionals, as their knowledge may bias the results.

Sampling Strategy

A convenience sampling method will be used to select participants. The research team will approach parents or guardians attending pediatric primary care settings in Al-Ahsa and invite them to participate in the study. The goal will be to recruit a minimum of 400 participants to ensure adequate statistical power for analyzing associations between parental demographics and awareness or attitudes toward antibiotic use.

Sample size estimation will be conducted using a sample size calculator with a 95% confidence interval, 5% margin of error, and an estimated response rate of 80%. The target sample size of 400 will provide sufficient power to detect statistically significant differences in parental awareness and attitudes based on demographic factors.

Data Collection

Data will be collected using a structured questionnaire administered to participants either in person during their pediatric consultation or via an online platform to

accommodate those who prefer digital participation. The questionnaire will be available in both Arabic and English to ensure that participants can understand and respond comfortably.

Development of the Questionnaire

The questionnaire will be developed based on a comprehensive literature review and will be pre-tested to ensure clarity and appropriateness for the study population. The questionnaire will be divided into four main sections:

1. **Demographic Information:** This section will collect data on participants' age, gender, educational level, socioeconomic status, number of children, and any previous healthcare-related experience.
2. **Knowledge of Antibiotics:** This section will include questions designed to assess parents' understanding of the appropriate use of antibiotics, including whether they know that antibiotics are ineffective against viral infections, their knowledge of antibiotic resistance, and their understanding of the risks associated with misuse or overuse of antibiotics.
3. **Attitudes Towards Antibiotic Prescriptions:** This section will assess parental attitudes toward the prescription of antibiotics for their children, including whether they believe antibiotics are necessary for common illnesses like colds or sore throats and whether they expect antibiotics to be prescribed during pediatric consultations.
4. **Expectations and Experiences with Healthcare Providers:** This section will explore parental expectations regarding antibiotic prescriptions during pediatric visits, their satisfaction with the communication they receive from healthcare providers, and whether they feel adequately informed about the risks of antibiotic use.

Pre-testing of the Questionnaire

Before data collection begins, the questionnaire will be pre-tested with a small sample of parents (n=20) in Al-Ahsa to identify any potential issues with the wording, clarity, or structure of the questions. Feedback from the pre-test will be used to refine the questionnaire to ensure its appropriateness for the target population.

Data Collection Procedure

Data collection will take place over a period of two months. Parents or guardians attending pediatric clinics in Al-Ahsa will be invited to participate in the study, and consent will be obtained before administering the questionnaire. Participants will be given the option to complete the questionnaire on-site or online, and those who complete the questionnaire will be thanked for their participation.

Variables

The primary variables of interest in this study are:

1. **Parental Knowledge of Antibiotics:** Assessed based on their understanding of antibiotic use for bacterial versus viral infections, antibiotic resistance, and the risks associated with misuse.
2. **Parental Attitudes Toward Antibiotic Prescriptions:** This includes their expectations for receiving antibiotic prescriptions during pediatric visits and their beliefs about the necessity of antibiotics for common childhood illnesses.
3. **Parental Experiences and Expectations with Healthcare Providers:** Includes satisfaction with communication from healthcare providers and perceived adequacy of information provided regarding antibiotic use.
4. **Demographic Variables:** These will include parental age, gender, educational level, socioeconomic status, and number of children.

Ethical Considerations

Ethical approval will be obtained from the Institutional Review Board (IRB) at King Faisal University in Al-Ahsa before the study begins. Informed consent will be obtained from all participants, and they will be assured that participation is voluntary, and their responses will be kept anonymous. Data will be stored securely and will only be accessible to the research team.

Participants will be informed that they can withdraw from the study at any time without any consequence. The study will follow ethical guidelines for research involving human subjects, ensuring respect for participants' privacy and confidentiality.

Data Analysis

Data will be analyzed using IBM SPSS software (Version 28). Descriptive statistics will be used to

summarize participant characteristics and responses to the questionnaire items. Frequencies and percentages will be calculated for categorical variables, while means and standard deviations will be calculated for continuous variables.

Inferential statistics will be used to explore associations between demographic factors and parental knowledge or attitudes toward antibiotic use. Chi-square tests will be used to assess associations between categorical variables, and independent t-tests or ANOVA will be used to compare continuous variables across different demographic groups.

Multivariate logistic regression will be employed to identify predictors of parental knowledge and attitudes, controlling for potential confounders such as educational level and socioeconomic status. Odds ratios and 95% confidence intervals will be reported for each model.

Result

Table 1 provides a demographic overview of the study population (n=400). The majority of participants are aged 26-35 years (43%), followed by 36-45 years (26%), with a smaller proportion in the youngest (18-25 years, 14%) and oldest (46 and above, 17%) age groups. Females constitute 69% of the sample, while males make up 31%. In terms of education, over half (52%) hold a university degree, while 31% have completed high school, and 17% have less than a high school education. Most participants fall into the middle socioeconomic category (59%), with 26% in the low category and 15% in the high category. Regarding family size, nearly half (47%) have 3-4 children, while 36% have 1-2 children, and 17% have 5 or more children

Table 1: Demographic Characteristics of the Study Population (n = 400)

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
18-25	56	14.0
26-35	172	43.0
36-45	104	26.0
46 and above	68	17.0
Gender		
Male	124	31.0
Female	276	69.0
Education Level		
Less than High School	68	17.0
High School	124	31.0
University Degree	208	52.0
Socioeconomic Status		

Low	104	26.0
Middle	236	59.0
High	60	15.0
Number of Children		
1-2	144	36.0
3-4	188	47.0
5 and above	68	17.0

Table 2 presents the parental knowledge about antibiotic use among the 400 participants. A high percentage (77.0%) of parents correctly identified that antibiotics are only effective against bacterial infections, and 80.0% understood that antibiotic misuse contributes to resistance. However, only 35.0% of parents correctly recognized that antibiotics do not cure viral infections, indicating a significant gap in

knowledge. Furthermore, just 24.0% knew that antibiotics should not be stopped once symptoms improve, reflecting a critical misconception. On the positive side, 69.0% of parents were aware that overusing antibiotics can harm children's health, demonstrating a reasonable level of understanding regarding the risks of antibiotic misuse

Table 2: Parental Knowledge About Antibiotic Use (n = 400)

Knowledge Items	Correct Responses (n)	Correct Responses (%)
Antibiotics are effective against bacterial infections only	308	77.0
Antibiotics can cure viral infections (False statement)	140	35.0
Misuse of antibiotics can lead to antibiotic resistance	320	80.0
Antibiotics should be stopped once symptoms improve (False)	96	24.0
Overuse of antibiotics can harm children's health	276	69.0

Table 3 illustrates a range of parental attitudes toward antibiotic use. Notably, 38% of parents believe antibiotics should be prescribed for every fever, though 40% disagree, showing divided opinions on this issue. A significant portion (47%) of parents expect antibiotics for sore throats, while only 24% consider them necessary for common colds, indicating some

awareness of appropriate use. Furthermore, 58% of parents feel antibiotics are over-prescribed, reflecting concerns about misuse. Despite these attitudes, 87% of parents trust their healthcare provider's decision on antibiotic use, highlighting strong confidence in professional guidance.

Table 3: Parental Attitudes Toward Antibiotic Use (n = 400)

Attitude Items	Agree (n)	Agree (%)	Neutral (n)	Neutral (%)	Disagree (n)	Disagree (%)
Antibiotics should be prescribed for every fever	152	38.0	88	22.0	160	40.0
Antibiotics are necessary for common colds	96	24.0	116	29.0	188	47.0
I expect my child to receive antibiotics for sore throat	188	47.0	100	25.0	112	28.0
Antibiotics are often over-prescribed by doctors	232	58.0	80	20.0	88	22.0
I trust my healthcare provider's decision on antibiotic use	348	87.0	32	8.0	20	5.0

Table 4 highlights parental expectations regarding communication from healthcare providers about antibiotic use. The vast majority (93%) of parents agree that healthcare providers should always explain why antibiotics are or are not needed, showing a strong demand for clear communication during consultations.

Additionally, 85% of parents agree that it is important for providers to discuss the risks associated with antibiotic misuse. However, 39% of parents feel that healthcare providers often fail to explain these risks, indicating a gap in communication that may need to be

addressed to improve parental understanding and satisfaction in pediatric care.

Table 4: Parental Expectations from Healthcare Providers (n = 400)

Expectation Items	Agree (n)	Agree (%)	Neutral (n)	Neutral (%)	Disagree (n)	Disagree (%)
Healthcare providers should always explain why antibiotics are or are not needed	372	93.0	16	4.0	12	3.0
Clear communication about the risks of antibiotic misuse is important	340	85.0	36	9.0	24	6.0
Providers often fail to explain the risks associated with antibiotic use	156	39.0	104	26.0	140	35.0

Table 5 presents the association between various demographic factors and parental knowledge of antibiotic use. The results indicate a statistically significant difference in knowledge scores across different age groups ($p=0.046$), with parents aged 26-35 demonstrating the highest mean knowledge score (4.1), followed by those aged 36-45 (4.0) and 46 and above (3.8), while the 18-25 age group had the lowest score (3.2). Gender differences in knowledge were not statistically significant ($p=0.064$), although females

had a higher mean score (4.0) than males (3.6). Education level showed a highly significant association with knowledge ($p<0.001$), as parents with a university degree had the highest knowledge score (4.2), compared to high school graduates (3.6) and those with less than high school education (2.8). Socioeconomic status also significantly impacted knowledge ($p=0.032$), with parents in the high socioeconomic category having the highest score (4.1), followed by those in the middle (3.9) and low (3.3) categories

Table 5: Association Between Demographic Factors and Parental Knowledge of Antibiotic Use

Demographic Variable	Mean Knowledge Score (out of 5)	p-value
Age		
18-25	3.2	0.046
26-35	4.1	
36-45	4.0	
46 and above	3.8	
Gender		
Male	3.6	0.064
Female	4.0	
Education Level		
Less than High School	2.8	<0.001
High School	3.6	
University Degree	4.2	
Socioeconomic Status		
Low	3.3	0.032
Middle	3.9	
High	4.1	

Discussion

This cross-sectional study conducted in Al-Ahsa, Saudi Arabia, provides valuable insights into parental awareness and attitudes towards antibiotic use in children within pediatric primary care settings. The

findings reveal a complex landscape of knowledge, attitudes, and expectations among parents, with important implications for public health strategies aimed at promoting responsible antibiotic use and combating antibiotic resistance.

Knowledge of Antibiotics

The study reveals a mixed picture of parental knowledge regarding antibiotic use. While a majority of parents (77%) correctly identified that antibiotics are only effective against bacterial infections, a significant

knowledge gap exists concerning the ineffectiveness of antibiotics against viral infections, with only 35% of parents answering this correctly. This discrepancy suggests that parents may have a general understanding of antibiotics' role but lack specific knowledge about

their limitations. Similar findings have been reported in other studies, such as Al-Ayed et al. (2019), who found that 59% of parents in their study believed antibiotics could treat viral infections [34].

The high percentage (80%) of parents understanding that antibiotic misuse contributes to resistance is encouraging and aligns with findings from other studies. For instance, Alkhuraisi et al. (2023) reported that 70% of participants in their Saudi Arabian study were aware of antibiotic resistance [35]. However, the fact that only 24% of parents in our study knew that antibiotics should not be stopped once symptoms improve is concerning. This misconception could lead to the premature discontinuation of antibiotic courses, potentially contributing to the development of antibiotic-resistant bacteria [36].

Attitudes Towards Antibiotic Use

Parental attitudes towards antibiotic use reveal some positive trends but also areas of concern. The finding that 58% of parents believe antibiotics are often over-prescribed by doctors suggests a growing awareness of the issue of antibiotic overuse. This awareness could be leveraged in public health campaigns to promote more judicious use of antibiotics. However, the fact that 38% of parents believe antibiotics should be prescribed for every fever, and 47% expect antibiotics for sore throats, indicates persistent misconceptions about appropriate antibiotic use. These attitudes are consistent with findings from other studies in the region who reported that 73% of Saudi parents expected antibiotics for upper respiratory tract infections [37].

The high level of trust in healthcare providers' decisions on antibiotic use (87%) is a positive finding that could be utilized to improve antibiotic stewardship. This trust provides an opportunity for healthcare providers to educate parents about appropriate antibiotic use during consultations. Similar high levels of trust in healthcare providers have been reported in other studies, where 78% of parents trusted their doctor's decision not to prescribe antibiotics [38].

Expectations from Healthcare Providers

The strong expectation (93%) for healthcare providers to explain why antibiotics are or are not needed reflects parents' desire for clear communication during consultations. This finding is consistent with other studies who found that parents valued clear explanations about antibiotic prescribing decisions [39]. The fact that 85% of parents consider it important for providers to discuss the risks of antibiotic misuse further underscores the opportunity for educational interventions during clinical encounters [40].

However, the perception among 39% of parents that providers often fail to explain the risks associated with antibiotic use suggests a communication gap that needs to be addressed. This finding aligns with research identified that parents often feel that clinicians do not provide sufficient information about antibiotic use and its risks [41,42].

Demographic Factors and Antibiotic Knowledge

The significant associations between demographic factors and antibiotic knowledge highlight important considerations for targeted interventions. The finding that parents aged 26-35 had the highest knowledge scores suggests that this age group may be more receptive to health information or have had more recent experiences with pediatric care. The lack of significant gender differences in knowledge scores contrasts with some studies found that mothers had better knowledge of antibiotic use compared to fathers in Lebanon [43].

The strong association between education level and antibiotic knowledge, with university graduates showing the highest scores, is consistent with findings from numerous studies. For example, Mallah et al. (2022) reported that higher parental education was associated with better antibiotic knowledge in China [44].

Implications and Recommendations

These findings have several important implications for public health strategies and clinical practice:

1. Targeted educational interventions: Given the variations in knowledge across different demographic groups, public health campaigns should be tailored to address specific knowledge gaps among different segments of the population.
2. Improved communication in clinical settings: Healthcare providers should be encouraged to provide clear explanations about antibiotic use and resistance during consultations, addressing the strong parental desire for such information.
3. Leveraging parental trust: The high level of trust in healthcare providers' decisions can be utilized to promote more judicious antibiotic use and combat misconceptions about antibiotic efficacy for viral infections.
4. Addressing socioeconomic disparities: Efforts should be made to improve access to health education for parents from lower socioeconomic backgrounds to reduce knowledge disparities.
5. Continuous professional development: Healthcare providers should receive training on effective communication strategies to discuss antibiotic use with parents, addressing the perceived communication gap identified in this study.

Limitations of the Study

This study has several limitations that should be considered when interpreting the results. First, the use of convenience sampling may have introduced selection bias, as participants who were more health-conscious or had stronger opinions on antibiotic use may have been more likely to participate. This limits the generalizability of the findings to the broader population. Second, the study relied on self-reported data, which can be subject to social desirability bias, where respondents provide answers they believe are more socially acceptable rather than reflecting their true knowledge or attitudes. Additionally, the study was conducted in a single geographic region (Al-Ahsa City, Saudi Arabia), which may limit the applicability of the results to other regions with different healthcare infrastructures and cultural attitudes towards antibiotic use. Lastly, while the questionnaire was pre-tested, it is possible that some nuances in parental understanding of antibiotic use were not fully captured due to the structured nature of the survey instrument.

Conclusion of the Study

This cross-sectional study provides valuable insights into the knowledge, attitudes, and expectations of parents regarding antibiotic use in pediatric care within Al-Ahsa City, Saudi Arabia. While a majority of parents demonstrated awareness of the role of antibiotics in treating bacterial infections and the risks of antibiotic misuse, significant gaps in knowledge remain, particularly regarding the ineffectiveness of antibiotics against viral infections. Parental attitudes reflect some misconceptions about the necessity of antibiotics for common illnesses, and there is a strong demand for clearer communication from healthcare providers regarding the appropriate use of antibiotics. The study highlights the need for targeted educational interventions aimed at addressing these knowledge gaps and improving communication strategies in clinical settings. By leveraging the high level of trust parents have in healthcare providers, there is an opportunity to promote more responsible antibiotic use and reduce the risk of antibiotic resistance in pediatric populations.

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