

Parent's Knowledge, Attitude, and Practice about utilizing Antibiotics for Children with Upper Respiratory Tract Infections: KSA

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Abstract

Antibiotics are frequently used to treat URTIs, but they seem to be ineffective on those caused by viruses. Antimicrobial resistance (AMR) has grown dramatically over time and has become a significant public health problem. Our research aims to assess the parental level of knowledge, attitude, and practice toward antibiotic use, especially in those who have children with URTI. A cross-sectional study included all regions of Saudi Arabia who have children less than 18 years and they were chosen by random sampling technique. An online questionnaire was distributed to assess knowledge, attitudes, and practices regarding antibiotics use for children with URTI. Finally, data was collected and analyzed with the (SPSS) program. The study included 545 participants, the majority of participants fall within the 20-30 and 41-50 age groups, with 28.1% and 27.9% respectively. There are more female participants (72.5%) than male participants (27.5%). Only 2.2% of participants had good knowledge of antibiotics for children with URTIs, 19.6% had moderate knowledge and the majority 78.2% had poor knowledge. Parents' attitude was 80.4% had a positive attitude, and 19.6% had a negative attitude towards antibiotics for children with URTIs. Regarding participants' practice, 61.8% had positive practice, and 38.2% had negative practice. In conclusion, Saudi parents exhibited very poor knowledge, negative attitudes, and practices toward antibiotic utilization for children with upper respiratory tract infections. Knowledge was significantly associated with the age and educational level of participants. On the other hand, attitude was significantly associated with place of residence and monthly income.

Keywords: Parents, Attitude, Antibiotics, URTI, KSA, AMR

INTRODUCTION

Children's upper respiratory tract infection (URTI) is accountable for more than 10 % of all outpatient and emergency department visits [1]. Upper respiratory tract infections have a large influence on children's activity level, academic performance, and financial burden on their families and healthcare providers [2]. Even though viruses such as rhinovirus and adenovirus are the most common causative organisms, bacteria can also be implicated in some cases [3]. Upper respiratory tract infections are characterized by symptoms such as common cold cough sore throat hoarseness of voice and fever. Most of them are self-limiting with minimum or no complications [4].

In general, antibiotics are one of the most frequently prescribed medications for children in pediatric outpatients, with upper respiratory tract infections responsible for most of these prescriptions [5]. An earlier study done in Palestine concluded that bacteria become more resistant with time [2]. Additionally, another study conducted in Malaysia showed the development of antimicrobial resistance (AMR) [6].

Antimicrobial resistance has developed in the past decades to be a major public health problem. Nowadays, many common infections are getting more difficult to treat, which means a trivial infection might be a lethal infection [7].

A recent study in Saudi Arabia shows that parents' knowledge of antibiotic use was considerably affected by their age group, sex, and marital status [8]. In another study done in Makkah

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How to cite this article: Kaliyaperumal R, Alzahrani R, Albishi M, Meeralam Sh, Mohammed Sh, Almaghrabi A, et al. Parent's Knowledge, Attitude, and Practice about utilizing Antibiotics for Children with Upper Respiratory Tract Infections: KSA. Arch Pharm Pract. 2023;14(S):A06231513.

in Saudi Arabia in 2019 compared men's and women's knowledge, all of them were unfamiliar to recognize antibiotic drugs, while a few percent of males successfully identified the common drug used for upper respiratory tract infections as (Amoxicillin) [9]. Moreover, a study conducted in 2020 stated that around 60% of 700 respondents believe that infection of the upper respiratory tract occurs by virus and self-recovering, which leads them to avoid using antibiotics [10]. Furthermore, a study conducted in the Al-Qassim region in Saudi Arabia in 2019 demonstrated that over 50% of 405 participants were aware of the side effects of incorrect use of antibiotics which lead to antibiotic resistance [11]. Meanwhile, another study conducted in the Tabuk region in 2020 revealed that 93% of participants were familiar with the use of antibiotics and just 22% were knowledgeable that they are used to treat infections caused by bacteria [12].

Assessing parental knowledge, attitude, and practice regarding antibiotic use for children with upper respiratory tract infections is particularly important as parents' behavior plays a major role in the misuse of antibiotics resulting in antimicrobial resistance. Additionally, upper respiratory tract infection is a common illness among children, but to the best of our knowledge, there are insufficient studies about this topic done across Saudi Arabia. Many of these researches concluded that there is a poor level of parental knowledge or misuse of antibiotics. Therefore, further assessment and intervention are necessary to raise public awareness regarding this issue. Our study aims to evaluate knowledge attitudes and practices towards antibiotic use for children with upper respiratory tract infections among parents in all Saudi Arabia regions in 2023.

MATERIALS AND METHODS

Study Design & Setting

A cross-sectional study involving Saudi parents from some regions of Saudi Arabia.

Participants, Recruitment, and Sampling Procedure

This observational cross-sectional study was conducted by an anonymous online questionnaire that includes our aims and main objectives, which target the population of parents who have children less than 18 years old in Saudi Arabia.

Inclusion Criteria

Saudi parents who have children and are willing to participate.

Exclusion Criteria

Parents who are not willing to participate are those who have children over 18 years old or children with lower respiratory tract infections.

Sample Size

The initial sample size was estimated by the Raosoft calculator with a confidence level of 95% at 384 participants and the final sample size was 545.

Method for Data Collection and Instrument

The subjects were chosen using the cluster random sampling technique. A Google form questionnaire adapted from Alshammari R, (2022) study after gaining consent [3]. It was filled by the parents who live in Saudi Arabia. The questionnaire will include sociodemographic questions about the parents (age, educational level, city of residency, and occupation), knowledge attitude and practice of parents towards antibiotics use for children with upper respiratory tract infections.

Scoring System

Fourteen questions were in the questionnaire, 6 of them to assess the knowledge level, 4 questions for attitude, and 4 for practices.

Answers were assessed using a Likert scale from 0-4
The maximum score is 56 and the minimum score is 0

For knowledge level:

- High: 80-100%
- Moderate:60-79%
- Poor: 0-59%

For attitude:

- Positive: 50-100%
- Negative: 0-49%

For practice:

- Positive: 50-100%
- Negative: 0-49%

Analysis and Entry Method

Data was entered on the computer using the "Microsoft Office Excel Software" program (2016) for Windows. Then was transferred to the Statistical Package of Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) to be statistically analyzed.

RESULTS AND DISCUSSION

The study included 545 participants, the majority of participants fall within the 20-30 and 41-50 age groups, with 28.1% and 27.9% respectively. There are more female participants (72.5%) than male participants (27.5%). The majority of participants are from the West (39.6%), followed by the Middle (23.5%) and East (13.6%). The majority of participants have a Bachelor's degree (61.5%), followed by high school (15.6%) and diploma (11.2%). The majority of participants fall within the 6,000 - 10,000 and Over 15,000 income brackets, with 31.2% and 28.3% respectively.

Table 1. Sociodemographic characteristics of participants (n=545)

Parameter	No.	Percent
Age	less than 20	40 7.3
	20 30	153 28.1
	31 40	126 23.1
	41 50	152 27.9
	51 60	67 12.3
	more than 60	7 1.3
Gender	Male	150 27.5
	Female	395 72.5
Location	East	74 13.6
	Middle	128 23.5
	North	55 10.1
	South	72 13.2
Education Level	West	216 39.6
	uneducated	1 .2
	Primary stage	7 1.3
	Intermediate stage	12 2.2
	High school	85 15.6

diploma	61	11.2
Bachelor's	335	61.5
Postgraduate studies	44	8.1
Monthly income	Less than 5,000	91 16.7
	6,000 - 10,000	170 31.2
	11,000 - 15,000	130 23.9
	Over 15,000	154 28.3

Table 2 shows that 13% agree and 6.2% strongly agree that it is advisable to give an antibiotic to every child who has a high temperature. 18.3% strongly agree that viruses cause most upper respiratory infections (sore throat and fever) and therefore antibiotics should not be prescribed for them. 10.8% strongly agree that children with flu symptoms improve faster when given antibiotics. 6.6% agree that antibiotics have no side effects. 44% strongly agree that inappropriate use of antibiotics can reduce their effectiveness and result in the emergence of antibiotic-resistant bacteria. 34.1% agree that antibiotics can prevent any complications associated with upper respiratory infections. 24.6% would replace the pediatrician because he prescribes antibiotics at every visit.

Table 2. Participants' attitude toward utilizing antibiotics for children with upper respiratory tract infections (n=545)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Is it advisable to give an antibiotic to every child who has a high temperature?	34 6.2%	71 13.0%	84 15.4%	192 35.2%	164 30.1%
Viruses cause most upper respiratory infections (sore throat and fever) and therefore antibiotics should not be prescribed for them.	100 18.3%	170 31.2%	146 26.8%	109 20.0%	20 3.7%
Children with flu symptoms improve faster when given antibiotics	59 10.8%	212 38.9%	109 20.0%	112 20.6%	53 9.7%
Antibiotics have no side effects	16 2.9%	36 6.6%	107 19.6%	197 36.1%	189 34.7%
Inappropriate use of antibiotics can reduce their effectiveness and result in the emergence of antibiotic-resistant bacteria	240 44.0%	187 34.3%	96 17.6%	17 3.1%	5 .9%
Antibiotics can prevent any complications associated with upper respiratory infections	51 9.4%	186 34.1%	205 37.6%	85 15.6%	18 3.3%
Do you think antibiotics are being used excessively and in unnecessary cases?	156 28.6%	241 44.2%	94 17.2%	47 8.6%	7 1.3%
Are you going to switch your pediatrician because he doesn't prescribe antibiotics as frequently as you'd like?	25 4.6%	66 12.1%	101 18.5%	239 43.9%	114 20.9%
Would you replace your pediatrician because he prescribes antibiotics at every visit?	134 24.6%	190 34.9%	113 20.7%	90 16.5%	18 3.3%
Do you think that most respiratory infections will go away without the use of any antibiotics?	71 13.0%	220 40.4%	168 30.8%	69 12.7%	17 3.1%

Table 3 shows that a significant portion of parents (50.3%) often follow their pediatrician's advice and instructions,

indicating a high level of trust in their pediatrician's judgment. However, it's also notable that a considerable

number of parents (21.8%) rarely ask their pediatrician not to prescribe antibiotics. The statistics on how often parents request antibiotic prescriptions for their children reveal that a substantial percentage (32.3%) often ask their pediatrician to

prescribe antibiotics, while a smaller proportion (2.8%) rarely make such requests. A notable finding is that a considerable number of parents (35.0%) believe that antibiotics are often prescribed simply because they ask for them.

Table 3. Participants' practice towards utilizing antibiotics for children with upper respiratory tract infections (n=545)

	Always	Often	Usually	Rarely	Never
How many times do you discuss with your pediatrician and ask him not to prescribe any antibiotics?	50 9.2%	137 25.1%	175 32.1%	119 21.8%	64 11.7%
How often do you ask your pediatrician to prescribe an antibiotic for your child?	15 2.8%	67 12.3%	176 32.3%	179 32.8%	108 19.8%
How often do you follow your pediatrician's advice and instructions?	274 50.3%	185 33.9%	64 11.7%	17 3.1%	5 .9%
How often do you think your pediatrician prescribes an antibiotic just because you asked him to?	33 6.1%	48 8.8%	131 24.0%	191 35.0%	142 26.1%

As illustrated in **Figure 1**, only 2.2% of participants had good knowledge of antibiotics for children with URTIs, 19.6% had moderate knowledge and the majority 78.2% had poor knowledge.

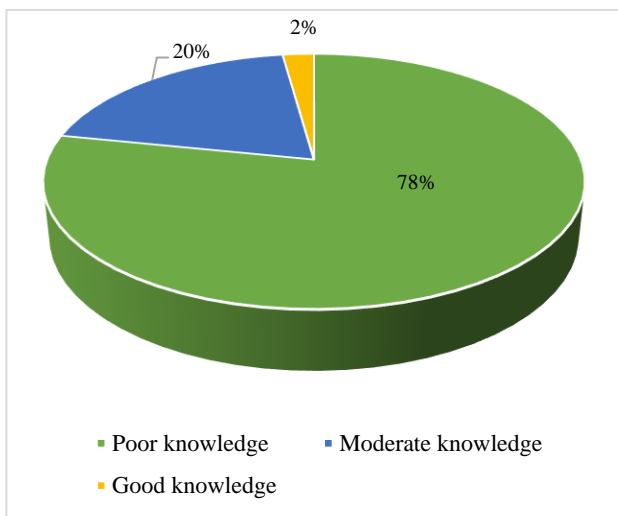


Figure 1. Participants' knowledge of antibiotics used for Children with Upper Respiratory Tract Infections

Figure 2 shows parents' attitude scores, as 80.4% had a positive attitude, and 19.6% had a negative attitude towards antibiotics for children with URTIs.

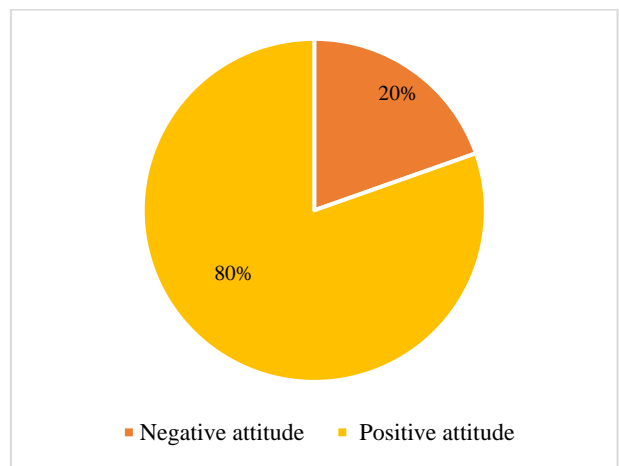


Figure 2. Participants' attitude towards antibiotics use for Children with Upper Respiratory Tract Infections

Regarding participants' practice in **Figure 3**, 61.8% had positive practice, and 38.2% had negative practice.

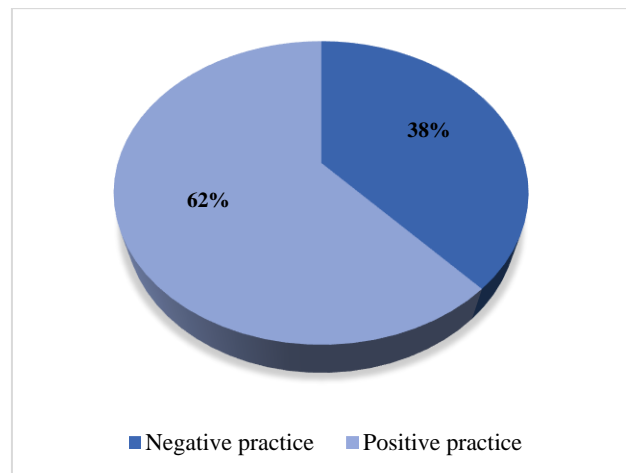


Figure 3. Participants' practice of antibiotics use for Children with Upper Respiratory Tract Infections

As illustrated in **Table 4**, age appears to have a significant influence on knowledge levels, with a clear trend of increasing knowledge as age increases. For example, the percentage of individuals with good knowledge levels increases from 7.3% in the less than 20 age group to 27.9% in the 41-50 age group. In terms of gender, there is no significant difference in knowledge levels between males and females, as indicated by the non-significant p-value of 0.487. When considering location, there are some differences in knowledge levels among individuals from different regions. For instance, the West region has the highest percentage of individuals with good knowledge levels at 39.6%, while the North region has the lowest percentage at 10.1%. However, it's important to note that the p-value for location is 0.061. Education level also appears to be strongly associated with knowledge levels, with a clear gradient of increasing knowledge levels as education level rises. For example, 61.5% of individuals with a Bachelor's degree have good knowledge levels, compared to only 0.2% of illiterate individuals. Finally, monthly income shows a potential association with knowledge levels, as the percentage of individuals with good knowledge levels tends to increase with higher income brackets. For example, 28.3% of individuals with an income over 15,000 have good knowledge levels, compared to 16.7% of individuals with an income less than 5,000. However, the p-value for monthly income is 0.083, suggesting a relatively weak association. Looking at the age category, the highest percentage of positive attitudes was observed in the age group of 41-50 years (23.3%), while the lowest was in the age group of less than 20 years (5.7%). However, there was no significant difference in attitude based on age as the p-value was 0.830. When it comes to gender, females had a higher percentage of positive attitudes (58%) compared to males (22.4%). The p-value was not significant at 0.726. The location of individuals did show a significant difference in attitude towards the topic, with the highest percentage of positive attitudes observed in the West region (34.3%) and the lowest in the North region (7.2%). The p-value for location was 0.010, indicating that

location played a significant role in determining the attitude. Regarding education level, individuals with a bachelor's degree had the highest percentage of positive attitudes (50.1%), while illiterate individuals had the lowest (0%). However, the p-value for education level was not significant at 0.183. Finally, monthly income also showed a significant difference in attitude towards the topic, with individuals earning over 15,000 having the highest percentage of positive attitudes (24.2%) and those earning less than 5,000 having the lowest (11.7%). The p-value for monthly income was 0.030. the highest percentage of positive responses was observed in the 20-30 age group, with 18.2% of individuals testing positive. This was followed by the 31-40 age group, with 15.8% testing positive. It is interesting to note that the percentage of positive responses decreased as age increased, with only 1.1% of individuals over 60 testing positive. The overall p-value for age was 0.057, indicating a weak association between age and positive test results. Moving on to gender, the data shows that there was no significant difference in the percentage of positive responses between males and females, with a p-value of 0.882. However, it is worth noting that a higher number of females participated in the study, with 395 females compared to 150 males. West region had the highest percentage of positive responses at 23.1%, followed by the Middle region at 15.4%. The p-value for location was 0.575, indicating a weak association between location and positive test results. Education level also showed some interesting findings. The data indicates that individuals with a Bachelor's degree had the highest percentage of positive responses at 38.0%, followed by those with a Secondary education at 9.7%. The p-value for education level was 0.761, suggesting no significant association between education level and positive test results. Finally, the data on monthly income revealed that individuals earning 6,000 - 10,000 had the highest percentage of positive responses at 21.8%, followed by those earning over 15,000 at 16.5%. The p-value for monthly income was 0.049, indicating a weak association between income and positive test results.

Table 4. Knowledge scores of participants in association with their sociodemographic characters (n=545)

	Knowledge			Total (N=545)	P value	
	Poor	Moderate	Good			
Age	less than 20	22	14	4	40	0.001
		4.0%	2.6%	0.7%	7.3%	
	20 30	109	40	4	153	
		20.0%	7.3%	0.7%	28.1%	
	31 40	95	30	1	126	
		17.4%	5.5%	0.2%	23.1%	
	41 50	134	17	1	152	
24.6%		3.1%	0.2%	27.9%		
51 60	62	4	1	67		
	11.4%	0.7%	0.2%	12.3%		
more than 60	4	2	1	7		
	0.7%	0.4%	0.2%	1.3%		

Gender	Male	114 20.9%	31 5.7%	5 0.9%	150 27.5%	0.487
	Female	312 57.2%	76 13.9%	7 1.3%	395 72.5%	
Location	East	52 9.5%	21 3.9%	1 0.2%	74 13.6%	0.061
	Middle	98 18.0%	26 4.8%	4 0.7%	128 23.5%	
	North	39 7.2%	16 2.9%	0 0.0%	55 10.1%	
	South	54 9.9%	16 2.9%	2 0.4%	72 13.2%	
Education Level	West	183 33.6%	28 5.1%	5 0.9%	216 39.6%	0.012
	Illiterate	0 0.0%	1 0.2%	0 0.0%	1 0.2%	
	Primary	3 0.6%	3 0.6%	1 0.2%	7 1.3%	
	Preparatory	7 1.3%	4 0.7%	1 0.2%	12 2.2%	
	Secondary	61 11.2%	19 3.5%	5 0.9%	85 15.6%	
	Diploma	48 8.8%	12 2.2%	1 0.2%	61 11.2%	
Monthly income	Bachelor	269 49.4%	62 11.4%	4 0.7%	335 61.5%	0.083
	Post-graduate	38 7.0%	6 1.1%	0 0.0%	44 8.1%	
	Less than 5,000	62 11.4%	25 4.6%	4 0.7%	91 16.7%	
	6,000 - 10,000	131 24.0%	35 6.4%	4 0.7%	170 31.2%	
Monthly income	11,000 - 15,000	107 19.6%	23 4.2%	0 0.0%	130 23.9%	0.083
	Over 15,000	126 23.1%	24 4.4%	4 0.7%	154 28.3%	

As a parent, it is crucial to have a thorough understanding of the appropriate use of antibiotics for children with upper respiratory tract infections. The knowledge, attitude, and practice of parents in this regard can have a significant impact on the overall health and well-being of their children. Our study aimed to evaluate knowledge, attitudes, and practices towards antibiotic use for children with upper respiratory tract infections among parents in all Saudi Arabia regions.

According to our study findings, only 2.2% of participants had good knowledge of antibiotics for children with URIs, 19.6% had moderate knowledge and the majority 78.2% had poor knowledge. Previous studies on Parent's Knowledge about utilizing Antibiotics for Children with Upper Respiratory Tract Infections have shown a concerning lack of understanding among parents regarding the appropriate use of antibiotics for their children. One study in Saudi Arabia found that only 50% of parents were aware that antibiotics are

not effective against viral infections, such as the common cold or flu, which are the most common causes of upper respiratory tract infections in children. This lack of knowledge can lead to unnecessary antibiotic prescriptions, contributing to the growing problem of antibiotic resistance [11]. Furthermore, another study revealed that many parents believe antibiotics are necessary to treat symptoms such as cough, congestion, and sore throat, although these symptoms are often caused by viruses and do not require antibiotic treatment. This misconception is concerning as it can lead to the overuse of antibiotics, which in turn can contribute to the development of antibiotic-resistant bacteria [13]. In addition, a study found that parents often pressure healthcare providers to prescribe antibiotics for their children, even when they are not necessary. This pressure can lead to inappropriate antibiotic use and contribute to the overall misuse of antibiotics in pediatric care [14]. Overall, the results of these previous studies highlight the urgent need for targeted

educational interventions to improve parent's knowledge about the appropriate use of antibiotics for children with upper respiratory tract infections. By addressing these misconceptions and providing parents with accurate information, we can work towards reducing unnecessary antibiotic prescriptions and combating the growing issue of antibiotic resistance.

Regarding attitude, 80.4% of our study participants had a positive attitude, and 19.6% had a negative attitude towards antibiotics for children with URIs. Previous studies have provided valuable insights into parents' attitudes toward utilizing antibiotics for children with upper respiratory tract infections. These studies have consistently shown that there is a significant level of misunderstanding and misconceptions among parents regarding the appropriate use of antibiotics in such cases. One of the key findings from these studies is that many parents believe antibiotics to be a cure-all solution for any kind of illness, including upper respiratory tract infections [15, 16]. This belief often leads them to demand antibiotics from healthcare providers, even when they are not necessary. This attitude is concerning as it contributes to the overuse and misuse of antibiotics, which in turn leads to the development of antibiotic-resistant bacteria [2]. Furthermore, previous research has also revealed that parents often feel pressure to request antibiotics from healthcare providers, especially when their child's symptoms are persistent or severe. This pressure may stem from a lack of understanding about the nature of upper respiratory tract infections and the appropriate course of treatment. Additionally, some parents may also have concerns about the potential consequences of not treating their child with antibiotics, such as the infection worsening or leading to complications [17]. Moreover, studies have shown that parents' attitudes toward antibiotics for upper respiratory tract infections are influenced by various factors, including their level of education, socioeconomic status, and past experiences with healthcare providers. For instance, parents with lower levels of education may have a limited understanding of the risks associated with antibiotic overuse, while those with higher socioeconomic status may be more likely to demand antibiotics as a means of exerting control over their child's health [2, 15, 17].

As for practice, 61.8% had positive practice, and 38.2% had negative practice. This was lower than previously reported results. According to a study, parents generally exhibited suitable behavior in real life. 85.6% of the parents said they never gave their feverish children antibiotics without a prescription. In the event of a fresh infection, 80.9% of them said they would never take the same medication again [16]. In comparison to research done in other nations, the outcome was extremely favorable [2, 12, 18]. This could be connected to parents becoming more conscious of the prudent use of antibiotics. In this case, the national action plan may have a significant effect on reasonable drug usage. Within the framework of this action plan, news programs, social media platforms, TV shows, and television networks all featured

messages regarding responsible drug use. Posters encouraging the prudent use of antibiotics were displayed in public areas. Parents may have used antibiotics more sensibly as a result of this.

Knowledge was significantly associated with the age and educational level of participants. On the other hand, attitude was significantly associated with place of residence and monthly income. However, the practice was only associated with participants' monthly income. A prior study found that higher levels of knowledge were demonstrated by the female gender compared to the male gender, high education level compared to low level, higher income level compared to low-income level, and using fewer antibiotics in the last year as opposed to a large number of antibiotics in the last year [16]. Higher education levels, low-income levels, and female gender were found to be connected with higher knowledge levels in the study conducted by Al Saleh *et al.* [19]. While Al Saleh *et al.* [19] observed higher income and better attitude levels in more than three children, high levels of education, urban life, high income, and fewer children were all related to improved attitude levels. In a prior study, better practices were linked to the female gender relative to the male gender, higher income level relative to lower income level, and lower number of antibiotics used in the last year relative to the greater number of antibiotics used in the last year [16]. In a multivariate study, Hernandez *et al.* [20] showed that a higher degree of education and fewer antibiotics used in a year were linked to improved knowledge and behavior.

Parents need to be well-informed about the nature of upper respiratory tract infections and the role of antibiotics in treating such conditions. Upper respiratory tract infections are often caused by viruses, which do not respond to antibiotics. Therefore, parents need to understand that antibiotics are not always the appropriate course of treatment for these types of infections. Misuse or overuse of antibiotics can lead to antibiotic resistance, which can have serious consequences for both the individual and public health [21]. In addition to knowledge, the attitude of parents towards antibiotics for upper respiratory tract infections is also crucial. Some parents tend to request antibiotics from healthcare providers even when they are not necessary, due to a belief that antibiotics are a quick fix for their child's illness. It is important for parents to adopt a more cautious and discerning attitude towards the use of antibiotics, and to trust the expertise of healthcare professionals in determining the most appropriate course of treatment for their child.

Furthermore, the practice of parents when it comes to utilizing antibiotics for their children's upper respiratory tract infections is of utmost importance. Parents need to follow the advice and recommendations of healthcare providers regarding the use of antibiotics. This includes adhering to prescribed dosages and completing the full course of treatment, even if the child's symptoms improve before the antibiotics are finished. It is also important for parents to

properly store and dispose of any leftover antibiotics, to prevent their misuse or overuse in the future.

CONCLUSION

In conclusion, Saudi parents exhibited very poor knowledge, negative attitudes, and practices toward antibiotic utilization in children with upper respiratory tract infections. Knowledge was significantly associated with the age and educational level of participants. On the other hand, attitude was significantly associated with place of residence and monthly income. However, the practice was only associated with participants' monthly income.

Knowledge, attitude, and practice of parents about utilizing antibiotics for children with upper respiratory tract infections play a significant role in the overall management of these conditions. Parents need to be well-informed about the appropriate use of antibiotics, adopt a cautious and discerning attitude toward their use, and follow the recommendations of healthcare providers when it comes to utilizing antibiotics for their children. By doing so, parents can help to ensure the effective and responsible use of antibiotics and contribute to the overall health and well-being of their children.

ACKNOWLEDGMENTS: We thank the participants who all contributed samples to the study.

CONFLICT OF INTEREST: None

FINANCIAL SUPPORT: None

ETHICS STATEMENT: Ethical approval was obtained from the research ethics committee of the Ministry of Health. An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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