







Original Research

# Parental knowledge, attitudes and practices on the use of antibiotics in children: a cross-sectional study in UAE

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## Abstract

**Background:** Lack of parental education and a poor attitude are major factors in the emergence of antibiotic resistance. Our goal was to compile information on parents' knowledge, attitudes, and practices (KAP) on the usage of antibiotics. Finding the variables connected to parent KAP scores and Practice was our secondary goal. **Methods:** A KAP questionnaire was distributed virtually in the UAE. A 28-item questionnaire was devised for this cross-sectional survey based on a comprehensive review of the subject. Questionnaires were scored on 18 items regarding parent antibiotic-related KAP, with one point for every correct response and a possible range of 0–10 for knowledge, 0–6 for attitudes, and 0–3 for practices. Higher scores indicated better KAP. Chi-squared tests and logistic regression were used to identify factors associated with practices and combined KAP scores. **Results:** Four Hundred parents from all over the UAE participated in the study with majority of the participants from Dubai (65%). Around 80% of the participants were mothers of 3-4 children. The mean knowledge score was 8.61 out of 10, the average attitude score was 15.13 out of 18 and the practice average score was 8.34 out of 9. Approximately 25% of the participants misbelieve that antibiotics can cure all types of infections (bacterial or viral). More than 10% believe it is ok to reuse antibiotics if symptoms are similar among the siblings. There was a statistically significant association between parental antibiotic-related knowledge or attitude and practice. **Conclusions:** In general, findings have shown a high level of parental knowledge, attitudes, and practice regarding the use of antibiotics among their children in the UAE. However, parents have shown some misconceptions and negative attitudes in this regard. Easy access of the public to antibiotics should be highly restricted and excess prescriptions of antibiotics should be limited.

**Keywords:** antibiotics; parents; upper respiratory infections; Knowledge; attitude; practice

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## INTRODUCTION

Children are at high risk of developing infections such as upper respiratory infections (URTI). Infections are associated with loss of productivity for parents and school absenteeism for children. Upper respiratory infections are often caused by viral infection. It is therefore essential to reserve the use of antibiotics for URIs which are only caused by bacterial infection.

The misuse of antibiotics can generate several problems. Inappropriate use of antibiotics for viral infections can increase the risk of antimicrobial resistance, which is a major public health problem. It has been estimated that 20-50% of all antimicrobial use is inappropriate. Several factors result in the overuse of antimicrobials in children including over prescription by physicians, easy access to antibiotics for self-medication, parents limited knowledge about antibiotics, and parents-physicians interaction. Parents' attitudes, beliefs, perceptions, and knowledge of antibiotics use widely contribute to the emergence of side effects and most important, resistance in their children. Physicians claim to sometimes be influenced by parents to prescribe antibiotics for Viral URTI.<sup>1</sup>

Various studies have evaluated KAP of parents in different parts of the world including Saudi<sup>2,3,4</sup> in Iran,<sup>5</sup> Palestine<sup>6</sup> in Jordan,<sup>7,8</sup> in Greece<sup>9</sup> and in U.S.A.<sup>10</sup> These studies reported varying results. Some reported poor, level of knowledge attitude and practice while other show satisfactory level of KAP. In the UAE the following studies evaluated parental KAP on antibiotic use. These studies were mainly limited to hospital settings in Ras Al



Khaimah UAE<sup>11</sup> and Dubai<sup>12,13</sup>. The studies showed that there is a gap in knowledge among the participants. A parent KAP assessment is a vital requirement for enhancing the proper use of antibiotics among children. This virtual survey aimed to include the public from all states in the UAE. This study was set to describe the KAP of parents on antibiotics. Our secondary objective was to identify the factors that are related to parent KAP scores.

## METHODS

### Design

This study was conducted after receiving approval from DPCG research ethics committee. During the conduct of the study each respondent was asked to give written informed consent for the study.

### Study Participants

The study was conducted virtually through online social platforms. Face to face visits were conducted to get verbal consent of parents at schools and public areas to get their email IDs to send the questionnaire. Parents who had children between the age of (1 to 12 years of age) were included through convenient sampling.

### Questionnaire

The survey was created based on previous KAP studies and it was customized for the context for the UAE. The survey consisted of 28 item questionnaires. The questionnaire was divided into 4 sections. The first section was designed to collect relevant demographic characteristics of parents like gender, age, insurance status (7 questions). The second section included 10 questions to investigate parent's knowledge about antibiotics. Third and fourth sections included 6 questions to assess parental antibiotic-related attitudes and 3 questions to assess antibiotic-related practices respectively. The knowledge section has a yes or no option and each correct answer gives 1 point. The attitude section and practice section have 3 level Likert scale, which makes the maximum score for attitude 18 and practice 9. The developed questionnaire was piloted among 15 individuals and relevant adjustments were made to the question to improve clarity and reliability.

### Classification of KAP scores

Knowledge score of 8 or above out of 10 is considered as highest level and knowledge score of <8 is considered lowest level. For attitude, the score of 14 and above out of 18 was considered highest level while attitude score of <14 is considered lowest level. On the other hand, for practice a score of 7 or more out of 9 is considered highest level, while score of <7 was considered lower level. The maximum KAP score is 37. KAP score 29 or above out of 37 is considered as highest level while the KAP score less than 29 is considered lowest level.

### Data analysis

Version 26.0 of the Statistical Package for Social Sciences was used to classify and analyze the data was used to analyze

the data. Means and standard deviations were used to describe quantitative variables, while frequency distributions (proportions, and percentages) were used to summarize qualitative variables. To identify the relationships between the components, chi-squared tests and logistic regression were performed. Demographic characteristics are summarized using frequency and percentages. association between knowledge score categories with practice and attitude categories was determined by chi-square test. Binary logistic regression was used to determine the association between demographic characteristics and KAP score categories. Statistical significance was defined as a p-value 0.05.

## RESULTS

Most of the study participants were mothers, had insurance coverage, and were university graduates. Most of the study participants reside in Dubai or Sharjah. Significant proportion of the participants were currently unemployed (Table 1). Half of the participants were aged between 30-39 years.

Table 1. Demographic Data of Participants

Demographic characteristics	Frequency	Percent	Total
Gender			
Male	77	19.3	400
Female	323	80.8	
Insurance			
Has Insurance	340	85	400
Has no Insurance	60	15	
Age			
20-29	73	18.3	
30-39	200	50	400
40-49	109	27.3	
>50	18	4.5	
Education level			
High school	70	17.5	
Bachelor degree	223	55.8	
Diploma degree	50	12.5	400
Higher education	39	9.8	
Other	18	4.5	
Number of children			
1-2	153	38.3	
3-4	160	40.0	400
>4	87	21.8	
Occupation			
Employed	206	51.5	400
Non-Employed	194	48.5	
City			



Abu Dhabi	23	5.8	
Dubai	260	65	
Sharjah	87	21.8	
Ajman	13	3.3	400
Fujairah	11	2.8	
Ras Al Khaimah	5	1.3	
Umm Al Quwain	1	0.3	

### Parent knowledge

The knowledge section included 10 questions. The Mean (SD) score for 400 respondents was 8.61 (1.46). A total of (321/400) 80.3% of parents scored 8 or more. More than 90% of the respondents were able to give correct answers to the following questions, "If twice the prescribed dose is taken the effects of antibiotics are more rapid (95.5%), antibiotics dispensing should require medical prescription (94.5%), taking antibiotics in advance can protect children from a common cold (92.8%), antibiotics should be administered in all cases, once a child has fever (91.3%), discontinuation of antibiotics (without completing the treatment course) increases the risk of antibiotic resistance (91.3%). The following questions were answered correctly by 80% or more of the respondents. Antibiotics should be withdrawn as soon as the symptoms disappear (86.5), overuse of antibiotics increases the risk of antibiotic resistance (84.5%), identifying the antibiotic from other drugs commonly used in URTI (80%). On the contrary, a fewer proportion of patients were able to answer these two questions correctly compared to previous knowledge questions. Only a total of 74.3% gave correct answer to that antibiotics can cure all types of infections (bacterial-viral)" and only 71.1% gave the correct answer to this statement "if child suffers from a cough, running nose, and a sore throat, it will be cured more quickly if he/she receives antibiotic".

### Parent attitude

The attitude of parent was assessed based on 6 questions with total maximum score of 18. The average (SD) attitude score was 15.13 (2.13). Majority (326/400) 81.5% had attitude score of 14 or more. More than half (66%) of the participants believed that it is incorrect to ask for an antibiotic prescription to prevent symptoms of their children from getting worse. In contrast, 10% believed this should be the case. Most parents (92.8%) are indifferent to reusing the antibiotic, which had been used in the past for their child if he/she presents with similar symptoms while 7.3% are in favor of reusing antibiotics. More than two thirds (77%) of the parents are against reusing antibiotics to treat similar condition among siblings. However, 14.3% believe it is ok to use antibiotics if symptoms are similar among the siblings. A high proportion of parents (79%) do not believe that changing their child's pediatrician is needed if he/she does not prescribe antibiotic often. In the contrary 8% of the respondents claimed that they would change the physician caring for their child in similar condition. Many parents (66.5%) believed that some respiratory diseases could be cured without

the use of antibiotics. Considerable proportion of the parents either disagree (12%) or were neutral (21.5%). Majority (84.3%) of the parents do not give antibiotic without pediatrician's consultation. In contrast 7.5% of the parents believe it is ok to give antibiotics without consulting a doctor.

### Parent practice

The practice questions contained 3 questions. The average (SD) score for practice questions is 8.34 (1.12). The majority of the respondents (375/400 or 93.8%) had a practice score of 7 or higher out of 9. Most patients (83%) disagree, while 14% show indifference and 3% agree with the statement "Usually, I insist my pediatrician prescribe an antibiotic for my child's respiratory infection". A similar proportion of patients disagree (86%), were neutral (9.3%) or agree (4.8%) that they I ask for pediatrician recommendation of antibiotic therapy over the phone without presenting their child physically. Similarly, more than two thirds of the parents disagree (81.8%) with the practice of requesting antibiotics for their child from the pharmacist without referring to the physician. The remaining 9.8% of the parents were neutral and few agree with the practice of obtaining antibiotics directly from the pharmacist (8.5%).

### Influence of parental antibiotic related knowledge and attitude on practice

There is a significant association between knowledge category dichotomized by score of 8 and practice dichotomized by value of 7. The correct responses to the questions "Antibiotics dispensing should require medical prescription" and "If twice the prescribed dose is taken the effects of antibiotics are more rapid effect", were shown to have significant correlation with higher practice levels (Table 2).

### Influence of parental antibiotic related attitude on practice

Higher attitude score (14 or above) was associated higher practice scores (7 or above) as shown above. The correct attitude related to question "I usually give my child antibiotics without previous pediatricians' consultation" was significantly associated with higher practice score (7 or higher), as shown in Table 3.

### Factors associated with KAP scores

A logistic regression was conducted to evaluate the association of the demographic characteristics such as gender, insurance, age, and education level, number of children, occupation, and city with KAP score dichotomized by overall score of 29. Among all these demographic factors, the independent variable number of children was significantly associated with higher KAP score (Table 4).

### DISCUSSIONS

This study aims to determine the level of parental knowledge, attitudes, and practices towards the use of antibiotics among their children. It is a cross-sectional study which has included 400 participants who were approached using convenient sampling method. It is conducted through an online survey. This method is preferred because it would eliminate the interviewer's influence on the parental responses so that



Table 2. Influence of parental antibiotic related knowledge on practice

Statements	B	S.E.	Wald	df	Sig.	Exp(B)
Antibiotics can cure all types of infections (bacterial-viral)s	.766	.503	2.325	1	.127	2.152
Antibiotics dispensing should require medical prescription	2.386	.613	15.168	1	.000	10.873
Antibiotics should be administered in all cases, once a child has fever	.996	.587	2.880	1	.090	2.708
If a child suffers from a cough, running nose, and a sore throat, it will be cured more quickly if he/she receives anti	.613	.505	1.473	1	.225	1.846
Taking antibiotics in advance can protect children from a common cold	.676	.636	1.131	1	.288	1.966
If twice the prescribed dose is taken the effects of antibiotics are more rapid	1.597	.708	5.088	1	.024	4.937
Antibiotics should be withdrawn as soon as the symptoms disappear	.491	.569	.746	1	.388	1.634
Overuse of antibiotics increases the risk of antibiotic resistance	.305	.547	.311	1	.577	1.357
Discontinuation of antibiotics (without completing the treatment course) increases the risk of antibiotic resistance	.048	.749	.004	1	.949	1.049
Select the antibiotic from the following picture	.708	.507	1.953	1	.162	2.030
Constant	-4.264	1.299	10.782	1	.001	.014

Table 3. Influence of parental antibiotic related attitude on practice

Statements	B	S.E.	Wald	df	Sig.	Exp(B)
If my child catches a cold, I ask for an antibiotic prescription to prevent my child symptoms from getting worse	.440	.422	1.087	1	.297	1.553
Usually, I reuse the antibiotic which had been used in the past for my child if he/she presents with similar symptoms	.997	.807	1.524	1	.217	2.709
If my child has symptoms like that of his brother, I will reuse the same antibiotic	.384	.322	1.423	1	.233	1.469
I change my child's pediatrician because he/she does not prescribe antibiotics often enough for my child	.104	.387	.072	1	.788	1.109
There are some respiratory diseases which can be cured without the use of antibiotics	.087	.347	.063	1	.802	1.091
I usually give my child antibiotics without previous pediatricians' consultation	1.760	.336	27.512	1	.000	5.814
Constant	-5.636	1.601	12.389	1	.000	.004

Table 4. Factors associated with KAP scores

Characteristics	B	S.E.	Wald	df	Sig.	Exp(B)
Gender	.426	.414	1.059	1	.304	1.531
Insurance	-.617	.390	2.509	1	.113	.540
Age	.335	.225	2.217	1	.137	1.398
Education level	-.146	.132	1.225	1	.268	.864
Number of children	-.647	.216	8.965	1	.003	.524
Occupation	-.565	.330	2.929	1	.087	.569
City	.055	.175	.099	1	.754	1.056
Constant	3.302	1.047	9.951	1	.002	27.154

participating parents can provide pertinent answers, in addition to its lower cost and higher speed in gathering data.<sup>14</sup> Most of the participants are mothers of 3-4 children, having insurance, between 30-39 years old, holders of bachelor's degree and residing in Dubai.

The results of this study show several findings. Firstly, most of the participants have a good level of knowledge, attitude, and practice. Secondly, there is a significant association between higher level of knowledge and better attitude with higher practice scores. Thirdly, the number of children was the only

variable associated with the parental KAP score.

In terms of knowledge domain, more than 90% of the participants are found to be knowledgeable about the necessity of physicians prescribing antibiotics, which found to contrast with Abu Hammour, et al. that was conducted in 2019 stating a higher frequency of parents administering nonprescribed antibiotics among their children.<sup>15</sup> The most cited reasons for self-medicating children with antibiotics include lack of time or money (83.9%), considering the pharmacist's recommendation (68.3%), or using a previously prescribed antibiotic for a similar



illness (66.2%) children.<sup>15</sup>

It is encouraging to find out that most of the parents (92.8%) are aware that antibiotics are not indicative for prevention of common cold and fever. Higher proportion of parents (17.2%) wrongly believed that antibiotics have preventive role in common cold management in a similar study conducted in Ras Al Kahimah in 2018.<sup>11</sup> The result might have differed due to differences in educational level and study participants demographic characteristics. This calls for more action to educate the public regarding the correct use of antibiotics.

Inadequacy parents' knowledge regarding the use of antibiotics in viral infections has been noticed in this study, as a quarter of the participants stated that antibiotics can cure all types of infections including viral infections. However, it is found to be better than the results of other studies in other regions like in KSA,<sup>4</sup> Palestine,<sup>16</sup> and Jordan<sup>17</sup> where 61.4%, 54.5%, 40% of the parents respectively believe that antibiotics can be used in viral infections. A discrepancy as well was found when our results are compared with Abu Hammour et al., 2019<sup>15</sup> in (Dubai) and Salama et al 2018 in Ras Al Khaimah,<sup>11</sup> as they found to be 51.4% and 67.3% misbelieving that viral infections are treated by antibiotics.

The statistical analysis in this study has shown that parents awareness about the importance of physician prescribing the antibiotic and complying with the specified dose have reflected a high level of practice towards the use of antibiotics among their children. This is a reasonable finding where high level of knowledge can impact the parents practice positively. A Turkish study that is published in 2021 has agreed that increasing parental awareness towards the antibiotics through social media, news and television programs will lead to rational use of antibiotics among their children.<sup>18</sup> However, in a study that was conducted in RAK, it was apparent that the behavior of the study participants, such as their high antibiotic consumption, self-medication, and inconsistent antibiotic usage, did not necessarily correspond to their knowledge and attitudes.<sup>11</sup>

In terms of parental attitudes in this regard, the current study has found that majority of the participants have demonstrated acceptable responses. However, there is still insufficiency among 10-15% of parents who are willing to reuse the antibiotics for similar conditions and between siblings and use antibiotics to prevent progression of symptoms. These results were displayed but with higher proportions by Abu Hammour, et al. 2019 in Dubai, which stated that around 38% of parents believe that antibiotics will decrease complications of upper respiratory tract infections and 66% of them may reuse the same antibiotics for similar symptoms of a previous illness.<sup>19</sup> The present study has shown that the correct parental attitude of avoiding giving the children antibiotics without previous pediatricians' consultation has obviously influenced their practice score in this context. In contrast, a Saudi study published in 2019, revealed that two third of the parents (68.8%) obtained antibiotics without a prescription from a community pharmacy. The most common reasons for doing so included time shortage, considering their child's condition was mild, using leftover antibiotics, or finding it easier to obtain

antibiotics directly from a pharmacist, rather than going to a physician for a prescription.<sup>4</sup>

Finally, the current study has found that there is a significant association between the number of children in a household and the parental KAP score. It is noticed that the more children the parents have the higher their the total KAP score regarding the use of the antibiotics. This association can be attributed to several factors. Parents with multiple children may exhibit more experience in managing common childhood illnesses and infections, which in turn can lead to better knowledge about the appropriate use of antibiotics. Moreover, they may be more likely to seek medical advice when their children are sick to reduce the misuse of antibiotics. Overall, the positive association between the number of children and parental KAP high scores of using the antibiotics is an important finding that emphasizes the need for interventions like education and awareness campaigns that target parents specially who are beginners and with fewer children to be well prepared for handling their children's illnesses and infections appropriately. In this regard, several studies have examined the effects of educational interventions on enhancing parents' knowledge, attitudes, and practices (KAP) regarding various topics. According to Jönsson et al. (2011).<sup>20</sup> some of these interventions were successful in improving parental KAP. Salimi et al. (2021) found that mobile-based interventions were more effective than booklets in improving parental KAP (21). However, Ivanovska et al. (2018)<sup>22</sup> noted that the effects of educational interventions may only be temporary, emphasizing the need for continuous and long-term interventions to promote optimal antibiotic use among parents.

This study has included good proportion of parents and it has given insights on the current state of parental KAP on antibiotic use for children with URTIs, it has also identified areas for potential improvement related to antibiotic use. However, a few limitations of the study do exist. Firstly, there were more respondents from Dubai and Sharjah state than the other UAE states due to logistics issues as the researchers mainly reside in Dubai. In addition, more mothers responded to the survey than fathers. So, the results cannot be generalized to whole parents in the UAE or other types of primary caregivers in addition to mothers. Response bias and information bias is expected due to the online conduct of the study. Finally, Due to the cross-sectional survey design the study only provides an overview of parents KAP at a particular point in time and cannot capture changes in behavior that could occur overtime.

## CONCLUSION

This study has concluded that parents in this study have misconceptions on antibiotic use in some instances of antibiotic use. Easy access of public to antibiotics was associated with inappropriate parenteral behaviors toward the use of antibiotics as self-medication for their children. Additionally, it was evident that there are inappropriate practices among parents for the purposes of obtaining the antibiotics. Moreover, higher parents' knowledge was associated with better practice. Therefore, the study has ended with the following recommendations: to establish health awareness programs regarding the antibiotics



in hospitals or through schools for partners who are planning to start families; to announce tips of proper using of antibiotics in trusted media like TV's programs; and to avoid dispensing excess and unnecessary amounts of antibiotics to the patient. Further research is recommended to investigate the means of amending inappropriate parental behaviors regarding the use of antibiotics among their children.

#### CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

#### AUTHORS' CONTRIBUTIONS

DK designed the study's design, came up with the study's

concept, and revised the article. DK edited the manuscript and contributed to the study's development. DK and SA contributed to the design of the study, carried out the statistical analysis, and assisted in writing the manuscript. DK and SA contributed to the design of the study and data entry. All the authors are responsible for data collection. The final manuscript was read and approved by all authors.

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