



Beliefs, Practices and Evaluation of Non-prescribed Antibiotics Use among Children in Madinah, Saudi Arabia

Duoaa Abdoh^{1*}, Maryam Fahmie¹ and Muatasim Noorelahi¹

¹College of Medicine, Taibah University, Madinah, Saudi Arabia.

Authors' contributions

This work was carried out in collaboration between all authors. Authors DA and MN conceived the idea. In addition, authors DA and MN contributed equally in literature review and conceptualization of study design. Acquisition of data and data entry were particularly done by authors DA and MF.

All authors have made a substantial contribution toward data analysis, interpretation, drafting and critically revising the paper, and agree to be accountable for all aspects of the work. All authors read and approved the final manuscript.

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ABSTRACT

Objectives: To assess the current knowledge, beliefs, awareness and practices of the Saudi population attending Maternity and Children Hospital (MCH) in Madinah City, Saudi Arabia using non-prescribed antibiotics for their children.

Methods: A cross-sectional study was conducted. Socio-demographic, knowledge, beliefs, awareness and behaviour data related antibiotics and patterns of antibiotics usage (PAPA scale) were collected. The knowledge, beliefs, awareness, and behaviours data were compared between subjects using non-prescribed antibiotics for their children and those did not by using appropriate statistical methods.

Results: 170 subjects reported using non-prescribed antibiotics for their children (48.5%). The average score of negative knowledge and beliefs about antibiotics misuse was higher among

*Corresponding author: Email: duoaa-abdoh@hotmail.com;

subjects using non-prescribed antibiotics. It was 4.3 ± 3.1 among subjects using non-prescribed antibiotics for their children compared to 1.7 ± 3.2 among those not using non-prescribed antibiotics. Also, the average positive score of behaviour and awareness was lower among subjects using non-prescribed antibiotics. The average score of the studied behaviour and awareness was found to vary by the educational level of the studied subjects with the higher average score was among of highly educated subjects.

Conclusion: The study revealed a considerable high proportion of the Saudi population using non-prescribed antibiotics for their children. The average score of negative knowledge and beliefs and positive score of behaviour was found to vary by the usage of non-prescribed antibiotics and by the educational level of the studied cohort. There is a need to conduct more community-based studies and to deliver health education programs about the dangers of antibiotics misuse through mass media.

Keywords: Antibiotics; resistance; self-medication; overuse; misuse; Saudi Arabia.

1. INTRODUCTION

Irrational usage of antibiotics is of concern in the global community and numerous health related non-desirable events have recently been noticed, specifically, antimicrobial resistance [1]. Overuse and misuse of antibiotics have become a routine practice for self-management and there is no legislation or restrictions on their usage of such antibiotics in Saudi Arabia [2]. Patients can bypass the health care system and purchase most of the antibiotics in private pharmacies without a prescription [3].

As a consequence, irrational use of antibiotics have been known to be associated with poor consumer's knowledge and behaviour pertaining to the usage of antibiotics [4]. Previous studies have indicated that parents have misconceptions about appropriate application and efficacy of antibiotics in several American, Asian and European countries [5,6].

In a study that was conducted in Riyadh city demonstrated the highest percentages of non-prescribed sales of antibiotics was for sore throat and diarrhea followed by UTI, acute bronchitis, otitis media and acute sinusitis [7]. Also, a study in Al-Ahsa region reported significant incidences of malpractice regarding antibiotic sale, and adverse events among consumers such as diarrhea and itching were noticed [8,9].

In the United States, sales of antibiotics are strictly controlled and not dispensed without a doctor's prescription [10]. On the other hand, developing countries still suffering from illegal sales of antibiotics (non-prescribed antibiotics) which is similar to Saudi Arabia [11–19].

However, other studies about antibiotic misuse was found higher among children [20]. In Yu et al. [21] study have reported that children receive antibiotics to treat their viral infections especially upper respiratory tract infection (URTI), which are usually self-limiting regardless of antibiotics.

The review of literature revealed that there are no published studies about this community issue in Madinah, Saudi Arabia. To make further assessments about current antibiotic misuse among caregivers of children, the present hospital-based cross-sectional study aimed to assess the pattern of antibiotic misuse for children among subjects attending maternity and children hospital (MCH) in Madinah city, Saudi Arabia, and to assess their knowledge, awareness and beliefs about this problem.

2. AIM

The aim of this study was to assess the pattern of antibiotic misuse for children among a cohort of population attending maternity and children hospital in Madinah city, Saudi Arabia, and to assess their knowledge, awareness and beliefs about this problem.

3. SUBJECTS AND METHODS

3.1 Study Design

The present study was based on a cross-sectional survey. The study was conducted in Maternity and Children Hospital (MCH), Madinah city, Saudi Arabia in 2015. The study aimed to assess the pattern of un-prescribed usage of antibiotics (self-medication) for children among the Saudi population attending this hospital, and to assess their knowledge, awareness and beliefs about this problem.

3.2 Sample

Using the online sample size calculator [22], the minimum effective sample was 350 and it was calculated at a confidence interval of 95%±5%. The minimum effective sample was calculated just to ensure a minimum number, if approached that would justify the findings of the study. In addition, the following inclusion and exclusion criteria were adopted to ensure that the respondents interviewed represented the Madinah population best. All subjects were interviewed in person for 20 minutes. The study employed a predesigned structured questionnaire to collect the data. Those who refused to participate or give incomplete information were excluded from the study. Only Saudi citizens were interviewed in this study.

3.3 Research Instrument

The study questionnaire has been validated by an epidemiologist and a pharmacologist. The questionnaire used in this study was formulated to include both socio-demographics and patterns of antibiotic usage [PAPA scale (1)]. The formulated questionnaire included questions about the pattern of self-medication (use of un-prescribed antibiotics) covering the following four domains: knowledge and beliefs (7 items), behavior (3 items), seeking information (7 items) and awareness about antibiotic resistance (3 items). Each item of the studied four domains was scored using a five-point Likert scale: 'strongly disagree', 'disagree', 'don't know', 'agree', and 'strongly agree'. Demographic questions concerning age of child and his parents, sex of child, level of parents' education and occupation were included in the study questionnaire.

Participation in this survey was completely voluntary, confidentiality and anonymity were maintained at all times. Prior approval was obtained from the ethical committee of Taibah College of Medicine, Madinah, Saudi Arabia. A consent form was given at the beginning of the questionnaire explaining the purpose of the study, and requesting their participation.

3.4 Statistical Analysis

These data were analyzed using the Statistical analysis System (SAS) [23]. Each question item for the four studied domains was scored as follows: "strongly disagree" and "disagree" = -1, "strongly agree" and "agree" = 1, and 'don't

know' = 0 to study beliefs and awareness items. On the other hand, the scoring was "strongly disagree" and "disagree" = 1, "strongly agree" and "agree" = -1, and 'don't know' = 0 to study behavioral items. The mean score for each of the studied domain was calculated from the individual scores for the respective items. Unpaired test was used to compare the average score of each studied domain items according to the usage of un-prescribed antibiotics for children. One way analysis of variance (ANOVA) was used to compare the average score of the studied domains related to beliefs and behaviors by parent's response to child according to his/her educational level. The level of statistical significance was defined as $P \leq 0.05$.

4. RESULTS

Out of the 350 participants, 170 subjects (48.6%) reported that they used un-prescribed antibiotics for their children. The reported that their children received antibiotics to treat common colds (35.9%), upper respiratory tract infections (42.9%), fever (14.1%), ear pain and infection (5.9%), and GIT problems (1.2%) [Fig. 1]. The majority of subjects using un-prescribed antibiotics for their children (87.7%) used it for the duration of 3-7 days [Fig. 2].

Table 1 presents the socio-demographic characteristics of the studied subjects by their usage of un-prescribed antibiotics for children. There have been no statistically significant differences between the two groups regarding all studied socio-demographic variables. However, the proportion of usage of un-prescribed antibiotics was more among female children (52.0%) and it was done by (52.6%), younger fathers and mothers. Self-medications were more prevalent among illiterate fathers (61.3%). Highly educated mothers, however, showed a high percent of self-medication (54.9%). Increasing distance from a medical facility center showed an increase in self-medication. 46.1 % when the distance ≤ 10 minutes, 48% for distance ranging from 11 to 20 minutes and became 49.7% for distance more than 20 minutes.

Table 2 shows the average score of negative beliefs and behaviors by the studied cohort's usage of un-prescribed antibiotics. There have been statistical significant differences of average scores of almost all studied items of beliefs and behaviors domains between those using un-prescribed antibiotics for their children and those

who do not. The average score for each studied item was higher among subjects using un-prescribed antibiotics for their children. The overall average score of negative beliefs and behaviors was higher (4.3±3.1) among subjects

reported using un-prescribed antibiotics for their children compared to that of subjects not using self-antibiotic medication (1.7±3.2), with statistical significant differences (p <.0001).

Table 1. Socio-demographic characteristics of studied subjects by their usage of un-prescribed antibiotics for children

Characteristics	Subjects using un-prescribed antibiotics N=170	Subjects not using un-prescribed antibiotics N= 180	P. value
Child sex			
Male	90 (46.0)	106 (54.0)	0.26
Female	80 (52.0)	74 (48.0)	
Parent respondent			
Father	20 (52.6)	18 (47.4)	0.59
Mother	150 (48.0)	162 (52.0)	
Father age, mean ±SD	38.1±10.3	39.9±9.4	0.22
Mother age, mean ±SD	31.2±8.1	32.5±6.9	0.10
Number of children mean ±SD	3.8±2.5	3.9±2.3	0.83
Monthly family income			
< 5000 SR	78 (52.0)	72 (48.0)	0.28
5000-20000 SR	88 (47.0)	99 (53.0)	
>20000 SR	4 (30.1)	9 (69.9)	
Father education			
Illiterate	19 (61.3)	12 (38.7)	0.32
Less than university	86 (46.5)	99 (53.5)	
University and higher	65 (48.5)	69 (51.5)	
Mother education			
Illiterate	18 (47.3)	20 (52.7)	0.25
Less than university	90 (45.0)	109 (55.0)	
University and higher	62 (54.9)	51 (55.1)	
Father occupation			
Unemployed	11 (52.4)	10 (47.6)	0.87
Students	2 (66.7)	1 (33.3)	
Employed	138 (48.6)	146 (51.4)	
Retired	19 (45.2)	23 (54.8)	
Mother occupation			
Unemployed	128 (47.0)	144 (53.0)	0.56
Students	11 (46.0)	13 (54.0)	
Employed	30 (57.8)	22 (42.2)	
Retired	1 (50.0)	1 (50.0)	
Marital status of parents			
Married	164 (49.0)	173 (51.0)	0.97
Divorced	4 (44.5)	5 (54.5)	
Widow	2 (50.0)	2 (50.0)	
Distance from medical facility			
center	83 (46.1)	97 (53.9)	0.56
≤ 10 minutes	53 (48.0)	48 (52.0)	
11-20 minutes	34 (49.7)	35 (50.3)	
>20 minutes			

*Data were presented by mean ± SD or n (%)

Table 3 shows the average score of positive behaviors and awareness of the studied cohort by their usage of un-prescribed antibiotics. Although the average score of positive behaviors and awareness was higher among subjects reporting no usage of un-prescribed antibiotics for children, the significant statistical differences between the two studied groups were only for

two items related to the studied behaviors. The overall average score of positive behaviors and awareness was higher (1.8 ± 1.7) among subjects reported not using un-prescribed antibiotics for their children compared to that of subjects using self- medicating antibiotics for their children (1.6 ± 1.8), with statistically significant difference ($p = 0.03$).

Table 2. Average score of negative beliefs and behaviors of the studied cohort by their usage of un-prescribed antibiotics

Beliefs	Subjects using un-prescribed antibiotics N=170	Subjects not using un-prescribed antibiotics N= 180	P. value
Antibiotics treat viral infections	0.52±0.85	0.05±1.00	<.0001*
Antibiotics can cure ALL types of infections (viral, bacterial, & fungal).	0.56±0.83	0.10±1.00	<.0001*
My child will be sick for a longer time if he/she doesn't receive an antibiotic for his symptoms	0.82±0.56	0.45±0.89	<.0001*
If my child has a cold or cough, it is best to get an antibiotic to get rid of it	0.37±0.93	-0.41± 0.91	<.0001*
Children with common colds get better faster when antibiotics are given	0.84±0.68	0.70±0.82	0.06
In the past antibiotics have cured my child's symptoms	0.86±0.50	0.69±0.71	0.04*
when I visit the doctor for my child's disease,, I expect prescription for medication including antibiotics	0.79±0.55	0.63±0.69	0.02*
Overall beliefs score	4.3±3.1	1.7±3.2	<.0001*

*Significant

Table 3. Average score of positive behaviors and awareness of the studied cohort by their usage of un-prescribed antibiotics

Behaviors and awareness	Subjects using un-prescribed antibiotics N=170	Subjects not using un-prescribed antibiotics N= 180	P. value
I get my child's antibiotics from the pharmacy without a prescription	0.17±0.98	0.50±0.86	0.001*
I generally store antibiotics at home for when they are needed	0.47±0.88	0.68±0.75	0.02*
In the past, I have changed doctors when my doctor did not prescribe antibiotics for my child	0.65±0.75	0.71±0.7	0.59
Some germs are becoming harder to treat with antibiotics	0.43±0.90	0.49±0.87	0.63
Some germs can become resistant to antibiotics if they are taken in inadequate doses	0.57±0.82	0.49±0.87	0.40
Antibiotics treat bacterial infections	0.86±0.60	0.84±0.68	0.40
Overall awareness score	1.6±1.8	1.8±1.7	0.03*

*Significant

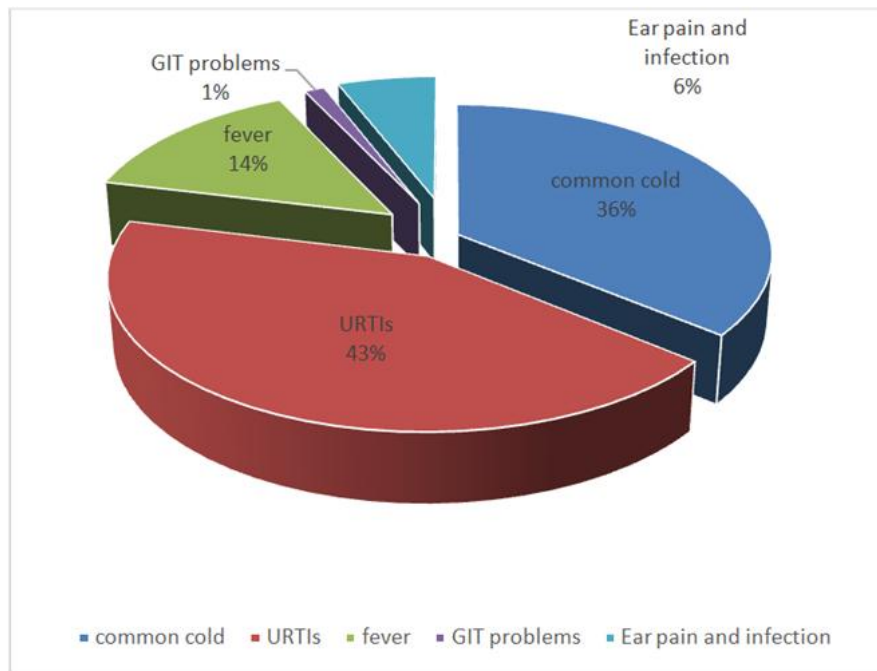


Fig. 1. Common uses of un-prescribed antibiotics

Table 4 displays the average score of the studied beliefs, behaviors and awareness about antibiotic misuse by educational level of parent respondents. The highest average score of negative beliefs was among those illiterate subjects, both fathers and mothers as a parent respondents but with no statistically significant differences ($p < 0.05$). The highest average score for positive behaviors and awareness, however, was among highly educated subjects in both fathers and mothers. Statistically significant differences were only observed for the average score of positive awareness about antibiotics resistance regarding to fathers' educational level ($p=0.001$). The higher average score of awareness was among highly educated fathers (2.1 ± 1.4), and the lowest was among illiterate fathers with the mean score was 1.3 ± 1.8 .

5. DISCUSSION

This study is the first hospital-based survey from parents of children (younger than 12 years old) in Madinah, Saudi Arabia concerning non-prescription usage of antibiotics. In this representative sample, we found that antibiotics could be easily dispensed as fewer than half of the studied subjects had been given antibiotics without prescription to their child with 42.9% for URTI, in which the majority were used it for 3-7 days. In Togoobaatar et al. [5] study, reported

that the majority of people interviewed were willing to take antibiotics for most respiratory tract infections including URTI and even those likely to have viral origin such as common cold; earache, cough, and flu. In addition, Togoobaatar et al. [5] study highlights that a large majority of those questioned (79%) believed that antibiotics should be taken at exact periods as prescribed (3-5 days) which agrees with our findings.

In the present study, the average score of negative beliefs and knowledge about all studied items about antibiotics was significantly higher among those subjects using un-prescribed antibiotics for their children. The overall negative beliefs score was 4.3 ± 3.1 among subjects using un-prescribed antibiotics for their children compared to 1.7 ± 3.2 among those not using un-prescribed antibiotics. This finding may be attributed to the general characteristics of the studied cohort as subjects not using un-prescribed antibiotics were more educated and have higher socio-economic standards as represented by monthly family income. Education and higher economic standard is known to have good impact on the beliefs and knowledge of subjects about health and its related problems which is in accordance with several studies [24,25].

Table 4. Average score of the studied beliefs, behaviors and awareness about antibiotic misuse by educational level of parent respondent

	Mean±SD	P. value
Average score of negative beliefs		
Father educational level		
Illiterate	3.9±3.7	0.24
Less than university	2.8±3.3	
University and higher	2.9±3.4	
Mother educational level		
Illiterate	3.3±3.7	0.70
Less than university	3.0±3.4	
University and higher	2.7±3.1	
Average score of positive behaviors		
Father educational level		
Illiterate	1.5±1.7	0.33
Less than university	1.5±1.7	
University and higher	1.7±1.8	
Mother educational level		
Illiterate	1.5±1.6	0.59
Less than university	1.6±1.6	
University and higher	1.8±1.7	
Average score of positive awareness on antibiotics resistance		
Father educational level		
Illiterate	1.3±1.8	0.001*
Less than university	1.6±1.5	
University and higher	2.1±1.4	
Mother educational level		
Illiterate	1.4±1.7	0.26
Less than university	1.5±1.7	
University and higher	1.8±1.6	

*Significant

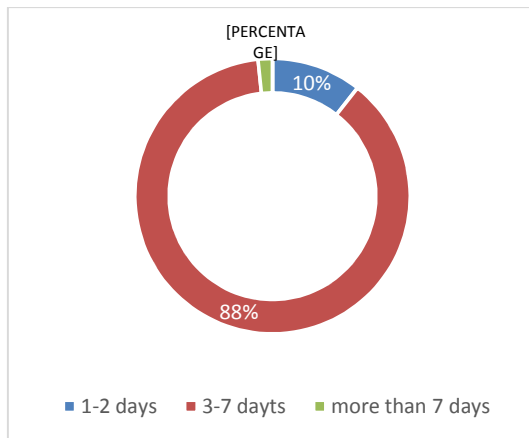


Fig. 2. Duration of antibiotic uses

Notably, nearly 80% of Napolitano et al. [26] study respondents received a prescription for their antibiotics, a result which substantiated our finding; the average score of positive behaviors and awareness for only two items related to the

studied behaviors; “taking antibiotics without prescription and storing antibiotics at home” was higher among subjects reported no usage of un-prescribed antibiotics for their children. The overall average score of positive behaviors and awareness was 1.8±1.7 among subjects reported not using un-prescribed antibiotics for their children compared to that of subjects using self- medicating antibiotics for their children 1.6±1.8 [26]. This finding may also be attributed to the general characteristics of the studied cohort as subjects using un-prescribed antibiotics were an increased distance from a medical facility [5].

In line with other studies [27–29] in which the highest average score for positive behaviors and awareness about antibiotics was among highly educated studied subjects, where this study significantly revealed higher average score of awareness with 2.1±1.4 for highly educated fathers, comparing to illiterate fathers with the mean score was 1.3±1.8 [27–29].

The present study appeared to have a number of strengths. The study questionnaire addressed almost all knowledgeable items related to antibiotics using PAPA scale. Additionally, the study questionnaire has been validated by an epidemiologist and a pharmacologist. This study has also the advantage of direct interviews with the participants, and not just distributing the questionnaires among them.

However, the lack of studies about this important issue among general population in Saudi Arabia has directed the authors to discuss their study findings with similar studies conducted globally and concerned with the same issue. Also, the study has included Saudi subjects from uncenter (MCH) and recruited a modest sample size that future researches will need to include many other medical centers to assess the extent to which the results of this study are generalizable.

6. CONCLUSION

The study findings revealed a considerable high proportion of Saudi subjects (48.6%) using non-prescribed antibiotics for their children. The higher average score of negative beliefs and knowledge about antibiotics misuse was found among these subjects. In addition, the average score of positive behaviors and awareness was low among them. Furthermore, the knowledge, behaviors and awareness of the studied subjects has been found to vary by their educational level. The study addresses the crucial need to develop structured health education programs to increase the knowledge, beliefs and awareness of the Saudi population regarding the danger of antibiotics misuse. Using different mass media to educate the Saudi population about these findings could have a positive impact.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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