

## A Description of Mothers' Knowledge and Practice about Antibiotic Use in Children in Northwest of Iran

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### Abstract

#### Background

Inadequate antibiotic usage in children might have severe side effects and lead to antibiotic-resistant pathogens. Iran is the second country in terms of the rate of antibiotic use globally, and approximately one-fourth of the population of this country is under 14-year-old. Therefore, the existing problems in this regard could be identified by evaluating the knowledge and practices of mothers concerning antibiotics. The present study aimed to investigate the knowledge and practice of mothers about antibiotics use among children.

#### Materials and Methods

This descriptive cross-sectional study was carried out in the pediatric hospital of Tabriz, Iran. A total of 450 mothers of children under 12 years old participated in this convenience sampling. They completed questionnaires (13 questions) of knowledge and practices (8 questions) designed by researchers. The data were analyzed using the SPSS software version 20.0.

#### Results

The mean scores of mothers' knowledge (ranged 0-13), and practices (from 0-8) were  $6.83 \pm 2.89$  and  $5.83 \pm 1.63$ , respectively. Moreover, the education level and occupation of mothers had a significant relationship with their knowledge and practices ( $P < 0.05$ ).

#### Conclusion

Considering the low level of knowledge and practices of mothers and the elevated antibiotic resistance during recent decades, major policies are required for medication distribution and counseling systems for parents. Furthermore, some plans are needed for public health education.

**Key Words:** Antibiotic, Children, Mother, Practice, Knowledge.

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## 1- INTRODUCTION

Antimicrobial therapy is one of the most important medical advances in the 21<sup>st</sup> century and has reduced human mortality (1). However, overuse of antibiotics is one of the most common issues worldwide (2, 3). According to previous studies, 20-50% of the prescribed antibiotics are unnecessary (4-6). In 2010, amoxicillin and azithromycin were the most frequently prescribed medicines in the US (3). Misuse of antibiotics could cause serious side effects and is one of the main reasons for drug resistance, leading to the emergence of antibiotic-resistant (7, 8). The relationship between antibiotic use and the development of resistant pathogens was confirmed by various studies (9-11). In other words, bacterial resistance is one of the most important threats in most of the developed and developing countries. The World Health Organization (WHO) has reported this as a global issue (12). Besides, the production and consumption of antibiotics could be costly for the health systems of countries (13).

Reduced response to treatment is the main complication of antimicrobial resistance that is very important among children (14). Children are most at risk for antibiotics misuse since half of them consume antibiotics mainly due to respiratory tract infections, sore throats, otitis, urinary tract infections, and common cold (3, 14, 15, 16). Moreover, parents' worries about their child's health could increase the unnecessary use of antibiotics. Persuading a physician to prescribe antibiotics by parents, self-medication by parents, or not completing a course of prescribed antibiotics are common among the children, which are directly related to the knowledge of parents (17, 18). Using broad-spectrum antibiotics in treating mild infections, the use of antibiotics in viral diseases, using broad-spectrum antibiotics as the first-line treatment, and antibiotic prescribing in viral diseases are known as

the other reasons for antibiotic misuse among children (19). Parents play the most significant role in making decisions about children's disease and their management. Consequently, their initial knowledge about medications and the function of medicines is critical (4, 20). Cultural characteristics, socioeconomic conditions, and the education level of parents could also affect their knowledge and practices about antibiotic use (21, 22). People in developing countries could receive medicines based on their preferences or the recommendation of a friend or a relative. Buying over-the-counter medicine is common in most countries, and pharmacies are a common source of health advice for people (8, 23, 24). In Iran, antibiotics have the first rank of selling medicine. Furthermore, according to WHO, Iran is the second country in the world in terms of utilizing antibiotics (12).

The management of this issue requires interdisciplinary cooperation and coordination between health care providers and the public. Therefore, investigating the knowledge of antibiotic use and the relevant performance based on the specific context of each country is very useful to deal with antibiotic misuse in that country. According to the census in 2016, children under 14 years old are 24% of the whole population of the country (25). This statistic indicates the necessity of special attention to this part of the population. According to national statistics, over 50% of patients in the big cities of Iran receive antibiotics annually (26). Tabriz is the largest industrial city in the Northwest of Iran, and the pediatric hospital is the biggest and only referral center in this part of Iran, providing service to all the cities around and even some of the neighboring countries. The current study aimed to investigate the knowledge and practices of mothers about antibiotic use among children under 12 years old, referring to the pediatric hospital of Tabriz. The results

could help to identify the weak points and problems.

## **2- MATERIALS AND METHODS**

### **2-1. Setting and participants**

This descriptive cross-sectional study was conducted in 2018 in the state Pediatric Medical Research & Training center of Tabriz, Iran. The sample was the Iranian mothers selected using the convenience sampling method. The inclusion criteria were having a child under 12 years old hospitalized in one of the wards and not being affected by congenital disabilities. Moreover, selected mothers knew the Persian language. The exclusion criteria were the diagnosis of mothers with psychological disorders or not responding to more than 20% of the questionnaire.

### **2-2. Sample Size**

To calculate the sample size, the mean score, and the standard deviation of the mothers' knowledge and practices were obtained using a pilot study on 30 participants. The sample size was determined as 400 for the knowledge variable and 336 for practices considering 95% of Confidence Interval (CI), and 10% the margin of error and applying sample size formula for descriptive studies. Finally, the sample size was determined as 450 mothers, considering the 10% attrition rate.

### **2-3. Measuring tool**

The data collection was performed using a researcher-made questionnaire with three parts completed by mothers in a silent room beside the wards with the guidance of one of the researchers. Besides, the questionnaire of illiterate participants was completed using interviews. The first part of the questionnaire was related to demographic characteristics of mothers and children, such as maternal age, child age, and mother education level. The

second and third parts addressed the knowledge and practice of mothers about antibiotic use, respectively. The knowledge questionnaire included 13 Yes/No questions identified the level of the mothers' knowledge in the four domains: identification of antibiotics, the role of antibiotics, side-effects, and antibiotic resistance. Moreover, the practice questionnaire included eight True/False questions that evaluated the practices of mothers in terms of antibiotic use. The False/True responses were scored as zero and one, respectively. Therefore, the score ranges of the knowledge and practices questionnaire were 0-13 and 0-8, respectively. In addition to the mean of knowledge and practices, the results were reported as poor (1-4 for knowledge, 1-3 for practices), moderate (5-9 for knowledge, 4-6 for practices), and good categories (10-13 for knowledge, 7-8 for practices). A panel of specialists confirmed validity content, and Content Validity Ratio (CVR) and Content Validity Index (CVI) were determined by 15 pediatric infectious professors and pediatric nursing professors. The reliability of the questionnaire was assessed through the internal consistency method using the Kuder-Richardson formula.

### **2-4. Data Analyses**

The data were analyzed by descriptive statistics, including frequency, percentage, mean, and standard deviation, using the SPSS software version 20.0. Furthermore, the groups were compared using the Chi-square test and the independent t-test based on the variable type and the normality of data distribution. In this study,  $p < 0.05$  was considered significant.

### **2-5. Ethical considerations**

The present study was confirmed by the Ethics Committee of the Tabriz University of Medical Sciences with the code of IR.TBZMED.REC.1396.368. Before the research, study purposes were explained to

the mothers, who met the inclusion criteria. The subjects were assured regarding the confidentiality of the data and their freedom in leaving the study at any stage. Furthermore, all participants signed informed written consent.

### 3- RESULTS

A total of 450 mothers were studied, and their mean age was  $27.34 \pm 6.17$  years old. The youngest and oldest mother was

18 and 47 years old, respectively. The mean age of the children was  $38.41 \pm 33.8$  months, and the youngest and oldest child was 4 months and 81 months old, respectively. Other demographic data of the participants are presented in **Table.1**. The mean knowledge and practice levels of mothers about antibiotic use were  $6.83 \pm 2.89$  and  $5.83 \pm 1.63$ , respectively (**Table.2**).

**Table-1:** Participants' characteristics.

Characteristics		Frequency	%
Mothers' education	University degree	87	19.28
	Diploma/High school	189	42.11
	Primary/Secondary school	136	30.20
	Illiterate	38	8.41
Mothers' job	Employed	106	23.55
	Housewife	344	76.45
Gender of child	Male	256	56.88
	Female	194	43.12
Sources of mothers' information	Physician	225	50
	TV/Radio	135	30
	Friends/Family	70	15.5
	Newspaper/Internet	20	4.5
Residency	City	310	68.79
	Rural	140	31.21

**Table-2:** Mean and levels of maternal knowledge and practices.

Variables	Mean (SD)	Min	Max	Levels	%
Maternal knowledge	6.83 (2.89)	1	12	10-13 (good)	23.5
				5-9 (middle)	57.6
				1-4 (poor)	18.8
				7-8 (good)	10.6
Maternal practices	5.83 (1.63)	2	8	4-6 (middle)	59.4
				1-3 (poor)	30.0

SD: Standard deviation.

**Table.3** demonstrates the frequency and percentage of the answers of mothers to each of the questions of knowledge. The results of the independent t-test revealed that the knowledge ( $p=0.04$ ), and practices ( $p=0.00$ ) of employed mothers and homemakers were significantly different. According to the results of the analysis of variance, There was a significant

difference between mothers' knowledge and practices and their level of education ( $p=0.00$ ). Moreover, a significant relationship was found between the age and knowledge of participants ( $p>0.05$ ). **Table.4** summarizes the relationships between demographic variables with the knowledge and practices of mothers.

**Table-3:** Frequency of mothers' responses to areas of maternal knowledge questioner.

Areas of maternal knowledge		%	
		Yes	No
Identification of antibiotics	Q <sub>1</sub> Paracetamol (Acetaminophen) is an antibiotic.	45	55
	Q <sub>2</sub> Penicillin is an antibiotic.	60	40
	Q <sub>3</sub> Cold syrup has antibiotic effects.	80	20
Role of antibiotics	Q <sub>4</sub> Should be given antibiotics in any fever disease?	60	40
	Q <sub>5</sub> Infectious sore throat is treated with cold syrup.	45	55
	Q <sub>6</sub> Urinary tract infection is treated with hygiene.	80	20
Side-effects of antibiotics	Q <sub>7</sub> The cold gets better by giving antibiotics.	56	44
	Q <sub>8</sub> Antibiotics in children have many side effects.	39	61
	Q <sub>9</sub> Antibiotics can cause allergies.	33	67
Antibacterial resistance	Q <sub>10</sub> Some antibiotics can cause diarrhea.	41	59
	Q <sub>11</sub> The antibiotic is discontinued by reducing the symptoms.	73	27
	Q <sub>12</sub> Misuse of antibiotics increases antibiotic resistance.	47	53
	Q <sub>13</sub> Antibiotics should be used until it is finished.	49	51

Q: Question.

**Table-4:** Relationship between mothers' characteristics and maternal knowledge and practices.

Variables		Maternal knowledge		Maternal practices	
		Mean Difference	t (p-value)*	Mean Difference	t (p-value)*
Mothers' job	Employed	1.36	2.02 (0.04)	1.40	4.48 (0.00)
	Housewife				
Residency	City	0.019	-0.22 (0.79)	-0.27	-0.76 (0.44)
	Rural				
Mothers' education	University degree	99.17	19.87 (0.00)	15.33	9.36 (0.00)
	Diploma/High school				
Sources of mothers' information	Primary/Secondary school				
	Illiterate				
Mothers' age	Physician	4.07	0.47 (0.68)	0.42	0.19 (0.89)
	TV/Radio				
	Friends/Family				
	Newspaper/Internet				
		r (p value)***		r (p value)***	
		0.042 (0.70)		0.072 (0.51)	

\* Independent t test. \*\* ANOVA statistical test. \*\*\* Bivariate correlation (Pearson) test.

#### 4- DISCUSSION

The present study aimed to investigate the knowledge and practices of mothers about antibiotic use in children aged under 12 years old, referring to the pediatric hospital of Tabriz, Iran. The findings showed that the knowledge and practices of more than 50% of mothers in terms of antibiotic use were in the moderate and poor levels. A study in Saudi Arabia reported the knowledge and practices of parents as weak (24). Furthermore, three investigations performed in Palestine, Jordan, and Kuwait observed the level of

knowledge and practices among parents as insufficient in antibiotics (3, 16, 27). A study in Pakistan also reported the need to increase maternal knowledge and practices regarding antibiotic use (9). Voidazan et al. carried out the study. A study in Romania demonstrated a high level of knowledge and practices among the participants about antibiotics (1). Furthermore, Nepal et al. reported the knowledge and practice levels of parents as favorable (28). In the present study, 43% of mothers were aware of medicine resistance due to antibiotic misuse. This figure is more than 85% in the study of

Voidazan et al. (1). Moreover, we observed that only 39% of mothers confirmed that antibiotics have side effects. However, Rousounidis et al. in Cyprus found that 93% of parents had good knowledge about the side effect of antibiotics, and 90% of the participants believed that antibiotic misuse reduces the effectiveness of the medicines and increases antibiotic resistance (4). Zyoud et al. reported that 79% of the participants were aware of antibiotic resistance (16). In the present study, 45% of mothers introduced Acetaminophen (Tylenol) as an antibiotic, while Nepal et al. reported it for 15% of the participants (28). Our findings showed that 60% of the participants stated that antibiotics should be administered in any fever disease. Hammour et al., Nepal et al., and Zyoud et al., found that 72%, 47%, and 64% of the participants believed that antibiotics effectively reduce fever, respectively (3, 16, 28). We observed that 56% of mothers considered antibiotics influential in cold treatment. In the study conducted by Nepal et al., 84% of the participants reported antibiotics effectively treating sore throat and cough (28). A total of 50% of the participants received most of the information about antibiotics from physicians. Voidazan et al., and Rousounidis et al., revealed it in 65% and 69% of the participants (1, 4). We found that 15.5% of the information of mothers were received from friends and relatives, while Voidazan et al. reported it as 10% (1). Besides, we revealed that television was the source of information for 30% of mothers and newspapers, and the internet was the information source for 4% of participants. Rousounidis et al., reported the mentioned result in 15% and 11% of the participants (4). We observed that the educational level of mothers had a significant relationship with their knowledge and practice scores. Rousounidis et al., reported low parents' education as the most important risk factor

elevating antibiotic misuse (4). The study conducted in Nepal found similar results in this regard (28). In the present study, living in urban or rural areas did not have a significant relationship with the level of knowledge and practices. These results were consistent with the findings of Godycki-Cwirko et al. in Poland (29), and Zayed Al-Ayed et al. in Saudi Arabia (24). On the other hand, in studies of Nepal and Lithuania, the knowledge and practices of urban participants were better than in rural regions (28, 30). Voidazan et al., reported a higher percentage of antibiotic use in rural areas than urban regions (1). This controversy could be related to the demographic varieties and the urban or rural structures of countries. Findings suggest that developing countries are similar to our country in this regard. Nevertheless, most studies conducted in developed countries show that their knowledge and practices are higher compared to in our study. These similarities and differences indicate that planning and training about antibiotic use in developed countries are efficient, and developing countries need more training programs. According to the findings of a systematic review, more than 33% of developing countries have lower knowledge about antibiotics and their role (31). In developing countries, pharmacies provide many medications to patients without a physician's prescription, so various medications are easily available to patients in these communities (23, 24). Also, the social and cultural differences of our country might affect the results. In Iran, most of the parents expect a physician to prescribe numerous medicines, and often, parents trust physicians who prescribe more medications. In many cases, parents persuade physicians to prescribe medicines, especially antibiotics. Furthermore, there is no organized system in Iran for referring patients to specialists based on the intensity of the disease.

Therefore, primary health care and health consults are not provided for the families. All of these factors may influence the level of knowledge and practices of parents.

## 5- CONCLUSION

Related programs are necessary to be designed considering the low level of knowledge and practices of mothers about antibiotic use and elevated antibiotic resistance in recent decades. The enhancement of knowledge and practices in parents requires collaboration between different parts. Moreover, modifying the public culture of antibiotic use could be improved the knowledge and practices of parents. To this end, major policies must be implemented concerning the limitation of medicine distribution. Moreover, counseling systems for parents and public health education in urban and rural areas are needed to be provided.

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## 7- CONFLICT OF INTEREST

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