



Evaluation of Mother's Knowledge and Beliefs Regarding Antibiotics Use of their Children

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Abstract:

Self-medication and patient noncompliance are contributing factors in antibiotic addiction. This essay describes the opinions and practices of Maa'n mothers on the use of antibiotics by their offspring. A cross-sectional survey was one of the data collection methods. We interviewed one hundred mothers who had given antibiotics to their children between the ages of six and eleven. Regression analysis and correlation tests were used to examine the connections between the variables.

According to our findings, 42.2% of mothers either strongly agreed or agreed that their child should take antibiotics in order to recover from a cold or the flu more rapidly. Furthermore, 29.8% of people were unaware of the negative consequences of antibiotics. Of the participants, 35.8% did not take their antibiotics as directed, and 28.9% of mothers reported pressuring their general practitioners to write prescriptions for their children. Of mothers, 75% indicated they did not believe that using antibiotics for self-medication may lead to resistance, while 10.15 percent claimed they had no knowledge of the topic. Regression analysis

results revealed that mothers' decisions to provide antibiotics to children with high fevers are strongly influenced by age group ($p < 0.001$).

Our results suggest that Maa'n women do not handle their prescriptions properly, and more attention should be paid to teaching them about the risks associated with antibiotics, bacterial resistance, and the need to avoid self-medication. Health education, suitable legislation, and actions are needed to reverse this and ensure Maa'n utilizes antibiotics appropriately.

Keywords: Mother - Knowledge- Beliefs - Antibiotics - Children.

1. Introduction

In order to implement the idea of safe antibiotic use, physicians must employ rational prescribing procedures, and patients must adhere to a set of rules; in the absence of these, antibiotics may result in microbial resistance and negatively impact human health. Antibiotics are ineffective in treating viral infections, despite the fact that they are occasionally abused for these purposes, especially when self-medicating [1]. Currently, at least 700,000 people die annually from antibiotic-resistant illnesses; however, if bacterial resistance is not addressed, this figure might rise to 10 million by 2050. If ongoing attempts to prevent antibiotic resistance are carried out, it is projected that 2.4 million people in high-income countries may die between 2015 and 2050 [2].

Many factors impact the development of antibiotic resistance. Every one of these components has the capacity to influence bacterial gene resistance or antibiotic effectiveness directly [3]. As per the results of the Central Asian and European Surveillance of Antimicrobial Resistance Network (CAESAR), antimicrobial resistance is considered a grave concern in Jordan. More MRSA, *Salmonella* spp., *S. pneumoniae*, *E. faecalis*, *E. faecium*, and other bacteria are found in the nation than in most other nations [4].

To tackle this health concern, the Jordanian Ministry of Health authorized the National Strategy and Action Plan to Combat Antimicrobial Resistance 2011–15 [5]. In Kosova, antibiotics may only be obtained with a prescription; yet, research indicates that self-medication and obtaining antibiotics from neighbourhood pharmacies without a prescription are frequent practices [6, 7]. Antibiotic self-medication is considered to be one of the primary causes of the growth of antibiotic-resistant bacteria in people [8, 9].

It is referred to as self-medication when a patient or parent takes medicine without a prescription, either on their own initiative or at the advice of untrained others. Due to inadequate drug regulations or monitoring of prescription medicine practices, it is a worldwide phenomenon that primarily occurs in developing countries. Africa, South America, Asia, including Jordan, and Southern and Southeastern European countries are the most frequent locations for antibiotic self-medication [10–12]. Children using antibiotics on their own is a behaviour that is highly connected with parents' attitudes, health knowledge, and beliefs toward this class of drugs [13].

It is also welcomed when parents help their children from self-medicating with antibiotics because this group is susceptible and drugs might have negative side effects [14–15]. Prescription monitoring, especially with regard to antibiotics and their usage, is not yet practically feasible in the Jordanian healthcare system. In order to monitor antibiotic use and combat bacterial resistance, the Kosovo research organization participates in several European initiatives. Based on the survey results acquired from these efforts, Jordan possessed the highest

percentage of total parenteral ceftriaxone ingestion in Asia in 2020 [16]. Another similar investigation found that Jordanian hospitals had exceptionally high rates of antibiotic usage among pediatric patients compared to most other countries [17]. Furthermore, a survey carried out at a basic healthcare facility in Kosovo demonstrates that parents' beliefs, comprehension, and use of antibiotics to their children are improper [18]. Given that it has the youngest population in Asia, Jordan deserves special consideration when it comes to prescription drug use, especially for young person's using antibiotics [19]. A detailed examination of parent attitudes in Kosovo will provide us with crucial insights into the elements influencing parents' opinions on the use of antibiotics for their children. Specifically, we wanted to know how parents felt about self-medication and how they followed through on giving their children antibiotics.

2. Methods

2.1. Study Design

The study was cross-sectional in nature and was carried out in primary schools throughout several Ma'an Governorate (Jordan) locales using an anonymous, structured questionnaire.

2.2. Questionnaire development and validation

A structured questionnaire that had been adjusted was used as the survey instrument to gather data on research questions [20]. Initially, the questionnaire was verified in a pilot survey with 30 parents, and we revised and validated its content based on their input. This instrument was created to gather demographic information, knowledge, attitudes, and perceptions of parents on antibiotic usage in their children. The demographics part, the section on parents' awareness of antibiotics and illnesses, the section on parents' antibiotic-using behaviours, and the section on parents' interactions with doctors on antibiotic prescriptions comprised the structure of the questionnaire. On a 5-point Likert scale, which goes from strongly disagree to disagree, undecided, agree to agree, agree to strongly agree, respondents' degree of agreement with the statements in the survey was assessed. Additionally, respondents were asked to rate their frequency of antibiotic usage as always, most of the time, often, sometimes, or never. They were also asked to rate their level of use as much, enough, not a lot, a little, or not at all.

2.3. Setting

A significant portion of the patients receiving medical care in these family medicine centers are primary school-aged children, according to our review of the patient registrations at these facilities prior to conducting study. Nine (9) distinct municipalities' elementary schools, both in rural and urban locations, participated in the poll. First, we made the request to conduct the research in seven locations of the Ma'an Governorate (Jordan) by contacting the Directorate of Education. The directors of the Directorate department chose one urban school and one rural school at random from their list of schools, using just the first even number as a guide. We got a schedule of meetings with the parents of the children after contacting the principals of the schools where the children had been selected. We chose a random time to visit a school without being aware of the particular class that would be included in this poll. During the regular parent-teacher conferences, communication between the school and parents was developed. After giving an introduction and providing information about the survey, teachers gave the parents the questionnaires. Parents received the questioners from the teachers within the classroom, where they were also collected.

Without interfering with the parents' survey responses, the researcher was on hand to help with any possible questions or requests for clarification. The months of May and June in 2024 were used for data collecting.

2.4. Participants

Questions on knowledge, attitudes, and perspectives were posed to one hundred (100) parents whose children had taken antibiotics for a variety of reasons. Research was used to do this. The goal of the study and the need of giving truthful answers were conveyed to the participants. The study did not include pediatric doctors. At any time, a participant may opt out of the questionnaire. It was voluntary and anonymous. Data was kept private and informed consent was obtained. In order to mitigate any bias, the research was conducted across all populations, with parents from both urban and rural areas being randomly selected. The University of Jordan's faculty of medicine's ethical committee gave permission to conduct the survey, which was obtained from the pertinent local education departments.

2.5. Data Analysis

The outcomes were analyzed using descriptive and comparative statistics. For certain variables, we employed cross tabulations and frequencies; for other variables, we utilized t tests and Chi-square (χ^2). Correlation tests were employed to investigate the impacts among many variables. To find out how a significant demographic variable impacts parents' opinions toward their children using antibiotics, regression analysis was done. SPSS (version 25.0) was used to perform statistical analysis.

3. Results

The survey sample consisted of 100 mothers. The average parent age was 39.64 years, with a standard deviation of 6.92. Additional demographic details of our respondents are provided in Table 1.

The data presented in Table 1 suggest that there are significant differences between mothers in terms of age group and urban or rural residence. We did not find statistically significant differences in terms of level of education, relationship with the pediatrician, resources for obtaining information on the use of antibiotics for their children, and attitudes and perceptions toward the use of antibiotics for their children. In most cases, the mothers' source of information about the antibiotics used for their children was the pediatrician. However, approximately one in four mothers also used alternative non-medical sources for information on antibiotics. No significant difference was observed in relation to mothers' perceptions statements implying incorrect use of antibiotics ($\chi^2=9.437$ for $p<0.05158$).

Table 1 Sociodemographic data of study sample (n=10).

Variables					p value
Education Level	Primary school (n)	Secondary School (n)	University degree (n)	Post graduate (n)	$\chi^2=7.7606$ 0.51227
	25	50	19	6	
Age	less 30	30-40 years	More than 40 years		$\chi^2=39.4194$ 0.00001
	60	35	5		

Living place	Total n (100 mothers) N	Urban		Rural			$\chi^2=39.4194$ 0.0000	
		53		47				
Relationship of mother with Pediatrician		Family		Friendship	Professional		$\chi^2=3.0797$ 0.214418	
		21		23	56			
Mother information sources about antibiotic use		Medical doctor	Electronic media	Internet	Family/Friends	other		$\chi^2=1.4104$ 0.84238
		82	6	4	4	3		
Perception of parents for antibiotic use		In high Temperature	For influenza	To accelerate the healing of common cold	Antibiotics do not have any side effect	The use of antibiotics does not increase the Antibiotic should bacterial resistance		$\chi^2=9.437$ 0.051058
		40	42	13	3	2		

0.01 < p < 0.05

Table 2 displays the results of the mothers' opinions and attitudes on doctor prescriptions and the use of antibiotics by mothers for their children. 51.3% of moms stated that they never preferred doctors to prescribe antibiotics for a runny nose, followed by cough (34%), cold (23.2%), and sore throat (10.8%). While some moms choose to self-medicate or take their children's medicines as directed by the pharmacist, 49% of mothers do not take antibiotics without a pediatric prescription. It is stated that moms utilize antibiotics as recommended by their physician in 64.2% of instances; in other situations, mothers only partially adhere to antibiotic therapy for their children due to noncompliance with instructions. It's shocking to see that over 60% of respondents (44.6% always and 17% very regularly) doubt if their children really need to take antibiotics when their physicians prescribe them. According to the majority of respondents, their doctors do not issue antibiotic prescriptions over the phone. Mothers who felt they had excellent access to medical care were just 23.8%. Mothers hold the belief that physicians overprescribe antibiotics, and they have a notable impact on the dosage of antibiotics given to their children. More details concerning this section are provided in Table 2.

Table 2 Mothers' perceptions of health services and health workers regarding antibiotics.

Variables	Always (%)	Very Often (%)	Sometimes (%)	Rarely (%)	Never (%)
How often would you prefer the pediatrician to prescribe antibiotics for your child when they have a cold?	11.6	8.2	12.4	44.6	23.2
How often would you prefer your pediatrician to prescribe antibiotics for your child if he has a runny nose?	4.6	4.0	6.8	33.3	51.3
How often do you wish your pediatrician would	12.1	13.7	23.4	40	10.8

prescribe antibiotics for your child when they have a sore throat?					
How often would you prefer your pediatrician to prescribe antibiotics for your child when they have a cough?	5.6	9.3	14.6	35.8	34.7
How often would you give your child an antibiotic without the advice of a pediatrician, because a pharmacist recommended the antibiotic?	4.2	8.2	12.6	26	49.0
When your pediatrician recommends an antibiotic, how often do you ask if it is truly necessary for your children?	44.6	17	17.8	15.7	4.9
How often does your pediatrician recommend antibiotics for your child over the phone?	2.9	3.3	4	21.8	68
How often do you follow all the pediatrician's instructions and advice?	64.2	19.9	6.6	6.6	2.7
How often do you urge your pediatrician to recommend antibiotics even when the microbial diagnosis is not clear?	4.9	4.4	3.5	20.8	66.4
How often does your pediatrician explain your child's illness and whether or not your child should take antibiotics?	47.7	21.4	12.1	12.4	6.4
How often does your pediatrician recommend a throat or nose swab before taking antibiotics?	11	11.9	17.9	38.6	20.6
Variables	Excellent (%)	Very Good (%)	Good (%)	Fair (%)	Poor (%)
How would you describe your access to health services?	23.8	40.6	30.2	4.1	1.3

Table 3 presents the data indicating mothers' views and knowledge on antibiotic therapy for their children. In 33.9% of cases, mothers agreed or strongly agreed that antibiotics should be used to treat fever. Although 42.2% of mothers strongly agreed or agreed that using antibiotics to assist a kid recover from a cold or flu is a good idea, 41.3% of mothers disagreed or strongly disagreed that using antibiotics to treat a cold or flu that is accompanied by a sore throat is not a good idea. Results show that more than a third of participants (29.8%) did not know about the negative consequences of antibiotics (strongly agreed, agreed, or were doubtful). Of the moms surveyed, just half (55.4%) believed that using antibiotics without a prescription reduces their efficacy and causes resistance. Antibiotics are often used, which affects mothers' awareness of their prescription, since most of them (74.4%) strongly agreed or agreed. Finding found that moms who choose to give their children antibiotics without a prescription were not motivated by time constraints was intriguing (84.3% disagreed or strongly disagreed). Amidst various other discoveries, it is significant that the majority of parents (67.1%) concurred or strongly concurred that they lacked knowledge concerning antibiotics, and the majority (81.9%) expressed concern regarding the adverse consequences of antibiotics. For more details on this section, see Table 3.

Table 3 Mothers' knowledge and attitudes toward antibiotic use in children.

Variables	Strongly Agree	Agree (%)	Undecided (%)	Disagree (%)	Strongly disagree
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	(%)				(%)
Antibiotics should be used if the child has a fever	13.9	19.9	12.1	32	22.1
Flu or colds accompanied by a sore throat should be treated NOT with antibiotics	13.2	27.4	18.1	29.8	11.5
When a child suffers from flu or a cold, it heals faster if it is first treated with antibiotics	16.1	26.1	16.1	26.9	14.8
Antibiotics have no side effects	4.2	13.5	12.1	38.6	31.6
If antibiotics are used without indication, their effectiveness decreases and the bacterium becomes more and more resistant	21.4	34	22.3	13.9	8.4
Antibiotics reduce the complications of an upper respiratory tract infection	20.3	38	24.1	13.2	4.4
Do you believe that antibiotics are widely used	35.3	39.1	13.6	6	6
Would you change your pediatrician, because you think he/she does not recommend antibiotics to your children often enough	5.7	10.8	12.1	41.2	30.2
Would you use an antibiotic again that you have previously used on your child for the same symptoms?	7.1	17.6	11.3	20.7	43.3
Would you insist that your pediatrician prescribe antibiotic therapy if your child was suffering from an upper respiratory tract infection?	11.5	17.4	21.8	31.6	17.7
How often would you give your child antibiotics, because you do not have time to go to the pediatrician?	4	2.6	9.1	19.6	64.7
How often would you give antibiotics to your child without the advice of a pediatrician, because your pediatrician has recommended the same antibiotic for the same symptoms in the past?	6.4	6.6	10.6	26.5	49.9
How often would you give antibiotics to your child without the advice of a pediatrician, because a friend/family member recommended it to you?	2.6	4.2	8.8	21	63.4
Do you think you are informed about the correct use of antibiotics?	17.2	49.9	17	14.4	1.5
Are you concerned about the possible side effects of antibiotics?	61.1	20.8	11.9	4.2	2
Do you agree that you would be unhappy if your pediatrician did not recommend antibiotics to your child in case of an upper respiratory tract infection?	13.7	20.3	21.4	11	33.6

The regression study demonstrates how several independent factors, such as age groups and residential location, impact dependent variables related to mothers' attitudes and actions on the use of antibiotics for their children. Parent age groups had a substantial impact on access to health care services, according to our data ($F=$

11.120, $R^2 = 0.24$), suggesting that age group influences service availability ($b=0.155$, $p < 0.001$). Additionally, the variable is strongly impacted by gender at $p < 0.05$ ($F=6.684$, $R^2 = 0.15$, $b=0.331$), and mothers' age group has a significant impact on their beliefs regarding the usage of antibiotics for children with high fever ($F=26.391$, $R^2 = 0.12$) ($b=0.55$, $p < 0.001$). More data from the regression analysis is included in Table 4.

Table 4 Regression analysis of different variables of Parents' knowledge and attitudes toward antibiotic use in children.

Regression Relations	Beta Coefficient (b)	R ²	F	p value	Relation confirmed
AG→AHCS	0.155	0.24	11.12	0.00	yes
RE→AHCS	0.043	0.00	000	0.492	No
AG→RWPE	-0.012	0.10	4.784	0.015	No
AG→AUHT	0.55	-0.235	26.391	000	Yes
AG→ANSE	0.007	0.002	0.812	0.184	No

$p < 0.05$; AG Age group, RE Residence (Urban/Rural), AHCS Access to health care services, RWPE Relation with pediatrician, AUHT Should antibiotic be used in children with high temperature, ANSE Antibiotics does not have a side effect.

4. Discussion

The opinions and behaviors of mothers toward the usage and administration of antibiotics for their children are shown by this study. Mother self-medication of antibiotics because they do not have time to visit the pediatrician, the pediatrician has previously prescribed the same antibiotic for the same symptoms in the past for their children, or the antibiotic was recommended by a friend or family member of the parents, characterizes the attitudes and practices of parents in Maa'n regarding the use of antibiotics for their children.

It is noteworthy that self-medication by rural parents among children in Peru was reported to be significantly higher (52% of children received over-the-counter antibiotics) [20] than in Maa'n, at 12.4%, while nearly matching the findings of the surveys in Greece and Italy (10% and 10.4% of mothers, respectively, confirm the use of antibiotics for their children without a doctor's prescription) [21, 22]. According to Chinnasami et al., thirty percent of Indian mothers admit to self-medication with antibiotics [23].

Our results on mothers' influence on pediatricians to prescribe antibiotics for their children are higher than those of the Turkish parent survey (12.4% vs. 6.3%). Moreover, compared to 38.45% in Turkey, 41% of mothers in Maa'n would advise an antibiotic for influenza [24]. Many moms in our research (29.8%) were unaware of the negative effects of antibiotics. Comparative research revealed that 23.6% of mothers in the Philippines and 26.4% of mothers in India [25] thought that antibiotics had no negative effects. 26 These results show how much parents everywhere need to be educated.

The Dhaka survey's findings showed that 25% of parents disagreed that antibiotic resistance is caused by overuse of antibiotics and that 10.15% of moms were unaware of the term. Moreover, 34.38% of mothers said that they did not think that using antibiotics on their own may result in resistance [27]. 44.6% of participants to a Maa'n poll were unaware of the consequences of no rational antibiotic usage or antibiotic resistance. According to a comparison of our survey findings with a government study conducted in Maa'n, 40.6% of cases compared to 17.1% in Maa'n should not be treated with antibiotics for sore throats and flu [23].

Our findings imply that Maa'n mothers' views toward antibiotics are typified by low treatment adherence and more reliance on doctors for antibiotic prescription. These results agree with the results of the Spanish survey by SoutoLópez et al. [28]. The age range of mothers significantly affects their access to medical treatment. While there were no differences in terms of educational level, demographic and socioeconomic information like age and urban or rural status between mothers in connection to antibiotic usage opinions and behaviors differ significantly from one another. These findings contradict some previous research that discovered that due of their emotional bond with their children; moms were more likely than dads to give their children antibiotics [25, 29, and 30].

It is our view that this finding should be investigated by other surveys for the analysis of the factors having the most influence on the antibiotic use behavior in Maa'n with relation to the gender of the parents [25, 30]. According to regression analysis results, mothers' belief that antibiotics should be given in children with high temperatures is significantly influenced by their age group. According to our findings, 19% of Saudi Arabian parents confirmed that children with fevers should get antibiotics, whereas 33.77% of others thought that antibiotics should be used in children with high temperatures [4].

Parents' attitudes toward antibiotic therapy in children indicate a moderate level of knowledge and do not reach an optimal and rational awareness level regarding antibiotic indications and conditions of use in the presence of various clinical conditions, such as fever, cold, flu or respiratory infections. Of concern is the insufficient knowledge of mothers about the safety of antibiotics and the tendency to self-medicate with antibiotics for their children. All these research findings point to an insufficient level of health education of parents in Maa'n regarding antibiotics. Our findings raise the need for educational awareness campaigns for mothers in Maa'n focused on the rational use of antibiotic medications. The findings of this survey could help us better understand and mitigate the unnecessary use of antibiotics in the future.

5. Limitations

The study used a self-administered questionnaire distributed in schools across Governorate during regular parent meetings. The data might have been subject to recall bias, as it would have been better to survey or interview mothers while they were using antibiotics on their children. The study could have been more representative if the questionnaires were distributed in community pharmacies, where parents would present their current behavior and practices regarding antibiotic use. However, logistical issues and potential influence of pharmacists in community pharmacies prevented this. The questionnaire also contained questions about the role of pharmacists and their impact on mothers' antibiotic selection. The sample size was low with postgraduate education levels, and the study did not analyze marital status, health status, and number of children, which may have influenced the findings.

6. Conclusion

This study shows that women in Maa'n, Jordan, confirm that their physician is their primary source of knowledge on the usage of antibiotics for their kids. Parental self-medication of antibiotics for their children for various reasons is still common, and the inclination for easy access to antibiotics for self-medication may be influenced by an inadequate degree of awareness and health education on the sensible use of

antibiotics. To address this issue and guarantee the responsible use of antibiotics in Maa'n, health education, sufficient measures and interventions are required.

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