

Full Length Research Paper

Patterns of antibiotic use among children

Hala Abdullah Hussien Abu Romman

Preventive Medicine Department, Royal Medical Services, Amman, Jordan.

Accepted 4 March, 2013

Misuse of antibiotics is considered one of the phenomenon that exist among mothers. This research is aimed at investigating the attitudes and conviction of parents for antibiotic use for their children. Random sample was selected from parents from Amman governorate. The sample composed of (40) family respondents. The results of the research revealed low awareness of parents on the use of antibiotics for their children. Also mothers' awareness is weak for the use of antibiotics during pregnancy, nursing and lactation. The results showed that pharmacists and physician contributes to some extent for the distribution of use of antibiotics despite of the wrong impression among parents that most of the common diseases can be treated through antibiotic.

Key words: Antibiotic, children, patterns.

INTRODUCTION

The use of antibiotics is very wide without any medical supervision. Wise et al. (1998) and Cars et al. (2001) approved that about 80% of the antibiotics are used in the community. Wise et al. (1998) reported that about 20 - 50% of antibiotic used are inappropriate. This behavioral pattern increases the risk of adverse effects and the resistance of antimicrobial community pathogens (Cizman, 2003). The constraints of antibiotic use should be determined with high controls and with the regulation of relationship of patients with physicians. The high demand of patients for antimicrobials shows increase of unnecessary prescriptions (Bauchner, 1997). The relief the patients feel when they take antibiotics increases the pressure on physicians to describe antibiotics.

Josta et al. (2012) showed that the use of antibiotic is connected to parents' use of antibiotics. Their research has shown that the high use of antibiotics among parents has contributed to high use of antibiotics among their children. Haung et al. (2012) revealed that while most antibiotics about 66.66% is given to children according to prescriptions, the rest of antibiotics are given without

prescriptions. Bajcetic and Jovanovic (2012) observed lack of knowledge and skill in administering antibiotics among children. The authors indicated that parents lack essential knowledge to deal with antibiotics they give to their children. They indicated also that parents did not consider the physiological and physical characteristics of their children. Consequently, this paper will test the distribution of antibiotic use.

METHODS

Study design

The purpose of this paper was testing the use of antibiotics among children. To accomplish this objective, cross-sectional study was used. Random sample of parents was selected. About (40) parents of fathers and mothers were selected to study the frequency of antibiotic use among children. Questionnaire was used as a tool for data collection. The questionnaire included 57 questions. Part of these questions care for the frequency of antibiotic use, while the rest asked about the demographic characteristics of parents. The validity of the questionnaire was tested using a group of mothers

Table 1. Demographic characteristics of sample (n=40).

Characteristic	%
Gender	
Male	17.5
Female	82.5
Marital status	
Married	87.5
Divorced	7.5
Widow	5.0
Age (years)	
Less than 18	0
18 - 25	7.5
26 - 35	45.0
36 - 45	30.0
46 - 55	17.5
56 - 65	0
More than 65	0
Household income	
Less than 200 JD	2.5
200 - 500 JD	35.0
500 - 1000 JD	27.5
More than 1000 JD	35.0
Education	
Primary	0.0
Up to grade 9	2.5
High School	20.0
College	7.5
Bachelor	55.0
Postgraduate	15.0
Place of residence	
Amman	97.5
Irbid	2.5

Table 2. Demographic characteristics of children (n=40).

Characteristic	%
Number of children per family	
One	48.5
Two	30.3
Three	18.2
Four	3.0
Age	
Average age of first child	9.78
Average age of second child	8.17
Average age of third child	6.43
Average age of fourth child	3.00

outside the sample of this research.

Statistical analysis

The collected data through questionnaires were coded and entered to Statistical Package of Social Sciences (SPSS) version 18. Descriptive statistics using frequencies, percentages and cross tables were used to get information about each question. Chi-square testing was used to find out if there are any significant differences among the questions of the research.

RESULTS

Demographic characteristics of sample

Respondents included 17.5% males and 82.5% females. The females of the sample were married or divorced mothers. The current married women were 87.5%, while the divorced were 7.5% and the widows were 5.0% of the sample. The marital status of females at least reflected their ability and experience to deal with the needs of children. The dominant age of the sample was 26 - 36 years, followed by 36 - 45 years which is the age of pregnancy (Table 1).

Most of the income ranged from 200 – 500 JD (0.7 JD=\$1) and 500 – 1000 JD, while the dominant education was the bachelor, which indicates that most of the sample are well educated and live in Amman (Table 1).

Demographic characteristics of children

The percentage of mothers with one child was 48.5%, while the percentage of mothers with two children is 30.3%. The percentage dropped for mothers with three children to 18.2% and 3.0% for mothers with four children. The average age of first child was 9.78 years, second child 8.17 years, third child 6.43 years, and fourth child 3.00 years.

Patterns of antibiotic use practiced by parents for children

Most of parents (62.5%) indicated that they give their children medical treatment through their physicians. On the other hand, about 20.0% of the sample indicated that they give their children treatment after checking the private clinic, while about 17.5% of the parents indicated other conditions to give their children treatment (Table 3).

The majority of parents indicated that they pay for their children's treatment (42.5%), while about 30.0% indicated that they have private insurance and 22.5% have national insurance. The majority of the sample indicated that their children has been treated by private physicians while the rest of the sample indicated that they receive medication through urgent care center, pharmacist or accident care

Table 3. Patterns of antibiotic use among children (n=40).

Characteristic	%
Medical treatment	
Physician	62.5
Private clinic	20.0
Others	17.5
Type of payment	
National insurance	22.5
Private insurance	30.0
Self pay	42.5
Other	5.0
Have/has your child(ren) been on an oral (by mouth)	
Yes	52.2
No	47.5
Who treated them?	
Urgent care center	7.5
Private physician	47.5
Pharmacist	7.5
Accidents and emergency room physician	2.5
Community clinic	12.5
Others	2.5
Frequency	
1	15.0
2	32.5
3	20.0
4	10.0
5	2.5
Source of antibiotic	
Pharmacy	85.0
Physician	15.0

and emergency room physician, community clinic or others. The most frequent visit for a physician was twice per year with 32.5% followed by three visits with frequency of 20.0. The source of antibiotics was mostly through the pharmacy with 85.0 and 15.0% provided by physician directly (Table 3).

Table 4 shows the causes and types of antibiotics taken by children. Most of antibiotics were used to treat strep throat and ear infection with 42.5% and bronchitis with 30.0%. The most frequent antibiotic used was Amoxicillin with 42.5% followed by Augmentin/Amoklan with 30.0%. The third highest percentage was reported for Pencillin with 10.0% (Table 4). The major cause for starting antibiotic was sore throat with 20.0% and cough, sore throat, runny nose, and earache with 10%. The other causes distributed for fever diarrhea, abdominal

pains and others.

About 65.0% of respondents indicated that they changed the physician to another one because he did not prescribe antibiotics. About 27.5% of respondents indicated that the treatment of cold was handled through antibiotics. About 17.5% of respondents reported that the physician of their children guided them to antibiotics as a treatment through phone consultation. The cause of consultation was sore throat infections with 10 and 5% for cough cases (Table 4).

More than half of respondents believe that infection associated with fever should be treated with antibiotics. Parents used antibiotics to treat their children in cases of bacterial infection (37.5%), fever (12.5%), and viral and bacterial infections 10%, while about 20% of respondents indicated that they use antibiotic for previous conditions. About 40% of the respondents indicated that they use antibiotics according to their accumulative experience with them. Based on non production of the desired effect of antibiotics, 45% of the sample indicated that non completion of the course of antibiotic will decrease the desired effect of antibiotic. Other factors was related to the use of unnecessary antibiotic or non completion of the course of antibiotic with 30 and 15% of respondents justifying the low response for the use of antibiotic with physician consultation (Table 5).

75.0% of respondents indicated that antibiotic can be used to treat child stomachache, diarrhea and vomiting, while 45% of respondents indicated that antibiotic can be used to treat cold, cough or nasal congestions. Also, 65% of respondents reported that their children require antibiotic for the treatment of cough, cold or flu symptoms before they take them to physician (Table 5).

About 65% of respondents indicated that they use antibiotics for their children more than 3 times per year, while about 25% of respondents indicated that they use the antibiotic more than once per month for their children. Some parents (27.5%) reported that they request the physician to prescribe them antibiotic for their children in case it lacks that. 20.0% parents used to change the physician if he refused to prescribe antibiotic for the treatment for their children (Table 6).

35.0% parents depend on others' experience (e.g, relatives) and advice to give their children antibiotic. About 55% of respondents indicated that Amoxicillin and Bactrim can be used to treat the symptoms of common cold. Moreover, about 27.5% of respondents show that Biaxin, Bactrim and Amoxicillin can be used to treat viruses (Table 6).

The majority of parents prefer the imported antibiotics over the local ones. About 55% of parents consider the price when purchasing antibiotics. About 12.5% of parents use antibiotics for their children as prophylaxis measure. More than half of respondents indicated that they use antibiotic from one child to another. About 32.5% of respondents indicated that they use leftover reconstituted antibiotic suspension from one child to

Table 4. Reasons and types of antibiotics taken (n=40).

Variable	%
Reason for taking antibiotics	
Bronchitis	30.0
Ears infection	12.5
Pneumonia, Bronchitis	7.5
Strep throat, Ear infection	42.5
Urinary tract infection	5.0
Wound infection	2.5
Type of antibiotic	
Amoxicillin	42.5
Augmentin/ Amoklan	30.0
Cefix	2.5
Ciproflaxacin,Augmentine/Amoklan	2.5
Keflex	5.0
Penicillin	10.0
Zithromax	7.5
Have you ever given your child/children "left-over"?	
Yes	47.5
No	52.5
Specify: why you start did the antibiotic?	
Abdominal pain	2.5
Cough	2.5
Cough, Sore throat, Runny nose, Earache	10.0
Diarrhea	2.5
Earache	2.5
Fever	5.0
Fever, Diarrhea	2.5
Fever, Sore throat	2.5
Painful	2.5
Runny nose	7.5
Sore throat	20.0
Did you ever go to another physician or emergency department to obtain antibiotics for your child/children, when the first physician that you saw did not prescribe antibiotics?	
Yes	65.0
No	32.5
Does your physician routinely treat your child's/children's cold symptoms with antibiotics?	
Yes	27.5
No	72.5
Has your physician ever told you over the phone to start antibiotics for your child without examining him/her?	
Yes	17.5
No	82.5
If you answered YES, what was the reason (why)?	
Abdominal pain, fever	2.5
Cough	5.0
Cough, sore throat	2.5
Earache	2.5
Runny nose	2.5
Sore throat	10.0
Urinary tract infection, earache	2.5

Table 5. Parents convictions about antibiotic (n=40).

Convictions about antibiotic	%
Do you think that all infections associated with fever should be treated with antibiotics?	
Yes	52.5
No	47.5
In what disease condition(s) do you usually use antibiotics for your child(ren)?	
Bacterial infection	37.5
Fever	12.5
Non	2.5
Fever, Bacterial infection	2.5
Fever, viral and bacterial infections	7.5
Viral and bacterial infections	10.0
Viral infection	7.5
All	20.0
If an antibiotic was effective in treating an infection 5 years ago, do you think it will always be effective against the same infection in the future?	
Yes	40.0
No	60.0
Why do you think that antibiotics sometimes do not produce the desired effect (that is, do not work)?	
Taking the antibiotics before meals	5.0
Using antibiotics without doctor's prescription	15.0
I don't know	2.5
Not completing the full course of antibiotics	45.0
Using antibiotics unnecessarily, not completing the full course	30.0
Using the same antibiotic with a different brand	2.5
Do you think antibiotics are necessary for treating your child's stomachache, diarrhea or vomiting?	
Yes	75.0
No	22.5
Do you think antibiotics are necessary for treating your child's common cold, cough or nasal congestion?	
Yes	45.0
No	52.5
Did your child develop an infection that was hard to treat because she/he was taking antibiotics when was needed?	
Yes	2.5
No	92.5
Did you know that your child needs antibiotic treatment before you take her/him to the doctor for cough, cold or flu symptoms?	
Yes	65.0
No	30.0

another. About 15% of respondents indicated that they use this behavior regularly (Table 7).

For the preservation of antibiotics, about 70% reported that they use refrigerators, while the rest use medicine cabinet to reserve medicine. Less than half of respondents reported that they suspended the antibiotics at home and these suspensions left at home took care of

emergencies (Table 7).

The majority of sample (65%) reported their knowledge that children may develop allergic reaction to antibiotic and that may cause death. One-third of respondents asked the children physicians to test them for antibiotic allergy, while two-thirds did not. Less than one-third of the sample reported if they know that one of the family

Table 6. Parents impression about the use of antibiotic (n=40).

Impression about use of antibiotics	%
How often do you use antibiotics for your children per year	
3 times year	65.0
Every 2 weeks	5.0
Monthly	2.5
More than monthly	25.0
Have you ever requested antibiotics prescription from your physician even if it was not included in the treatment plan for your child's illness?	
Yes	27.5
No	70.0
Have you ever consulted another doctor to prescribe an antibiotic for your child's illness if the previous doctor did not prescribe any?	
Yes	20.0
No	80.0
Have you ever selected and gave antibiotic(s) for your child(ren) based on relatives' advice?	
Yes	35.0
No	65.0
Do you believe that antibiotics like Amoxicillin and Bactrim will effectively treat and limit the duration of symptoms from the common cold?	
Yes	55.0
No	45.0
Do you believe that antibiotics like Biaxin, Bactrim, and Amoxicillin are effective against viruses?	
Yes	27.5
No	72.5

Table 7. Preference of antibiotic, use and reservation (n=40).

Variable	%
Preference of antibiotics, use and reservation	
Do you prefer local or imported antibiotics?	
Local	17.5
Imported	82.5
Do you consider antibiotic price when buying?	
Yes	55.0
No	45.0
Had you ever used antibiotics for your child as a prophylaxis measure?	
Yes	12.5
No	87.5
Had you ever used siblings (brothers and sisters) antibiotic(s) from one child to another?	
Yes	52.5
No	47.5
Did you ever use leftover reconstituted (prepared) antibiotic suspension from one of the children for any of the other siblings (children)?	
Yes	32.5
No	67.5

Table 7. Contd.

If your answer YES, how often?	
Rarely	7.5
Sometimes	2.5
Usually	15.0
If you answered YES, when was the suspension prepared?	
2 weeks	5.0
3 weeks	5.0
A month	10.0
A week ago	5.0
Do not know	7.5
Where do you usually store the prepared antibiotic suspension?	
Drug cabinet	30.0
Refrigerator	70.0
Do you prepare antibiotic suspension at home?	
Yes	47.5
No	50.0
If your answer NO, do you ask your pharmacist to do so?	
Yes	52.5
No	17.5
Do you keep antibiotic suspension at home for emergency use?	
Yes	45.0
No	55.0

members has antibiotic allergy. Mothers were the highest allergic for antibiotics. More than 52.5% of the sample reported their knowledge of the harmfulness of antibiotics for children's teeth. About 27.5% of mothers reported their intake of antibiotic through pregnancy, while 17.5% reported that it is safe to take it during pregnancy. Moreover, about 22.5% of mothers reported that it is safe to take antibiotic during nursing and 20.0% reported it is safe during lactation.

DISCUSSION

The aim of this research is to assess parents' knowledge, attitudes and experience regarding antibiotic use for their children. The results of the research revealed misuse of antibiotics of parents for their children as well as some misbehavior of physicians to satisfy the confidence of parents.

Despite the fact that more than 62.5% of parents reported that they consult physician to treat their children, the results show that parents' first believe that antibiotics is considered a major treatment of different common disease such as cold symptoms, sore throat, diarrhea,

running nose and others. Parents show some contradiction concerning their awareness of the negative impact the antibiotic could leave for children and the patterns of using antibiotic to treat their children.

Despite parents' knowledge of the decrease in effect of antibiotics as a result of frequent use, some parents give their children antibiotic once per month or more. Other parents reported that they use antibiotic as prophylaxis procedure for their children. These results indicate high misuse of antibiotics as well as the emotional dealings with children in this respect.

Pharmacies are the major source of antibiotics. The low restriction on pharmacist for the purchase of antibiotics makes it possible for parents to get antibiotics for their children any time. In addition, physicians contribute to the increased use of antibiotics through providing them directly to parents. Physicians do not practice their role in increasing the knowledge about the use of antibiotics. Some physicians introduce consultations by telephone without diagnosing the health status of children. Other physicians prescribe antibiotics for the satisfaction of parents. The responsibility of physicians is to sensitize parents on the allergicity of antibiotics; however this is not practiced fully.

Table 8. Parents' knowledge of antibiotics (n=40).

Knowledge of antibiotics	%
Do you know that some children might develop allergic reaction to antibiotics causing death?	
Yes	65.0
No	35.0
Did you ever ask your physician to test your child for antibiotic allergy?	
Yes	32.5
No	67.5
Do you know if any of your family members are allergic to some antibiotics?	
Yes	30.0
No	70.0
If your answer to question 46 was Yes, what is his/her relation to you?	
Father	5.0
Grandparents	5.0
Mother	12.5
Sister	2.5
Uncles	7.5
Do you know that some antibiotics are harmful for children's teeth?	
Yes	52.5
No	47.5
Have you ever taken antibiotics during pregnancy?	
Yes	27.5
No	70.0
Do you think it is safe to use antibiotics during pregnancy?	
Yes	17.5
No	80.0
Do you think it is safe to use antibiotics while nursing?	
Yes	22.5
No	75.0
Have you ever taken antibiotics during lactation?	
Yes	20.0
No	77.5

One of parents' misbehavior is the storage of antibiotics for long time or not completing the antibiotic course for their children and reserving it for future use. Parents are not knowledgeable enough to deal with suspension antibiotics. Most parents did not realize that when an antibiotic is suspended its validity for use will have to be determined and its method of reservation has to be taken into consideration.

The majority of parents indicated correct procedure for the reservation of treatment, but the antibiotic reserved is

not used properly, because antibiotic should be used completely by the child as a treatment course, or suspending antibiotic will alter its maximum period of use. Both of these facts make parents deal with antibiotic wrongly despite their knowledge that non completion of treatment course may cause decrease of the desired effect of antibiotics.

Parents believe that antibiotic is the only treatment that can be used for various diseases. They believe that antibiotic is a proper treatment for bacterial infections, fever,

fever, viral infections, and some parents believe that antibiotic is necessary in any of the previous cases. Even though parents show improper intake of antibiotics, mothers reported that they use antibiotic during pregnancy, nursing and lactation and they believe that it is safe for the health of the baby. These convictions contradict the medically approved ethics of the effect of medicine on infant or baby health during pregnancy, nursing and lactation.

Depending on personal experience or other experience in antibiotics was a contributor for the determination of the type of antibiotic to be used for children. Such conviction indicates that the parents depend on history of dealing with antibiotic to draw their future attitudes.

REFERENCES

- Bauchner H (1997). Parent's impact on antibiotic use. *APUA Newslett.* 15:1-3.
- Cars O, Molstad S, Melander A (2001). Variation in antibiotic use in the European Union. *Lancet* 357:1851-3.
- Cizman M (2003). The use and resistance to antibiotics in the community. *Int. J. Antimicrob. Agents* 21:297-307.
- Haung K, Hsieh Y, Hung C, Hsiao F (2012). Off-lab antibiotic use in the pediatric population: a population-based study in Taiwan. *J. Food Drug Anal.* 20(3):597-602.
- Wise R, Hart T, Cars O, Streulens M, Helmuth R, Huovinen P, Sprenger M (1998). Antimicrobial resistance. Is a major threat to public health. *BMJ* 317:609-10.