

## Patterns, Knowledge and Attitudes of Irrational Antibiotic Use in the Saudi Community

Hanem F. Mohamed<sup>1,2</sup>, Nadyah Alanizy<sup>3</sup>, Salma Almutairi<sup>3</sup>, Eman Alshamari<sup>3</sup>, and Hanaa Akelly<sup>3</sup>

1. College of Nursing, King Saud Bin Abdul Aziz University for Health Science, Riyadh, KSA

2. Faculty of Nursing, Medical Surgical Nursing Department, Tanta University, Egypt

3. Undergraduate Nursing Students, King Saud Bin Abdul Aziz University for Health Science, Riyadh, KSA.

\* E-mail of the corresponding author: [hanemfm@hotmail.com](mailto:hanemfm@hotmail.com)

### Abstract

**Background:** Antibiotics are one of the most commonly sold drugs without prescription in the Eastern countries because there is no policy to regulate antibiotics use and they are available over the counter. Irrational use of antibiotics leads to unwanted side effects, increase admissions, cost, and increase antimicrobial resistance. Antimicrobial resistance on the other hand considered a global problem in the community as well as in hospitals. This study thought to evaluate the current patterns of use, knowledge and attitudes of irrational use of antibiotics among Saudi population. Uncovering related factors are important in order to intervene effectively.

**Methods:** A convenience sample of 427 participants was interviewed from the community in a semi structured interview. A descriptive comparative cross sectional design was used to investigate patterns, knowledge and attitudes of irrational antibiotic use. The questionnaire included demographics, patterns, knowledge and attitudes of antibiotic use. The questionnaire was developed by the investigator and was piloted and tested for validity and reliability.

**Results:** Participants in this study were young, university graduates, 59% females, and 55% were married. Results showed inappropriate use of antibiotics for self and family throughout the year. Half of participants based their antibiotic use on pharmacist, friend's advice and previous use. Majority does not read the antibiotics' instructions and are not aware of possible side effects, or their own allergy to such antibiotic. In addition there was a general unsatisfactory level of knowledge regarding antibiotics use. Women reported statistical significant higher level of knowledge than men. Further, attitude toward antibiotic use wasn't that instructive.

**Conclusion and Recommendations:** As reflected from young age and highly educated sample in the current study, the low level of knowledge and inappropriate pattern regarding antibiotic use constitute a true problem in the community. A number of implications flow from this study, education alone could not be enough to change behavior. There is a basic need to address the attitudes and belief to get benefits of changing a pattern or behavior. To bridge the gap between knowledge and attitude toward antibiotic use, a culturally aware health education campaigns should reach all the Saudi community. Further, establishing a medical policy to regulate antibiotic use is of great importance.

**Keywords:** Antibiotic, Irrational, Pattern, Knowledge, Attitude.

### 1. Introduction

Antibiotics are agents that help kill or inhibit bacterial growth. It is anticipated that antibiotics are widely used in the community without prescription (Cars, 2001; Carbon & Bax, 1998). In the Eastern countries, there is no fixed policy to regulate antibiotics use, they are available over the counter, and they are one of the most commonly sold drugs. The irrational consumption of antibiotics is high in these countries (Shehadeh, et al., 2012; Dar-Odeh et al., 2010; Al-Momany et al., 2009). People expectations for antibiotics are high even in case they are not needed which leads to inappropriate use. Inappropriate use of antibiotics interne leads to unwanted side effects, increase admissions, cost and increase antimicrobial resistance (Cizman, 2003; Buke et al., 2003). Antimicrobial resistance on the other hand considered a global problem in the community as well as in hospitals (Farrell, et al., 2005; WHO, 2000). This study thought to evaluate the current patterns of use, knowledge and attitudes of irrational use of antibiotics among Saudi population. Uncovering related factors are important in order to intervene effectively.

**Significance:** In Saudi Arabia same like most of the Eastern countries, there is no regulation for antibiotics use, they are available over the counter and people can buy them from the pharmacy. Pharmacists do not require customers to have a prescription to sell antibiotics. People from the community come directly to ask about specific antibiotic or when they ask advice from pharmacists what type of antibiotic is helpful in some cases and in both situations, pharmacists sell the antibiotic. Further, inappropriate antibiotic use in the Saudi community not thoroughly researched. In order to go further step toward improving people awareness and appropriate use of antibiotics, this study served as a first step that aimed at investigating the patterns, knowledge and attitudes toward inappropriate antibiotic use among people in the Saudi community

## 2. Methods:

**Sample and setting:** A convenience sample of 427 participants was interviewed in a semi structured interview. Sample was recruited from the community (shopping malls, beauty salons, cafeterias, and gyms). Participants were told about the purpose of the study and a written approval was taken. The interview lasted 10 to 15 minutes and inclusion criteria was mainly being adult (18 years and older).

**Design:** A descriptive, comparative, cross-sectional design was used to investigate patterns, knowledge and attitudes of irrational use of antibiotics. The study questionnaire included:

- A. Demographic profile (age, gender, education, occupation, marital status, and number of children).
- B. Participants' medical history; such as presence of chronic illness and taking medication.
- C. Pattern of antibiotic use questionnaire was developed by the investigator after reviewing the related literatures and previous research that share the same objectives (Shehadeh, et al. 2012; Buck, et al. 2003; Buck, et al. 2005; Cespedes & Larsons, 2006). The questionnaire included the following questions: what is/are the most common antibiotic you use, for whom you could use antibiotics without visiting a doctor, in which season you use antibiotics the most, what is your reference when you use antibiotics, do you read the antibiotic's instruction before use, do you pay attention to possible side effects of the antibiotic you use, do you have drug allergy, and did you ever have allergic test, are you taking any medication for chronic illness, and do you have information about possible drug interaction?. Responses to most of the questions were yes, no and don not know. The 3 questions of name of antibiotic, seasons of using antibiotic, and reference when use antibiotics were open ended questions. Responses for the questions, do you read antibiotics' instructions, and do you pay attention to possible side effects were 3-points Likert scale always, sometimes and never.
- D. Knowledge of antibiotics questionnaire was modified from previous works and included 4 questions: What are antibiotics, what is the aim of antibiotics, what possible side effects of antibiotics are, and the period of antibiotic use. Knowledge of antibiotic questionnaire has been used widely in an MCQ form (Buck, 2003, Buck, et al., 2005; Shehadeh, 2012). In the present study, antibiotics knowledge questionnaire was open ended questions to give the participants a chance to express their own response that reflect their own knowledge and to have more variability. Responses then were categorized and interpreted accordingly. The entire study questionnaire was developed in English and was translated into Arabic language. Pilot testing for the questionnaire was done on 30 cases and responses were reviewed before starting data collection. The questionnaire was translated back into English to be entered in SPSS version 16 and the piloted cases were not included in the main study. The questionnaire was reviewed by 2 nursing researchers who have experience in the field to ensure validity.
- E. Attitude toward antibiotic use was assessed using the following 2 questions: Did you ever start antibiotics by yourself when you get ill? And do you think frequent inappropriate antibiotic use has any danger? Responses for these questions were yes/no. Attitude toward antibiotic use questionnaire was used widely in similar previous research (Buke et al. 2003; Mitsi et al., 2005).

**Protection of human subjects:**

Approval to collect data was obtained from authorized personnel. Investigator explained about the study purpose and about voluntary participation and withdrawal. Eligible participants were asked to sign consent.

Numbers instead of names were used to obtain data.

## 3. Results:

The demographic profile of the study sample revealed a mean age of 31 (16.7) years old. 56.2% were in the age group 18 to 29 years old, and 31.4% were in the age group 30 to 44 years old. 60 % was female and 40% was males. 55.3% was married, 41% single and small percentage were either divorced or widowed. Regarding number of children, 33.7% has no children, 39.1% have 1to 3 children, and 27.2% have more than 3 children. 62.5% of the participants were university graduates, 20.6% graduated from high school, 11% had less than 12 years of education, and 5.6% was illiterate. 53.5% was not working and 46.5% was working. The demographic characteristics of the study sample are shown in table 1.

### Patterns of antibiotic use

The patterns of antibiotic use questionnaire included many questions, regarding name of antibiotic 36% reported that they remember the name of the antibiotic they used to use and 64% reported that they do not remember the name of antibiotic they use. The most commonly reported antibiotics were Augmentin and Amoxicillin. 52.7% indicated that they use antibiotics for themselves when they get ill, 2 % for their husbands, 9.3% for children,

and 36% for family members (parents, grandparents and siblings) who are taking care of. 61% of the participants reported that they use antibiotics mainly in winter, 27% throughout the year, and 12% occasionally when they get ill. Regarding reference when use antibiotics, 47% reported the doctor, 18% pharmacist, 6% friends and relatives, 16% own information from previous use, and 13% more than one reference. Regarding reading the antibiotics' instructions, 37.7% reported that they always read the instructions of the antibiotic, 51.3% reported that they read it sometimes, and 11% indicated that they never read an antibiotics' instruction. 49.4% reported that they always pay attention to the side effects of the antibiotics they use, 43.1% reported that they pay attention to side effects sometimes, and 7.5% never paid any attention to possible side effects of antibiotics. Regarding allergy, 4 % reported that they have allergy and they know that they have it, 61.4% do not have allergy, 34.6% they do not know if they have allergy or not. When participants were asked if they do allergy test before they use antibiotic, 29.3% reported yes and 70.7% reported no. 14% of participants indicated that they are taking medications for chronic illness they have, and 86% are not taking any chronic illness medication. Another question asks about information on possible drug interaction for those who are taking medications for chronic illness, 13% reported yes they know about possible drug interaction, and 87% reported no. Results of the patterns of antibiotic use are shown in table 2.

#### **Knowledge of antibiotics**

The knowledge of antibiotic questionnaire included 4 questions. Regarding definition of antibiotic 73.1% reported that they do not know what are antibiotics and 26.9% reported that they know that they are a group of medication that kills bacteria and microorganisms. As for the aim of antibiotics use, 13% said that they do not know, 4% reported they used for pain, 44% for respiratory problems, 18% for inflammation, and bacterial infection, 5% for headache, 9% for injuries, and 7% for gastrointestinal problems. For side effects of antibiotics, 76.3% do not know any side effect for antibiotics and 23.7% reported that they know that antibiotics could cause skin rash, and fever. Regarding the period of antibiotic use, 7% reported that they stop antibiotic when the bottle finished, 51.5% when they feel better, 42% as advised by the doctor. Knowledge of antibiotic use is presented in table 3.

To test the difference between knowledge between men and women, a non parametric test was done and results showed statistical significance. Women reported higher level of knowledge than men regarding aim of the antibiotic ( $z = -3.34$ ,  $p = .001^{**}$ ), and the period of antibiotic use ( $z = -2.70$ ,  $p = .007^{**}$ ). The other 2 items on the knowledge questionnaire were approaching statistical significance ( $z = -1.75$ ,  $p = .08$ ) for side effect of antibiotic and ( $z = -.174$ ,  $p = .08$ ) for definition of antibiotic. Results are shown in table 4.

#### **Attitude**

Two questions were used to assess participants' attitude regarding antibiotic use. Regarding the first question, did you ever start antibiotic by yourself when you get ill? 57% answered yes and 43% answered no. The second question was, do you think frequent inappropriate use of antibiotic has any dangerous? 23.7% reported yes and 76.3% no. Attitude toward antibiotic use is shown in table 5.

#### **4. Discussion:**

Findings from this study are of considerable concern not only because they expose the improper patterns of antibiotics use in the community, but also because they sheds the light on the unsatisfactory level of knowledge and unconstructive attitude. This study revealed that irrational antibiotic use is high (57%) and the pattern of antibiotic use cannot be ignored. A relatively high percentage of participants inappropriately used antibiotics for themselves and family, based on their own knowledge, previous use, and advice from pharmacists. The pattern of antibiotic use was throughout the year with high percentage used them during winter. In addition, majority were not aware of possible side effects of antibiotics, or if they are having allergic reaction from antibiotics. Further, majority do not read the pamphlet of an antibiotic to get information about possible side effects. 14% of participants in this study reported taking medication for chronic illnesses and 76% indicated that they do not know about possible drug interactions with antibiotics. Although, the pattern of antibiotic use was not thoroughly studied in previous research the same way it was explored in this study. Results from this study were similar to those of Shehadeh, (2012), Buke et al. (2005), and Cespentes, & Larson (2006) who reported high percentages of irrational use of antibiotics in their studies. Results were also consistent with Mitsi et al. (2005) who reported use of antibiotics for medicating self, children and family members. Pharmacists, previous use of antibiotics were the reference of antibiotic use in this study and that was the same like Bakri et al. (2005), Reynolds and McKee (2009).

Reasons why pattern of antibiotic use is improper even with high percentage of educated people in this study is not clear. Culture, age, gender, unawareness, and availability of antibiotics over the counter could play a role. Other factors that were not investigated in this study such as health insurance and economical status could be also factors.

Regarding knowledge of antibiotic use, results from current study were consistent with previous studies that

recommend the need for improving knowledge and awareness. Participants reported low knowledge regarding all the items on knowledge of antibiotic questionnaire, with women having statistically significant higher level of knowledge than men. This was consistent with other research such as Mitsi et al. (2005), Corbett et al. (2005), Cespedes & Larson (2006), Shehadeh et al. (2012), Buck et al. (2005). Having high level of knowledge among women could be due to some reasons. 59.7% of participants in this study were female, university graduates, and young age. It is believable that women in the Eastern culture are more involved in child and family care. With education and younger age, women become more aware of health related information that allows them to provide better care for themselves, children and family.

## 5. Conclusion and recommendations:

As reflected from young age and highly educated sample in the current study, the low level of knowledge and inappropriate pattern regarding antibiotic use constitute a true problem in the community. A number of implications flow from this study, education alone could not be enough to change behavior. There is a basic need to address the attitude and belief to get benefits of changing pattern or behavior. To bridge the gap between knowledge and attitude toward antibiotic use, a culturally aware health education campaigns should reach all the Saudi community. A fixed policy that regulates the antibiotic use is also recommended.

### Limitations

This study needs to be replicated to include physicians and pharmacists to comprehensively cover the phenomena and establish a base for future intervention research.

Table 1: demographic characteristics of the sample

Item (N= 427)	Number	%
Age		
18-29	240	56.2%
30-44	134	31.4%
>45	53	12.4%
Gender		
Female	256	60%
Male	171	40%
Marital Status		
Single	175	41%
Married	236	55.3%
Divorced	9	2%
Widowed	7	1.6%
Education		
Illiterate	24	5.6%
Less than 12 years	47	11.1%
High school	88	20.6%
University	267	62.5%
Post graduate	1	.2%
Occupation		
Employed	195	46.5%
Non-employed	229	53.5%
Number of children		
No children	144	33.7%
1 to 3 children	167	39.1%
More than 3 children	116	27.2%

Table 2: Patterns of antibiotic use among the study sample

Items	Responses			
	Yes	No		
Do you remember name of antibiotic	36%	64%		
Did you ever had allergy test before taking antibiotic	29.3%	70.7%		
Do you take medication for chronic illness	12%	87%		
For whom you use antibiotic	Self 52.7%	Husbands 2%	Children 9.3%	Family members 36%
Season you use antibiotic the most	Winter 61%	Through the year 27%	When get ill 12%	
Who is your reference	Doctor 47%	Pharmacist 18%	Friend/relative 6%	Previous use 16% Mix 13%
Do you read the antibiotics' instruction	Always 37.7%	Sometimes 51.3%	Never 11%	
Do you pay attention to possible side effect of antibiotic	Always 49.4%	Sometimes 43.1%	Never 7.5%	
Do you know you have allergy	Yes 4%	No 61.4%	Don't know 34.6% DN	

Table 3: Knowledge of antibiotic use

Item	Response	
	Know	DN
Definition	26.9%	73.1%
Aim of antibiotic		
Pain	4%	
Respiratory problems	44%	
Bacterial infection/ inflammation	18%	
Headache	5%	
Injuries	9%	
GIT problems	7%	
DN	13%	
Side effects		
Rash and fever	23.7%	
Don't know	76.3%	
The period of antibiotic use		
When finish bottle	7%	
When feels better	51.5%	
As advised by doctor	42%	

Table 4: Knowledge of antibiotic and gender

Item	z	p
Definition of antibiotic	-1.74	.08
Aim of antibiotic	-3.34	.001**
Side effects of antibiotic	-1.75	.08
The period of antibiotic use	-2.70	.007**

Table 5: Attitude toward antibiotic use

Item	Yes (Number/%)	No (Number/%)
Did you ever start antibiotic by yourself when you get ill?	244 (57%)	183 (43%)
Do you think frequent inappropriate use of antibiotic has any dangerous?	101(23.7%)	326(76.3%)

## 6. References:

- Al-Bakri, A.G., Bustanji, Y., Yousef, A. M. (2005). Community consumption of antimicrobial drugs within the Jordanian population: sources, patterns and appropriateness. *International Journal of Antimicrobial Agents*, 26, 389-395.
- Al-Momnay, N., Al-Bakri, A., Makahleh, Z., Wazaify, M. (2009). Adherence to international antimicrobial prophylaxes guidelines in cardiac surgery: a Jordanian study demonstrates needs for quality improvement. *Journal of Management Care Pharmacology*, 15, 262-271.
- Buke, C., Ermertcan, S., Hosgor-Limoncu, M., Ciceklioglu, M., & Eren, S. (2003). Rational antibiotic use and academic staff. *International Journal of Antimicrobial Agents*, 21, 63-66.
- Buke, C., Hosgor-Limoncu, M., Ermertcan, S., Ciceklioglu, M., Tuncel, M., Kose, T. & Eren, S. (2005). Irrational use of antibiotics among university students. *Journal of Infection*, 51,135-139.
- Carbon, C. & Regulating the use of antibiotics in the community. *British Medical Journal*, 317, 663-665.
- Cars, O., Molstad, S., Melsnder, A. (2001). A variation in antibiotic use in the European Union. *Lancet*, 357, 1851-1853.
- Cespedes, A. & Larson, A. (2006). Knowledge, attitude, and practices regarding antibiotic use among Latinos in the United States: Review and recommendations. *Professionals in Infection Control and Epidemiology*, 34(8), 495-501.
- Cizman, M. (2003). The use and resistance to antibiotics in the community. *International Journal of Antimicrobial Agents*, 21, 297-307.
- Corbett, K., Gonzales, R., Leeman-Catillo, B., Flores, E., Maselli, J. & Kafadar, K. (2005). Appropriate antibiotic use: Variation in knowledge and awareness by Hispanic ethnicity and language. *Preventive Medicine*, 40, 162-169.
- Dar-Odeh, N., Abu-Hammad, O., Al-Omiri, M., Khraisat, A., Shehabi, A. (2010). Antibiotics prescribing practices by dentists: a review. *Therapy and Clinical Risk Management*, 6, 301-306.
- Farrell, D.J., Jenkins, S.G., Brown, S.D., Patel, M., Lavin, B. & Klugman, B. (2005). Emergence and spread of *Streptococcus pneumoniae* with erm (b) and mef(A) resistance. *Emergency of Infectious Disease*, 11, 851-858.
- Mitsi, G., Jelastopulu, E., Basiaris, H., Skoutelis, A., & Goges, C. (2005). Patterns of antibiotic use among adults and parents in the community: A questionnaire-based survey in a Greek urban population. *International Journal of Antimicrobial Agents*, 25, 439-443.
- Raynolds, L. & McKee, M. (2009). Factors influencing antibiotic prescribing in China: An exploratory analysis. *Health Policy*, 90, 32-36.
- Shehadeh, M., Suaifan, G., Darwish, R., Wazaify, M., Zaru, L., and Alja'fari, S. (2012). Knowledge, attitudes and behavior regarding antibiotics use and misuse among adult in the community of Jordan: a pilot study. *Saudi Pharmaceutical Journal*, 20,125-133.
- World Health Organization, overcoming antimicrobial resistance. Report on infection diseases. Geneva: *World Health Organization*, 2000.

Job-shop production refers to a manufacturing environment that produces goods in small batches according