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Assessment of Nurses' Knowledge and Awareness about the Rational Use of Antibiotics

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ABSTRACT

Background: Lack of knowledge is an important factor that contributes to incorrect use of medicines. Recent surveys show that the general knowledge about the rational use of antibiotics in the community is limited. This contributes to the problem of irrational antibiotic use, leading to a progressive loss of bacterial sensitivity to these drugs, the spreading of resistant strains of bacteria and reduces the number of available effective drugs for serious or antibiotic-resistant infections. Nurses who responsible to protect the health of individuals and community have very limited information regarding thoughts, perceptions, and knowledge about antibiotic use.

Objectives:
1.To assess and evaluate the nurses' knowledge about the rational use of antibiotics.
2.To identify their awareness about the consequences of incorrect use of antibiotics.

Methods: the present study is cross-sectional study; a questionnaire about antibiotic use was given to a sample of nurses in the General Basrah hospital and Al-sader teaching hospital in Basrah governorate southern of Iraq. 110 nurses returned completed questionnaires.

Results: The findings of present study revealed that 55.5% of nurses were poor knowledge regarding rational use of antibiotics. 46% of nurses were aware that antibiotics used to treat bacteria only. A great percentage of nurses had misconceptions about the use of antibiotics. Well percentage of nurses in this study had a sufficient knowledge regarding the risks of inappropriate use of antibiotics. 69% of them understand that antibiotics have many side effects and 61% realize that inappropriate use of antibiotics could contribute to resistance to these drugs, but they still use them inappropriately.

Majority of nurses (82%) practiced self-medication with antibiotic. (93%) from them believed that, their previous experience in nursing allow them to instruct the necessary treatment without return to the physicians' opinion.

Conclusion: The present study indicate that a lack of general knowledge and awareness regarding appropriate and rational use of antibiotics between the nurses. Since this may be due to a lack of educational background on this subject.

Recommendations: Increase knowledge and awareness of nurses and other health care providers about rational use of antibiotics by develops and delivers education programs at all levels of the health system on how to monitor and improve antibiotics use.

Key Words: knowledge; rational use; medicines; nurses; antibiotics; irrational antibiotic use; misconceptions; Self-medication.

1. INTRODUCTION

Rational use of medicines refers to the correct, proper and appropriate use of medicines. Rational use requires that patients receive the appropriate drug, in the proper dose, for an adequate period of time, and at the lowest cost to them and their community (WHO, 2010). World Health Organization (WHO) estimates that more than half of all drugs prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly. This incorrect use may take the form of overuse, underuse and misuse of drugs. Incorrect use of drugs occurs in all countries, causing harm to people and wasting resources (WHO, 2010).

Generally, antibiotics are drugs used to prevent or treat infections caused by pathogenic – disease-producing microorganisms (antimicrobial drugs). In current practice, antibiotics used interchangeably with antibacterial drugs (a class of drugs used to treat bacterial infections only, where they destroy bacteria (bactericidal) or prevent bacteria from multiplying (bacteriostatic). Antibiotics are among the most frequently used drugs worldwide. The success of antibiotics in saving lives and decreasing severity and duration of infectious diseases has encouraged their extensive use. Antibiotics are not effective against the viruses that cause many illnesses including influenza and most upper respiratory tract infections, including the common cold, or fungal infections like those caused by yeast (Abrams et al., 2009).

Irrational use of antibiotics is very common, and it accelerates the development of adverse drug effects, emergence of newer strains of bacteria that are resistant to many antibiotics, health care costs and reduces the number of available effective drugs for serious or antibiotic-resistant infections (Abrams et al., 2009; Richard A. Lehne, 2001). Antibiotic resistance occurs when antibiotics no longer work against disease-causing bacteria. These infections are difficult to treat and can lead to longer lasting illnesses, extended hospital stays, and the need for more expensive and toxic medications. Some resistant infections can even cause death. i.e., ineffective antibiotics will lead to increased morbidity, health-care use and eventually premature mortality (Livermore, 2003). Furthermore, antibiotics are required for other treatments, such as surgery and cancer chemotherapy, which would become unavailable with the disappearance of effective antibiotics. Unfortunately, while resistance to older antibiotics is increasing, the development of new generations of antibiotics is stalling (Kaplan and Laing, 2004). Therefore, efficient use of existing antibiotics is needed to ensure the availability in the long term of effective treatment of bacterial infections. Efficient use includes both restrictive and appropriate use (Sarahroodi and Arzi, 2009).

Appropriate use of antibiotics comprises – take antibiotics only when prescribed by a physician. Many patients take antibiotics without medical prescription (as Self-medication). Do not prescribed antibiotics to patients who do not need them like colds, flu and other viral infections. These antibiotics not only of no benefit, they become less effective against the bacteria they are intended to treat. Follow all directions when taking antibiotics and take the entire prescribed regimen (full course) even if you feel better before finishing them or take it for only a few days before their illness completely cured. Taking the full course of antibiotics is the only way to kill all of the harmful bacteria. A shortened course of antibiotics, on the other hand, often wipes out only the most vulnerable bacteria while allowing relatively resistant bacteria to survive. Do not used antibiotics routinely with mild symptoms. Routine use of antibiotics with mild symptoms, not help you to get better more quickly, is the primary cause of the increase in the number of drug-resistant bacteria and even some common bacterial illness, such as mild ear infections; do not benefit much from antibiotics. Throw away any unused antibiotics; do not save antibiotics for future use since partial and incomplete treatment regimens are ways that bacteria develop resistance to antibiotics. Do not share your medication and do not take antibiotics prescribed for someone else; specific antibiotics are prescribed for specific bacteria, since not all antibiotics are able to cure all bacterial infections (Pechere, 2007).

Self-medication is a common problem worldwide and defined as obtaining and consuming drugs without the advice of a physician either for diagnosis, prescription or surveillance of treatment (Montastruc et al., 1997). Two thirds of all antibiotics are sold without prescription, through unregulated private sectors. Self-medication with antibiotics has the potential to produce harmful effects on the society, as well as, on individual patients (Awad et al., 2005). Overuse and misuse of antibiotics is a particularly serious global problem. It is now evident that both developing countries as well as, developed countries are experiencing many aspects of inappropriate use of medications in their health care facilities (Otoom and Sequeira, 2006).

However, most plans regarding antibiotic misuse are directed toward optimizing physicians' prescriptions, while other potential sources of antibiotic misuse are neglected. The problem of inappropriate antibiotic use is not the physician's alone – it is shared by the other health professionals' drug sellers/pharmacists, health workers, community and the pharmaceutical companies as well, all should be taken into consideration in attempting to curb the problem (Bin Abdulhak et al., 2011).

Many agencies and organizations, including the Centers for Disease Control and Prevention (CDC) and the WHO, have recognized antibiotic resistance as one of the most pressing public health issues of our time. This has resulted in massive surveillance and research efforts, particularly in the area of antibiotic overuse. Nurses have been largely

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Table 1
Demographic characteristics of the respondents (N = 110)

Variable		Number	Percentage
Age	< 25 years	24	21.8%
	26 – 35 years	30	27.3%
	36 – 45 years	38	34.5%
	> 46 years	18	16.4%
Gender	Male	47	42.7%
	Female	63	57.3%
Years of education	12 years and less	60	55%
	13 years and more	50	45%
Years of nursing experience	10 years and less	38	34.5%
	11– 20 years	44	40%
	21 years and more	28	25.5%

Table 2
Respondents' knowledge score for correct answers about appropriate use of antibiotics

Score level	Number	Percentage
Poor (< 50%)	61	55.5%
Fair (50 – 69 %)	34	30.9%
Good (70% and over)	15	13.6%
Total	110	100%

Table 3
Respondents' knowledge about antibiotic use against bacteria and other organisms

Variable	Total N=110	
	N	%
Number of nurses who answered the correct answer	51	46%
Number of nurses who answered the wrong answer	59	54%
Total	110	100%

absent from relevant educational and research efforts. Although advanced practice nurses frequently receive continuing education concerning appropriate antibiotic use, most nurses do not. Their exposure to the subject is limited to public service announcements and the lay literature, inadequate sources for any practicing professional (Ann Marie Hart, 2006).

Misconceptions and lack of basic knowledge about antibiotic use have been reported by several studies across populations in both developed and developing countries (Larson et al., 2009; Grigoryan et al., 2007; Andre et al., 2010; Azevedo et al., 2009; Sawalha, 2008; You et al., 2008; Ling et al., 2011; Aris Widayati et al., 2012). Different studies in neighbourhood countries from 2008 to 2012 showed unsatisfactory knowledge of proper antibiotic use, antibiotics could be easily obtained without a medical prescription and misconceptions regarding antibiotic use exist in the community (Mayadah et al., 2012; Abobakr et al., 2009; Nehad et al., 2012; Sarahroodi et al., 2010).

2. OBJECTIVES OF THE STUDY

1.To assess and evaluate the nurses' knowledge about the rational use of antibiotics.
2.To identify their awareness about the consequences of incorrect use of antibiotics.

3. METHODOLOGY

This study was a cross-sectional involving 110 nurses from General Basrah hospital and Al-sader teaching hospital in Basrah governorate south of Iraq. The study was conducted from January to April 2013. Participation in the study was voluntary and anonymous. The present study, as we believes, is the first study of its kind to be implemented in Basrah. The data obtained through the administration of questionnaire designed to gather information such as socio-

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Table 4

Respondents' knowledge about antibiotic use against bacteria and other organisms regarding years of education

Variable	Years of education				Total N=110	%
	12 yrs and less		13 yrs and more			
	N	%	N	%		
Number of nurses who answered the correct answer	29	57%	22	43%	51	100%
Number of nurses who answered the wrong answer	31	53%	28	47%	59	100%
Total	60	--	50	--	110	--

Table 5

Respondents' knowledge about antibiotic use against bacteria and other organisms regarding years of experience

Variable	Years of experience						Total N=110	%
	10 yrs and less		11– 20 yrs		21 yrs and more			
	N	%	N	%	N	%		
Number of nurses who answered the correct answer	14	27.5%	24	47%	13	25.5%	51	100%
Number of nurses who answered the wrong answer	24	41%	20	34%	15	25%	59	100%
Total	38	--	44	--	28	--	110	--

Table 6

Respondents' awareness about medical causes for antibiotics use (N=110)

Medical causes	Number	percentage
Urinary tract infection	66	60%
Tonsillitis	62	56%
Gastroenteritis (diarrhea & vomiting)	55	50%
Ear infections	42	38%
Bronchitis or chest infections	38	35%
Sore throat	33	30%
Flu or Cold	27	25%
Runny nose	11	10%
Toothache	11	10%

demographic data, level of knowledge on correct, proper and appropriate use of antibiotics and consequences of incorrect use of antibiotics. The knowledge index for appropriate use of antibiotics calculated for each nurse by summing the number of correct answers then dividing by the total score of the questions multiplied by 100. The main index for all nurses was calculated and an arbitrator cut – off point is 50 %. Poor knowledge level considered if the percentage of correct answers below the cut – off point. Fair knowledge level considered if the 50 – 69 % of answers are correct and good knowledge level considered if the percentage of correct answers 70% and over. The collected data was transferred to a Microsoft excel worksheet to obtain the results which has been expressed as numbers and percentages.

4. RESULTS

Socio-demographic characteristics of the 110 nurses in the present study was 57.3% were females and 42.7% were males, the majority of them 34.5% at age 36 – 45 years old, 55% of nurses 12 and less years of education. 40% of the nurses were having 11 – 20 years of experience (Table 1). The findings of the table 2 presented that 55.5% of nurses was poor knowledge, followed by 30.9% of nurses was fair knowledge, while 13.6% of nurses was good knowledge. Table 3 shows that about 46% of nurses who answered correctly that antibiotics are effective against bacteria only and 54% of them believed wrongly that antibiotics are effective against bacteria and other organisms. Table 4 shows that about 57% from nurses who answered correctly that antibiotics are effective against bacteria only with 12 and less years of education and 43% from them with 13 and more years of education while 53% of nurses who believed wrongly that antibiotics are effective against bacteria and other organisms with 12 and less years of education and 47% from them with 13 and more years of education. Table 5 shows that about 47% from nurses who answered correctly that antibiotics are effective against bacteria only with 11– 20 years of experience while 27.5% of them with 10 and less years of experience and 25.5% of them with 21 and more years of experience. Table 6 presents the

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Table 7
Respondents' misconceptions about antibiotics use (N=110)

Misconceptions	Number	percentage
Antibiotics help to get better more quickly	93	85%
Antibiotics will always be effective in the treatment of same infection in the future	74	67%
Antibiotics should be stopped as soon as the patient feels better	64	58%
Store antibiotics at home for necessary	57	52%
Antibiotics used routinely even with mild symptoms	33	30%

Table 8
Nurses' awareness about antibiotic side effects and antibiotic resistance

Variable	aware		unaware		Total	%
	No	%	No	%		
Awareness about side effects of antibiotics	76	69%	34	31%	110	100%
Awareness about antibiotics resistance	68	61%	42	39%	110	100%

conditions that indicate the use of antibiotics according to nurses' knowledge. 60%, 56%, 50%, 38%, 35%, 30% of nurses believed that the antibiotics are effective against urinary tract infection, tonsillitis, gastroenteritis, ear infections, bronchitis or chest infections and sore throat respectively. Table 7 shows misconceptions of nurses regarding antibiotics use. 85% of nurses believed that, antibiotics help to get better more quickly, 67% supposed that, antibiotics will always be effective in the treatment of same infection in the future, 58% believed that, antibiotics should be stopped as soon as the patient feels better before complete drug course, 52% believed that, it is very important to store antibiotics at home for necessary, while 30% of them used antibiotics routinely even with mild symptoms. Table 8 show that 69% of nurses understand that antibiotics have many side effects and 61% of nurses understand that inappropriate use of antibiotics cause antibiotics resistance. Table 9 reveal that 82% of nurses were practiced antibiotic self-medication – use antibiotics and instruct antibiotics as well for patients, relatives, and friends without consulting a physician. 84 (93%) from 90 nurses, who practiced antibiotic self-medication, use and instruct antibiotics to patients without return to the physicians opinion depending on their previous experience.

5. DISCUSSION

Knowledge by itself is not enough to change behaviour, but does play an important role in shaping beliefs and thoughts regarding a particular behaviour. Knowledge and thoughts influence persons' behaviors and outcomes. Improvements in knowledge are often correlated with better health practices. Antibiotics are powerful medicines that fight bacterial infections – like urinary tract infection, many wound and skin infections, severe sinus infections that last longer than 2 weeks, some ear infections, and some tonsillitis (tonsillitis caused by strep bacteria). Antibiotics are ineffective and should not be used to treat viral infections – like bronchitis, colds, flu (influenza), most cough, most ear infections, most tonsillitis and sore throats, and viral gastroenteritis. All these viral infections will usually go away on its own and not required antibiotics treatment. If antibiotics used to treat viral infections may do more harm to people and community than benefit (Livemore, 2003). Such antibiotic-taking behavior can result in insufficient antibiotic exposure for eradicating infectious bacteria and potentially create an environment that promotes antibiotic resistance. Using antibiotics when not required can lead to the development of many adverse effects and bacterial strains that are resistant to drugs. The findings of the present study revealed that more than half of nurses (55.5%) had poor knowledge regarding antibiotic use followed by 30.9% and 13.6% of nurses was fair and good knowledge respectively. Poor knowledge regarding antibiotics guides to extensive irrational use, and consequently leads to adverse drug effects and antibiotic resistance that has reached to levels places the human race in a real danger. About 46% of nurses in this study knew that antibiotics are effective in bacterial infections, but more than half (54%) of them had wrong knowledge regarding antibiotics' effectiveness for other infections. More than half of nurses (60%) answered correctly that urinary tract infection treated with antibiotics while 56% and 50% of them believed wrongly that antibiotics are drugs of choice for treatment of tonsillitis and gastroenteritis. Antibiotics can treat most urinary tract infections successfully because the most important cause of urinary tract infection is bacteria (viral or fungal infections are rarely causes) (Nicolle, 2008) while the most important cause of tonsillitis and gastroenteritis is viruses and the overwhelming majority of patients recover completely with or without medication.

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Table 9

Nurses use of antibiotics without medical prescription

Questions	Answers					
	Yes	(%)	No	%	Total	%
Are you using antibiotics without medical prescription (self-medication with antibiotics)?	90	82%	20	18%	110	100%
Are you instructing antibiotics for patients, relatives, and friends?	90	82%	20	18%	110	100%
use antibiotics without a prescription as a result of their previous experience.	84	93%	6	7%	90	100%

In 40% of patients with tonsillitis, symptoms have resolved in three days and within one week in 85%, regardless of whether streptococcal infection is present or not. Tonsillitis caused by a virus will usually go away on its own. Home treatments such as gargling with salt water, drinking warm tea, and taking pain medicine (such as acetaminophen or ibuprofen) may help relieve discomfort. Antibiotics are not effective treatment for viral tonsillitis and generally prescribed for tonsillitis caused by strep bacteria. A strep infection will usually go away on its own but antibiotic treatment is needed because untreated strep throat can cause serious complications (Del Mar et al., 2006). The most common cause of acute gastroenteritis in all ages is viruses, and is usually an acute and self-limiting disease that does not require medication except symptomatic treatment and replacing lost fluids and electrolytes. Antibiotics had not usually used for gastroenteritis, although they are sometimes recommended if symptoms are particularly severe or if a susceptible bacterial cause is isolated or suspected (Grimwood and Forbes, 2009). In addition, 38%, 35%, 30% of nurses believed wrongly that the antibiotics are effective against other viral infections such as ear infections, bronchitis or chest infections and sore throat respectively.

This study showed that, a great percentage of nurses had misconceptions about the use of antibiotics. 85% of them expressed beliefs that antibiotics help to get better more quickly. 67% supposed that, antibiotics would always be effective in the treatment of same infection in the future. 58% thought that, antibiotics should be stopped as soon as the patient feels better before complete drug course. 52% believed that, it is very important to store antibiotics at home for necessary, while 30% of them used antibiotics routinely even with mild symptoms. These wrong beliefs may be due to lack of awareness and knowledge of respondents towards proper use of antibiotics. They must be aware that to take all prescribed doses of an antibiotic and do not stop when symptoms are relieved. If medication stopped too soon, symptoms of the current infection may recur and new infections that are caused by antibiotic-resistant organisms and that are harder to treat may develop (Abrams et al., 2009).

Nurses must be attentive that not to take antibiotics left over from a previous illness or prescribed for someone else. Even if infection is present, the likelihood of having the appropriate drug on hand, and in adequate amounts, is extremely small. Thus, taking drugs not prescribed for the particular illness tends to maximize risks and minimize benefits (Abrams et al., 2009). Accordingly, the relationships between knowledge and beliefs suggest that the more appropriate nurses' knowledge about the use of antibiotics; the fewer misconceptions they will have regarding the effectiveness of antibiotics. In contrast to those misconceptions, nurses in this study had a sufficient knowledge regarding the risks of inappropriate use of antibiotics. (69%) of them understand that antibiotics have many side effects and (61%) realized that inappropriate use of antibiotics could contribute to resistance to these drugs. Despite of this, a good percentage of nurses still used antibiotics inappropriately (despite owning the correct information, they fail to employ what they know properly – there is wrong behaviors). This result proves the lack of knowledge about correct, proper and appropriate use of antibiotics.

The previous findings are in line with most other studies from elsewhere – Sweden, Hong Kong, Greece, Jordan, Syria but in contrast to what reported by the European study (Andre et al., 2010). Majority of nurses (82%) practiced self-medication with antibiotic as well as they instructed antibiotics for patients, relatives, and friends without consulting a physician. This rate is similar to other studies including population in China and Greece but there are some lower rates, reported from study in Palestinian and study in Iran by 53% of antibiotic self-medication and other studies in Turkey (45.8%)(Buke et al., 2003), Jordan (40.7%), (Al-Azzam et al., 2007) and in Sudan (Sawalha, 2008).

93% of nurses, who practiced antibiotic self-medication said that, their previous experience in the field of nursing, allow them to diagnose the disease and prescribe the necessary treatment without return to the physicians' opinion. These nurses do not understand that, antibiotics should not used without physician advise because in most cases there is no necessitate to use antibiotics and in other cases physician need to send the patient for laboratory investigation before prescribing treatment to confirm the diagnosis and then choose the appropriate antibiotic and determine the treatment period. In addition, antibiotics dosage (amount and frequency of administration) should be individualized according to characteristics of the causative organism, the chosen drug, and the patient's size and condition (e.g., type and severity of infection, ability to use and excrete the chosen drug). Dosage often must be reduced if the patient has renal impairment or other disorders that delay drug elimination. Most antibiotic drugs are given orally or IV for systemic infections. The route of administration depends on the patient's condition (e.g.,

location and severity of the infection, ability to take oral drugs) and the available drug dosage forms. In serious infections, the IV route is preferred for most drugs.

6. CONCLUSION

The present study indicate that a lack of general knowledge and awareness regarding appropriate and rational use of antibiotics between the nurses. Since this may be due to a lack of educational background on this subject.

7. RECOMMENDATIONS

Increase knowledge and awareness of nurses and other health care providers about rational use of antibiotics by develops and delivers education programs at all levels of the health system on how to monitor and improve antibiotics use.

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