

Knowledge, practice and attitude of employees working at some Iraqi ministries about the use of antibiotics: across sectional study

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ABSTRACT

INTRODUCTION: Abuse of antibiotics is a growing problem worldwide. One of its major impact is development of antibiotics-resistance-bacteria. Knowledge and attitude of the community about the use of antibiotics is very important to overcome this hazardous problem.

OBJECTIVE: to measure the knowledge, practice and attitude of the non-health professional employees working at the headquarters of some Iraqi ministries and to disclose their association with some sociodemographic features.

METHODS: A cross sectional study, with analytic elements, was conducted in Baghdad from October 2014 to June 2015. A structured questionnaire was distributed among 1525 non-health profession employees working at the headquarters of ten Iraqi ministries. Knowledge, practice and attitude were measured and then their association with some sociodemographic features was figure out using statistical analysis by using SPSS ver. 20.

RESULTS: Response rate was 65.96 % (1006 out of 1525 participants). More than 70 % of the participants claimed that they use antibiotics in correct dose at a correct time. On the other hand, about 70 % of them stop antibiotics as soon as they got well without counselling a doctor. More than 50 % of the participants do not have the knowledge about toxic effect of the antibiotics on the ear, kidneys, bone marrow, and liver. About 50 % of the participants in this study have used antibiotics prescribed by a person other than the physicians. Amoxicillin is the antibiotic most commonly abused by the participants.

CONCLUSION: Most of participants were using antibiotics properly with regards to dose and timing, on the other hand most of them were using antibiotics unnecessarily for simple viral infection. And they usually discontinued the antibiotics prematurely by their own just because they get well.

Key words: antibiotics, Iraqi ministries, optimal use, abuse, knowledge.

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INTRODUCTION

Antibiotics, also known as antibacterial and antimicrobials, revolutionized medicine during the second-half of the 20th century. But as time goes on, the success of antibiotics may be completely cancelled out by their combative counterparts: resistant bacteria.¹ Antibiotic resistance is one of the biggest threats to the global health, food security, and development today which can affect anyone, of any age, and in any country. It occurs naturally, but misuse of antibiotics in humans and animals is accelerating the process. A growing number of infections

such as pneumonia, tuberculosis, gonorrhoea, and salmonellosis are becoming harder to treat as the antibiotics used to treat them become less effective. Antibiotic resistance leads to longer hospital stays, higher medical costs and increased mortality.²

The rapid emergence of resistant bacteria is occurring worldwide, endangering the efficacy of antibiotics.³⁻⁸ Since the first warning of antibiotic resistance, this phenomenon has increased dramatically, and as a result 70% of all hospital acquired infections in the United States are resistant to at least one family of antibiot-

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ics. The treatment of these infections leads to higher health care costs because these therapies require longer hospital stays and more expensive drugs.⁹ To confront this increasing problem, it is necessary to understand the ecology of antibiotic resistance, including their origins, evolution, selection and dissemination.¹⁰ In the United States, at least 2 million people acquire serious infections with bacteria that are resistant to one or more of the antibiotics designed to treat those infections. At least 23,000 people die each year as a direct result of these antibiotic-resistant infections. Many more die from other conditions that were complicated by an antibiotic-resistant infection.⁷

Many instructions are advice to minimize bacterial resistance such as following physicians' direction carefully, finishing the whole course of treatment and avoiding saving antibiotics for later on or using someone else's prescription.¹¹

An effective antibiotic stewardship should be adopted in prevention and control of infection and a harmonized approach to their use in animal and human health should be fostered. Practical economic models are needed to develop new products that avoid rewarding researchers for what they do already.¹²

World Health Association (WHO) has distributed the duties of many stakeholders in combat resistance against antibiotics.¹³

People can help tackle resistance by:

- Using antibiotics only when prescribed by a doctor;
- Completing the full prescription, even if they feel better;
- Never sharing antibiotics with others or using leftover prescriptions.

Health workers and pharmacists can help tackle resistance by:

- Enhancing infection prevention and control;
- Only prescribing and dispensing antibiotics when they are truly needed;
- Prescribing and dispensing the right antibiotic (s) to treat the illness.

Policymakers can help tackle resistance by:

- Strengthening resistance tracking and laboratory capacity;
- Regulating and promoting appropriate use

of medicines.

Policymakers and industry can help tackle resistance by:

- Fostering innovation and research and development of new tools;
- Promoting cooperation and information sharing among all stakeholders.

The similar report shows extensive antibiotic resistance across the WHO Eastern Mediterranean Region. In particular, there are high levels of *E. coli* resistance to third generation cephalosporin and fluoroquinolones; the two important and commonly used types of antibacterial drugs. Resistance to third generation cephalosporin in *K. pneumoniae* is also high and widespread. In some parts of the Region, more than half of *Staphylococcus aureus* infections are reported to be methicillin-resistant (MRSA), meaning that treatment with standard antibiotics does not work. The report reveals major gaps in tracking of antibiotic resistance in the Region. WHO's Regional Office for the Eastern Mediterranean has identified strategic actions to contain drug resistance and is supporting countries to develop comprehensive national policies, strategies and plans.¹³

In fact, the World Health Organization (WHO) states that multidrug-resistant bacterial infections have led to more than 8 million additional hospital stays and currently cost the health care system in excess of 20 billion US\$.¹⁴

Identifying subgroups of the population with high levels of antibiotic use and with misconceptions about antibiotic use will help public health officials target and track the impact of interventions.¹⁵ Reports are limiting about the knowledge and attitude of Iraqi people about the use of antibiotics so this study was designed to measure the knowledge, practice and attitude of the non-health professional employees who are working at the headquarters of some Iraqi ministries and to figure out their association with some sociodemographic features.

METHODS

Setting and study design: A cross sectional study with analytic elements, was conducted in Baghdad from October 2014 to June 2015. Questionnaire forms were distributed among 1500 non-health professions employees working at

the headquarter of ten Iraqi ministries. The ministries were Health, Education, Higher Education and Scientific Research, Electricity, Foreign Affairs, Defence, Interior, Youth and Sport, Agriculture, and Labour and Social Affairs.

Ethical consideration: The proposal of this study was made according to the regulations and ethical considerations of Ministry of Health in Iraq and its approval was taken. Agreement from all ministries involved in the study was also taken. Verbal consent was taken from each participant after explaining the aim of the study, and all data were kept confidential during all stages of the work.

Definition of the participant inclusion and exclusion criteria: the targets of this study were the employees working at the headquarters of the above mentioned ministries who were 18-63 years and who are accepted to participate in this study. Employees who were medical and medical allied professions were excluded from the study.

Sampling: Ten ministries were selected according to the geographic location at the first stage. Then each ministry allocated 150 questionnaire forms to be distributed among its employees apart from Ministry of Health which was allocated 175 forms. The employees were selected by the authors conveniently from each ministry. The sample of each ministry was gender matched.

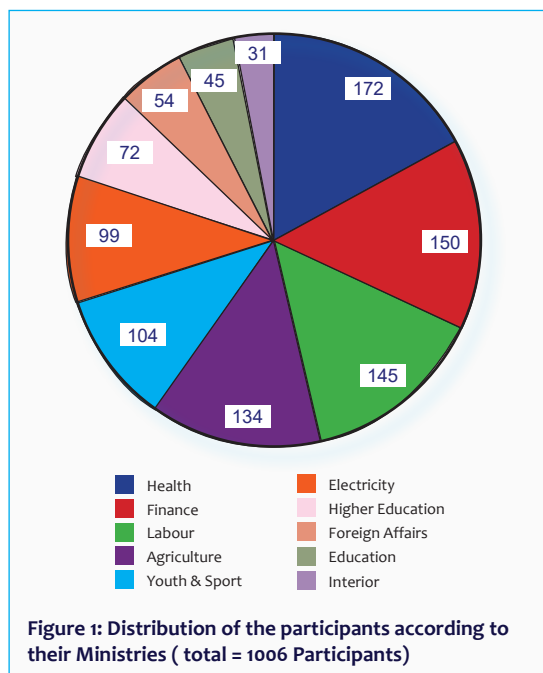
The questionnaire and data collection: the questionnaire form was designed by the authors themselves and critically reviewed by 5 epidemiologists, 3 pharmacologists, one statistician. It is validated by a pilot study conducted on a 50 employees who were not included in the final calculation of the results of this study. The questionnaire form has included 4 parts. *The first* has included some demographic features of the involved employees; age, gender, marital status, educational level, residency, income per a month, and presence of chronic diseases. *The Second part* has included questions designed to measure the knowledge of participant about the side effects profile of the antibiotics. *The Third Part* has included the questions measuring the attitude of the participants about the use of antibiotics. While *the Forth part* has included questions measuring their practice of using antibiotics. The questions used in this study were close-ended questions. The authors have ex-

Table 1: the distribution of participants accords to demographic features.

	Variable	Number	%
Age (years)	18-27	183	18.2
	28-37	399	39.7
	38-47	239	23.8
	48-57	150	14.9
	58-63	35	3.5
Gender	Male	526	52.3
	Female	480	47.7
Marital status	Single	290	28.8
	Married	685	68.1
	Divorce	10	1.0
	Widow	21	2.1
Educational level	Primary school	20	2.0
	Intermediate school	39	3.9
	Secondary school	138	13.7
	Institution	114	11.3
	College	643	63.9
	Postgraduate	52	5.2
Income/ Month	Fair	186	18.5
	Accepted	387	38.5
	Good	320	31.8
	Very good	113	11.2
Chronic diseases	No any chronic diseases	865	86.0
	Hypertension	47	4.7
	Diabetes mellitus	22	2.2
	Asthma	17	1.7
	Rheumatic disease	10	1.0
	Peptic/gastric ulcers	9	0.9
	Thyroid disease	7	0.7
	Tow diseases or more	29	2.9
	Total	1006	100.0

plained the questions and how to fill the forms for all participants who were advised to fill the forms personally. Then, the forms were recollected again by the author for statistical analysis.

Definitions used in this study: income per a month was grouped into *fair* when it is less than a half million Iraqi Dinar a month, *accepted* when it is between a half - one a million Iraqi Dinar a month, *good* when it is one to one and a half million Iraqi Dinars a month, and *very good* when it is more than one and a half million Iraqi Dinar a month. For sake of this study presence of a chronic medical illness/s was considered only if it is diagnosed by a physician.



Statistical analysis: Data entry and analysis were done using SPSS version 20. Frequencies and percentages were calculated. Chi square was used to assess statistical significance for categorical variables, probability value of less than 0.05 consider statistically significant. For questions measuring the practice of the participants about how to use antibiotics, the participants choose either yes if he/she is agree with the question, no if he/she is not, and sometimes if he/she is practicing the topic of the question in few occasions. Then, we allocated 3 points for the participants for each right answers, 2 points for sometimes, and 1 points for wrong answers. If the participants collected 40 points and above he/she was labelled as a *correct user* of the antibiotics; otherwise, he was considered *incorrect user*.

Then, we try to find any association between some socio-demographic features with being correct or incorrect user of the antibiotics. Also, we compared whether prescribing antibiotics by physician or not has an association on the participants of being correct or incorrect user.

RESULTS

Out of 1525 employees involved in this study, 1006 (65.96 %) have answered the questionnaire. **Table 1** shows some demographic features

Table 2: Distribution of the participants according to their answers about questions measuring their practice of how to use antibiotics.

The question	Answer	Number	%
Did you / your family member use correct dose of the antibiotics?	Yes	778	77.3
	No	43	4.3
	Sometimes	185	18.4
Did you / your family member use correct timing of the antibiotics?	Yes	707	70.3
	No	55	5.5
	Sometimes	244	24.3
Did you / your family member stop taking the antibiotics when get well without counselling the doctor?	Yes	703	69.9
	No	138	13.7
	Sometimes	165	16.4
Did you stop taking the drug when there is complication without counselling a doctor?	Yes	635	63.1
	No	238	23.7
	Sometimes	133	13.2
Did you use the antibiotic if same symptoms as previous case without counselling a doctor?	Yes	485	48.2
	No	333	33.1
	Sometimes	188	18.7
Did you ask special antibiotics from the doctor because it's used before and comfortable with?	Yes	306	30.4
	No	463	46.0
	Sometimes	237	23.6
Did you use antibiotics during common cold and flu without counselling a doctor?	Yes	708	70.4
	No	140	13.9
	Sometimes	158	15.7
Did you use antibiotics during influenza without counselling a doctor?	Yes	706	70.2
	No	138	13.7
	Sometimes	162	16.1
Did you use antibiotics during abdominal colic pain and diarrhoea without counselling a doctor?	Yes	486	48.3
	No	311	30.9
	Sometimes	209	20.8
Did you use antibiotics during burning micturition without counselling a doctor?	Yes	165	16.4
	No	703	69.9
	Sometimes	138	13.7
Did you use antibiotics during nose congestion without counselling a doctor?	Yes	309	30.7
	No	473	47.0
	Sometimes	224	22.3
Did you use antibiotics during toothache without counselling a doctor?	Yes	371	36.9
	No	432	42.9
	Sometimes	203	20.2
Did you use antibiotics during skin problem without counselling a doctor?	Yes	122	12.1
	No	749	74.5
	Sometimes	135	13.4
Did you use antibiotics with the tea or coffee or juice	Yes	116	11.5
	No	773	76.8
	Sometimes	117	11.6

of the participants. **Figure 1** shows the distribution of participant according to the ministry they work in, out of all 1006 participants, MOH

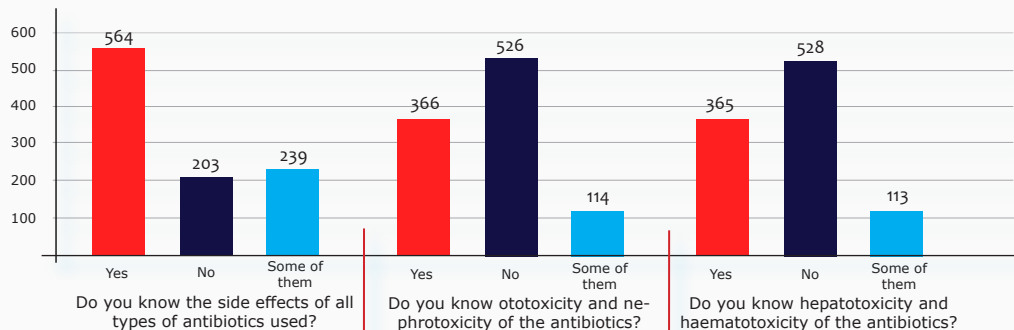


Figure 2: Knowledge of the participants about the side effect of the antibiotics used

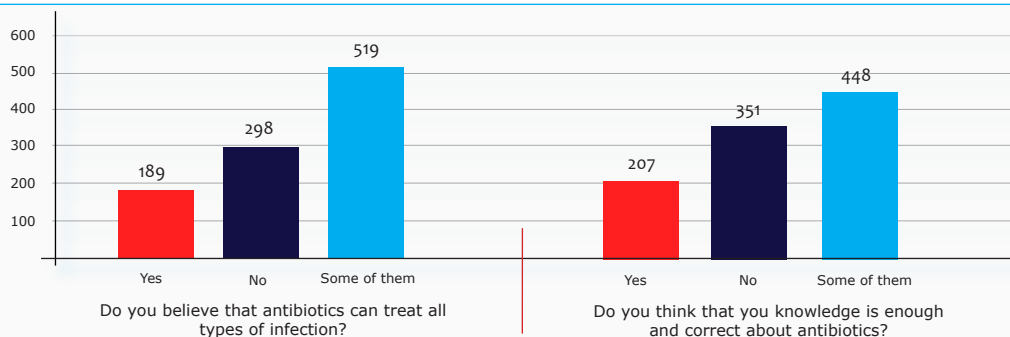


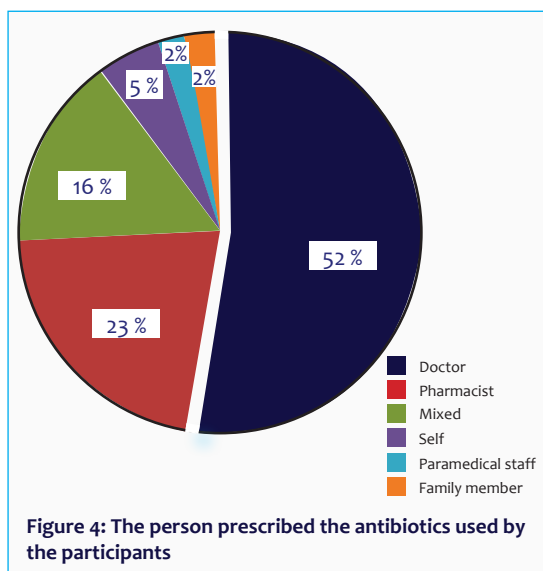
Figure 3: Participants' attitude about their opinion regarding assessing their knowledge about the antibiotics

Table 3: Association of some demographic features of the participants with their quality of practice of using antibiotics (correct or incorrect users).

Demographic Features		Quality of participants' practice of using antibiotics				Total	P value
		Incorrect user		Correct user			
		No	%	No	%		
Gender	Female	135	28.13	345	71.87	480	0.425
	Male	160	30.42	366	69.58	526	
Age (year)	18-27	61	33.33	122	66.67	183	0.724
	28-37	112	28.07	287	71.93	399	
	38-47	68	28.45	171	71.55	239	
	48-57	45	30	105	70	150	
	≥58	9	25.71	26	74.29	35	
Marital state	Single	83	28.62	207	71.38	290	0.053
	Married	196	28.61	489	71.39	685	
	Divorce	5	50	5	50	10	
	Widow	11	52.38	10	47.62	21	
Economic state	Fear	62	33.33	124	66.67	186	0.554
	Middle	113	29.20	274	70.80	387	
	Good	90	28.13	230	71.87	320	
	Very good	30	26.55	83	74.45	113	

172 participants, finance 150 participants, and labour and Social Affairs 145. While the least responders were education by only 45 and the Interior ministry by 31 participants.

Table 2 shows the frequency distribution of the answers of the participants about their practice towards using antibiotics. More than 70 % of the participants claimed that they or



their families use antibiotics in correct dose at a correct time. On the other hand, about 70 % of them claimed that they or their family stop antibiotics as soon as they got well without counselling a doctor. Similarly, about 70 % of the

participants usually use antibiotics for common cold and influenza without counselling a doctor.

Figure 2 shows the knowledge of the participants about the common adverse effects of the use of antibiotics. It shows that more than 50 % of the participants do not have the knowledge about toxic effect of the antibiotics on the ear, kidneys, bone marrow, and liver.

Figure 3 shows that about a fifth of the participants believe that antibiotics can treat all types of infection and that they think they have correct and enough information about the use of antibiotics.

Table 3 shows the association between some demographic features of the participants and their quality of practice of using antibiotics; whether they are correct or incorrect user. The results were statistically nonsignificant.

About 50 % of the participants in this study have used antibiotics prescribed by a person other than the physicians (**see figure 4**).

Gender and monthly income of the partici-

Table 4: Effect of who described the antibiotics (being physician or not) on the association of some demographic features of the participants on their quality of knowledge about the antibiotics whether they are correct or incorrect users.

Quality of participant's knowledge		Description by doctor (total 521)		Description by not a doctor (Total 485)			
		Correct	Incorrect	Correct	Incorrect		
Gender	Female	169	66	176	69	480	0.001
	Male	178	108	188	52	526	
Age (Years)	18-27	59	41	63	20	183	0.730
	28-37	145	64	124	48	399	
	38-47	79	36	92	32	239	
	48-57	51	26	54	19	150	
	≥58	13	7	13	2	35	
Marital state	Single	104	52	103	31	290	0.305
	Married	235	111	254	85	685	
	Divorce	3	3	2	2	10	
	Widow	5	8	5	3	21	
Economic state	Fear	54	38	70	24	186	0.0001
	Middle	131	70	143	43	387	
	Good	117	51	113	93	320	
	Very good	45	15	38	15	113	
Educational level	Primary	8	3	8	1	21	0.36
	Secondary	15	4	15	5	39	
	High school	57	23	45	13	138	
	Institution	40	21	39	14	114	
	Collage	202	116	245	80	643	
	Postgraduate	25	7	12	8	52	
Total		347	174	364	121	1006	

Table 5: Participants' causes of discontinuation of antibiotic.

Stopping causes	Number	Percent
Not stop before the time	141	14.0
Feeling better	700	69.6
Fear from complication	5	0.5
No answer	160	15.9
Total	1006	100.0

Table 6: Types of antibiotics used by the participants.

Usual antibiotics used	Number (total:1006)
Amoxicillin	143 (14.2 %)
Cephalexin	65 (6.5 %)
Amoxicillin/clavulanate	38 (3.8 %)
Ampicillin	32 (2.2 %)
Metronidazole	22 (2.2 %)
Ciprofloxacin	18 (1.8 %)
Trimethoprim/ sulfamethoxazole	11 (1.1 %)
Cefotaxime	5 (0.5 %)
Doxycycline	3 (0.3 %)
Not specific	358 (35.7 %)
More than one	310 (30.8 %)

pants have a statistically significant association with being correct and incorrect user when taking in consideration the person who describe the antibiotics: physician or not. (p value 0.001 and 0.0001 respectively) ([see table 4](#))

On reviewing the causes of discontinuation of the antibiotics, 700 participants (69.6 %) were stopping the drugs because they feel better without consulting the physician as shown in [table 5](#).

Amoxicillin is the most common antibiotic used by the participants of this study, 143(14.2%), followed by cephalexin, 65(6.5%), while doxycycline was the least used one. More than one antibiotics was used by 310(30.8%) participants and 358 (35.7%) did not identified a specific antibiotics as shown in [table 6](#).

DISCUSSION

In our study we have selected a gender match sample in accordance to the national demographic statistics of Iraq.¹⁶ similarly, The percentage of married to unmarried among participants was nearly similar to the Iraqi statistics.¹⁷

The target of this study was the employees

of non-health professions working at the headquarters of 10 Iraqi ministries in Baghdad. This approach was made to avoid the potential difficulties in selecting a sample from the community at a large. This approach can explain why we have got a high percentage of participants 643 (63.9 %) who were having a college certificate. It's similar to Iraq Health Information System Review and Assessment,¹⁸ and why did we have a two-third of participants grouped as having accepted to good monthly income; permanent employees have a fixed salary that is paid on a similar nationwide scale.

Chronic illnesses are reported in 14% of the participants; hypertension is the commonest followed by diabetes mellitus; a percentages similar to that of the general population according to 2016 annual statistical report of Ministry of Health and Environment in Iraq.¹⁹

In our study, although about half of the participants have given correct answers about measuring the knowledge of using antibiotics, only one third were using them correctly. This shows clearly that knowledge alone is not enough when designing community based educational programs unless it is associated with behavioural changes of the community.

[Table 2](#) shows that about 70 % of the participants are following doctors' instruction with regard to the dose and timing of using the antibiotics; on the other hand, more than two thirds of the participants usually stop the prescribed antibiotics by their own just on getting well or when an adverse event occur without consulting a physician. A study from Mukalla in Yamen²⁰ has found that about 70 % of the participants were using the antibiotics according to physicians' prescription, half of them do repeat intake of the medication without doctor's advice, and one third of the participants ask a physician to prescribe a specific antibiotic on their preference. This is also supported by the results of a study done in nine countries over the world.²¹

We found that 708 (70.4 %) of the participants were using antibiotics for common cold and influenza and 486 (48.3 %) of them using antibiotics for abdominal pain and diarrhoea without counselling a physician. These practices and behaviour are very risky on the patients themselves and the community in general be-

cause using antibiotics unnecessarily is a risk factor for antibiotic resistance; in addition, to the financial burden this behaviour casts on the health budget. These results are similar to that reported by many studies.^{21-23, 25}

What was reported for common cold, influenza, and diarrhoea by tendency of the participants to use antibiotics without consulting a physician is not applied for urinary incontinence, nasal congestion, toothache, and skin problems as only 165 (16.4 %), 309 (30.7 %), and 371 (36.9 %), 122 (12.1 %) participants were using antibiotics for these problems without a physician's advice. Surprisingly, this is consistent with the results of a study conducted in nine European, Middle Eastern and South Eastern countries.²¹

More than half of the respondents, 564 (56.1%), think that they know the side effects of antibiotics. However, more than 50 % of them (figure 2) admitted that they do not know the toxic effect of the antibiotics on the ear, kidneys, liver and blood. Similarly, about half of them admitted that their information about the benefits of the antibiotics was inadequate and inaccurate. This can clearly show that the educational programs for the people should include something about the side effects of the antibiotics as this might be another good drive for people not to use antibiotics erroneously.

According to the answers about questions measuring the practice of using antibiotics, most of the respondents were grouped as being correct user of antibiotics. This is similar to the study conducted in nine countries²¹ and in Mukalla.²⁰

As shown in table 3, The correct user of antibiotics is increasing with age; however, this association has not got a statistical significance. This attitude can be explained on the fact that increasing age is directly related to the experience and wisdom and inversely related to impetuosity. Gender, marital and economic status showed to statistically significant association to being correct or incorrect user of antibiotics. It is worth mentioning that despite have statistically insignificant association with being correct or incorrect user of antibiotics, being a divorced or widowed persons were relatively much lower to be a correct user of antibiotics in comparison to being a married and a single person (about 50 % versus 70 %). This obvious difference can be

attributed to psychological instability and sense of depression and marginalisation. This is contrary to a study conducted at Oxford University and matching with another study from India.^{26, 27}

The study revealed that monthly income of the participants is linked to their providing correct answers for the optimal use of antibiotics. Availability of money gives a person a more chance for visiting a private clinic and allows the person to gain more attention and explanation about the antibiotics. Saving the fees of the physician and availability of prescribing antibiotics as an over the counter drug in Iraq can drive many of low income to use antibiotics without a physician's advice. A similar result was shown by a study conducted by the National Centre for Transitional Diseases 2003.²¹

Although most of the respondents did not recall a specific antibiotic used or recalling more than one, amoxicillin is the single most widely used, followed by Cephalexin, amoxicillin/clavulanate, Ampicillin, and metronidazole. Doxycycline was the least abused antibiotics. A nearly similar result was reported by many other studies.^{20, 28-30}

Prescription of antibiotics by a person other than a physician is an illegal and dangerous behaviour because only physicians are equipped with a scientific base for how to examine the patient, diagnose the disease, and choosing a proper treatment. With a good knowledge about the complications of the disease and the adverse effects of the drugs and their interactions. Unfortunately, we found that about a half of the participants in our study have used the antibiotics prescribed by persons other than a physician like pharmacist, paramedical staff, family members, relative and friends, and self-prescription. This bad and dangerous phenomenon were also reported in other studies from Lebanon³¹ and Yemen.²⁰ Rules regulating this vital issue in Iraq is already present;³² however, they are mostly not enforced. Great efforts should be exercised from Ministry of Health in Iraq, Iraqi Medical Association and syndicate of Iraqi pharmacists to effectively prohibit this bad behaviour and to follow the western examples like Australia, and UK.^{33, 34}

Nearly 70% of respondents discontinue the antibiotic before the correct timing because of

their sense of improvement. And few of them, 0.5%, are doing so due to the fear of the emergence of the complications of the antibiotics. Only, 14% of the participants have answered that they have never discontinued the antibiotic before the correct timing. This result disagreed with that from Mukalla in Yemen,²⁰ but agreed with Pechère study²¹ and CDS report from the USA.³⁵

CONCLUSIONS

This study has showed that Iraqi persons represented by employees of nine Iraqi Ministries are comply to the advice for using antibiotics with regards to dose and timing, but they are not for using antibiotics unnecessarily for simple viral infection. And they usually discontinued the antibiotics prematurely by their own just because they get well. Also, about half of the survey sample have admitted that they use antibiotics prescribed by persons other than physician and this behavior was associated with the gender and monthly income. Most of the participants are using more than a single antibiotic or using unspecified one; however, the commonest antibiotics abused was amoxicillin followed by cephalixin.

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Abbreviations: Methicillin-Resistant Staphylococcus Aureus (MRSA), Ministry of Health (MOH), Statistical Package for the Social Sciences (SPSS), World Health Association (WHO)

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