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RESEARCH ARTICLE

Assessment of Antibiotic Knowledge Among Final Year Pharmacy Students at Baghdad University

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Abstract:

Background:

Antibiotics are life-saving drugs that if misused lead to antibiotic resistance and consequently to a substantial public health issue. Pharmacists have a major role in ensuring the rational use of antibiotics to prevent antibiotic resistance. This study aimed to assess antibiotic knowledge among final year pharmacy students at Baghdad University.

Methods:

A cross sectional study using a newly developed and validated questionnaire was given for 148 final year (5th stage) students at Baghdad University – College of Pharmacy during November 2016. Only 140 students (response rate 93%) completed the questionnaire. The 10 items-questionnaire consisted of 5 major domains: Antibiotic effectiveness, side effects, resistance, use in specific cases (*e.g.*, during pregnancy and septicemia), and the legal issues of antibiotic dispensing.

Results:

Only 20% of students have good overall antibiotic knowledge. The least knowledge for pharmacy student was in regard to antibiotic side effects and antibiotic resistance at which only 22% and 19% of pharmacists possessed good antibiotic knowledge respectively. Knowledge of student was the best in legal issues of antibiotic dispensing. There was a non-significant difference in antibiotic knowledge between male and female pharmacy students.

Conclusion:

Antibiotic knowledge among pharmacy students at Baghdad University was very poor and less than expected.

Keywords: Antibiotic, Pharmacy students, Antibiotic knowledge, Antibiotic dispensing, Antibiotic side effects, Antibiotic resistance.

Article History

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1. INTRODUCTION

Antibiotics are one of the most commonly prescribed and used drugs worldwide. They are life saving drugs. Unfortunately, non-prescription antibiotics are overused worldwide [1]. This irrational usage may lead to the development of antibiotic resistance [2]. There are negative financial and health consequences for such resistance [3] especially in developing countries because of the high prevalence of infectious diseases and limited facilities for detecting antibiotic susceptibility [4, 5]. Pharmacists play an

important role in reducing antibiotic resistance by ensuring effective and safe use of antibiotics through assessing the appropriateness of the prescribed antibiotic in of its indication, dose [6], and patient preference, besides counseling and educating patients about the proper usage of their prescribed antibiotics [7]. Therefore, pharmacists must have comprehensive knowledge about antibiotics. Many studies conducted in Middle East countries have shown that community pharmacists have poor knowledge of antibiotics [8, 9]. Meanwhile, it is unclear whether the main cause of such poor knowledge is related to negligence of pharmacists to maintain and develop their professional competence or related to gaps in the teaching techniques and/or the curriculum of

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pharmacy colleges. Consequently, other studies were carried out in USA [10], and Kosovo [11] to detect antibiotic knowledge among final year pharmacy students; both studies found that student knowledge about antibiotics is only moderate. To the best of our knowledge, no study has been conducted to assess antibiotic knowledge among pharmacy students in Iraq. Therefore, this study aimed to evaluate antibiotic knowledge among final year (5th stage) students at Baghdad University – College of pharmacy.

2. METHODS

2.1. Development of the Questionnaire

The questionnaire items were developed based mainly on the concepts discussed in chapter 5 of the British National Formulary (BNF) 72, and a review of the literature [10 - 12]. A pool of 20 items was developed; however, only 10 items were chosen with the aim to develop a comprehensive and short questionnaire. The chosen items were slightly modified to ensure compatibility with the Iraqi scenario. The proposed 10 items-questionnaire assessing students' knowledge in 5 major domains: antibiotic effectiveness (item 1 and 7), side effects (items 2 and 5), resistance (items 3, 6 and 10), antibiotic usage in specific cases (*e.g.*, during pregnancy and septicemia) (items 8 and 9), and the legal issues of antibiotic dispensing (item 4). All items were provided with a dichotomous response of “Yes” or “No”. The questionnaire details are given in Appendix 1.

2.2. Validity and Reliability of the Questionnaire

For content validity, the structured questionnaire was emailed to 3 expert pharmacists in clinical research with at least a master degree in clinical pharmacy. Experts were asked to indicate their opinion about the importance and clarity of each item in the questionnaire. All participated experts come into mutual agreement about the importance and clarity of all items in the questionnaire.

To assess reliability the questionnaire was piloted to 20 students in the fifth stage at Baghdad University – college of pharmacy. The cronbach's alpha for the obtained data was 0.650 which was considered sufficient [13].

2.3. Scoring of the Validated Questionnaire

To have a good knowledge in any domain, the student must answer all question(s) in that domain correctly. Overall knowledge for the participant was measured based on the summation of the correct answers for all items in the questionnaire. Answering correctly at least 80% of items was considered as good knowledge, while fair knowledge was achieved by answering at least 60% but less than 80% of items correctly. Answering correctly of less than 60% of questionnaire items was considered as a poor knowledge.

Table 1. Demographic data of participants.

Parameter	Value
Age in years Mean±SD	22.2±1.45
Gender	54 (38.6%)
Male no.(%)	86 (61.4%)
Female no.(%)	

2.4. Sample Size Calculation

The sample size for this cross sectional study was calculated by using Raosoft online sample size calculator (<http://www.raosoft.com/samplesize.html>) by keeping the margin of error as 5%, confidence interval as 95%, response distribution as 50% and population size as 221 (5th stage pharmacy students for the academic year 2016-2017 was 221 student according to the data from Pharmacy college registration unit). The required sample size was 141 students; however, the required sample size was increased to 148 students after taking into consideration a drop-out rate of 5%.

2.5. Study Design

A cross sectional study for a convenient sample of 5th stage students was conducted at Baghdad University- College of pharmacy during November 2016. This study was ethically approved by the ethical committee at Baghdad University – College of pharmacy. Students were asked to participate in this study by their colleague (a researcher of this study) not by their teacher to reduce the risk of bias in response rate. All recruited participants were informed about the aim of the study and only those who provided their verbal informed consent were included in this study. Each student was asked to fill in the paper based questionnaire without searching books or the internet. The students were also asked to fill in their gender and age. The questionnaire was distributed to student in the free time between lectures. Only 140 students (response rate of 94.6%) completed the questionnaire.

2.6. Statistical Analysis

Statistical Package for the Social Sciences (SPSS) version 17 was used for data input and analysis. Categorical variables were presented as number and frequencies while continuous variables were presented as mean± Standard Deviation (SD).

Chi square test was used to test the significance of difference among categorical variables. *P*- values of less than 0.05 were considered significant.

3. RESULTS

The majority of participants were females with an average age of 22.2 years (Table 1). This study showed that only (20%) of pharmacy students have good overall antibiotic knowledge. The highest knowledge (85.7%) among pharmacy students was in regard to legal issues of antibiotic dispensing, while the least knowledge (19.3%) was in regard to antibiotic resistance. More details are given in Table 2.

Table 3 showed a non-significant difference in antibiotic knowledge between female and male pharmacy students.

Table 2. Antibiotic knowledge among fifth stage pharmacy college students.

Parameter	Degree of Knowledge	Number of Student (%)
Antibiotic effectiveness	Good*	87 (62.1)
	Poor *	53 (37.9)
Antibiotic side effects	Good*	37 (26.4)
	Poor *	103 (73.6)
Antibiotic resistance	Good*	27 (19.3)
	Poor *	113 (80.7)
Legal issue in dispensing antibiotics	Good*	120 (85.7)
	Poor*	20 (14.3)
Choice of antibiotic in special cases	Good*	59 (42.1)
	Poor*	81 (57.9)
Overall knowledge	Good (³ 80% correct answers)	28 (20)
	Fair (³ 60% < 80% correct answers)	84 (60)
	Poor (less than 60% correct answer)	28 (20)

Good*: Answer 100% of question(s) correctly, Poor*: Answer less than 100% of question(s) correctly

Table 3. The effect of student gender on antibiotic knowledge.

Parameter	Degree of Knowledge	Male(n=54)	Female (n=86)	P value
Antibiotic effectiveness	Good*	38	49	0.111
	Poor*	16	37	
Antibiotic side effects	Good*	17	20	0.282
	Poor *	37	66	
Antibiotic resistance	Good*	12	15	0.554
	Poor *	44	71	
legal issue in dispensing antibiotics	Good*	48	72	0.394
	Poor*	6	14	
Choice of antibiotic in special cases	Good*	20	39	0.332
	Poor*	34	47	
Overall knowledge	Good (³ 80% correct answers)	11	17	0.242
	Fair (³ 60% < 80% correct answers)	36	48	
	Poor (less than 60% correct answer)	7	21	

Good*: Answer 100% of question(s) correctly, Poor*: Answer less than 100% of question(s) correctly

4. DISCUSSION

This study showed that most (62.1%) of the participated students had good knowledge about antibiotics effectiveness. A similar finding was obtained by a survey for pharmacy students at the major public university in Trinidad and tobacco at which 62% of them had good knowledge [14]. Despite this apparent similarity in antibiotic knowledge between Iraqi and Trinidadian pharmacy students, the actual knowledge of Trinidadian students can be considered higher than that of Iraqi students because all of the included students in that study were from 3rd and 4th stage, while those in the current study were in 5th stage, and it is well known that pharmacy student knowledge is directly related to the student's stage [15, 16].

This study showed a poor (42.1%) knowledge among pharmacy students in identifying antibiotics that can be used safely and effectively during pregnancy or in cases of septicemia. There is no any similar study in this regard and it is the 1st time to get such information, however a closely related study that assessed pharmacists' knowledge about the safe antibiotics during pregnancy showed that nearly half of the participated pharmacists possessed such knowledge which is slightly better than that obtained in the current study for final stage pharmacy students [17].

In this study, only a minority (19%) of students had good knowledge about antibiotic resistance which is much lower than the knowledge among Indian (55%) [18] and Malaysian (84%) [19] Pharmacy students.

This study showed that a promising high percent (85.7%) of respondent students agreed that antibiotics should be dispensed only in response to a valid prescription. The knowledge about antibiotic dispensing rules by Iraqi students is higher than that for students at the University of Prishtina – Kosovo (57%) [11]; this large difference may be attributed to different nature of the question in both studies. However, it is not clear whether this high knowledge for antibiotic dispensing will be applied in the future by these junior pharmacists to improve the currently irrational antibiotic prescribing pattern in Iraq [9].

This study showed that only 26.4% of participant students had a good knowledge toward antibiotic side effects, this was nearly similar with knowledge of the pharmacy students in Kosovo at which 37% of them had good knowledge about antibiotics side effects and lower than that of Indian students (74%) [18]. This difference may be attributed to the difference in the method of teaching pharmacy students at which most of the Indian pharmacy students are studying Pharm D program, a clinically oriented teaching program, in contrast to Iraqi students.

A final finding of this study was the non significant difference in antibiotic knowledge between female and male pharmacy students. Similarly, many other studies showed that the knowledge of pharmacy students about medications [20] diseases [21] and even pharmacovigilance [22] was not significantly different in correlation with student gender.

Overall antibiotic knowledge as shown by this study was less than expected and only a minority of students possess good antibiotic knowledge, this in contrast with pharmacy students in Trinidad and Tobago at which most of them had good antibiotic knowledge [14]. This poor overall antibiotic knowledge among Iraqi pharmacy students indicate that the irrational antibiotic prescribing and dispensing among Iraqi pharmacists may be partially attributed to a problem in the current curriculum of pharmacy college, which is uniform in all Iraqi pharmacy colleges; the current curriculum focus on clinical and pharmaceutical subjects in the last 2 years of the college making it difficult for the student to understand and memorize such important subjects, besides offering students one course (8 weeks) of hospital training which seems to be insufficient [23]. On the other hand, lacking of local guidelines for prescribing and dispensing of antibiotics, besides patient health beliefs and demands for antibiotics, can be another source for irrational antibiotic usage in Iraq and other Middle Eastern countries [24].

The major limitation of this study is that it included students from one Iraqi Pharmacy College; however, further studies are recommended to be done to include students from other pharmacy colleges in Iraq and other Middle Eastern countries with focus on student opinion about the major causes for such low antibiotic knowledge.

Despite the above limitation, it is recommended to revise and continuously update the scientific curriculum with great focus on student training programs besides, starting clinical and pharmaceutical subjects in earlier stages of the pharmacy college.

CONCLUSION

In conclusion, antibiotic knowledge among pharmacy students in Iraq was very poor and less than expected.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from local Ethical Committee at College of Pharmacy - University of Baghdad.

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

Informed consent was obtained from all the participants.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

FUNDING

None

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

APPENDIX 1: ANTIBIOTIC KNOWLEDGE QUESTIONNAIRE

Dear participant, this questionnaire aims to assess your knowledge about antibiotics including their benefits, side effects, contraindications and main types. If you accept to help us please reply to the following questions with honesty.

1. Antibiotics are effective to hasten the recovery of patients with a sore throat due to common cold or influenza

Yes No

2. Frequent antibiotic usage can decrease patient immunity

Yes No

3. Antibiotics should be stopped immediately after symptoms were resolved to avoid the development of antibiotic resistance

Yes No

4. Old generations of antibiotics (e.g., Ampicillin and tetracycline) can be dispensed by pharmacists without prescriptions

Yes No

5. Hypersensitivity reactions are the only side effect for antibiotics

Yes No

6. When antibiotics used topically, there is no risk of

development of antibiotic resistance

Yes No

7. There is no any therapeutic advantage by combining antibiotics (e.g., Clarithromycin and cefuroxime)

Yes No

8. Only penicillins (e.g., amoxicillin) are safe to be used during pregnancy

Yes No

9. In septicemia, it is best to wait for the result of culture and sensitivity before starting antibiotic therapy

Yes No

10. The use of broad spectrum antibiotics are usually preferred over narrow spectrum antibiotics

Yes No

Note: The correct answer for all of the above questions is No.

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