Research Article

Knowledge, attitudes, and practices of primary health-care physician in Bahrain toward antibiotics use

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ABSTRACT

Background: Antimicrobial resistance was listed among the most dangerous threats to global health security. Antimicrobial use is influenced by the interplay of the knowledge, expectations, and interactions of prescribers and patients, economic incentives, characteristics of the health system(s) and the regulatory environment. Knowledge, attitudes, and practice of antibiotic prescription among primary health-care doctors are important to understand the antimicrobial resistance; hence, this study aimed to examine these aspects in Bahrain. **Objective:** The objective of the study was to assess the knowledge, attitudes, and practices of the Primary Health Care Physician (PHP) in Bahrain toward antibiotics use. **Materials and Methods:** Cross-sectional study have been conducted among PHP working in primary health care centers (PHC) in Bahrain. A structured, anonymous, self-administered questionnaire was used to conduct the study. The following items were collected for each participant: Demographic (age, sex, nationality.etc), work factors (qualification, years of experience, morning or shift.etc) and knowledge, attitude, and practice toward antibiotics use. Each questionnaire was coded and assigned a special identity number for data entry and processing. Data were entered into a data base program (Statistical Package for the Social Sciences). Frequency tables were produced for each item. Cross tabulation with chi square test was done for certain variables with demographic and work related items. **Results:** A sample of 155 primary care physicians was taken; 138 (89%) were Bahrainis and 17 (11%) were non-Bahrainis, from which 39 (25.2%) were males and 116 (74.8%) were females. They were asked to judge their level of knowledge about antibiotics use in general and 94 of them (61.8%) classified their level as being "good" and 37.5% as excellent. More than half of the doctors (55.2%) admitted that they have not received any kind of formal training about antibiotic use. Almost all the doctors (95.5%) agreed that prescribing antibiotics in an inappropriate way puts the patients at risk. Majority of the doctors (89%) ranked patients' clinical condition as being the most influencer on their judgment to prescribe antibiotics, followed by obtaining a positive microbiological result in symptomatic patients (85.1%). More than three-quarter of doctors (80.5%) agreed that providing local antimicrobial guidelines will help in decreasing the problem of antibiotics overuse and resistance. More than 85% agree that using antibiotics appropriately will be the ultimate key to decrease antimicrobial resistance. **Conclusion:** In general, there is a good attitude toward the importance of antibiotics use among PHC doctors, but the knowledge is not as good with only 61.8% of PHC doctors considered their knowledge as good toward antibiotics use and around half (55.2%) stated that they did not receive any formal training in this field. Antibiotics use and antimicrobial resistance should be strengthened in the curriculum of undergraduate and postgraduate training programs.

KEY WORDS: Knowledge; Attitudes; Practices; Primary Health Care; Bahrain; Antibiotics Use

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INTRODUCTION

World Health Organization (WHO) defines antibiotic resistance as "the ability of bacteria to resist the effect of antibiotic treatment to which they were once sensitive."[1] In the world health record issued in 2007 WHO, microbial evolution and antimicrobial resistance were listed among the most danger threats to global health security.[2] This indicates that antibiotic resistance is escalating, which carries a huge threat to the entire globe.[3] The relationship between the consumption of antimicrobials and the development of resistance is complex, and it is driven by many interconnected factors, in particular, the use and misuse of antimicrobials. Antimicrobial use, in turn, is influenced by the interplay of the knowledge, expectations, and interactions of prescribers and patients, economic incentives, characteristics of the health system(s) and the regulatory environment.[4-7] This is also complicated by the lack of introducing new agents which can take over the already developed resistance and hence keeping the globe liable to serious diseases and increase the rate of mortality.[4] To help eradicate or at least minimize this problem; lots of things must be taken into consideration and a high level of multifaceted interventions needed engaging health-care practitioners and public.

In 2006, a study was conducted to identify the patterns of antibiotic resistance in China, Kuwait, and the USA. It revealed that Kuwait had the second rapid growth rate of resistance during the period from 1999 to 2003.[8] Another two studies reported the emergence of antibiotics resistance in the Gulf Cooperation Council (GCC) countries, including Bahrain.[9,10]

This rise in the antibiotic resistance was attributed mainly to the inappropriate prescribing of antibiotics and overuse of antibiotics, including self-medication.[4,5] Other factors included the lack of policies for restricting and auditing antibiotic prescriptions in many GCC countries, misuse of antibiotics in the animal health sector recognizing most classes of antibiotics are used both in animal and human health, and lack of guidelines for the use of antibiotics in the animal industry.[5-7,9,10] All this decrease the threshold to investigate the practice of utilizing antibiotics. One alarming study which was launched in 2009 in Kuwait about the prescription of antibiotic in 50 primary health care centers (PHC) revealed a high prescribing rate for antibiotics with almost four-in-ten prescriptions involving an antibiotic.[11] Furthermore, another study done in Saudi Arabia which came to confirm the misuse of antibiotic by practitioners in Riyadh hospitals. The study revealed that 47.6% of them are inappropriately using antibiotics.[12]

To establish a compact plan to combat the acceleration of the antibiotics' resistance, one must study the attitude, knowledge, practice, and the patterns of resistance in different countries. A lot of studies were conducted in different countries such as Saudi Arabia, India, and Jordan to assess those aspects. Approximately 50% of the participants in those studies stated that a lack of proper knowledge about antibiotic use led to higher resistance rates.[12-14] 70% of the doctors in the Jordanian study attributed the lower efficacy of the antibiotics to their misuse in the daily practice.[9] Other studies in India, Spain, and Brazil showed similar results.[13,15,16]

In Bahrain, there were two previous articles that studied the patient's knowledge, attitude, and practice in regard to antibiotic use,[17,18] but there is no study to evaluate the primary health-care knowledge, attitude, and practice toward this topic. Therefore, we conducted this study to evaluate the knowledge, attitudes, and practice of antibiotic prescription among primary health-care doctors working in governmental primary care centers in Bahrain.

MATERIALS AND METHODS

A cross-sectional stud was conducted among primary health-care physicians working in PHC in Bahrain. All the 326 primary health-care doctors who are working in the governmental health centers in the morning and evening shifts were eligible to participate in the study. Those who are on leave during the study, those who refuse to participate or did not complete the questionnaire were excluded from the analysis.

A structured, anonymous, self-administered questionnaire was used to conduct the study. The items of the questionnaire were adopted from previous studies conducted in the Kingdom of Saudi Arabia (KSA).[7] The following items were collected for each participant: Demographic (age, sex, nationality... etc), work factors (qualification, years of experience, morning or shift.etc) and knowledge, attitude, and practice toward antibiotics use. An instruction about filling the questionnaire was provided with each questionnaire, and clear instruction for each question was included.

The questionnaires were distributed to all primary health-care doctors by name through the chief of medical services of primary health care. The questionnaires were then collected from each health center by the researchers after 1 week through the doctor in charge of each health center.

Each questionnaire was coded and assigned a special identity number for data entry and processing. Data were entered into a database program (Statistical Package for the Social Sciences version 23). Frequency tables were produced for each item. Cross-tabulation with Chi-square test was done for certain variables with demographic and work-related items.

This study was reviewed and approved by the Research Ethics Committee of the Ministry of Health in Bahrain.

RESULTS

A total of 200 questionnaires were distributed of which 155 primary care physicians completed the questionnaire; 138 (89%) were Bahrainis and 17 (11%) were non-Bahrainis, from which 39 (25.2%) were males and 116 (74.8%) were females. The questionnaire was distributed among all the health-care centers in all municipalities in Bahrain. Majority of the physicians who answered were below 40 years of age (37.8%). Around half of them (45.3%) have 10–20 years of experience in the field, and 42.9% of them are entitled as consultant family physician [Table 1].

They were asked to judge their level of knowledge about antibiotics use in general and 94 of them (61.8%) classified their level as being "good" [Figure 1].

More than half of the doctors (55.2%) stated that they have not received any kind of formal training about antibiotic use. Nevertheless, from those who answered yes, 35.7% said they were trained in their family residency program [Figure 2].

As part of obtaining a foundational knowledge about antibiotics' use, 130 (84.4%) of the doctors credited that to their formal medical education while 64.3% attributed it to the medical journals [Table 2].

Several questions were asked to assess their perception and attitude toward antimicrobial prescription. Almost all the doctors (95.5%) agreed that prescribing antibiotics in an inappropriate way puts the patients at risk and (92.2%) disagreed the statement that says, "It is always better to over-prescribe then under-prescribe antibiotics." The same percentage went against allowing everyone to buy antibiotics without a prescription. Ninety-four (61.4%) of the doctors do classify antibiotic resistance as being a countrywide problem, and much higher percentage (80.4%) think it has extended the country limits and became a worldwide problem. Fortunately, 108 (69.7%) of the physicians have confidence in their practice and knowledge towards antibiotics prescription [Table 3].

Sometimes, doctors need to prescribe antibiotics empirically before obtaining cultures, so a question was directed on how long you usually prescribe empirically; 63.8% of them chose 1 week as a preference duration [Figure 3].

For sure, there are a lot of factors that have an influence on the doctors' decision on whether to start antibiotics or not. Majority of the doctors (89%) ranked patients' clinical condition as being the most influencer on their judgment, followed by obtaining a positive microbiological result in symptomatic patients (85.1%). However, all the doctors (100%) strongly refuse prescribing antibiotics only to satisfy their senior physician and 83.7% refuse as well to prescribe only upon patients' request [Table 4].

Table 1: Demographic data and jobs characteristics of PHC doctors in Bahrain

Characteristics	No. (%)
Nationality	
Bahraini	138 (89)
Non Bahraini	17 (11)
Total	155 (100)
Gender	
Male	39 (25.2)
Female	116 (74.8)
Total	155 (100)
Age groups	
<40	42 (37.8)
>50	30 (27)
40–50	39 (35.1)
Total	111 (100)
Marital status	
Married	138 (92.6)
Single	11 (7.4)
Divorced	0 (0)
widowed	0 (0)
Total	149 (100)
How many years have you been practicing in primary care?	
<10 years	47 (31.3)
>20 years	35 (23.3)
10–20 year	68 (45.3)
Are you a family residency program graduate?	
General practitioner	28 (18.2)
Family physician	60 (39)
Consultant family physician	66 (42.9)
Total	154 (100)

PHC: Primary health care centers

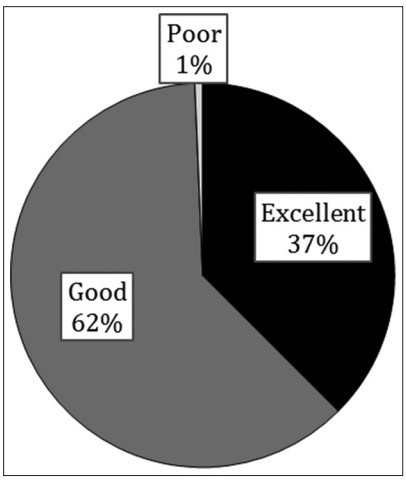

Figure 1: The level of knowledge about antibiotics use in general among primary health care centers doctors in Bahrain

Shedding the lights toward decreasing the budget load, a question was directed to the doctors if whether they put into their minds the cost effectiveness of prescribing antibiotics and 60.5% of them responded that they always do [Figure 4].

Table 2: Main source of knowledge about antibiotics use among PHD doctors in Bahrain

Source of knowledge	Yes No. (%)	No No. (%)	Total No. (%)
As part of formal medical education	130 (84.4)	24 (15.6)	154 (100)
Medical journals	99 (64.3)	55 (35.7)	154 (100)
Specialized Workshop	41 (26.6)	113 (73.4)	154 (100)
General reading	64 (41.6)	90 (58.4)	154 (100)
General media (TV, Radio, TV)	9 (5.8)	145 (94.2)	154 (100)
Internet (non-medical sites)	22 (14.3)	132 (85.7)	154 (100)

TV: Television

When trying to investigate the possible causes of the inappropriateness in using antibiotics, 122 physicians (79.2%) declared that it is due to the lack in skills and knowledge and second to overworked health-care personnel (59.1%) [Table 5].

List of solutions was put to see which can enhance in controlling the antimicrobial resistance according to the physician point of view; nearly three-quarter of them (80.5%) agreed that providing local antimicrobial guidelines will help, also 86 doctors see that depending on the antimicrobial susceptibility test will much decrease the resistance rate. Expectedly, more than 85% agree that using antibiotics appropriately will be the ultimate key to decrease the antimicrobial resistance [Table 6].

What might happen if doctors continued to overuse antibiotics? It had been found that physicians chose those

Table 3: Perceptions and attitudes in relation to antimicrobial prescribing among PHC doctors in Bahrain

Perceptions and attitudes	Do not agree No. (%)	Neutral No. (%)	Agree No. (%)	Total No. (%)
Inappropriate antibiotic prescribing puts patients at risk	6 (3.9)	1 (0.6)	147 (95.5)	154 (100)
It is always better to over-prescribe antibiotics than under-prescribe?	142 (92.2)	8 (5.2)	4 (2.6)	154 (100)
Everyone should be able to buy antibiotics without a prescription?	143 (92.9)	5 (3.2)	6 (3.9)	154 (100)
Antimicrobial resistance is a problem in my daily practice?	47 (31.1)	28 (18.5)	76 (50.3)	151 (100)
Antimicrobial resistance is a significant problem for my clinic?	61 (39.4)	46 (29.7)	48 (31)	155 (100)
Antimicrobial resistance is a significant countrywide problem?	33 (21.6)	26 (17)	94 (61.4)	153 (100)
Antimicrobial resistance is a significant worldwide problem?	18 (11.8)	12 (7.8)	123 (80.4)	153 (100)
I am aware of the antimicrobial resistance rates and patterns in my clinic?	67 (43.2)	36 (23.2)	52 (33.5)	155 (100)
I feel confident about my knowledge and practice in the area of antimicrobial prescribing?	24 (15.5)	23 (14.8)	108 (69.7)	155 (100)
I receive regular training and education in antimicrobial prescribing in my workplace?	105 (67.7)	26 (16.8)	24 (15.5)	155 (100)
The infectious diseases service in my work is easily accessible?	62 (40)	32 (20.6)	61 (39.4)	155 (100)
The infectious diseases service in my work is very helpful?	44 (28.8)	39 (25.5)	70 (45.8)	153 (100)

PHC: Primary health care centers

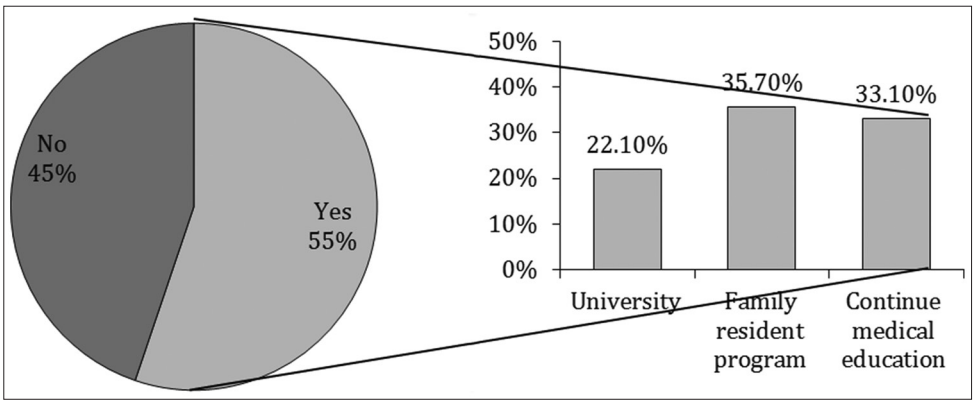

Figure 2: Formal training in antibiotics use among PHD in Bahrain

Table 4: Factors may influence your decision to start antimicrobial therapy among PHC doctors in Bahrain

Factors	Yes No. (%)	No No. (%)	Total No. (%)
Patient's clinical condition	137 (89)	17 (11)	154 (100)
Positive microbiological results in symptomatic patients	131 (85.1)	23 (14.9)	154 (100)
Wanting to satisfy the senior treating physician	0 (0)	154 (100)	154 (100)
Worry of missing patients with possible infections	35 (22.7)	119 (77.3)	154 (100)
On patient's request	25 (16.3)	128 (83.7)	153 (100)

PHC: Primary health care centers

Table 5: Perception of the most important causes of inappropriate use of antibiotics among PHC doctors in Bahrain

Perception	Yes No. (%)	No No. (%)	Total No. (%)
Poor skills and knowledge	122 (79.2)	32 (20.8)	154 (100)
Unrestricted availability of antimicrobials	73 (47.4)	81 (52.6)	154 (100)
Inadequate supervision	54 (35.1)	100 (64.9)	154 (100)
Lack of physician interest in the subject of antimicrobial prescribing and infection management lack of effective hospital policies	63 (40.9)	91 (59.1)	154 (100)
Overworked health care personnel	122 (79.2)	32 (20.8)	154 (100)

PHC: Primary health care centers

Table 6: Perceived factors that may help control antimicrobial resistance among PHC doctors in Bahrain

Perceived factors	Yes No. (%)	No No. (%)	Total No. (%)
Treating infection, not contamination or colonization	72 (46.8)	82 (53.2)	154 (100)
Physician education on appropriate antimicrobial therapy	132 (85.7)	22 (14.3)	154 (100)
Consulting with infectious diseases experts	55 (35.7)	99 (64.3)	154 (100)
Providing local antimicrobial guidelines	124 (80.5)	30 (19.5)	154 (100)
Knowledge of pathogens and antimicrobial susceptibility test results	86 (55.8)	68 (44.2)	154 (100)
Obtaining local antibiotic resistance profiles	84 (54.5)	70 (45.5)	154 (100)
Practicing antimicrobial restriction	66 (42.9)	88 (57.1)	154 (100)
Removing catheters when not essential	51 (33.1)	103 (66.9)	154 (100)
Targeting antimicrobial therapy to likely pathogens	73 (47.4)	81 (52.6)	154 (100)

PHC: Primary health care centers

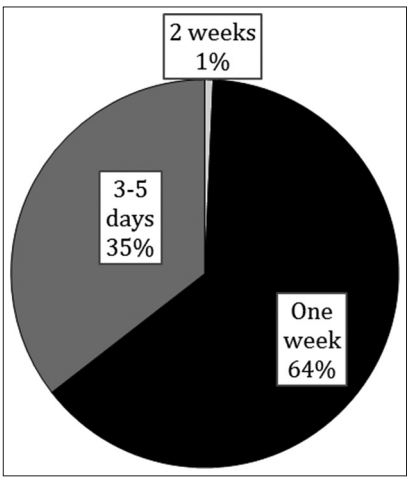

Figure 3: Usual duration of empiric antimicrobial therapy among primary health care centers doctors in Bahrain

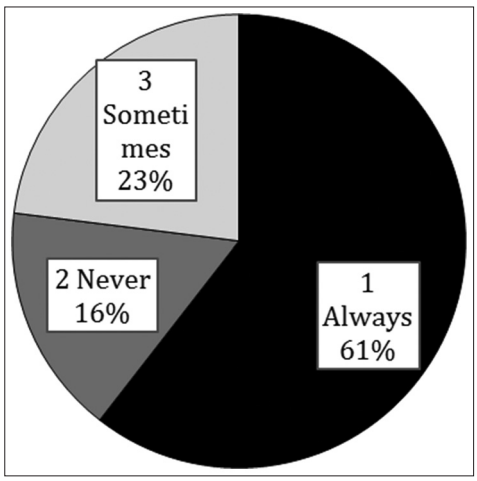

Figure 4: Trial of primary health care centers doctors in Bahrain to make their antibiotics prescribing cost effective

three consequences as most important; antimicrobial resistance (94.8%), waste of resources (76%), and the adverse drug reactions and medication errors (65.6%) [Table 7].

DISCUSSION

The majority (61.8%) of the participants in this study classified their general knowledge about antibiotics use

Table 7: Perceived important consequences of antimicrobial overuse among PHC doctors in Bahrain

Perceived important consequences	Yes No. (%)	No No. (%)	Total No. (%)
Antimicrobial resistance	146 (94.8)	8 (5.2)	54 (100)
Adverse drug reactions and medication errors	101 (65.6)	53 (34.4)	154 (100)
Quicker discharge from hospital	3 (1.9)	151 (98.1)	154 (100)
Better patient outcome	7 (4.5)	147 (95.5)	154 (100)
Waste of resources	117 (76)	37 (24)	154 (100)

PHC: Primary health care centers

as "good" and 37% as excellent. More than half of the doctors (55.2%) admitted that they have not received any kind of formal training about antibiotic use. Almost all the doctors (95.5%) agreed that prescribing antibiotics in an inappropriate way puts the patients at risk. Majority of the doctors (89%) ranked patients' clinical condition as being the most influencer on their judgment to prescribe antibiotics, followed by obtaining a positive microbiological result in symptomatic patients (85.1%).

Our data collected showed that a huge percentage of the doctors (80.4%) agree that antibiotic resistance is a worldwide problem which matches the world health records that were issued by the WHO in 2001 and 2007, and many other studies that were conducted among different populations from several other countries such as Saudi Arabia, Jordan, India, Spain, and Brazil which all agreed that "Antimicrobial resistance is a worldwide problem."[3-5,8-10,12]

This problem is increasing and it has been attributed to the inadequate knowledge and the malpractice of doctors towards prescribing antibiotics. As our study revealed that 95.5% of the physicians refer to the acceleration of antibiotics resistance to the improper way of prescribing antibiotics, 92.2% think that over-prescription is another attributing cause. This is very similar to our neighbor countries Kuwait and Saudi Arabia, because one study in Saudi Arabia disclosed that 48.6% of their study population believed that inadequate knowledge is the most important contributor to poor antimicrobial practices. That is, not only within the gulf region but also among the Asian continent as well, as only 35% of the doctors assessed in a study in India felt confident about their knowledge regarding antibiotic use. Another very important factor is the lack of hospital policies. 40.9% of the participants confessed that this is a major contributor to the higher resistance rates and that was stressed upon by the same study conducted in India and other countries.[8,9,11-14]

To prevent the inappropriateness and the emergent resistance in antibiotic use, doctors must be trained well in this field; however, it is sadly reported that only 55% of the respondents said they have received formal training about antibiotic use. This not an encountered problem only in our country, rather, India has much higher rates of doctors who never been taught in this field (84.37%); therefore, it is not clear whether the doctors have enough confidence in prescribing antibiotics. To overcome this problem, (85.7%) of the doctors think that establishing well-organized training sessions and educational programs with evidence-based guidelines will help them in the decision of prescribing the appropriate antibiotic and providing well-structured guidelines will be of ultimate benefit in decreasing the microbial resistance. This also was confirmed by the results obtained from both studies in KSA and India.[12,13]

It is very reassuring that the main drive for decisions to initiate antimicrobial therapy is the patient's clinical condition (89%) and that was the same choice for the participants in the study held in KSA.[12]

One of the strengths of this study is that it included more than 50% of the doctors practicing in primary care in Bahrain. Using a well-structured validated questionnaire that has been used previously made it feasible to compare our results with the international literature. One of the major limitations in this study is the recall bias which could affect the accuracy of the responses from the participants.

CONCLUSION

Our study showed considerable unmet training and education needs for the doctors in the field of antimicrobial prescribing. Moreover, it appears that local guidelines should be established and to be more accessible to the primary care physicians to enhance their performance in prescribing antibiotics.

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