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Assessment of Nurses' Knowledge, Attitude, and Practices on Antibiotic Use and Resistance in Baghdad: A single-hospital study

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ABSTRACT

Background: There are so many evidences that there was antimicrobial resistance, and there were many strains that emerged which were difficult to treat. We are living in a situation that the dissemination of multiple drug resistant bacteria can lead us to the situation, in which no treatment could be offered for bacterial infection in future.
Aim of study: Assessment of nurses' knowledge, attitude, and practices on antibiotic use and resistance in Fatima Al Zahra hospital in Baghdad.
Subjects and Methods: A cross-sectional study. The study was carried on from 1st of February to 31st of March 2021. A questionnaire was constructed by the research team based on literature review and was adapted to assess the nurses' knowledge, attitude, and practices on antibiotic use and resistance in Fatima Al Zahra hospital. The adopted questions were mainly based on previous studies carried out in Lebanon, and Ethiopia. It was piloted among 10 nurses. The questionnaire was further revised by the research team. The final questionnaire contained 26 questions on the following: Demographics characteristics (5 questions), Knowledge of antibiotics (7 questions), Attitude towards antibiotic use (7 questions); and practice with regards to antibiotic use (7 questions). Analysis plan: IBM SPSS (Statistical Package for the Social Sciences) Statistics version 21 Multilingual and Microsoft Excel 2010 were used to analyze the data. The frequencies were stated first then Chi-Square test and Fisher's exact test were used to investigate the association. The p-value less than 0.05 were considered significant.
Results: One hundred and eight nurses participated in this study, of whom 101 (93.5%) were female, 31(28.7%) of participants at the age group of (18-27) years, 33(30.6%) were at the age group of (28-37) years, with mean age 26± 0.54 SD. Regarding the highest qualification, 41(38%) graduated from the high school of nursing, 35(32.4%) graduated from the midwife school. About 46(42.6%) of the participants were working in pediatric words, and 23(21.3%) were working in gynecology and obstetrics (Gyn & Obs) words. There was gap in the knowledge especially in nurses who had lowest qualification: 44(40%), of them believe that using antibiotic in cold can speed recovery and 41 (38%) believe that antibiotic can cure viral infections, and 42(38.9%), of them consider that newer and more costly antibiotics affect better.
Conclusion: There was a gap in nurse's knowledge, and practice, towards the antibiotic use and antibiotic resistance, the Current work place was the most effective factor in this gap.

Introduction

High numbers of infections are untreatable due to antimicrobial resistance (AMR). About 214 thousand newborns die every year from sepsis caused by bacteria resistant to current antibiotics. (1)

One of the major causes of women`s death following abortion and childbirth is, caused by bacteria resistant to current antibiotics. Antibiotic resistance may also be a serious problem when women have sexually transmitted infections (STI), especially gonorrhea, which may lead to pelvic inflammatory disease, causing chronic pain and discomfort, infertility, and ectopic pregnancies, and newborn blindness. "An estimated 3 million treatment failures due to resistant gonorrhea occur each year in the world and will lead to an additional cost of US$ 500 million". (2)

World health organization (WHO) leads the response to AMR over the past 20 years and its actions led to the development of the Global Action Plan on Antimicrobial Resistance (GAP-AMR) by the Sixty-eighth World Health Assembly in May 2015. (3)

In 2019, the WHO announced AMR as one of the top 10 global public health threats facing humanity in 2019. (4)

The cost of AMR to the economy is significant, in addition to death and disability, prolonged illness results in longer hospital stays, this lead for more expensive medicines and financial loads for those effected. (5)

The WHO reported that antibiotics contribute to, 17% of the substandard or falsified medicines consumed globally, and this will contributed to drug resistance. (6)

There are so many evidences that there was antimicrobial resistance, and there were many strains that emerged which were difficult to treat. (7-12)

Many studies demonstrated that, the most common cause of developing antimicrobial resistance is unscientific prescription and antibiotics misuse which leads to the failure of drug therapy, and prolonged the duration of therapy and leads multi-drug resistance bacteria. (13-17)

To deal with this threat doctors and all the medical staff should assess the problem and try to prevent the dissemination of multi resistant strains of bacteria, by the rational use of antibiotic and infection control methods. (18)

The control of AMR requires change in the antimicrobial prescribing behavior of health workers. Changes in antimicrobial prescribing patterns will need changes in physicians' behavior towards the magnitude of AMR problem. Nurses in hospitals play important role in prevention of transmissions of resistant bacteria and promoting awareness on AMR for patients and communities. Thus, information on physicians' and nurses' knowledge and belief on AMR will permit the development of more effective interventions on containment of AMR.(19)

Nurses are eager to participate in antibiotic surveillance. Efforts to engage nurses should address knowledge needs and consider the roles in which nurse-driven antibiotic surveillance occurs. (20)

In order to assess the future antimicrobial resistance outcome, it is very important; to assess the knowledge, attitude, and practice (KAP) of young nursing staffs as it was found very few studies which evaluate KAP on antimicrobial resistance among Nursing Staffs, this study was carried out to assess nurses` knowledge, attitude, and practice on antibiotic use and resistance in Fatima AL Zahra hospital.

Subjects and Method

A cross-sectional study was conducted from 1st of February to 31st of March 2021, by using a questionnaire that was structured by the research team based on literature review and was adapted to assess the nurses' knowledge, attitude, and practices on antibiotic use and resistance in Fatima Al Zahra hospital. The adopted questions were mainly based on previous studies carried out in Lebanon, and Ethiopia. (17, 21)

It was piloted among 10 nurses. The questionnaire was further revised by the research team. The final questionnaire contained 26 questions on the following: Demographics characteristics (5 questions), Knowledge of antibiotics (7 questions), attitude (7) and practice (7).

Regarding knowledge questions it contained 7 questions, assessed using correct, wrong and unsure responses, 3 scores was given for each correct answer and 2 scores for each unsure and 1 score for the wrong answer, the good Knowledge score was (15-21), for average Knowledge score (8-14) and for poor Knowledge score (1-7).

Attitude towards antibiotic use (7 questions), assessed using agree, disagree, and neutral responses, 3 scores was given for each correct answer and 2 scores for each neutral and 1 score for the wrong answer, so the positive score of attitude was 14-21, and for negative attitude score was 1-7, and for neutral score was 8-13. Practice with regards to antibiotic use (7 questions), Scoring and analysis of responses to the practice subscale assessed using strongly agree, agree, neutral, disagree and strongly disagree responses, score for strongly agree5, for agree 4, for neutral 3, for disagree 2, and for strongly disagree 1 if the answer was correct. The score for good practice was 24-35, for neutral score was 12-23, and (1-11) for bad practice. (22)

The knowledge questions and it`s correct answers were:

K1: (Yes) I heard of antibiotic resistance.
K2: (no) antibiotic can cure viral infections.
K3: (no) using antibiotic in cold can speed recovery.
K4: (Yes) antibiotics can cure bacterial infection.
K5: (Yes) newer and more costly antibiotics have no better affect.
K6: (no) antibiotics are effective in obstructed nose and headache.
K7: (Yes) Antibiotics effective in treating urinary tract infections.

The attitude question and it`s correct answer was:

A1: measures are needed to minimize antibiotic resistance (agree).
A2: there is a risk with irrational use of antibiotics at present (agree).
A3: antibiotic resistance can result from inappropriate use of antibiotics (agree).
A4: sensitivity test is a good option for assessing antibiotics resistance (agree).
A5: antibiotic isn`t safe drug and can't be commonly used (agree).
A6: the more antibiotics we use in society, the higher is the risk that resistance develops and spreads (agree).
A7: I can take antibiotics without seeing doctor (disagree).

The practice question and it`s correct answer was:

P1: I ask physician about sensitivity test for assessing antibiotic resistance before I use antibiotic (strongly agree).

P2: I don`t use antibiotic in lower than recommended dose because this can lead to antibiotic resistance (strongly agree).

P3: I use hand washing & vaccination, as important steps in prevention of AMR (strongly agree).

P4: I don`t buy the same antibiotics, if I am sick and they helped me get better when I had the same symptoms before (strongly agree).

P5: I consult a pharmacist about taking antibiotics (strongly agree).

P6: I believe that skipping one or two doses of antibiotics contribute to the development of antibiotic resistance (strongly agree).

P7: I don`t ask the doctor to prescribe antibiotic for the common cold (strongly agree).

The final questionnaire was translated to Arabic in order to facilitate the task to read and answer the questionnaire.

Sampling method: the hospital has 152 nurses at the morning shift, of these nurses 124 only who fulfilled the inclusion criteria, distributed in the various wards; pediatrics wards 46 nurses, Gyn & Obs ward 23, operation theater16, outpatient 21 nurses, delivery room 18 nurse. Those who completed the questionnaire were only 108.

The study team used a convenient sampling methodology to recruit participants for the KAP survey due to limitations of the resource. The sampling framework was subsequently stratified among the five groups, gynecology and obstetrics and pediatrics, operation theater, delivery room, and outpatient department.

All study participants were assured for privacy and informed that their names will not appear in the questionnaire. Participants were only identified by age, gender, marital status, and place of current work and participant names only used in the consent forms.

Inclusion criteria: all nursing stuff who was working on morning shift at any department of the Fatima Al Zahra hospital who agree to participate in the study.

Exclusion criteria: the nursing stuff on night shift.

Statistical analysis: The statistical analysis was performed using statistical package for social science (SPSS-21). The Chi-square and fisher's exact probability tests were used. A P value of ≤ 0.05 was considered significance and a 95% confidence interval was calculated for all odds ratio calculations.

Ethical approval was obtained from Al-Rusafa Health Directorate Scientific and Ethical Review Committee, Ministry of Health, Iraq.

Results

One hundred and eight nurses participated in this study, of whom 101 (93.5%) were female, 31(28.7%) of participants at the age group of (18-27) years, 33(30.6%) were at the age group of (28-37) years, with mean age 26± 0.54 SD. Regarding the highest qualification, 41(38%) graduated from the high school of nursing, 35(32.4%) graduated from the midwife school. About 46(42.6%) of the participants were working in pediatric words, and 23(21.3%) were working in gynecology and obstetrics (Gyn & Obs) words. Thirty-three participants (30.6%) had 1-5 years of Work experience. Regarding the Marital status of the participants 68(63%) of them were married. table 1.

Table 1: Demographics Characteristics of the participants

		Frequency	Percent
Age group(years)	18-27	31	28.7
	28-37	33	30.6
	38-47	25	23.1
	> 47	19	17.6
Gender	Male	7	6.5
	Female	101	93.5
Highest qualification	High school of nursing	41	38.0
	High school of midwife	35	32.4
	High institute of health	25	23.1
	College of nursing	7	6.5
Current work place	Pediatric	46	42.6
	Obs. & Gyn.	23	21.3
	Outpatient	13	12.0
	Delivery ward	19	17.6
	Operation room	7	6.5
Work experience (years)	1-5	33	30.6
	6-10	31	28.7
	11-15	16	14.8
	>15	28	25.9
Marital status	Married	68	63.0
	Unmarried	30	27.8
	Widow	6	5.6
	Divorced	4	3.7
Total		108	100.0

Regarding the knowledge questions the responses were as following:

Most of participants 98(90.7%), heard of antibiotics resistance, and 92(85.1%) of them consider antibiotics can cure bacterial infection, and 94(87%) know that antibiotics effective in treating urinary tract infections, but there was a gap in the knowledge especially in nurses who had lowest qualification: 44(40%), of them believe that using antibiotic in cold can speed recovery, and 41 (38%) believe that antibiotic can cure viral infections, and 42(38.9%),of them consider that newer and more costly antibiotics affect better. Table 2.

The attitude questions responses were:

The nursing stuff attitude towards antibiotic use and resistance, it was positive attitude since most of them agree that there is a misuse of antibiotics at present, and 66.7% of the participants agree that they should ask a doctor before using antibiotics. Most of the participants agree that the more antibiotics we use in society, the higher is the risk that resistance develops and spreads, and that antibiotic isn`t safe drug and can't be commonly used. Table 2.

Table 2: frequency and percentages of participant`s responses to the knowledge, attitude, and practice questions

	Knowledge(k) , attitude(A) and practice(P) question													
Answer	K1		K2		K3		K4		K5		K6		K7	
	NO.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
yes	98	90.7	57	52.8	62	57.4	92	85.2	54	50	25	23.1	94	87
no	4	3.7	41	38	44	40.7	9	8.3	42	38.9	72	66.7	11	10.2
do not know	6	5.6	10	9.3	2	1.9	7	6.5	12	11.1	11	10.2	3	2.8
	A1		A2		A3		A4		A5		A6		A7	
	NO.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Disagree	11	10.2	9	8.3	7	6.5	14	13	24	22.2	25	23.1	72	66.7
Neutral	18	16.7	14	13	20	18.5	15	13.9	9	8.3	12	11.1	14	13
Agree	79	73.1	85	78.7	81	75	79	73.1	75	69.4	71	65.7	22	20.4
	P1		P2		P3		P4		P5		P6		P7	
	NO.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Strongly disagree	2	1.9	2	1.9	1	.9	2	1.9	2	1.9	2	1.9	2	1.9
disagree	17	15.7	30	27.8	2	1.9	28	25.9	29	26.9	31	28.7	53	49.1
Neutral	11	10.2	24	22.2	2	1.9	3	2.8	3	2.8	22	20.4	7	6.5
agree	74	68.5	48	44.4	95	88	71	65.7	70	64.8	49	45.4	42	38.9
Strongly agree	4	3.7	4	3.7	8	7.4	4	3.7	4	3.7	4	3.7	4	3.7

The practice questions responses:

Regarding Practice the current study found that 30(27.8%) of the participants agree that antibiotic use in lower than recommended can't cause antibiotic resistance and 31(28.7%), of them believe that skipping one or two doses of antibiotics can`t contribute to the development of antibiotic resistance and 22(20.4%) were unsure about the answer. Table 2.

Table 3: the association of knowledge score to some sociodemographic characteristics

		Level knowledge						P
		Good		Average		Poor		
		Count	%	Count	%	Count	%	value
Age group(years)	18-27	11	35.5	14	45.2	6	19.4	.763
	28-37	10	30.3	14	42.4	9	27.3	
	38-47	7	28	10	40	8	32.0	
	> 47	3	15.8	11	57.9	5	26.3	
Gender	Male	3	42.9	4	57.1	0	0	.313
	Female	28	27.7	45	44.6	28	27.7	
highest qualification	high school of nursing	9	22	20	48.8	12	29.3	.160
	high school of midwife	11	31.4	12	34.3	12	34.3	
	high institute of health	8	32.0	15	60	2	8	
	college of nursing	3	42.9	2	28.6	2	28.6	
current work place	pediatric	16	34.8	23	50.0	7	15.2	.001
	obs & gyn	0	0	12	52.2	11	47.8	
	outpatient	6	46.2	4	30.8	3	23.1	
	delivery ward	4	21.1	9	47.4	6	31.6	
	operation room	5	71.4	1	14.3	1	14.3	
work experience year	1-5	13	39.4	14	42.4	6	18.2	.640
	6-10	8	25.8	16	51.6	7	22.6	
	11-15	4	25	7	43.8	5	31.3	
	>15	6	21.4	12	42.9	10	35.7	
marital status	married	19	27.9	31	45.6	18	26.5	.891
	unmarried	9	30.0	15	50.0	6	20	
	widow	2	33.3	2	33.3	2	33.3	
	divorced	1	25	1	25.0	2	50.0	

The current study found that current work place has significant statistical association to knowledge of the nursing stuff, but there were no significant statistical association between knowledge and nurse's gender, age, qualification, experience or the Marital status. Table3.

It was shown that participants' attitude towards antibiotic use was not statistically associated with gender, age, qualification, current work, experience nor the Marital status. Table 4.

Table 4: the association of attitude scores to some sociodemographic characteristics

demographic variables		Negative attitude, count		Positive attitude,		P value
		count	&%	count	&%	
Age group(years)	18-27	3	9.7	28	90.3	1.000
	28-37	3	9.1	30	90.9	
	38-47	3	12.0	22	88.0	
	> 47	2	10.5	17	89.5	
Gender	Male	0	0.0%	7	100	0.356
	Female	11	10.9%	90	89.1	
highest qualification	high school of nursing	5	12.2	36	87.8	.559
	high school of midwife	5	14.3	30	85.7	
	high institute of health	1	4.0	24	96.0	
	college of nursing	0	0.0	7	100	
current work place	pediatric	4	8.7	42	91.3	.282
	obs & gyn	2	8.7	21	91.3	
	outpatient	0	0.0	13	100.0	
	delivery ward	3	15.8	16	84.2	
	operation room	2	28.6	5	71.4	
work experience (years)	1-5	1	3.0	32	97.0	.313
	6-10	5	16.1	26	83.9	
	11-15	2	12.5	14	87.5	
	>15	3	10.7	25	89.3	
marital status	married	6	8.8	62	91.2	.649
	unmarried	4	13.3	26	86.7	
	widow	1	16.7	5	83.3	
	divorced	0	0.	4	100	

Current study shows that participants' practice towards antibiotic use was not statistically associated with gender, age, qualification, experience or the marital status, but current work place has significant statistical association to practice of the nursing stuff. Table (5).

Table 5: the association of attitude scores to some sociodemographic characteristics

demographic variables		Good practice		Bad practice		P value
		Count	%	Count	%	
Age group (years)	18-27	14	45.2	17	54.8	.533
	28-37	10	30.3	23	69.7	
	38-47	11	44.0	14	56.0	
	> 47	6	31.6	13	68.4	
Gender	Male	3	42.9	4	57.1	1.000
	Female	38	37.6	63	62.4	
highest qualification	high school of nursing	13	31.7	28	68.3	.395
	high school of midwife	13	37.1	22	62.9	
	high institute of health	13	52.0	12	48.0	

demographic variables		Good practice		Bad practice		
current work place	college of nursing	2	28.6	5	71.4	.032
	pediatric	18	39.1	28	60.9	
	obs & gyn	3	13.0	20	87.0	
	outpatient	6	46.2	7	53.8	
	delivery ward	11	57.9	8	42.1	
	operation room	3	42.9	4	57.1	
work experience (years)	1-5	12	36.4	21	63.6	.792
	6-10	14	45.2	17	54.8	
	11-15	6	37.5	10	62.5	
	>15	9	32.1	19	67.9	
marital status	married	25	36.8	43	63.2	.618
	unmarried	13	43.3	17	56.7	
	widow	1	16.7	5	83.3	
	divorced	2	50.0	2	50.0	

Discussion

There are so many evidences that there was antimicrobial resistance, and there were many strains that emerged which were difficult to treat. We are living in a situation that the dissemination of multiple drug resistant bacteria can lead us to the situation, in which no treatment could be offered for bacterial infection in future. The overuse of antibiotics in the outpatient sectors and during hospitalization is expected to increase the bacterial antibiotic resistance.

The study surveyed nursing stuffs in Fatima Al Zahra hospital, to assess their knowledge, attitude, and practice towards antibiotic use in the form of questionnaires.

More than one third of studied hospital nursing stuffs believed that antibiotics can speed up recovery of common cold & cough, and 37.9% of them believed that antibiotics can cure illnesses caused by viral infections. This may lead to miss prescription of antibiotic for treating common cold and other viral disease like diarrhea due to Rota virus. Our results are harmonious with other studies when Huang Y, et al, found that 43.4% of nurse student think that antibiotics can cure illnesses caused by viral infections & 23.3% of them believe that antibiotics can speed up recovery of common cold & cough,. (11-13)

Half of the participants may use antibiotic in low dose and they think it can`t cause antibiotic resistance, also they agree that skipping one or two doses of antibiotics doesn't contribute to the development of antibiotic resistance, these two mistakes can cause bacterial antibiotic resistance, (1,23), these results were also reached by other studies, when Kulkarni P, et al, found that about 40% of the participants (among interns in a teaching tertiary care hospital)were either agree or unsure that skipping one or two doses of antibiotics doesn't contribute to the development of antibiotic resistance, and when Bharti RK, et al, found that 36.2% of the nurses agree that Skipping one or two doses does not contribute to the development of antibiotic resistance, (12, 24).

The current study found that more than three quarter of the participants know that antibiotics can cure bacterial infection, which is comparable to 88% in a study conducted by Marzan M, et al, in Bangladesh , (25), and higher than the proportion (73%) reported in Qatar (26).

Most of participants 98(90.7%), heard of antibiotics resistance, this result was reached by other studies, Jayaweerasingham M, (27), but it was higher than result found by other when Dönmez S, et al, found that 66.5% of participants have previously heard of antibiotic resistance; in Turkey. (28)

In the current study it was found that more than two thirds of the participants asked the doctors and do antibiotic sensitivity test before use of antibiotic which was higher than the result of another study when, Jayaweerasingham M, et al, found that (58.3%) among a group of trainee nurses in Sri Lanka stated that "they always consult a doctor before starting antibiotics". (27)

Half of the participants in the current study, think that newer and more costly antibiotics have no better affect; this was lower than results of when Huang Y, et al, found that 72.4% of the nurses think that the "efficacy is not better if the antibiotics are newer and more costly".(11)

The current study shows that more than half of participants ask the doctor to prescribe antibiotic for the common cold this result was higher than other study when they found that one third of the participants "Ask doctor to prescribe antibiotics for common cold".(13)

This study found that more than two thirds of participants don`t use antibiotic to treat headache, this was also inconsistent with other study when they found that two thirds of participants will "Use antibiotics for obstructed nose with headache). (13).

Conclusion

There was a gap in nurse's knowledge, and practice, towards the antibiotic use and antibiotic resistance, the Current work place was the most effective factor in this gap.

Recommendations

1. Establishment of a course on rational use of antibiotics at the nursing and midwife schools.
2. There should be a focus on the antibiotic usage and prescription practice introduction of nursing stuff in their curriculum, and on the antibiotic knowledge education for nursing stuff.

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