

Evaluation of Pharmacists' Knowledge on Antibiotic Use in Kidney Failure in Rada'a, Yemen

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Abstract

Background: Kidney failure is an important health problem that affects millions of people around the world. Chronic renal failure (CRF) represents kidney damage resulting from early- to end-stage renal disease (ESRD) and is a major public health condition worldwide, Among the treatments used are antibiotics. Antibiotics are vital medicines used to fight and treat bacterial infections. Although these medications are effective in treating infections, their improper use can lead to serious health problems, including increased drug resistance. Community pharmacies play a crucial role in providing antibiotics and guiding patients on their safe and appropriate use

Aim: This research seeks to assess pharmacists' understanding of antibiotic usage in patients with kidney failure in Rada'a Town.

Methods: A cross-sectional study design was utilized in community pharmacies situated in Rada'a Town. A convenience sample consisting of 68 pharmacists was chosen. Data collection was conducted through a structured closed questionnaire, which was later analyzed using SPSS software.

Results: The participant group was predominantly male (86.8%), with 47.1% of respondents being under 25 years old. Most participants (47.1%) had between 1 to 5 years of professional experience, and 64.7% held a diploma. The pharmacists exhibited a commendable level of knowledge regarding chronic kidney disease (84.1%) and awareness of the condition itself (71.3%). Amoxicillin was found to be the most frequently prescribed antibiotic deemed safe (72.1%), while Vancomycin was recognized as the most commonly prescribed antibiotic considered unsafe (60.3%).

Conclusion: The findings show a moderate awareness of chronic kidney disease among pharmacists in Rada'a Town. While Amoxicillin is commonly prescribed as a safe antibiotic, Vancomycin is seen as unsafe. Many pharmacists showed uncertainty about various antibiotics, indicating a need for better education. Overall, awareness is adequate, but significant improvements are necessary.

Keywords: Chronic Kidney Disease, Antibiotic Safety, Awareness, Pharmacy Practice, Patient Care.

1.1 Introduction:

Kidney failure is an important health problem that affects millions of people around the world. Chronic renal failure (CRF) represents kidney damage resulting from early- to end-stage renal disease (ESRD) and is a major public health condition worldwide. The estimated global prevalence of patients with CRF ranges between 11% and 13%, while the global prevalence of patients with ESRD is 0.1% (Zahraa S and ihsan S., 2022).

Kidney failure occurs when the kidneys lose the ability to effectively filter toxins and waste from the blood. Chronic diseases such as high blood pressure, diabetes, and heart disease are among the most prominent causes that lead to kidney failure. Kidney failure requires extensive medical intervention, as the global prevalence of CRF patients is increasing, and although more caution is usually taken when caring for these patients, patients with stage 1 to 5 CRF, as well as dialysis patients, remain at high risk for infection (Harita R Patel. *et al.*,2004).

Among the treatments used are antibiotics. Antibiotics are vital medicines used to fight and treat bacterial infections. Although these medications are effective in treating infections, their improper use can lead to serious health problems, including increased drug resistance. Community pharmacies play a crucial role in providing antibiotics and guiding patients on their safe and appropriate use (Sai-Ping Jiang. *et al.*, 2014).

The success of antibiotic use in kidney failure depends on the knowledge, attitudes and practices of community pharmacists. Pharmacists should be aware of appropriate antibiotics for patients with renal failure, appropriate doses and potential drug interactions (Lyne L., *et al.*, 2008).

The quality of knowledge, attitudes and practices of community pharmacists in this

context aims to promote appropriate health care for patients with renal failure and reduce potential problems associated with the use of antibiotics (Lolwa A., *et al.*,2021).

Pharmacists can provide advice to patients on the proper use of antibiotics, explain potential side effects and drug interactions, and adjust dosing and timing. The quality of community pharmacists' knowledge, attitudes, and practices about the use of antibiotics for patients with kidney failure, leads to receiving correct drug care and appropriate advice on the safe and effective use of antibiotics for patients with kidney failure (Pooja V., *et al.*,2022).

1.1. Problem of the statement:

The problem of this study lies in the potential gap in knowledge and practices among pharmacists in Rada'a, which may adversely affect the quality of healthcare provided to patients. This research aims to assess the level of pharmacists' awareness concerning antibiotic use in kidney failure, focusing on identifying factors that influence this awareness, such as educational background and clinical experience.

1.2. Objectives of the Statement

Assess pharmacists' awareness and practices regarding the use of antibiotics in patients with kidney failure in Rada'a Town.

2. Methods & Materials

Study Design:

A descriptive cross-sectional study design was conducted to assess the awareness of pharmacists of antibiotics used in kidney failure in Rada'a Town.

Population:

The population of the study was all the pharmacists in community pharmacies of Rada'a Town.

Sampling: Convenience sampling of 68 pharmacists.

Table (1) Frequency Distribution of variable					
		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	male	59	86.8	93.7	93.7
	female	4	5.9	6.3	100.0
Age	Less than 25	32	47.1	47.8	47.8
	26 to 40	30	44.1	44.8	92.5
	More than 40	5	7.4	7.5	100.0
Years of experience	Less than 1 years	12	17.6	18.8	18.8
	1 to 5 years	32	47.1	50.0	68.8
	6 to 10 years	11	16.2	17.2	85.9
	More than 10 years	9	13.2	14.1	100.0
Education level	Diploma	44	64.7	65.7	65.7
	Bachelor's	23	33.8	34.3	100.0
CPC	Yes	52	76.5	81.3	81.3
	No	12	17.6	18.8	100.0

Data Collection Tool:

Questionnaire on sociodemographics and antibiotic awareness.

Ethical Consideration:

Official approval was obtained from Al-Baydha University for study conduct.

3. Results

Table 1: There were (86.8%) male and (5.9) female pharmacists out of them (64.7%) have diploma and (33.8%) have bachelor's

degree. The percentage of pharmacists who are less than 25 years is (47.1%), those who are 26 to 40 is (44.1%), and those who are more than 40 is (7.4%). The percentage of years of experience of pharmacists who are less than one year is (17.6%) , those who are from one year to less than 5 years is (47.1%) those who are from 6 to 10 years is (16.2%), those who are more than 10 years is (13.2%) and those from 15 years and more is (0.00%) .

Table (2) Frequency Distribution of answer Information about chronic kidney disease					
		Frequency	Percent	Valid Percent	CumulativePercent
Does severe dehydration cause kidney failure?	Wrong answer	1	1.5%	1.5	1.5
	Correct answer	66	97.1%	98.5	100.0
Do you advise kidney failure patients to drink plenty of fluids?	Wrong answer	39	57.4%	59.1	59.1
	Correct answer	27	39.7%	40.9	100.0
Do you notice the spread of infectious diseases in kidney failure patients?	Wrong answer	33	48.5%	49.3	49.3
	Correct answer	34	50%	50.7	100.0
Do all medications cause kidney failure?	Wrong answer	4	5.9%	5.9	5.9
	Correct answer	64	94.1%	94.1	100.0
Correct answer = 71.3%		Wrong answer =28.7%			

Table 2: The findings reveal that 66 pharmacists (97.1%) understand the link between severe dehydration and kidney failure, while only 1 (1.5%) does not. Regarding fluid intake advice for kidney failure patients, 27 (39.7%) gave correct guidance, and 39 (57.4%) did not. About the spread of infectious diseases,

33 (48.5%) observed it, while 34 (50.0%) did not, with 1 (1.5%) not responding. Finally, 64 pharmacists (94.1%) acknowledged that not all medications cause kidney failure, with 4 (5.9%) indicating otherwise. These results highlight areas needing further education in kidney care.

Table (3) Frequency Distribution of General information about chronic kidney failure

		Frequency	Percent	Valid Percent	Cumulative Percent
Chronic kidney failure affects kidney function in disposing of waste and toxins from the body	Wrong answer	1	1.5	1.5	1.5
	Correct answer	66	97.1	98.5	100.0
Some antibiotics are extensively metabolized in the kidneys.	Wrong answer	7	10.3	11.5	11.5
	Correct answer	54	79.4	88.5	100.0
Is there importance in adjusting antibiotic doses according to kidney function in patients suffering from kidney failure?	Wrong answer	4	5.9	6.1	6.1
	Correct answer	62	91.2	93.9	100.0
Do you know antibiotics that can be safely used in cases of kidney failure?	Wrong answer	4	5.9	6.3	6.3
	Correct answer	59	86.8	93.7	100.0
Do you know how to adjust the antibiotic dose according to kidney function in patients suffering from kidney failure?	Wrong answer	33	48.5	50.0	50.0
	Correct answer	33	48.5	50.0	100.0
Do you know the common side effects of using antibiotics in cases of kidney failure?	Wrong answer	10	14.7	15.9	15.9
	Correct answer	53	77.9	84.1	100.0
Do you know the precautions and therapeutic guidelines specific to antibiotic use recommendations in kidney failure?	Wrong answer	12	17.6	19.0	19.0
	Correct answer	51	75.0	81.0	100.0
Do you provide guidance to patients suffering from kidney failure regarding antibiotic use?	Wrong answer	11	16.2	16.7	16.7
	Correct answer	55	80.9	83.3	100.0
Total	Wrong answer	15.9%			
	Correct answer	84.1%			

Table 3: show The results indicate that participants have a strong grasp of the link between antibiotics and kidney function. Specifically, 97% (66 participants) correctly identified the impact of kidney failure on toxin elimination, while 79.4% (54 participants) recognized that some antibiotics are metabolized in the kidneys. Additionally,

91.2% (62 participants) understood the importance of adjusting antibiotic doses based on kidney function. Knowledge about safe antibiotics for individuals with kidney failure was correct for 86.8% (59 participants), while awareness of common antibiotic side effects in this context was noted by 77.9% (53 participants). Finally, 75% (51

participants) understood precautions for provided guidance to patients regarding antibiotic use, and 80.9% (55 participants) antibiotics.

Table 4: shows safe and unsafe drugs for chronic kidney failure

antibiotics	Answer	Percent	antibiotics	answer	Percent	antibiotics	Answer	Percent
Amoxicillin	Safe	72.1	Cefpodoxime	Safe	25	Clarithromycin	Safe	36.8
	Unsafe	17.6		Unsafe	50		Unsafe	32.4
	I don't know	7.4		I don't know	22.1		I don't know	27.9
Amoxicillin	Safe	63.2	Cefepime	Safe	25	Spiramycin	Safe	20.6
	Unsafe	22.1		Unsafe	47.1		Unsafe	47.1
	I don't know	11.8		I don't know	25		I don't know	27.9
Amoxicillin Clavulanate	Safe	48.5	Imipenem Cilastatin	Safe	19.1	Doxycycline	Safe	38.2
	Unsafe	38.2		Unsafe	52.9		Unsafe	38.2
	I don't know	8.8		I don't know	25		I don't know	20.6
Benzathine Penicillin G	Safe	48.5	Fosfomycin	Safe	25	Metronidazole	Safe	44.1
	Unsafe	29.4		Unsafe	42.6		Unsafe	33.8
	I don't know	19.1		I don't know	29.4		I don't know	19.1
Cefadroxil	Safe	33.8	Nitrofurantoin	Safe	14.7	Clindamycin	Safe	36.8
	Unsafe	48.5		Unsafe	44.1		Unsafe	39.7
	I don't know	14.7		I don't know	36.8		I don't know	20.6
Cefazolin	Safe	33.8	Gentamicin	Safe	22.1	Ciprofloxacin	Safe	42.6
	Unsafe	47.1		Unsafe	51.5		Unsafe	35.3
	I don't know	16.2		I don't know	23.5		I don't know	19.1
Cefuroxime	Safe	41.2	Amikacin	Safe	19.1	Levofloxacin	Safe	42.6
	Unsafe	44.1		Unsafe	51.5		Unsafe	35.3
	I don't know	11.8		I don't know	26.5		I don't know	19.1
Cefoxitin	Safe	32.4	Tobramycin	Safe	26.5	Moxifloxacin	Safe	42.6
	Unsafe	47.1		Unsafe	48.5		Unsafe	32.4
	I don't know	17.6		I don't know	22.1		I don't know	22.1
Ceftriaxone	Safe	50	Erythromycin	Safe	27.9	Co Trimoxazole	Safe	13.2
	Unsafe	38.2		Unsafe	45.6		Unsafe	54.4
	I don't know	7.4		I don't know	23.5		I don't know	29.4
Cefotaxime	Safe	42.6	Azithromycin	Safe	48.5	Vancomycin	Safe	10.3
	Unsafe	44.1		Unsafe	33.8		Unsafe	60.3
	I don't know	10.3		I don't know	14.7		I don't know	26.5

Table 4: show Is based on the survey results. It is found that the most commonly prescribed safe antibiotic by pharmacists was Amoxicillin (72.1%) followed by Ampicillin (63.2%) and ceftriaxone (50%). On the other

hand, the most commonly prescribed unsafe antibiotic by pharmacists was Vancomycin (60.3%) followed by Co-Trimoxazole (54.4%) and Imipenem Cilastatin (52.9%).

Table 5: independent samples test of gender1

Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Result of the first axis	Male	59	2.7797	.72082	.09384
	Female	4	2.5000	1.29099	.64550

Result of the second axis	Male	58	6.4655	1.58076	.20756
	Female	4	6.0000	1.41421	.70711
Result of the third axis	Male	58	13.5172	5.04103	.66192
	Female	4	16.5000	1.91485	.95743
Total	Male	59	22.4237	6.33872	.82523
	Female	4	25.0000	2.30940	1.15470

Table 5 shows the results of a questionnaire that was conducted on two groups of pharmacists, males and females, to measure their awareness of antibiotics in three axes.

Table 6: independent samples test of gender2				
Independent Samples Test				
		t-test for Equality of Means		
		df	Sig. (2-tailed)	Mean Difference
Result first axis	Equal variances assumed	61	.478	.27966
	Equal variances not assumed	3.128	.696	.27966
Result second axis	Equal variances assumed	60	.569	.46552
	Equal variances not assumed	3.538	.566	.46552
Result third axis	Equal variances assumed	60	.247	-2.98276
	Equal variances not assumed	6.475	.040	-2.98276
Total	Equal variances assumed	61	.425	-2.57627
	Equal variances not assumed	6.756	.114	-2.57627

Table 6: shows the results of an independent samples test on pharmacists' awareness of safe and prohibited antibiotics for kidney failure patients. The p-values for the first axis are 0.478 (equal variances) and 0.696 (unequal), with a mean difference of 0.27966. For the second axis, the p-values are 0.569 and 0.566, with a mean difference of 0.46552. The

third axis shows a p-value of 0.247 (equal variances) and 0.040 (unequal) with a mean difference of -2.98276. Overall, the p-values are 0.425 and 0.566, and the mean difference is -2.57627. The results indicate no significant differences in awareness, except for the third axis, highlighting the need for targeted educational interventions.

Table 7: independent samples test of education level				
Independent Samples Test				
		Levene's Test for Equality of Variances		t-test for Equality of Means
		F	P-value	.t
Result first axis	Equal variances assumed	.884	.351	.853
	Equal variances not assumed			.823
Result	Equal variances assumed	.593	.444	-1.062

second axis	Equal variances not assumed			-1.162
Result third axis	Equal variances assumed	2.052	.157	-1.247
	Equal variances not assumed			-1.358
Total	Equal variances assumed	8.397	.005	-1.589
	Equal variances not assumed			-1.899

Table 7: The t-test analysis evaluated antibiotic awareness among two groups of pharmacists (bachelor's and diploma holders) in relation to kidney failure across four categories.

In Axis 1, focusing on patients with kidney failure, the p-value was 0.351, indicating no significant difference. Axis 2, which assessed general kidney failure information, had a p-value of 0.444, also showing no significant difference. Axis 3, regarding antibiotic use in kidney failure, yielded a p-value of 0.157, confirming no significant difference as well.

In contrast, Axis 4, which evaluated overall antibiotic awareness, revealed a p-value of 0.005, indicating a significant difference between the two pharmacist groups. These findings underscore the need for targeted educational interventions to enhance antibiotic awareness among pharmacists.

Discussion of the Results

The first finding of this study shows that the majority of sample were males (86.8%). This finding is in line with (Syed A, et al, 2020) and (Yuki K, et al, 2014), who stated that the majority of sample were males (55% and 51.3%; respectively). The finding is not in line with the finding of (Daniela M, et al, 2020) and (Lolwa A, et al, 2015), who stated that the majority of sample were females (78.5% and 62.1%; respectively).

The second finding of this study shows that the majority of sample were <25 (47.1%). This finding is in line with (Syed A, et al,

2020) and (Daniela M, et al, 2020), who stated that the majority of sample were <25 (42% and 60.1%; respectively). The finding is not in line with the finding of (Lolwa A, et al, 2015), who stated that the majority of sample were >25 (60.6%).

The third finding of this study shows that the majority of sample's years of experience were 1-5 year (47.1%). This finding is in line with (Syed A, et al, 2020) and (Lolwa A, et al, 2015), who stated that the majority of sample's years of experience were 1-5 y (46% and 60%; respectively). The finding is not in line with the finding of (Daniela M, et al, 2020) and (Yuki K, et al, 2014), who stated that the majority of sample's years of experience were 5-10 y (50.2% and 40.3%; respectively).

The fourth finding of this study shows that the majority of sample had diploma (64.7%). This finding is in line with (Syed A, et al, 2020) and (Yuki K, et al, 2014), who stated that the majority of sample have diploma (55.6% and 59.4%; respectively). The finding is not in line with the finding of (Daniela M, et al, 2020) and (Lolwa A, et al, 2015), who stated that the majority of sample have Bachelor's degree (84.5% and 54.4%; respectively).

The fifth finding of this study shows that the information about chronic kidney disease were good (84.1%). This is due to their education at university and reading about kidney diseases and their medications because they are widespread. This finding is in line with

(Syed A, et al, 2020) and (Daniela M, et al, 2020), who stated that the information about chronic kidney disease were good (79.8% and 76%; respectively). The finding is not in line with the finding of (Yuki K, et al, 2014), who stated that the information about chronic kidney disease were poor (35.2%). This is due to their poor education at university and their lack of reading about kidney diseases and their medications.

The sixth of this study shows that the awareness about chronic kidney disease was good (71.3%), This is due to the spread of kidney disease and their increasing demand for medicines, especially antibiotics. This finding is in line with (Daniela M, et al, 2020), who stated that the awareness about chronic kidney disease was good (80.4%). This is due to the spread of kidney disease and their increasing demand for medicines, especially antibiotics. The finding is not in line with the finding of (Yuki K, et al, 2014), who stated that the awareness about chronic kidney disease was poor (49.2%) due to lack of interest in ordering and dispensing medications according to the prescription or the patient's request.

It is found that the most commonly prescribed safe antibiotic by pharmacists was Amoxicillin (72.1%). This finding is similar to those of (Lolwa A, et al, 2015) who found that the most commonly prescribed safe antibiotic by pharmacists was Amoxicillin (80%). The finding is different from the finding of (Syed A, et al, 2020) who found that the most commonly prescribed safe antibiotic by pharmacists was Ceftriaxone (71.4%).

It is found that the most commonly prescribed unsafe antibiotic by pharmacists was Vancomycin (60.3%). This finding is similar to those of (Yuki K, et al, 2014) who found that the unsafe antibiotic by pharmacists was Vancomycin (76%). The finding is different from the finding of (Lolwa A, et al, 2015) who

found that the unsafe antibiotic by pharmacists was Ciprofloxacin (91.7%).

Conclusion

The survey indicated a strong awareness of chronic kidney disease among pharmacists. Amoxicillin emerged as the most frequently prescribed safe antibiotic, whereas Vancomycin was identified as the most commonly prescribed unsafe antibiotic. Nonetheless, there are knowledge gaps pertaining to specific medications, suggesting a moderate level of overall awareness. Continuous training is crucial to enhance pharmacists' understanding and guarantee optimal pharmaceutical care for patients.

Recommendations

Pharmacists are advised to participate in continuous professional development programs focused on antibiotics and their effects on patients with kidney failure. Additionally, a comprehensive guide outlining the properties and safety of these medications should be created and made available in all pharmacies.

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