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ORIGINAL ARTICLE

Knowledge and Attitude of Iraqi Pharmacists Regarding the Adverse Effects of NSAIDs Based on Years of Experience

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ABSTRACT

Objectives: Informing patients about the adverse effects of non-steroidal anti-inflammatory drugs (NSAIDs) is essential to ensure their safe use. The aim of this study was to determine whether the years of experience of Iraqi pharmacists affect their knowledge of the renal and gastrointestinal adverse effects of NSAIDs, and their attitudes toward informing patients about drug safety.

Materials and Methods: An online cross-sectional survey was conducted between January and October 2023. A convenience sample of Iraqi pharmacists working in hospitals and/or community pharmacies answered a validated questions about demographics, knowledge, and attitudes regarding the adverse effects of NSAIDs.

Results: Of the 309 Iraqi pharmacists who participated, 46% had less than four years of experience. Eighty-five percent had good knowledge of the adverse effects of NSAIDs. Specifically, 83% of participants with good knowledge and ≥4 years of experience were younger than 35 years (p=0.008). Among participants with good knowledge and <4 years of experience, 93% had a bachelor's degree (p=0.008), and 57% worked from six to more than ten hours per day (p=0.045). The dispensing patterns of NSAIDs showed a highly significant association (p<0.001) with participant knowledge regardless of years of experience. Negative attitudes were reported more frequently among pharmacists with fewer years of experience than those with longer years of experience (73% vs. 71%, respectively; p>0.05). Sixty percent of the participants agreed that education about adverse drug reactions (ADRs) increases anxiety and medication nonadherence. Seventy-eight percent agreed that pharmacists and physicians could improve patients' knowledge of ADRs. Pharmacists believed that leaflets reduce patients' medication adherence (57%) but help patients improve their medication knowledge (51%; p<0.05) and monitor and report ADRs (56%; p<0.05).

Conclusion: Despite years of experience, good knowledge and negative attitudes were found regarding safety information for NSAIDs. Pharmacists and physicians play an important role in ensuring appropriate drug use. Leaflets serve as a source of information, but they can also lead to medication nonadherence.

Keywords: Adverse drug reaction, Iraq, medication adherence, NSAIDs, pharmacist

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INTRODUCTION

Non-steroidal anti-inflammatory drugs (NSAIDs), antiplatelets, diuretics, and anticoagulants are four medication classes that contribute to potentially avoidable drug-related hospitalizations.[1] NSAIDs are anti-inflammatory, analgesic, and antipyretic agents commonly used to treat conditions such as arthritis, premenstrual syndrome, headache, and gout.[2-4] Aspirin, an antiplatelet agent, is one of the NSAIDs that is frequently recommended for primary and secondary prophylaxis against ischemic stroke and cardiovascular events.[3] NSAIDs comprise approximately 5-10% of all medications prescribed annually. They are used either alone or in combination with other drugs.[4,5]

The awareness of patients regarding the risks of NSAIDs is lower than expected, which may be due to the ease of their purchase as over-the-counter (OTC) medicines.[6] The drugs are obtained either from a community pharmacy or from other sources, such as supermarkets or websites.[6,7] Thus, pharmacists play a role in ensuring patient safety as part of their job responsibilities.[8] The Beers Criteria of the American Geriatric Society, updated in 2023,[9] strongly recommend avoiding the chronic use of non-selective cyclooxygenase-2 inhibitors and high-dose aspirin for high-risk patients aged >75 years and those on anticoagulants, corticosteroids, and antiplatelet agents. NSAID use increases the risk of gastrointestinal bleeding or peptic ulcer disease; approximately 2-4% of patients experience these issues after 1 year of treatment.[9] Treatment with these drugs can also cause renal vasoconstriction, resulting in decreased renal perfusion and abnormal renal function.[5] In the early stages of treatment, non-aspirin NSAIDs can have adverse cardiovascular effects, and the risk of adverse effects may increase as the treatment progresses. The approximate risk increase ranged from 10% to ≥50%, depending on the drugs and doses studied.[2] These effects include hypertension, myocardial infarction, stroke, and heart failure.[10] Elderly patients (>65 years) with comorbidities such as hypertension, heart disease, diabetes, gastrointestinal, and renal problems may have an increased risk of adverse drug reactions (ADRs) from using NSAIDs.[5,6,11,12] Additionally, polypharmacy use with the risk of drug interactions and the type, duration, and dose of NSAIDs are considered risk factors for NSAID-related ADRs.[5,6,10,13] Alcohol consumption and smoking status may also increase the risk of adverse effects, particularly cardiovascular and gastrointestinal adverse effects.[12]

Adverse drug events (ADEs), including ADRs, are any unintended, adverse medical events or harm following medical intervention unrelated to a patient's medical condition. ADEs can occur even without any errors during prescription, dispensing, or taking the medication.[14] These events are the fifth leading cause of mortality among hospitalized patients.[15] Hussain et al.,[16] found that healthcare professionals (HCPs) in Baghdad, Iraq had a positive attitude toward reporting ADRs, but their knowledge of these reactions remains inadequate. The unavailability of reporting forms was the main reason that discouraged HCPs from reporting and detecting ADRs.[16] Most pharmacists were reported to be inexperienced by the Iraqi Pharmacovigilance Center (IqPhvc).[17]

Since 2010, this center has been a member of the World Health Organization International Monitoring Program of Drugs and is part of the Pharmacy Department of the Directorate of Technical Affairs.[18] The IqPhvc has a center in each healthcare committee, where pharmacists are responsible for monitoring and reporting ADRs. This center verifies and assigns alerts to ADRs in all healthcare settings. The IqPhvc ensures the safety of vaccines, medicines, and herbal and biopharmaceutical products, whether in the private or public sections.[18] To provide effective patient care with the IqPhvc, pharmacists must possess extensive knowledge of drug risks and exhibit a proactive approach to educating patients about drug safety. In Iraq, non-communicable diseases, which account for 55% of deaths, pose a significant health burden. These include cardiovascular disease, stroke, cancer, diabetes, and chronic lung disease.[19] Consequently, due to the scarcity of information on the subject of awareness of the adverse effects of NSAIDs and patient education in Iraq, this study aimed to assess whether years of experience affect pharmacists' knowledge of NSAID-related adverse effects, in addition to their attitudes toward informing patients about the safety of NSAIDs and, more specifically, ADRs.

MATERIALS AND METHODS

A cross-sectional study using an online survey was conducted from January to October 2023. The survey was created using Google Forms and distributed among private Iraqi pharmacist groups on Facebook, Telegram, and WhatsApp. Reminders were sent every two weeks. An online sample size calculator[20] determined the minimum required sample size to be 377 with a 5% margin of error and 95% confidence interval.

Public and private pharmacy colleges in Iraq offer bachelor's degrees in pharmacy sciences after five years of study. After graduation, licensed pharmacists can work in hospitals and/or community pharmacies.

The convenience sampling method was used to recruit pharmacists working in community pharmacies and/or hospitals, excluding those in medical stores or those with invalid responses. The participants provided their consent before answering the questionnaire. This study was approved by the Collegiate Committee for Medical Research Ethics at the University of Mosul (approval number: CCMRE-phA-21-10, date: 25.01.2023).

Survey questionnaire

Three parts of the questionnaire were used to collect data (Appendix I). The questions were in English, which is the language of education in Iraqi pharmacy colleges. The first section included pharmacists' demographic data regarding age, sex, and educational level, as well as their work patterns and NSAID dispensing. The second part was a knowledge scale on NSAID-related kidney and gastrointestinal adverse effects, which was adapted from a validated form by Owusu et al.[21] The scale had ten questions: nine multiple-choice questions with one question requiring either "true," "false," or "I do not know" as an answer. Each correct answer was awarded one

point, resulting in a total of 10 points. The total score was then categorized as poor knowledge (≤4 points) or good knowledge (5-10 points). The third part was a validated attitude scale developed by Phueanpinit et al.,[22] to assess pharmacists' attitudes toward providing drug safety information to patients. The questionnaire consists of 17 questions divided into three subparts: "the roles of pharmacists in providing ADR information to patients" (questions 1 to 8), "usefulness and necessity of patient information leaflets (PILs) for patients" (questions 9-14), and "the roles of drug companies in preparing PILs" (questions 15-17). This score is based on a 5-point Likert scale ranging from strongly disagree =1 to strongly agree =5. The negatively worded questions (questions 7 and 12) in the original scale were transformed into positively worded questions to have the same scale scoring as the other questions. The lowest possible total score was 17; the highest was 85. It was then grouped as poor (17-40), moderate (41-63), and good (64-85). We classified the attitude scores into two groups, negative (<64) and positive (≥64).

Statistical analysis

IBM SPSS version 24 (IBM, New York, NY, USA) was used for statistical analysis. Continuous data were presented as mean, standard deviation (SD), minimum, and maximum, while categorical data were presented as frequencies and percentages (%). A Pearson's chi-square test or Fisher's exact test was used to determine statistical significance at $p<0.05$.

RESULTS

Three hundred nine pharmacists participated in the survey, with a response rate of 82%. The mean (SD) years of experience was 5.2 (±4.8), with a median of 4 years. A total of 45.6% of participants had less than 4 years of experience, whereas 54.4% had four or more years of experience. Table 1 shows that more than two-thirds of the participants were male and aged 23-28 years. Only 17.2% had a higher education beyond a bachelor's degree. Moreover, 57% worked in hospitals and pharmacies, 72.5% had pharmacies located in the city, and 51.8% (156/301) had one or two pharmacists co-working with them in the pharmacy. Nearly half (47%, 143/304) of the workers worked for approximately six to ten hours each day for six days a week.

Most participants (85%) dispensed NSAIDs as OTCs or prescribed medications. The frequently dispensed NSAIDs were diclofenac (76.7%), mefenamic acid (70.9%), and ibuprofen (67.3%). Approximately half of the participants (48%) preferred to instruct their patients about NSAIDs. Almost two-thirds of the participants relied on academic learning and medical textbooks as sources of information on NSAIDs.

On the knowledge scale (Table 2), the participants had a mean (± SD) of 6.8 (±2), and 85.4% had good knowledge about the adverse effects. The number of years of experience was not significantly associated with knowledge ($p>0.05$).

Years of experience were not significantly associated ($p>0.05$) with the answers to the knowledge questions. The lowest percentage of correct answers was for question two regarding NSAID-drug interactions (Figure 1).

Table 3 shows statistically significant associations between age and knowledge of pharmacists with ≥4 years of experience ($p=0.008$). In particular, about 83% of those with good knowledge were younger than 35 years. In addition, knowledge of pharmacists with <4 years of experience showed a significant association with scientific degrees ($p=0.008$); 93% of those with good knowledge had a bachelor's degree. Working hours were significantly associated ($p=0.045$) with knowledge, as 57% of those with <4 years of experience who had good knowledge worked from six to more than ten hours per day for six days a week. The dispensing patterns of NSAIDs showed a highly significant association ($p<0.001$) with participant knowledge.

Table 2 also shows a non-significant association ($p>0.05$) between years of experience and attitudes toward providing drug safety information to patients. Approximately 73% of pharmacists with <4 years of experience and 71% of those with ≥4 years of experience had negative attitudes. Only 28% of the participants exhibited a good attitude.

In Figure 2, 64% of pharmacists with more years of experience agreed to informing patients about ADRs (Q1). About two-thirds (60%) of the participants agreed that informing patients about ADRs might increase their anxiety (Q2), leading to patients discontinuing their medication (Q4). Most participants agreed with the roles of pharmacists (85%) and physicians (70%) in providing patients with ADR information (Q3 and Q6). Regarding question 7, which asked about improving patients' confidence in self-reporting ADRs through education, 47% of pharmacists with fewer years of experience disagreed with this concept. Seventy percent of participants found it necessary to improve patients' knowledge of ADRs (Q8).

Figures 3 and 4 show a significant difference ($p<0.05$) between years of experience and participants' responses to questions 9 and 11 of the attitude scale. Approximately half of the participants (50.8%, $p=0.004$) agreed that PILs improved patients' knowledge about medication (Q9), and 56.6% believed that PILs may reduce patients' adherence to medications (Q10). In contrast, 56% of pharmacists agreed that PILs were useful in helping patients monitor ADRs and improve their confidence in reporting these reactions (Q11, $p=0.019$). Forty-seven percent of pharmacists with many years of experience agreed that PILs are useful in reducing workload by informing patients about ADRs (Q13). Regarding the roles of drug companies in PILs preparation, approximately 60% of the participants agreed (Q15-Q17).

In Table 4, none of the demographic factors showed a significant association with the attitudes of participants based on years of experience. Most participants with negative attitudes were male, young (less than 35 years), had a bachelor's degree, and worked at hospitals and pharmacies, mostly in the city. They had fewer than three co-working pharmacists, worked less than 10 hours daily, had an unspecified dispensing pattern for NSAIDs, and preferred verbal methods to deliver information to patients.

Table 1. Demographical data of pharmacists based on experience years, (n=309)

	Total	Pharmacists with <4 years of experience	Pharmacists with ≥4 years of experience
Factors	**309 (100%)**	**141 (45.6%)**	**168 (54.4%)**
Age (years) (mean ± SD)	28.22 (±4.94)	25.45 (±1.90)	30.55 (±5.48)
23-28	208 (67.3%)	130 (92.2%)	78 (46.4%)
29-34	71 (23.0%)	11 (7.8%)	60 (35.7%)
35-40	16 (5.2%)	0 (0.0%)	16 (9.5%)
More than 40	14 (4.5%)	0 (0.0%)	14 (8.3%)
Gender			
Female	107 (34.6%)	49 (34.8%)	58 (34.4%)
Male	202 (65.4%)	92 (65.2%)	110 (65.5%)
Scientific degree			
Bachelor's degree	256 (82.8%)	126 (89.4%)	130 (77.4%)
Higher than bachelor's level	53 (17.2%)	15 (10.6%)	38 (22.6%)
Working place			
Hospital (general/private)	42 (13.6%)	17 (12.1%)	25 (14.9%)
Private pharmacy	90 (29.1%)	59 (41.8%)	31 (18.5%)
Both	177 (57.3%)	65 (46.1%)	112 (66.7%)
Location of the pharmacy			
In the city	224 (72.5%)	102 (72.3%)	122 (72.6%)
In a rural area	43 (13.9%)	22 (15.6%)	21 (12.5%)
Not working at a private pharmacy	42 (13.6%)	17 (12.1%)	25 (14.9%)
Number of co-working pharmacists (301)			
None	51(16.9%)	26 (18.7%)	25 (15.4%)
Less than three	156 (51.8%)	70 (50.4%)	86 (53.1%)
Equal to or more than three	52 (17.3%)	26 (18.7%)	26 (16.0%)
Not working at a private pharmacy	42 (14.0%)	17 (12.2%)	25 (15.4%)
Working hours per day (304)			
1-5 hours	117 (38.5%)	55 (39.3%)	62 (37.8%)
6-10 hours	143(47.0%)	63 (45.0%)	80 (48.8%)
More than 10 hours	44 (14.5%)	22 (15.7%)	22 (13.4%)
Dispensing patterns of NSAIDs			
OTC medication	22 (7.1%)	8 (5.7%)	14 (8.3%)
The prescribed medication	24 (7.8%)	7 (5.0%)	17 (10.1%)
Both	263 (85.1%)	126 (89.4%)	137 (81.5%)
Names of most frequent dispensed NSAIDs#			
Diclofenac	237 (76.7%)	107 (75.9%)	130 (77.4%)
Mefenamic acid	219 (70.9%)	105 (74.5%)	114 (67.9%)
Ibuprofen	208 (67.3%)	106 (75.2%)	102 (60.7%)
Aspirin	126 (40.8%)	58 (41.1%)	68 (40.5%)
Meloxicam	101 (32.7%)	48 (34.0%)	53 (31.5%)

Table 1. Continued

Factors	Total 309 (100%)	Pharmacists with <4 years of experience 141 (45.6%)	Pharmacists with ≥4 years of experience 168 (54.4%)
Methods of providing patient instructions			
Verbally	148 (47.9%)	66 (46.8%)	82 (48.8%)
Written information by the PILs	15 (4.9%)	7 (5.0%)	8 (4.8%)
Both	139 (45.0%)	63 (44.7%)	76 (45.2%)
None	7 (2.3%)	5 (3.5%)	2 (1.2%)
Sources of information regarding NSAIDs#			
Academic learning	191 (61.8%)	83 (58.9%)	108 (64.3%)
Medical websites	164 (53.1%)	75 (53.2%)	89 (53.0%)
Medical applications	165 (53.4%)	70 (49.6%)	95 (56.5%)
Medical text book	183 (59.2%)	87 (61.7%)	96 (57.1%)
Research articles	85 (27.5%)	38 (27.0%)	47 (28.0%)
Scientific conferences, workshops, webinars	77 (24.9%)	35 (24.8%)	42 (25.0%)

Data are expressed as frequency (%). #Multiple responses were provided, NSAIDs: Non-steroidal anti-inflammatory drugs, PILs: Patient information leaflets, OTC: Over-the-counter, SD: Standard deviation

Table 2. A statistical analysis of pharmacists' knowledge and attitude, (n=309)

Variables	Total 309 (100%)	Pharmacists with <4 years of experience 141 (45.6%)	Pharmacists with ≥4 years of experience 168 (54.4%)	*p* value
The knowledge category				
Poor knowledge (0-4)	45 (14.6%)	20 (14.2%)	25 (14.9%)	0.873*
Good knowledge (5-10)	264 (85.4%)	121 (85.8%)	143 (85.1%)	
Knowledge score				
Mean (± SD)	6.8 (±2.0)	6.77 (±1.92)	6.85 (±2.05)	
Minimum-maximum	1-10	2-10	1-10	
The attitude category				
Poor (17-40)	2 (0.6%)	0 (0.0%)	2 (1.2%)	0.541**
Moderate (41-63)	220 (71.2%)	103 (73.0%)	117 (69.6%)	
Good (64-85)	87 (28.2%)	38 (27.0%)	49 (29.2%)	
Attitude score				
Mean (± SD)	59.5 (±6.4)	59.72 (±6.1)	59.39 (±6.7)	
Minimum-maximum	38.0-77.0	42.0-77.0	38.0 -74.0	

Data are expressed as frequency (%). *p* value is significant at $p < 0.05$. *Based on chi-square test, **based on Fisher's exact test. NSAIDs: Non-steroidal anti-inflammatory drugs, SD: Standard deviation

DISCUSSION

In this study, most Iraqi pharmacists (85.4%) demonstrated good knowledge about NSAID-related renal and gastrointestinal adverse effects. This finding is consistent with the results of Owusu et al.,[21] who reported that 90% of community pharmacists in Qatar had good knowledge. Pharmacists are knowledgeable and skilled in medication-related aspects. This is related to their education, roles, and duties as medication professionals, in addition to other HCPs.[4,8] This is particularly true in remote and rural areas with limited medical services.[23] Pharmacists must be attentive to risk factors while dispensing NSAIDs and be able to reduce complications by screening and monitoring high-risk patients.[4,8]

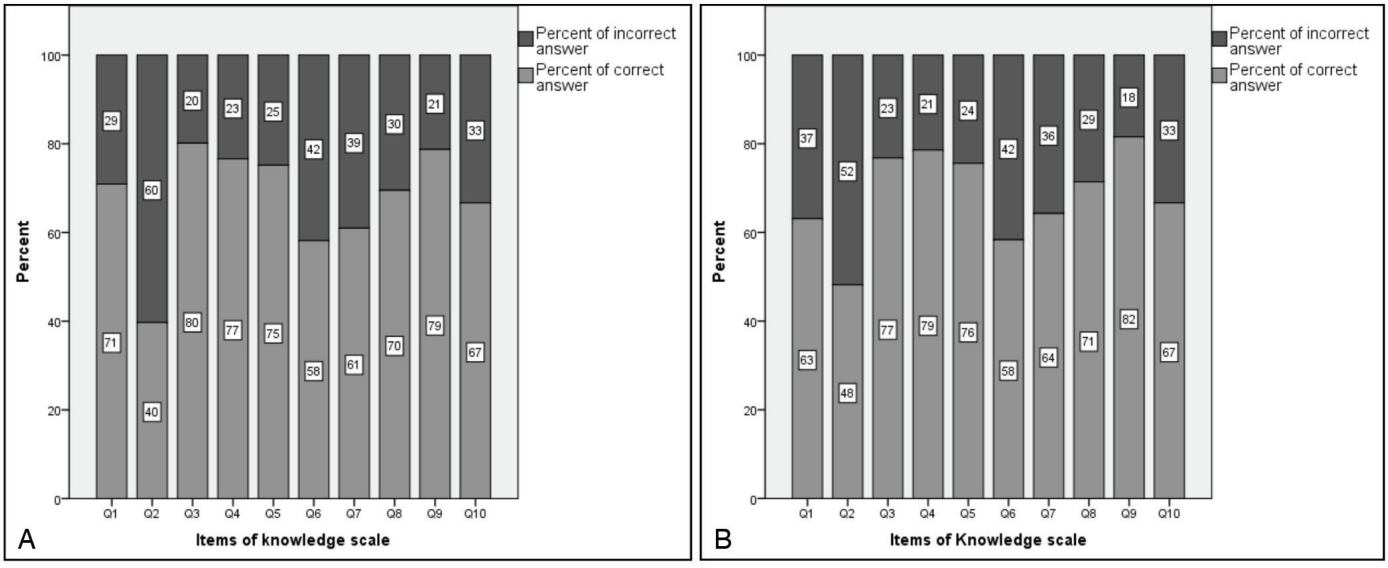

Figure 1. The responses to knowledge scale item (A: Pharmacists with <4 years of experience, n=141, B: Pharmacists with ≥4 years of experience, n=168)

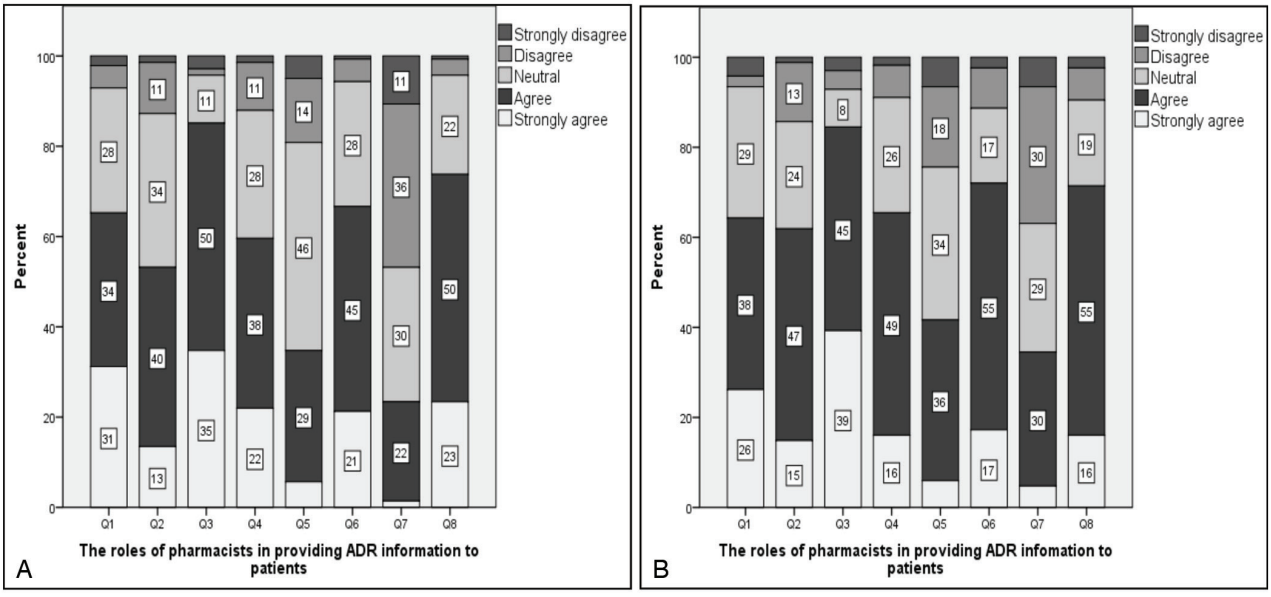

Figure 2. Responses to Q1 to Q8 of attitude scale; the roles of pharmacists in providing ADR information to patients (A: Pharmacists with <4 years of experience, n=141, B: Pharmacists with ≥4 years of experience, n=168)

ADR: Adverse drug reaction

Years of experience were unrelated to participants' knowledge and attitude (p>0.05). A significant association was found between the knowledge of pharmacists with ≥4 years of experience and their age and the knowledge of pharmacists with <4 years of experience and their scientific degree (p<0.05). Younger Iraqi pharmacists and those with a bachelor's degree were more attentive and proactive and tended to depend on their knowledge of academic learning and medical textbooks. Other pharmacists preferred online sources to update their knowledge of NSAIDs' adverse reactions.[21] More knowledgeable pharmacists can provide better patient advice, leading to increased confidence in their careers.[4] Perhaps this is why our participants with long working hours had good knowledge. Patients often prefer to consult pharmacists about ADRs because such consultations are free and readily available, and they form part of their professional duties.[24]

For proper patient management, continuous medical education on updated NSAID safety information is needed.[21,25] In addition, more ADR education topics should be included in undergraduate healthcare education programs.[26] Technology, on the other hand, plays a crucial role in healthcare and should be carefully adopted. For example, support systems contain alerts for drug interactions and reminders for drug monitoring.

Table 3. The association between different demographic factors and pharmacists' knowledge based on experience years (n=309)#

Factors	Pharmacist knowledge <4 years of experience; n=141		Pharmacist knowledge ≥4 years of experience; n=168	
	Poor knowledge n=20	Good knowledge n=121	Poor knowledge n=25	Good knowledge n=143
Age (years)				**(*p*=0.008)***
23-28	19 (95.0%)	111 (91.7%)	17 (68.0%)	61 (42.7%)
29-34	1 (5.0%)	10 (8.3%)	3 (12.0%)	57 (39.9%)
35-40	-	-	1 (4.0%)	15 (10.5%)
More than 40	-	-	4 (16.0%)	10 (7.0%)
Gender				
Male	17 (85.0%)	75 (62.0%)	15 (60.0%)	95 (66.4%)
Female	3 (15.0%)	46 (38.0%)	10 (40.0%)	48 (33.6%)
Scientific degree		**(*p*=0.008)***		
Bachelor's degree	14 (70.0%)	112 (92.6%)	21 (84.0%)	109 (76.2%)
Higher than bachelor's level	6 (30.0%)	9 (7.4%)	4 (16.0%)	34 (23.8%)
Working place				
At the hospital	3 (15.0%)	14 (11.6%)	5 (20.0%)	20 (14.0%)
At a private pharmacy	8 (40.0%)	51 (42.1%)	6 (24.0%)	25 (17.5%)
Both	9 (45.0%)	56 (46.3%)	14 (56.0%)	98 (68.5%)
Location of the pharmacy				
In the city	13 (65.0%)	89 (73.6%)	18 (72.0%)	104 (72.7%)
In a rural area	4 (20.0%)	18 (14.9%)	2 (8.0%)	19 (13.3%)
Not working at a private pharmacy	3 (15.0%)	14 (11.6%)	5 (20.0%)	20 (14.0%)
Number of co-working pharmacists (301)				
None	1 (5.3%)	25 (20.8%)	2 (9.5%)	23 (16.3%)
Less than three	10 (52.6%)	60 (50.0%)	9 (42.9%)	77 (54.6%)
Equal to or more than three	5 (26.3%)	21 (17.5%)	5 (23.8%)	21 (14.9%)
Not working at a private pharmacy	3 (15.8%)	14 (11.7%)	5 (23.8%)	20 (14.2%)
Working hours per day (304)		**(*p*=0.045)***		
1-5 hours	3 (15.8%)	52 (43.0%)	10 (43.5%)	52 (36.9%)
6-10 hours	13 (68.4%)	50 (41.3%)	13 (56.5%)	67 (47.5%)
More than 10 hours	3 (15.8%)	19 (15.7%)	0 (0.0%)	22 (15.6%)
Dispensing patterns of NSAIDs		**(*p*<0.001)***		
OTC medication	4 (20.0%)	4 (3.3%)	8 (32.0%)	6 (4.2%)
The prescribed medication	4 (20.0%)	3 (2.5%)	3 (12.0%)	14 (9.8%)
Both	12 (60.0%)	114 (94.2%)	14 (56.0%)	123 (86.0%)
Methods of providing patient instructions				
Verbally	7 (35.0%)	59 (48.8%)	11 (44.0%)	71 (49.7%)
Written information by the PILs	2 (10.0%)	5 (4.1%)	4 (16.0%)	4 (2.8%)
Both	9 (45.0%)	54 (44.6%)	10 (40.0%)	66 (46.2%)
None	2 (10.0%)	3 (2.5%)	0 (0.0%)	2 (1.4%)

*Based on Fisher's exact test. #*p* values of all other associations were >0.05 based on chi-square test or Fisher's exact test as appropriate. Data are expressed as frequency (%). NSAIDs: Non-steroidal anti-inflammatory drugs, PILs: Patient information leaflets, OTC: Over-the-counter

Table 4. The association between different demographic factors and pharmacists' attitudes based on experience years (n=309)#

Factors	Pharmacists' attitudes toward <4 years of experience; n=141		Pharmacists' attitudes toward ≥4 years of experience; n=168	
	Negative attitude n=103	Positive attitude n=38	Negative attitude n=119	Positive attitude n=49
Age (years)				
23-28	97 (94.2%)	33 (86.8%)	58 (48.7%)	20 (40.8%)
29-34	6 (5.8%)	5 (13.2%)	38 (31.9%)	22 (44.9%)
35-40	-	-	13 (10.9%)	3 (6.1%)
>40	-	-	10 (8.4%)	4 (8.2%)
Gender				
Male	64 (62.1%)	28 (73.7%)	78 (65.5%)	32 (65.3%)
Female	39 (37.9%)	10 (26.3%)	41 (34.5%)	17 (34.7%)
Scientific degree				
Bachelor's degree	94 (91.3%)	32 (84.2%)	90 (75.6%)	40 (81.6%)
Higher than bachelor's degree	9 (8.7%)	6 (15.8%)	29 (24.4%)	9 (18.4%)
Working place				
At the hospital	11 (10.7%)	6 (15.8%)	19 (16.0%)	6 (12.2%)
At a private pharmacy	42 (40.8%)	17 (44.7%)	24 (20.2%)	7 (14.3%)
Both	50 (48.5%)	15 (39.5%)	76 (63.9%)	36 (73.5%)
Location of the pharmacy				
In the city	79 (76.7%)	23 (60.5%)	85 (71.4%)	37 (75.5%)
In a rural area	13 (12.6%)	9 (23.7%)	15 (12.6%)	6 (12.2%)
Not working at a private pharmacy	11 (10.7%)	6 (15.8%)	19 (16.0%)	6 (12.2%)
Number of co-working pharmacists (301)				
None	17 (16.7%)	9 (24.3%)	19 (16.8%)	6 (12.2%)
Less than three	57 (55.9%)	13 (35.1%)	58 (51.3%)	28 (57.1%)
Equal to or more than three	17 (16.7%)	9 (24.3%)	17 (15.0%)	9 (18.4%)
Not working at a private pharmacy	11 (10.8%)	6 (16.2%)	19 (16.8%)	6 (12.2%)
Working hours per day (304)				
1-5 hours	43 (42.2%)	12 (31.6%)	47 (40.2%)	15 (31.9%)
6-10 hours	41 (40.2%)	22 (57.9%)	55 (47.0%)	25 (53.2%)
More than 10 hours	18 (17.6%)	4 (10.5%)	15 (12.8%)	7 (14.9%)
Dispensing patterns of NSAIDs				
OTC medication	7 (6.8%)	1 (2.6%)	12 (10.1%)	2 (4.1%)
The prescribed medication	4 (3.9%)	3 (7.9%)	14 (11.8%)	3 (6.1%)
Both	92 (89.3%)	34 (89.5%)	93 (78.2%)	44 (89.8%)
Methods of providing patient instructions				
Verbally	50 (48.5%)	16 (42.1%)	57 (47.9%)	25 (51.0%)
Written information by the PILs	5 (4.9%)	2 (5.3%)	8 (6.7%)	0 (0.0%)
Both	43 (41.7%)	20 (52.6%)	53 (44.5%)	23 (46.9%)
None	5 (4.9%)	0 (0.0%)	1 (0.8%)	1 (2.0%)

Data are expressed as frequency (%). #*p* values of all associations were >0.05 based on chi-square test or Fisher's exact test as appropriate. NSAIDs: Non-steroidal anti-inflammatory drugs, PILs: Patient information leaflets, OTC: Over-the-counter

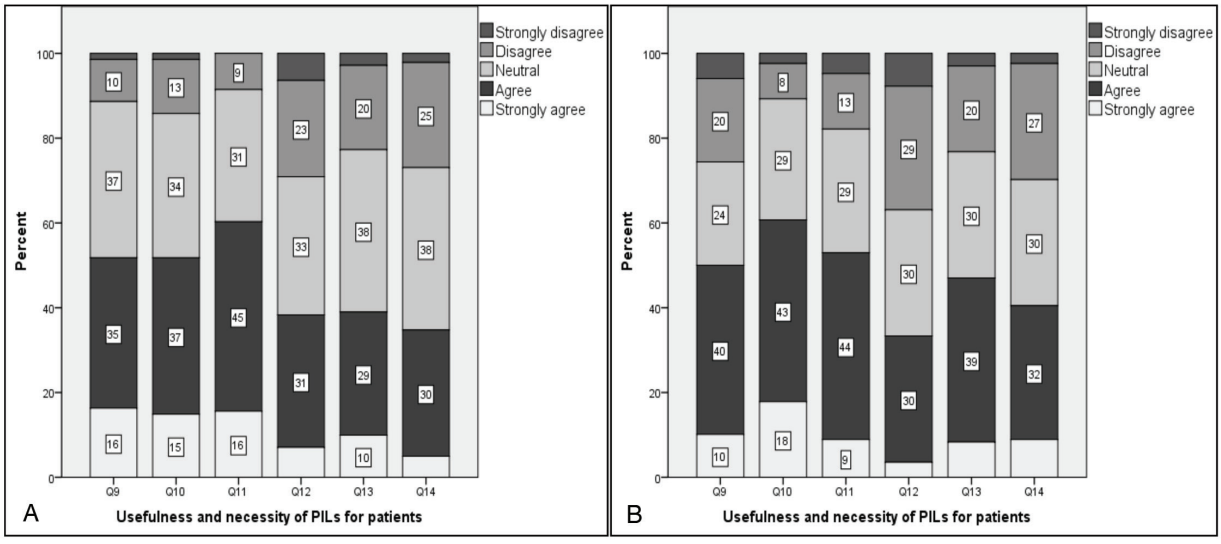

Figure 3. Responses to Q9 to Q14 of attitude scale; the usefulness and necessity of PILs for patients. (A: Pharmacists with <4 years of experience, n=141, B: Pharmacists with ≥4 years of experience, n=168)

PILs: Patient information leaflets

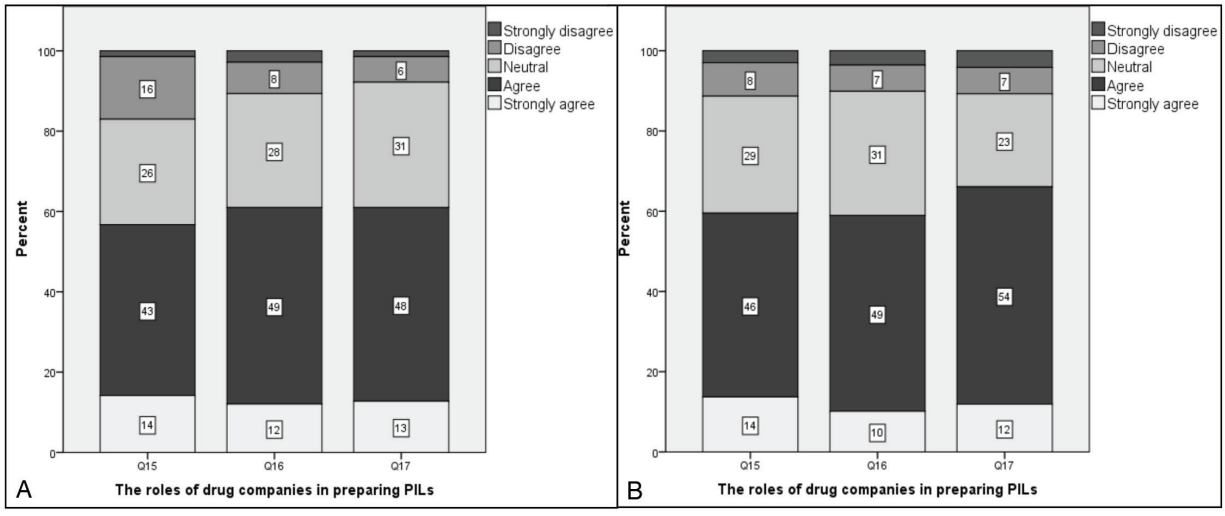

Figure 4. Responses to Q15 to Q17 on the attitude scale; the roles of drug companies in preparing PILs (A: Pharmacists with <4 years of experience, n=141, B: Pharmacists with ≥4 years of experience, n=168)

PILs: Patient information leaflets

Through this system, physicians and pharmacists can also share patient information to guide their prescription decisions.[25] Accessing artificial intelligence (AI) applications can enhance pharmacovigilance activities, but caution should be exercised to ensure accurate information.[27]

A highly significant association (p<0.001) was observed between the dispensing patterns of NSAIDs and the participants' knowledge. These drugs are available as prescribed and OTC medicines.[28,29] The increase in their use as OTC medicines may lead to unintentional overuse and therapeutic repetitions.[30] Most NSAID overuses lacked adequate information or counseling from HCPs.[4] In particular, these drugs are frequently prescribed for elderly patients, those with comorbidities, and those with polypharmacy.[11,31] Community pharmacists may be better positioned to educate patients with minimal health literacy[30] and advise on OTC drugs.[32,33] Patients often believe NSAIDs are safe and are unaware of risks such as drug interactions or abuse/misuse potential.[32] On the other hand, hospital pharmacists should review medications for high-risk patients,[8,26] for greater safety awareness, therapeutic individualization, and follow-up.[8] Those high-risk patients included elderly, use multiple medications, low therapeutic index, and unsuitable drugs.[8]

Only approximately one-third of the participants had a good attitude toward educating patients about drug safety information. This is in contrast to the findings of Owusu et al.,[21] and nearly similar to the good attitudinal results reported among 42.1% of hospital pharmacists[22] and 36% of orthopedic physicians[29] in Thailand using the same attitude scale. Pharmacists with less

than four years of experience had more negative attitudes than those with more years of experience (73% vs. 71%). These findings are similar to the results reported by others[4,22] and in contrast to Kopciuch et al.,[24] who showed that pharmacists with longer professional experience were less willing to report ADRs. Therefore, regardless of whether years of experience influence pharmacists' attitudes, continued awareness of the importance of patient education regarding ADRs remains essential.

Although 85% of the participants agreed that pharmacists play a role in educating patients about ADRs, 70% believed that physicians also play a similar role. Likewise, a study reported that Iraqi physicians had a role in reporting ADRs (78%) and monitoring drug safety (96%) as part of their duty.[34] Physicians play an essential role in providing risk information regarding NSAIDs and desire to share patient education responsibilities with pharmacists.[30] By recognizing the risk factors before prescribing, adverse effects during treatment can be minimized.[29] It also allows patients to weigh the risks and benefits before starting treatment with any class of NSAIDs.[4,29]

Health literacy presents a challenge, as patients often lack medical vocabulary, knowledge, and understanding of new information.[30] In this study, 64% of pharmacists with more experience agreed to inform patients about ADRs, and 70% of participants found it necessary to improve patients' knowledge of these reactions. In addition, approximately half of the less experienced pharmacists disagreed with the ability of education to improve patients' confidence in self-reporting ADRs. However, participants' concerns (60%) increased regarding patients' anxiety and medication nonadherence, similar to others' findings.[22,29] There is uncertainty about whether NSAID users have adequate information about their therapeutic risks and benefits,[30] and all essential NSAID issues, such as risk information, may not be fully explained to all patients.[28] Pharmacists and physicians tend to inform patients about common NSAID adverse effects, such as gastrointestinal adverse effects.[22,29,30] However, patients may lack information about the severe, perhaps less common, cardiovascular, and renal adverse effects of NSAIDs.[5,22,30] This may render patients with inadequate understanding more vulnerable to the risks of NSAID therapy.[30] Therefore, balanced, individualized information is needed based on patients' cases to use NSAIDs without fear or concern, similar to others' opinions.[4,25,28]

Various methods, including teach-back techniques and written materials, can be used to effectively convey information to patients.[30] Using PILs is useful in saving time, improving patient education, and increasing their confidence in reporting and monitoring ADRs, as agreed upon by approximately 50% to 56% of our participants and supported by other studies.[22,29] The FDA also mandates the use of approved medication guides as written information to clarify treatment risks and benefits.[30] However, concerns have been raised about the impact of PILS on patient care, as the content may not be suitable or understandable for all patients.[4] This may affect their willingness to use the drug again if they are aware of its adverse effects on their health. Approximately 57% of the participants had similar concerns. Phueanpinit et al.,[22] suggested the availability of user-friendly leaflets to help patients who extensively use a high-risk drug with the potential for serious ADRs. These leaflets should be easy to read and understandable for patients with minimal health literacy.[30] Technology can support both pharmacist and patient education, but multimedia education should be limited to a supplementary role, not a replacement for HCP education.[7]

Several factors can influence the rate and type of education on drug safety information, such as patient-related factors like age, understanding ability, type, and duration of NSAIDs used.[11,28,30] Pharmacist-related factors include age, gender, workload, number of co-workers, working hours, experience, and educational level.[21,24,28,30,35] Pharmacists may not have sufficient time to counsel patients adequately in busy pharmacies with limited staff.[32] According to Kopciuch et al.,[24] younger pharmacists, those with higher educational degrees (master's and doctoral degrees), and those with less experience had a strong sense of duty regarding drug safety.

Online surveys offer cost-effective, easy-to-implement, and nationwide participant access. However, the low response rate may limit the generalizability of the study results. The response rates were influenced by the participants' desirability and interest in responding to the survey. Our study's response rate, although slightly lower than the target rate, was higher than that reported by others.[21,22,33] A cross-sectional design does not allow for the assessment of causal relationships, and self-reporting raises concerns about recall bias, social desirability bias, and the trust issue between participants and researchers.

In this study, it was difficult to distinguish between counseling and education regarding new or repeated prescriptions of NSAIDs. The knowledge questions did not assess other adverse effects of NSAIDs, and perhaps the participants were more interested in the gastrointestinal and renal adverse effects of NSAIDs, which resulted in higher knowledge scores. The results should be exercised when interpreting the results. Nonetheless, the study can still benefit pharmacists in terms of improving their attitudes toward informing patients about drug safety information and encouraging pharmacists to stay up-to-date with the latest information.

CONCLUSION

Regardless of years of experience, a good degree of knowledge was found among most Iraqi pharmacists regarding the renal and gastrointestinal adverse effects of NSAIDs. Knowledge was significantly associated with the dispensing patterns of NSAIDs, participants' age, their scientific degrees, and working hours. Most participants had negative attitudes toward providing information on drug safety, which was not significantly related to years of experience. Patient education requires the efforts of both pharmacists and physicians to ensure proper drug use with minimal risks. Leaflets can be helpful as a reliable source of information but can also be a reason for nonadherence to the therapeutic regimen.

Ethics

Ethics Committee Approval: This study was approved by the Collegiate Committee for Medical Research Ethics at the University of Mosul (approval number: CCMRE-phA-21-10, date: 25.01.2023).

Informed Consent: The participants provided their consent before answering the questionnaire.

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Footnotes

Authorship Contributions

Concept: H.F.K., Design: H.F.K., A.İ.S., Data Collection or Processing: H.F.K., A.İ.S., H.A., Analysis or Interpretation: H.F.K., Literature Search: H.F.K., Writing: H.F.K.

Conflict of Interest: The authors have no conflicts of interest to declare.

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