
Perception of pharmacist about medication adherence among patients in Erbil city

Received: 26/05/2025

Accepted: 22/07/2025

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Abstract

Background and objective: Medication adherence stands as a vital public health concern, especially for managing diseases that need prolonged treatment. Pharmacists' functions are crucial as essential healthcare providers who reach patients directly to deliver education and counseling services for improving adherence. The research evaluated pharmacists' views about patient medication adherence in Erbil City through assessments of their knowledge, attitudes, practices, and perceived barriers.

Methods: A descriptive cross-sectional research design included 350 licensed pharmacists who worked in public and private pharmacies throughout Erbil City. The research used a structured self-administered questionnaire based on the Knowledge-Attitude-Practice (KAP) model to gather data. The researcher used SPSS version 29 to perform a statistical analysis of the data, with $P \leq 0.05$ as the significance level.

Results: The survey revealed that 91.7% of pharmacists understood adherence concepts, yet 43.1% chose 80% as the proper adherence threshold. The survey revealed that 94.0% of pharmacists recognized their essential function in adherence promotion, yet only 26.3% stated they counsel patients in every instance. The survey showed that 72.9% of participants considered adherence very important, yet 44.6% rated patient adherence as average and 34.0% rated it as poor. Knowledge levels demonstrated significant relationships with gender, ethnicity, and education status ($P < 0.05$), and practice levels showed a significant relationship with attitude ($P = 0.004$). The analysis revealed no meaningful relationships between patient demographic characteristics and their scores on attitude or practice.

Conclusion: The pharmacists of Erbil show strong knowledge and favorable perspectives about medication adherence, yet they face challenges in actual practice and knowledge comprehension. We must establish specific interventions and professional training programs to enhance adherence-related practices.

Keywords: Medication Adherence, Pharmacists, Knowledge-Attitude-Practice, Patient Counseling.

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Introduction

Medications are an essential part of chronic disease management. However, adherence to long-term therapy remains poor. The World Health Organization (WHO) defines adherence to long-term therapy as “the extent to which a person’s behavior – taking medication, following a diet, and/or executing lifestyle changes – corresponds with agreed recommendations from a health-care provider.” Poor adherence is considered a major drug-related problem and is associated with increased emergency-room visits, hospitalizations, and suboptimal clinical outcomes, all of which increase the burden on the health care system (1). Awareness alone isn't enough to ensure proper medication use. In the United States, although patients obtain their prescriptions, only about half take them as intended—accounting for serious error types like incorrect timing, dose, or frequency. European data mirror this trend: a 2019 Spanish primary-care study noted adherence rates hovering at just 50–53%, reinforcing the global challenge of translating awareness into action (2). Therapy adherence remains a major challenge, as studies indicate that approximately 50% of patients in developed countries do not follow their prescribed treatment regimens. The rate of non-adherence is believed to be even higher in low- and middle-income countries due to various barriers,

including limited access to healthcare services, low health literacy, and insufficient follow-up and support systems (3). Multiple factors from the perspectives of the patient, therapy, and healthcare system contribute to medication non-adherence. Common patient-related barriers include forgetfulness, misunderstanding instructions, fear of adverse effects, high pill burden, and lack of motivation. These factors significantly interfere with consistent and effective medication use (4,5). Patients who manage long-term conditions, including hypertension, diabetes, and asthma, face specific barriers to adherence (6). Enhancing medication adherence practices leads to improved health outcomes, along with a reduction in hospital admissions and overall healthcare costs. Promoting adherence is therefore a critical component of achieving better patient care and optimizing healthcare resource utilization (7). Community pharmacists are often the most accessible healthcare professionals, frequently interacting with patients and offering more touch points than doctors. A 2022 analysis using 2018 insurance-claim data found that patients with chronic conditions visited pharmacies nearly twice as often as they saw physicians (8). Community pharmacies enable pharmacists to monitor non-adherence signs in patients during their routine dispensing

interactions and apply individualized interventions (9).

The literature contains scarce research about pharmacists' adherence promotion activities in Iraq and Kurdistan, even though adherence receives growing attention in pharmacy practice. The current literature mainly investigates physician or patient perspectives while disregarding how pharmacists experience and handle adherence support in their daily activities (10). A similarly designed knowledge-attitude-practice survey of 350 pharmacists in Erbil examined their perceptions of over-the-counter medications, using a comparable methodological approach (24). This research investigates community pharmacists in Erbil City who share their views about medication adherence while examining their knowledge base, attitudes, and current practices alongside their perceived obstacles. The research results will enable the development of better pharmacist-led adherence strategies and patient-focused pharmaceutical care in primary healthcare facilities. This study aims to evaluate pharmacists' knowledge, attitude, and practice about medication adherence. The study also aims to examine the existing methods that pharmacists employ to bolster or enhance patient adherence, to identify pharmacist-perceived barriers that affect patients' adherence to medications, and to explore

associations between pharmacists' sociodemographic characteristics (e.g., age, gender, education, experience) and their knowledge, attitudes, and practices regarding adherence. The study aims to assess the perceptions of pharmacists regarding medication adherence among patients in Erbil City and to identify factors influencing their knowledge, attitudes, and practices toward improving adherence.

Methods

Study Design and Setting: This study adopted a descriptive, cross-sectional design to evaluate the perception of pharmacists regarding patients' medication adherence in Erbil City, Kurdistan Region, Iraq. It was conducted in both public and private licensed pharmacies across the city, ensuring the inclusion of pharmacists registered with the Kurdistan Syndicate of Pharmacists. The study spanned a 6-month period, from October 2024 to March 2025, allowing for adequate participant recruitment, data collection, and analysis.

Inclusion Criteria: Licensed pharmacists practicing in public or private pharmacies in Erbil who provided informed consent and voluntarily agreed to participate were included.

Exclusion Criteria: Individuals working in pharmacies who were not licensed pharmacists, those who did not complete the full questionnaire, and

pharmacists who did not reside in Erbil City were excluded.

Sample Size and Sampling Technique:

Using Epi Info™ software (version 7.2), a sample size of 316 pharmacists was calculated based on a population of 1,770 pharmacists, with a 95% confidence level, 5% margin of error, and expected frequency of 50%. To account for potential non-responses, 350 pharmacists were approached. A non-probability convenience sampling method was used based on pharmacists' availability and willingness to participate. Convenience sampling was selected due to limited time and resource availability, allowing my study to efficiently reach practicing pharmacists in Erbil. While this method may introduce sampling bias, it was deemed appropriate given the study's scope and logistical constraints.

Data Collection Tool: Data were collected using a structured, self-administered questionnaire developed through literature review and expert validation. The questionnaire consisted of five sections: socio-demographic data (age, gender, education, years of experience, pharmacy type), knowledge regarding medication adherence, attitudes toward adherence, practices related to adherence, and perceived barriers to adherence. The items included multiple-choice and Likert-scale questions, and the questionnaire was administered in English, structured

according to the Knowledge-Attitude-Practice (KAP) model.

Statistical Analysis: Data were entered and analyzed using IBM SPSS Statistics (version 29). Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize the data. Inferential statistics, such as the chi-square test and independent samples t-test, were used to assess associations between pharmacist characteristics and their perceptions or behaviors. A P-value ≤ 0.05 was considered statistically significant. Knowledge levels were classified as poor (≤ 3), moderate (4-6), or good (7-9) based on total knowledge scores from the questionnaire. Higher scores indicated better understanding of medication adherence. Attitude scores greater than 17 and 17 were categorized as positive attitude, while scores below were considered negative attitude. Practice scores of 15 or more were considered good practice, whereas scores below 15 were classified as poor practice.

Ethical Considerations: Ethical principles were carefully observed during the development of the questionnaire. The content was designed to avoid any potential harm to participants by focusing solely on professional practices and excluding personal or sensitive topics. An informed consent section was included at the beginning, clearly outlining the

study's aim, the voluntary nature of participation, and the guarantee of confidentiality and anonymity. Ethical approval was obtained from the Ethical Committee of the College of Pharmacy, Hawler Medical University.

Results

The study included 350 pharmacists from Erbil City. Most were aged 23–32 years (68.9%), female (52.6%), and

married (54.9%). Nearly all were employed (98.9%) and predominantly Kurdish (90%). About 45.7% had 1–5 years of experience, and 84.6% held a bachelor's degree. Nearly half (47.7%) worked in community pharmacies. Overall, the sample represented a young, employed, and ethnically Kurdish pharmacy workforce with varied practice settings.

Table 1. Socio-Demographic Characteristics of the Participating Pharmacists in Erbil City (N = 350)

Variable	Subcategory	No. (%)
Age Group	<= 22	2 (0.6)
	23-32	241 (68.9)
	33-42	95 (27.1)
	43-52	12 (3.4)
Gender	Male	166 (47.4)
	Female	184 (52.6)
Marital Status	Single	156 (44.6)
	Married	192 (54.9)
	Divorced	2 (0.6)
	Widowed	0 (0.0)
Employment Status	Employed	346 (98.9%)
	Unemployed	4 (1.1)
Ethnic Background	Kurdish	315 (90.0)
	Arabic	21 (6.0)
	Turkman	9 (2.6)
	Assyrian/Chaldean/Syriac	5 (1.4)
Years of Experience as a Pharmacist	< 1 year	38 (10.9)
	1-5 years	160 (45.7)
	6-10 years	73 (20.9)
	> 10 years	79 (22.6)
Level of Education	Bachelor	296 (84.6)
	Master	44 (12.6)
	PhD	4 (1.1)
	Other	6 (1.7)
Type of Pharmacy Practice	Community Pharmacy	167 (47.7)
	Hospital Pharmacy	81 (23.1)
	Clinical Pharmacy	69 (19.7)
	Other	23 (6.6)

The findings in Table 2 indicate that the vast majority of pharmacists in Erbil City are knowledgeable about the concept of medication adherence, with 91.7% reporting familiarity. When asked about the minimum threshold at which medication adherence is considered

acceptable, responses varied: 43.1% identified 80% as the correct threshold. Moreover, 91.1% of respondents acknowledged that community pharmacists serve as the first point of contact for patients regarding medication use.

Table 2. Knowledge About Medication Adherence Among Pharmacists, (N = 350)

Variable	Response	No. (%)
Familiarity with medication adherence concepts	Yes	321 (91.7)
	No	29 (8.3)
Availability of tools to support adherence	Yes	241 (68.9)
	No	109 (31.1)
Perceived minimum medication adherence threshold	50%	71 (20.3)
	60%	86 (24.6)
	80%	151 (43.1)
	100%	42 (12.0)
Awareness that community pharmacists are first contact	Yes	319 (91.1)
	No	31 (8.9)

According to Table 3, most pharmacists considered medication adherence very important (72.9%). Patient adherence was commonly rated as average (44.6%) or poor (34.0%). Nearly all respondents (94.0%) agreed that pharmacists play a key role in promoting adherence. Major influencing factors identified included

socioeconomic status (49.1%), privacy during consultations (90.6%), psychological factors (95.1%), and disease severity (90.9%). Most pharmacists (94.3%) believed that adherence affects treatment outcomes, while fewer (76.9%) recognized cultural influences.

Table 3. Attitudes Toward Medication Adherence and Influencing Factors Among Pharmacists (N = 350)

Variable	Response	No. (%)
Importance of medication adherence	Very unimportant	4 (1.1)
	Unimportant	1 (0.3)
	Neutral	17 (4.9)
	Important	73 (20.9)
	Very important	255 (72.9)
Patient adherence rating	Very poor	14 (4.0)
	Poor	119 (34.0)
	Average	156 (44.6)
	Good	51 (14.6)
	Very good	10 (2.9)
Belief that pharmacists have key role	Yes	329 (94.0)
	No	21 (6.0)
Impact of socioeconomic factors	Very significantly	113 (32.3)
	Significantly	172 (49.1)
	Moderately	59 (16.9)
	Slightly	6 (1.7)
	Not at all	0 (0.0)
Belief in privacy of consultation	Yes	317 (90.6)
	No	33 (9.4)
Belief in psychological factors	Yes	333 (95.1)
	No	17 (4.9)
Belief that disease severity influences adherence	Yes	318 (90.9)
	No	32 (9.1)
Belief that medication adherence impacts outcome	Yes	330 (94.3)
	No	20 (5.7)
Belief that cultural factors affect adherence	Yes	269 (76.9)
	No	81 (23.1)

Table 4 shows that most pharmacists in Erbil actively engaged in adherence practices. About 37.4% frequently discussed adherence, and 42.9% assessed it during prescription refills. Over half (50.6%) spent less than five minutes on counseling. Follow-up was performed occasionally by 40.6% of

participants, and 78.6% developed personalized adherence plans. Most pharmacists (92.6%) believed that the pharmacist–patient relationship influences adherence, and 67.1% cited patient misunderstanding as a key barrier.

Table 4. Practice-Related Activities Toward Medication Adherence Among Pharmacists (N = 350)

Variable	Response	No. (%)
Frequency of discussing medication adherence	Never	11 (3.1)
	Rarely	26 (7.4)
	Sometimes	96 (27.4)
	Often	131 (37.4)
	Always	92 (26.3)
When patient adherence is assessed	Routine checkups	77 (22.0)
	During prescription refill	150 (42.9)
	Occasionally	93 (26.6)
	Rarely	23 (6.6)
	Never	7 (2.0)
Time spent in adherence counseling	< 5 minutes	177 (50.6)
	5 to 10 minutes	147 (42.0)
	10 to 20 minutes	21 (6.0)
	> 20 minutes	4 (1.1)
	No consulting at all	1 (0.3)
Frequency of follow-up with patients	Never	28 (8.0)
	Rarely	49 (14.0)
	Sometimes	142 (40.6)
	Often	97 (27.7)
	Always	34 (9.7)
Development of personalized adherence plans	Yes	275 (78.6)
	No	75 (21.4)
Pharmacist patient relationship affects adherence	Yes	324 (92.6)
	No	26 (7.4)
Patients misunderstanding instructions affects adherence	Yes	235 (67.1)
	No	115 (32.9)

Table 5 shows that pharmacists' knowledge levels were significantly associated with gender, ethnicity, and education ($P < 0.05$). Female and Kurdish pharmacists had higher knowledge scores, and those with a bachelor's

degree demonstrated the strongest knowledge levels. No significant associations were found for age, marital status, employment status, years of experience, or pharmacy type.

Table 5. Association Between Sociodemographic Variables and Knowledge Score Levels

Variable	Categories	Poor Knowledge No. (%)	Moderate Knowledge No. (%)	Good Knowledge No. (%)	Chi-Square (P-value)
Age Group	<= 22	0 (0.0)	2 (0.6)	0 (0.0)	2.904 (0.821)
	23 - 32	5 (1.4)	123 (35.1)	113 (32.3)	
	33 - 42	1 (0.3)	47 (13.4)	47 (13.4)	
	43 - 52	0 (0.0)	7 (2.0)	5 (1.4)	
Gender	Male	1 (0.3)	96 (27.4)	69 (19.7)	7.122 (0.028*)
	Female	5 (1.4)	83 (23.7)	96 (27.4)	
Marital Status	Single	3 (0.9)	75 (21.4)	78 (22.3)	3.544 (0.471)
	Married	3 (0.9)	104 (29.7)	85 (24.3)	
Employment Status	Employed	6 (1.7)	176 (50.3)	164 (46.9)	0.940 (0.625)
	Unemployed	0 (0.0)	3 (0.9)	1 (0.3)	
Ethnic Background	Kurdish	3 (0.9)	165 (47.1)	147 (42.0)	25.082 ($< 0.001^{**}$)
	Arabic	3 (0.9)	7 (2.0)	11 (3.1)	
	Turkman	0 (0.0)	6 (1.7)	3 (0.9)	
	Assyrian/ Chaldean/Syriac	0 (0.0)	1 (0.3)	4 (1.1)	
Years of Experience as a pharmacist	< 1 year	1 (0.3)	19 (5.4)	18 (5.1)	5.015 (0.542)
	1-5 years	3 (0.9)	75 (21.4)	82 (23.4)	
	6-10 years	0 (0.0)	42 (12.6)	29 (8.3)	
	> 10 years	2 (0.6)	41 (11.7)	36 (10.3)	
Level of Education	Master	1 (0.3)	17 (4.9)	26 (7.4)	17.164 (0.009**)
	PhD	1 (0.3)	0 (0.0)	2 (0.6)	
	Bachelor	4 (1.1)	157 (44.9)	135 (38.6)	
	Other	0 (0.0)	0 (0.0)	0 (0.0)	
Type of Pharmacy Practice	Community	3 (0.9)	80 (22.9)	84 (24.0)	3.227 (0.780)
	Hospital	1 (0.3)	47 (13.4)	33 (9.4)	
	Clinical	1 (0.3)	39 (11.1)	38 (10.9)	
	Other	0 (0.0)	13 (3.7)	10 (2.9)	

*Significant at level ($P < 0.05$) ** Significant at level ($P < 0.01$)

The chi-square test revealed a statistically significant association between pharmacists' attitude levels and their practice levels ($\chi^2 = 8.271$, $df = 1$, $P = 0.004^{**}$). Among participants with a negative attitude, a greater proportion exhibited poor practice (37.4%). In contrast, those with a positive attitude were more likely to demonstrate good practice (20.0%). These findings indicate that positive professional attitudes are significantly linked to better pharmacy practice, highlighting the importance of fostering constructive attitudes to enhance clinical performance, Table 6.

Discussion

Our cross-sectional study of 350 Erbil community pharmacists yields significant insights into their medication adherence knowledge, attitudes, and practices. This study examined people's

knowledge, attitudes, and practices about medication adherence. They are youthful (23–32 years old), slightly female, and hold bachelor's degrees, reflecting regional workforce trends (11–12). Almost all work full-time, with around half having 1–5 years of experience, which is consistent with growth rates in emerging countries (13). Importantly, most pharmacists (91.7%) demonstrate understanding of medication adherence, with 68.9% employing adherence tools, which is consistent with Jordan's findings (14). However, a significant proportion (43.1%) underestimate the required adherence threshold, believing that 50–60% is sufficient, whereas the general 80% threshold is accepted for chronic therapy, emphasizing the need for targeted training and clear national guidelines, similar to the Saudi Arabia study (15).

Table 6. Association Between Attitude Level and Practice Level

Attitude Level	Poor Practice No. (%)	Good Practice No. (%)	Chi-square	P-value
Negative Attitude	131 (37.4)	103 (29.4)	8.271	0.004 ^{**}
Positive Attitude	46 (13.1)	70 (20.0)		

^{**}Significant at level ($P < 0.01$)

Nearly all pharmacists state that community pharmacists are the initial point of contact and play an important role in promoting medication adherence. The majority of pharmacist's rate patient adherence as suboptimal because 80% of participants rate it as average or poor, indicating that non-adherence remains a significant issue in Erbil due to a lack of patient understanding of adherence and its consequences, resulting in both intentional and unintentional non-adherences. The study supports local findings of inadequate adherence among Erbil patients with chronic illnesses, where only 27% of patients demonstrate high adherence (16). The survey participants cite forgetfulness, fear of adverse effects, financial restrictions, and a lack of understanding as common reasons for noncompliance. According to our study's findings, more than 90% of participants report mental health difficulties, sickness stage, and a lack of private consultation space as barriers to adherence. The research findings are consistent with those from Kuwait and Saudi Arabia (17,18).

Positive attitudes regarding adherence do not lead to improved practice execution, and practices remain unsatisfactory. The study finds that pharmacists provide adherence counseling to their patients in only 26.3% of cases, but frequently in 37.4% of cases. The counseling sessions last

less than five minutes, falling short of the WHO's guidelines that recommend at least three minutes for effective patient education and counseling using detailed patient-centered methodologies. Our study is similar to the study in Saudi Arabia (19). The study finds that pharmacists with postgraduate degrees and female pharmacists have higher knowledge scores, supporting prior research on how education and professional development promote adherence competence. Our findings are similar to these studies in Europe and the United States (20, 21). Kurdish pharmacists have the highest knowledge scores among all ethnic groups. Years of experience, age, and workplace type have no effect on knowledge scores; however, pharmacists with more formal education indicate superior adherence knowledge. All individuals have a positive attitude toward adherence throughout the trial. Importantly, we find a strong link between positive attitudes and increased levels of adherence-related practice ($P = 0.004$). This lends credence to the notion of planned behavior, which holds that positive attitudes toward conduct increase behavioral intention and lead to consistent action. Studies in Pakistan show that pharmacists who prioritize adherence improvement are more likely to counsel patients and monitor drug use (22). In our study, pharmacists who firmly believe in the importance of

adherence intend to act on their beliefs. This is consistent with local evidence that a structured clinical pharmacist-led intervention, incorporating patient education and adherence support, significantly improved medication compliance and treatment outcomes among Erbil-area patients (25).

Barriers such as a lack of time, inadequate tools, system restrictions, patient opposition, and a lack of support frequently prevent pharmacists from turning positive attitude into persistent practice. This observation aligns with the findings of the Saudi Journal, which reported that community pharmacists face significant challenges in implementing Medication Therapy Management services. The study identifies negative physician attitudes, lack of training, and insufficient support staff as primary barriers that contribute to the gap between pharmacists' intentions and their practical application in patient care (23). As a result, enabling mechanisms, such as arranging counseling time (for example, using reminder tools) and integrating reminder tools, are critical. This is the first study in Iraq's Kurdistan area to evaluate pharmacist adherence support using the KAP paradigm. Our high sample size from both the public and private sectors promotes generalizability. While our findings are consistent with international trends, they also highlight context-specific deficiencies, such as ethnic variations in

knowledge. Limitations include cross-sectional research, which provides a snapshot of self-reported data, potential pharmacist response bias, and single-location sampling. Future research should incorporate observational and longitudinal studies to evaluate the effectiveness of training treatments for improving adherence patterns. Using pharmacists' existing motivation for system transformation can improve patient outcomes and public health.

Conclusion

This study demonstrates that pharmacists in Erbil City have a strong understanding of medication adherence principles and acknowledge their vital responsibility to enhance patient adherence. The findings show that sociodemographic factors, including gender, ethnicity, and education level, significantly influence pharmacists' knowledge; however, these variables do not affect their attitudes and practices. The research establishes a statistical connection between positive attitudes and effective adherence-related practices, highlighting how attitude influences professional conduct. The study emphasizes the need for specific training and organizational support to bridge the gap between theoretical knowledge and practical application and to enable pharmacists to lead adherence intervention efforts. Because pharmacists serve as the first point of

contact with patients, strengthening their role enhances adherence, improves therapeutic outcomes, and reduces healthcare costs.

These findings underscore the need for targeted training and institutional support to connect theory with clinical practice, empowering pharmacists to lead adherence-enhancing interventions. To operationalize these insights, future strategies should include structured continuing education programs and policy reforms that embed adherence-focused competencies into routine pharmacy services.

Competing interest

The authors declare that they have no competing interests.

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