Republic of Iraq

Ministry of Higher Education &

Scientific Research

Al Zahrawi University College

Department of Pharmacy

Graduation Research

Pharmacists' Attitudes and Role in Diabetes Management in Middle Euphrates of Iraq

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2025 A.D. 1446 A.H.

Abstract

Background: Pharmacists play a pivotal role in diabetes management beyond medication dispensing, contributing to therapy management, patient counseling, and training course. However, in Iraq, pharmacists' roles remain largely restricted to administrative tasks and dispensing, with limited involvement in direct patient care.

Objective: This study aimed to assess Iraqi pharmacists' attitudes toward diabetes management, compare these attitudes across different healthcare settings, and identify barriers to providing expanded diabetes-related services.

Methods: A descriptive, cross-sectional, survey-based study was conducted across three governorates in Middle Euphrates of Iraq (Babylon, Karbala, and Najaf) from September 2024 to February 2025. A total of 215 pharmacists from hospitals, primary care centers, and community pharmacies participated. Data were collected using a structured questionnaire and analyzed with IBM SPSS Statistics version 22. Statistical tests included Spearman's correlation, Mann-Whitney, and Kruskal-Wallis, with significance set at $p < 0.05$.

Results: Among participants, 55.3% were female, and 79.1% expressed interest in diabetes management, but only 31.6% had completed specialized diabetes training course. Age ($p = 0.023$) and years of experience ($p = 0.019$) significantly influenced diabetes training course completion, while gender, workplace, and governorate showed no significant effect. Pharmacists with 4-6 years of experience demonstrated a greater tendency to counsel on glucose meter use and immunization importance ($p = 0.011$, $p = 0.02$). Male pharmacists showed more interest in insulin storage counseling ($p = 0.009$), while female pharmacists prioritized immunization training course ($p = 0.014$). Geographic differences also affected counseling attitudes, with Karbala and Najaf pharmacists focusing on insulin pen usage, neuropathy, retinopathy, and nephropathy screening.

Conclusion: Iraqi pharmacists at included area demonstrated a positive attitude toward diabetes management, yet engagement in advanced services remains limited. Age and experience emerged as key factors influencing pharmacists' involvement, highlighting the need for continuous diabetes-specific training course and clearer national guidelines to empower pharmacists in enhancing diabetes care across all healthcare settings.

Keywords: Pharmacy services, Diabetes, Iraq, Attitude.

1. Introduction:

Diabetes is a chronic metabolic disorder characterized by elevated blood glucose levels and needed continuous monitoring[1]. International standards for diabetes care have recognized the crucial role of pharmacists in diabetes management. Pharmacists may provide many services beyond dispensing medications, including management of medication therapy, reconciliation of medication, preventive care services such as screening and immunization, as well as training course and behavioral counseling. Collaboration among physicians, nurses, dieticians, and pharmacists is required to ensure optimum patient care and adequate diabetes management[2]. Health care settings that adopt a multidisciplinary team approach in the management of diabetes improve efficiency and cost-effectiveness of diabetes care. The interventions of pharmacists have been proven to improve glycemic control, empower patients to self-management, and increase patients' satisfaction and quality of life[3]. Pharmacists are becoming more involved in direct patient care, and cultural diversity. Moreover, the current literature provides limited information on types of services provided by pharmacists in different practice settings (community, primary care, and hospital) and whether the setting has an impact on attitudes[4].

Although globally the pharmacist's role has changed from dispensing to drug therapy management, the pharmacist's role in Iraq is still largely limited to dispensing and pharmacy administration (e.g., stock management, medication orders, and record keeping). There is a lack of clear local guidelines clarifying patient-related pharmacists' activities[5].

The present study was designed to measure pharmacists' attitude toward diabetes management, compare these attitudes across different healthcare settings, and identify barriers to providing expanded diabetes-related services.

2. Subjects and methods:

Study design

A descriptive, cross-sectional survey-based study was conducted in a Middle-Euphrates, Iraq. The questionnaire was conducted during the period of September 2024 to February 2025. Three governorates in Middle Euphrates of Iraq, Babylon, Karbala and Najaf were included in this study. Pharmacists were responded to the questionnaire(n = 215) worked in hospitals and primary care centers in addition to community (private) pharmacies.

Questionnaire design

The questionnaire contained three sections: (a) participants' demographics, (b) characteristics of respondents, (c) list of possible diabetes patient support activities (diabetes-related services) that could be delivered by pharmacists. In this section, the frequency of providing relevant information/activities to patients was measured as: never = 0%, rarely = 25%, often = 75%, or always = 100%.

Data Collection

Two hundred fifteen pharmacists were approached; the questionnaires were given to those who agreed to participate and they were completed anonymously. Questionnaires were distributed in person by the researcher. All sites were visited once to distribute the questionnaires and subsequently to collect them. The time required for completion of the questionnaire collection was around six month .

Data Analysis

Data analysis was accomplished using IBM SPSS Statistics for Windows, version 22 (IBM Corp., Armonk, N.Y., USA). Demographic characteristics were summarized using frequencies and percentages. Respondents' attitudes toward diabetes were presented as interquartile range (IQR). Statistical correlational analysis (Spearman's rank correlation) was used to measure the association between diabetes attitudes and

provision of diabetes services to patients. Mann-Whitney and Kruskal-Wallis tests were used to evaluate the differences in medians between the groups of predictor variables, and diabetes attitudes subscales and diabetes services. Statistical significance for all analysis was defined as $p < 0.05$. The predictor variables were categorized as follows: (a) age: 23-27; 28-32; 33-37; 38-42, and >42 years; (b) gender: male and female;(c) years of experience: 1–3; 4–6, and > 6 years; (d) practice sites (workplace): hospital; primary care center, and community pharmacy (e) level of education: Bachelors, Master and PhD; (f) The governorate (living place): Babylon, Karbala and Najaf ; (g) interest in diabetes: yes, no; (h) special diabetes training course in the past: yes, no.

With regards to the diabetes-related services, the internal consistency for each group of diabetes services that pharmacists may provide to patients with diabetes was assessed using Cronbach α test. The test results were as follows: 5 statements of blood glucose monitoring , 3 statements of hypoglycemia management, 8 statements of general pharmacotherapy management including insulin and oral antidiabetic drugs , 7 statements of comorbid disease management , and 3 statements of healthy living choices.

3. Results:

215 Iraqi pharmacists agreed to participate and completed the questionnaire. Respondents' demographic characteristics are shown in table 1. Of the 215 respondents, 67 (31.2%) were in the age group of 28-32 years. Female respondents were 119 (55.3%) more than male respondents [96 (44.7 %)] . It was found that pharmacists working in hospital with community pharmacy (*n* = 132, 61.4%) and those had 1-3 years of experience were the most (n = 93, 43.3%). Babylon was the

first of responders (*n* = 117, 54.4%). 170 (79.1%) pharmacists were interesting in diabetes, but 147 (68.4%) did not complete special diabetes training course.

For completing special diabetes training course, there were significant differences with age groups of 28-32 years (p=0.023) but there were no significant differences with gender (p=0.439).

There were no significant differences of interesting in diabetes with both age groups (p=0.222) and gender (p=0.189).

There were no significant differences of interesting in diabetes (0.491) and completing special diabetes training course (p=0.504) with governorate (living place).

There were no significant differences of interesting in diabetes (p=0.633) and completing special diabetes training course (p=0.147) with workplace (practice site).

There were no significant differences of interesting in diabetes (p=0.987) and completing special diabetes training course (p=0.405) with training education level.

The experience (years of practice) of pharmacists had significant differences with completing special diabetes training course (p=0.019) but no significant differences with interesting in diabetes (p=0.991).

Pharmacists aged 33-37 years (*n* = 53; 24.7%) had significantly more attitude toward provide training course on the importance of regular screening for neuropathic pain (p = 0.026).

Pharmacists with 4-6 years of practice (*n* = 49; 22.8%) had significantly more attitude toward counsel on the use of a blood glucose meter (including how to obtain a blood sample) and provide training course about the importance of immunization (for influenza and pneumococcal pneumonia) in diabetes (p = 0.011 and 0.02 respectively) while those with 1-3 years (*n*= 93; 43.3%) had significantly more attitude toward counsel on the appropriate use of syringes and needles (p = 0.008).

Male pharmacists (*n* = 96; 44.7%) had significantly more attitude toward counsel on the appropriate storage of insulin (p = 0.009) while female pharmacists (*n* = 119;

55.3%) had significantly more attitude toward provide training course about the importance of immunization for influenza and pneumococcal pneumonia in diabetes (p = 0.014).

Table 1. Demographic and other characteristics of respondents (*n* = 215)

Parameter	choices	n (%)
Age (years)	(23_27) (28_32) (33_37) (38_42) >42	54 (25.1) 67 (31.2) 53 (24.7) 10 (4.7) 31 (14.4)
Gender	Female Male	119 (55.3) 96 (44.7)
Years of practice (experience)	(1_3) (4_6) >6	93 (43.3) 49 (22.8) 73 (34.0)
Workplace (Practice Site)	Primary care center Hospital Hospital with community Community	28 (13.0) 2 (0.9) 132 (61.4) 53 (24.7)
Educational level	Bachelors Master PhD	201(93.5) 6 (2.8) 8 (3.7)
Governorate (living place)	Babylon Karbala Najaf	117 (54.4) 69(32.1) 29 (13.5)
Is diabetes an area that interests you?	Yes No	170 (79.1) 45 (20.9)
Have you ever completed special diabetes training course in the past?	Yes No	68 (31.6) 147 (68.4)

Pharmacists had Master degree (*n* = 6; 2.8%) had significantly more attitude toward both counsel on the appropriate storage of insulin (p = 0.003) and counsel on the appropriate use of insulin pens (p = 0.003) while pharmacists had PhD degree (*n* = 8; 3.7%) had significantly more attitude toward counsel on appropriate insulin administration (p= 0.029).

Pharmacists were living in Karbala (*n* = 69; 32.1%) had significantly more attitude toward both counsel on the appropriate use of insulin pens (p = 0.017) and provide

training course on the importance of regular screening for neuropathic pain (p = 0.031) while those were living in Najaf (*n* = 29; 13.5%) had significantly more attitude toward provide training course on the importance of regular screening of nephropathy (p= 0.48), provide training course on the importance of regular screening for retinopathy (p= 0.006), counsel on good foot care techniques (p= 0.001) and provide training course about the importance of immunization for influenza and pneumococcal pneumonia in diabetes (p= 0.001).

Pharmacists were working in hospital (n= 2; 0.9%) had significantly more attitude toward both counsel on the use of a blood glucose meter (p= 0.006) and counsel on the appropriate times to check blood glucose (p= 0.018).

Interquartile Range (IQR) for Each service suggests that while some services have consistent provision patterns, others (such as blood glucose target counseling, nephropathy screening, and medication history reviews) show more variation among pharmacists as showing in table 2.

Table 2 : The Interquartile Range (IQR) for the frequency of providing different diabetes-related pharmacy services

	Frequency of providing this service to patients, n(%)				
	Never	Rarely	Often	Always	IQR
Services related to blood glucose monitoring					
Counsel on the use of a blood glucose meter, including how to obtain a blood sample?	19(8.8)	29(13.5)	92(42.8)	75(34.9)	1
Counsel on the appropriate times to check blood glucose?	12(5.6)	25(11.6)	87(40.5)	91(42.3)	1
Counsel on the current treatment targets for blood glucose?	21(9.8)	36(16.7)	90(41.9)	68(31.6)	2
Counsel on the interpretation of A1C results?	22(10.2)	32(14.9)	94(3.7)	67(31.2)	2
Provide drug therapy recommendations to the physician to help the patient reach blood glucose targets?	57(26.5)	38(17.7)	84(39.1)	36(16.7)	2
Services related to hypoglycemia management					
Counsel on signs and symptoms	27(12.6)	31(14.4)	94(43.7)	63(29.3)	2

of hypoglycemia?					
Identify possible causes of hypoglycemia?	28(13.0)	42(19.5)	94(43.7)	51(23.7)	1
Provide recommendations for the treatment of hypoglycemia to the patient?	29(13.5)	33(15.3)	85(39.5)	68(31.6)	2
Services related to pharmacotherapy					
Conducting a drug history, including Prescription medications Over-the-counter products?	51(23.7)	20(9.3)	65(30.2)	79(36.7)	2
Review the patient's drug refill history to identify poor adherence?	49(22.8)	24(11.2)	69(32.1)	73(34.0)	2
Counsel on the appropriate use of syringes and needles?	26(12.1)	26(12.1)	70(32.6)	93(43.3)	1
Counsel on the appropriate use of insulin pens?	15(7.0)	19(8.8)	74(34.4)	107(49.8)	1
Counsel on the appropriate storage of insulin	7(3.3)	11(5.1)	54(25.1)	143(66.5)	1
Counsel on appropriate insulin administration (mixing insulin, injection technique, timing of injection, rotation of sites)?	18(8.4)	29(13.5)	70(32.6)	98(45.6)	1
Describe the appropriate time to administer each oral antidiabetic drug?	16(7.4)	30(14.0)	74(34.4)	93(43.3)	1
Describe potential adverse effects of each oral antidiabetic drug?	25(11.6)	43(20.0)	76(35.3)	71(33.0)	2
Services related to comorbid disease management					
Provide training course on the importance of controlling blood pressure in diabetes?	29(13.5)	22(10.2)	72(33.5)	92(42.8)	1
Provide training course on the importance of regular screening of nephropathy?	38(17.7)	37(12.6)	83(38.1)	68(31.6)	2
Review the patient's drug profile to identify drugs that are renaly cleared?	53(24.7)	41(19.1)	67(31.2)	54(25.1)	1
Provide training course on the importance of regular screening for neuropathic pain?	46(21.4)	32(14.9)	69(32.1)	68(31.6)	2
Provide training course on the importance of regular screening for retinopathy?	47(21.9)	35(16.3)	73(34.0)	60(27.9)	2

Counsel on good foot care techniques?	39(18.1)	34(15.8)	63(29.3)	79(36.7)	2
Provide training course on the importance of diabetes foot care?	33(15.3)	35(16.3)	71(33.0)	76(35.3)	2
Services related to healthy living choices					
Provide training course about the importance of immunization for influenza and pneumococcal pneumonia in diabetes?	48(22.3)	50(23.3)	58(27.0)	59(27.4)	2
Provide basic information on diet as it relates to diabetes management?	14(6.5)	26(12.1)	74(34.4)	101(47.0)	1
Provide basic information on exercise as it relates to diabetes management?	27(12.6)	18(8.4)	89(41.4)	81(37.7)	1

4. Discussion

The study conducted on 215 Iraqi pharmacists revealed several important insights regarding their attitudes, knowledge, and involvement in diabetes management: Interest in Diabetes Management: While 79.1% of pharmacists showed interest in diabetes, only 31.6% had completed diabetes training course.

Impact of Demographics: Age significantly influenced the completion of diabetes training course ($p=0.023$), whereas gender, place of residence, workplace, and training course level had no significant impact.

Experience and Attitude toward counseling: Pharmacists with 4-6 years of experience were more engaged in counseling on glucose meter usage and the importance of immunization.

Gender Differences: Male pharmacists were more likely to provide counseling on insulin storage, while female pharmacists focused more on patient training course regarding immunization.

Geographic Variations: Pharmacists from different cities showed varying attitudes

toward diabetes counseling, such as insulin pen usage, neuropathic pain screening, and nephropathy training course.

This study aligns with Khdour et al., 2022, which emphasized that specialized training significantly impacts pharmacists' involvement in diabetes management[6]. Similarly, Al-Enezi et al., 2021 in Kuwait[7] and Džomba et al., 2020 in Bosnia and Herzegovina found that pharmacists with specialized training were more effective in diabetes counseling[8]. Additionally, Mustansiriyah University Study (2022) highlighted the importance of clinical pharmacists in modifying treatment plans for type 2 diabetes patients, demonstrating improvements in glycemic control and patient outcomes[9].

In this study, pharmacists frequently provided counseling on blood glucose monitoring, similar to the findings of Wibowo et al., 2020, which highlighted the role of community pharmacists in Australia in supporting diabetes patients[10]. El-Attar et al., 2019 in Tripoli, Libya, reported inconsistencies in pharmacists' diabetes knowledge, which mirrors the gap in special diabetes training course found in this study[11]. Furthermore, Mansoor et al., 2023 conducted a scoping review emphasizing pharmacists' roles in diabetes care, including training course, medication management, and collaborative care models[12].

The Iraqi pharmacists in this study had generally positive attitudes toward diabetes care, especially those with more experience or special training course. This is consistent with Odeh et al., 2021, who found strong positive attitudes among pharmacists in Jordan toward diabetes counseling after receiving specialized training[13]. Additionally, the Egyptian Drug Authority (2023) published guidelines to standardize pharmacists' roles in diabetes care, emphasizing the importance of patient safety and pharmaceutical care in both community and hospital settings[14].

This study found that pharmacists with better training were more willing to educate patients about diabetes management. This aligns with Alsairafi et al., 2020 in Kuwait, which demonstrated that pharmacist-led training courseal programs improved patient

knowledge and health behaviors[15]. Similarly, Aumet et al., 2023 discussed how pharmacists have become essential in supporting chronic disease management, including diabetes, by providing medication adherence counseling and lifestyle modifications[16].

The variation in attitudes among Iraqi pharmacists between different provinces is similar to Sharma et al., 2023[17], Johnson et al., 2023[18], Li et al., 2023[19], and Mbatha et al., 2023[20].

5.Conclusion:

Iraqi pharmacists at included area demonstrated a positive attitude toward diabetes management, yet engagement in advanced services remains limited. Age and experience emerged as key factors influencing pharmacists' involvement, highlighting the need for continuous diabetes-specific training course and clearer national guidelines to empower pharmacists in enhancing diabetes care across all healthcare settings.

This study reinforces the need for structured diabetes-specific training for pharmacists, as their attitudes and involvement in diabetes management are closely linked to their training course and experience. While there is high interest, barriers such as a lack of continuing training course prevent full engagement. Therefore, future efforts should focus on expanding pharmacists' continuing training course programs and standardizing their roles in diabetes management.

6. Recommendation

1. Expanding Training and Training course: Develop national training programs for pharmacists on diabetes care. Integrate diabetes-related courses into pharmacy curricula. Strengthen continuing training course programs focusing on medication management and blood glucose monitoring.

2. Enhancing Pharmacists' Involvement in Patient Care: Promote collaboration between pharmacists, doctors, and healthcare professionals for comprehensive diabetes care. Establish pharmacist-led counseling clinics in hospitals and primary care centers. Implement national guidelines defining pharmacists' role in diabetes management.

3. Addressing Barriers to Diabetes Services: Raise awareness among pharmacists about their role beyond medication dispensing. Provide financial and institutional support for specialized diabetes training. Ensure equal training opportunities for both male and female pharmacists.

4. Improving Public Awareness and Patient Support: Launch public health campaigns highlighting pharmacists' role in diabetes care. Encourage free pharmacist consultations for diabetes patients. Utilize digital tools and mobile apps to track patient adherence to medications and lifestyle changes.

5. Conducting Further Research: Carry out long-term studies to evaluate the impact of pharmacist-led interventions. Investigate regional differences in pharmacists' attitudes toward diabetes care. Assess patients' perspectives on receiving diabetes counseling from pharmacists.

7. Inclusion Criteria

Pharmacists who:

- Are aged 23 years and all above
- Have at least 1 year of practice experience
- Work in any practice site (primary care center, hospital, hospital with community, or without community).
- Reside in Babylon, Karbala, or Najaf governorates.
- May or may not have completed a special diabetes training course.

8. Exclusion Criteria

Pharmacists who:

- Who don’t complete the questionnaire.
- Do not reside in Babylon, Karbala, or Najaf.
- Have less than 1 year of practice experience.

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