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Knowledge, attitudes, and practices of community pharmacists regarding obesity management: A cross-sectional study

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Abstract

Background and objective: Obesity is a chronic, multifactorial condition characterized by an excessive accumulation of body fat that presents significant health risks. Community pharmacists, for instance, are highly accessible and often serve as the first point of contact for patients seeking advice on weight management. This study aims to fill a research gap by evaluating community pharmacists' knowledge, attitudes, and practices related to obesity and weight management.

Methods: A cross-sectional study was carried out among 331 community pharmacists among different pharmacy settings in Erbil city from November 2024 to May 2025. An interview was done with each Pharmacist using a well-designed questionnaire including the socio-demographic characteristics of studied participants and questions related to opinions, knowledge, attitude and practice.

Results: Out of total 331 pharmacists participated in this study, 59.5% of them were females and 40.5% were males. Most of respondents (43.2%), possessed 1–5 years of professional experience with majority worked in community pharmacy environments (77.9%). Less than half (46.5%) of them showed positive attitudes toward obesity management, especially in-patient counseling. A significant association existed between knowledge and attitude (P = 0.001), while no significant association was found between knowledge and practice (P = 0.79), attitudes and practice (P = 0.878).

Conclusion: This study assessed community pharmacists' knowledge, attitudes, and practices regarding obesity and weight management, revealing that the majority of the participants had average knowledge and more than half of the respondents had negative attitude but a very high proportion had an average and good level of practice and that's why we had significant association between knowledge and attitude which is notably a good outcome of the study. However, practical involvement was limited. The results highlight a gap between pharmacists' attitudes and their actual practices.

Keywords: Community Pharmacy, Dietary advice, Knowledge, On-communicable disease, Risk factors.

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Introduction

Obesity is a chronic, multifactorial disorder marked by an excessive buildup of body fat, which poses considerable health concerns. The World Health Organization (WHO) defines obesity as a body mass index (BMI) of 30 kg/m² or above (1). The worldwide incidence of obesity has escalated significantly in recent decades, resulting in heightened morbidity and mortality rates linked to its correlation with numerous chronic diseases. Obesity is a primary risk factor for non-communicable diseases, such as cardiovascular diseases, type 2 diabetes, some malignancies, and musculoskeletal disorders, including osteoarthritis (2). These issues are intensified by psychological concerns, as mental health illnesses like sadness and anxiety often co-occur with obesity, resulting in a detrimental loop of declining health (3). The worldwide health crisis has highlighted the necessity for comprehensive weight management techniques and interdisciplinary healthcare initiatives.

Multiple causes contribute to the increase in obesity, encompassing genetic, environmental, and behavioral elements. Unhealthy dietary practices, inactive lifestyles, and stress-induced overeating are major factors in the onset of obesity (4). The etiology of obesity is difficult, although a primary reason is the energy imbalance between caloric intake and caloric expenditure (5). This imbalance is additionally affected by genetic predisposition and hormonal variables, including leptin resistance, which disrupts hunger management and energy metabolism (6). Environmental factors, such as the heightened accessibility of high-calorie, nutrient-deficient meals and the reduction in physical activity, especially in metropolitan areas, significantly contribute to the escalating obesity epidemic (1).

Obesity rates in Erbil city have escalated to concerning proportions, with current statistics indicating that 33.4% of adults are overweight and 40.9% are obese and the trends are presumably influenced by swifts in urbanization, lifestyle modifications, and heightened intake of high-calorie foods (7). The public health aspects are substantial, as obesity markedly exacerbates the nation's prevalence of chronic diseases, such as diabetes, hypertension, and cardiovascular disease. Moreover, the economic burden of obesity is significant, as healthcare expenditures rise in response to the growing need for obesity-related interventions (8). Targeted therapies are essential to tackle this issue, and Pharmacists, as readily available healthcare specialists, are ideally situated to assume a crucial role in obesity management (9).

Pharmacists, especially those in community, clinical, and primary care environments, are essential members of

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the healthcare team. Their role in obesity management encompasses not only drug distribution but also patient education, counselling, and collaboration with other healthcare professionals to deliver comprehensive Weight Management Services (WMS). Community Pharmacists are readily available and frequently act as the initial point of contact for patients seeking guidance on weight management (10). Their responsibilities encompass advising on over-the-counter weight loss medicines, including orlistat, offering counsel on dietary supplements, and instructing patients on lifestyle changes. Although community Pharmacists possess the potential to enhance public health, many lacks adequate training in obesity treatment, hence constraining their efficacy in providing these services (9).

This study aims to assess the knowledge, attitudes, and practices of community pharmacists in Erbil city regarding obesity and weight management. It seeks to identify gaps and opportunities to enhance the role of pharmacists in addressing this growing public health issue.

Specific Objectives:

1. To assess the level of knowledge and identify gaps in knowledge among community pharmacists regarding obesity and its management.

2. To evaluate the attitudes of community pharmacists toward their role in managing obesity.

3. To examine the current practices of community pharmacists in providing weight management services.

4. To explore the relationship between pharmacists' knowledge, attitudes, and their actual practices in obesity management.

Subjects and Methods

Study design: This research employed a descriptive cross-sectional methodology to assess the involvement of community Pharmacists in obesity and weight management in Erbil City, Iraq. This study was conducted over six-month duration, commencing on November 1st and terminating at the end of April. The timeframe encompassed several phases, including data collection and report composition. The research was conducted in the licensed community pharmacies within Erbil. The research focused on licensed pharmacy practitioners operating in Erbil. The city comprises 1,771 Pharmacists and 817 licensed pharmacies.

Sample Size and sampling method:

The sample size was calculated using Cochran’s formula with the following assumptions: a 95% confidence level (Z = 1.96), an estimated proportion (p) of 0.5 to maximize variability, and a margin of error (e) of 5%. These values yielded a required sample size of 316 pharmacists.

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Due to the lack of a complete and up-to-date list of practicing community pharmacists in Erbil, a convenience sampling method was used. The researcher personally visited and approached pharmacists who were available and willing to participate, covering different practice settings such as community pharmacies, primary healthcare centers, and hospital outpatient clinics. This approach helped ensure a diverse and practical sample, especially since some pharmacists were not working in traditional community pharmacy roles.

Data collection: Prior to the main data collection, a pilot study was conducted to assess the clarity, relevance, and reliability of the questionnaire. The pilot testing involved seven actively practicing pharmacists working across two community pharmacies owned by the researcher. Feedback obtained from this preliminary testing phase was used to identify ambiguous questions, improve the wording of items, and ensure overall coherence and feasibility of the instrument. No major modifications were required, and the results from the pilot study were not included in the final data analysis. An organized Google Form served as the instrument for data gathering. The inquiry was conducted in person using an iPad, allowing Pharmacists to input their responses instantly and in real-time. Data were collected by lead investigators, pharmacies were visited individually, and pharmacists were solicited to participate in the study. Informed consent and confidentiality were conveyed verbally to each participant before their engagement. The questionnaire comprised two primary sections: sociodemographic information and the knowledge, attitude, and practice segment.

Validity and reliability: The questionnaire's validity was confirmed by distributing it to four specialists in community medicine and community pharmacy, with modifications implemented based on their response. The questionnaire's reliability was assessed using SPSS 26, employing Cronbach's alpha, yielding a value of 0.826, indicating acceptable internal consistency. The total attitude scores were calculated then we determined the median then we categorized it as following. Less than the median score regarded as negative attitudes and more than the median regarded as positive attitudes. While practice level was determined by calculating of the total score of the practice questions then it categorized as poor, medium and good based on value of scores as mentioned in the methodology.

Ethical Considerations: The research complied with ethical standards to guarantee participant confidentiality and anonymity. Pharmacists volunteered willingly, and no personally identifiable information was gathered. Ethical approval for the project was

https://doi.org/10.15218/zjms.2026.003

secured by the College of Pharmacy, reference number HMU ECPh 29/02024-43, before the initiation of data collection. informed consent was obtained, and anonymity was guaranteed by omitting participants' names from the study questionnaire, with assurance that the collected information would be utilized solely for research purposes.

Statistical analysis: Data input analysis was conducted using IBM SPSS Statistics version 26. Descriptive statistics were employed to encapsulate demographic information and overarching trends. To assess connections between categorical variables, the Chi-square test (χ^2) was employed, and when anticipated cell counts were below 5, Fisher's Exact test served as an alternative. Statistical significance was defined as a P-value of less than 0.05. Data formatting and presentation, including the creation of frequency tables and the emphasis of noteworthy findings, were executed using Microsoft Excel. The statistical study of knowledge levels was categorized the responses into three grades: poor (3-9 correct answers), average (10-16 correct answers), and good (17 or more correct answers). The overall attitude score was derived from the median and the total practice score was categorized into three classifications: poor (10-34), average practice (35-54), and good practice (55 and above).

Results

Participant's demographics:

Among the 331 pharmacists that participated in the study, the mean ± SD of age was 29.8±5.6 years. Female pharmacists comprised 59.5% of the sample, and male pharmacists represented 40.5%. The majority of respondents possessed 1–5 years of professional experience (43.2%), with most worked in community pharmacy environments (77.9%). The weekly working hours fluctuated, with the largest percentage exceeding 20–30 hours (35.3%), (Table 1).

https://doi.org/10.15218/zjms.2026.003

Table 1. Demographic Characteristics of Participants (n = 331)

Variable	No.	(%)
Age (years)		
< 25	75	(22.7)
25-34	200	(60.4)
35-44	49	(14.8)
45-54	5	(1.50)
≥55	2	(0.60)
Gender		
Male	134	(40.5)
Female	197	(59.5)
Years of Experience as a Pharmacist		
< 1 year	26	(7.90)
1–5 years	143	(43.2)
6–10 years	86	(26.0)
> 10 years	76	(23.0)
Type of Pharmacy Practice		
Community Pharmacy	258	(77.9)
Primary Care Pharmacy	29	(8.80)
Clinical Pharmacy	44	(13.3)
Number of Hours Worked Per Week		
< 20 hours	92	(27.8)
20–30 hours	117	(35.3)
31–40 hours	60	(18.1)
> 40 hours	62	(18.7)
Location of Pharmacy Practice		
Urban	285	(86.1)
Suburban	30	(9.10)
Rural	16	(4.80)
Total	331	(100.0)

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Figure 1 illustrates a bar chart that summarizes the distribution of participants across three knowledge levels, revealing that the majority exhibited average knowledge at 66.5%. In contrast, 23.9% of the individuals were categorized as possessing low knowledge, while 9.7% were recognized as having strong knowledge. Table 2 delineates each knowledge question alongside the respective number and percentage of participants who responded properly and erroneously, facilitating a thorough examination of particular knowledge deficiencies. Of the 20 knowledge questions, 4 exhibited a greater frequency of erroneous responses than correct ones. These questions exhibited a higher frequency of erroneous replies, suggesting areas where Pharmacists may possess less knowledge or where the questions may have been more difficult.

Table 2. Participant Responses to Obesity-Related Knowledge Questions (n = 331)

Question	Correct No. (%)	Incorrect No. (%)
K1. What is the recommended percentage of daily calories that should come from fats for adults trying to maintain a healthy weight?	214 (64.7)	117 (35.3)
K2. Which hormone is primarily responsible for signaling satiety to the brain?	146 (44.1)	185 (55.9)
K3. Which of the following is a potential side effect of long-term use of Orlistat?	289 (87.3)	42 (12.7)
K4. What is the minimum weekly amount of moderate exercise recommended for adults to stay healthy, according to WHO?	145 (43.8)	186 (56.2)
K5. Which of the following is considered a first-line treatment for obesity management?	324 (97.9)	7 (2.1)
K6. Which BMI range is classified as "overweight" by the World Health Organization (WHO)?	196 (59.8)	135 (40.2)
K7. Which of the following statements is true about the relationship between stress and weight gain?	253 (76.4)	78 (23.6)
K8. When counseling patients about portion control, which method is often recommended as an easy reference for portion sizes?	78 (23.6)	253 (76.4)
K9. Which of the following medications is known to cause weight gain as a side effect?	264 (79.8)	67 (20.2)
K10. Which dietary component has the highest thermogenic effect, meaning it requires more energy to digest?	92 (27.8)	239 (72.2)

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K11. Which of the following is a common reason for weight regain after initial weight loss in patients?	202 (61)	129 (39)
K12. Which of the following is a non-pharmacological approach that is most effective in preventing obesity in children?	274 (82.8)	57 (17.2)
K13. How much weight loss is generally considered sufficient to start seeing health benefits, such as improved blood pressure and blood sugar levels?	169 (51.1)	162 (48.9)
K14. Which of the following best describes the role of a pharmacist in weight management counseling?	278 (82.5)	53 (17.5)
K15. In the context of weight loss medications, which of the following is a mechanism of action for GLP-1 receptor agonists like liraglutide?	206 (62.2)	125 (37.8)
K16. Which of the following is the primary target for weight loss in adults to reduce the risk of type 2 diabetes?	163 (49.2)	168 (50.8)
K17. What role does the gut microbiota play in obesity?	179 (54.1)	152 (45.9)
K18. Which of the following statements about meal frequency and metabolism is correct?	139 (42)	192 (58)
K19. Which of the following is a key feature of the Mediterranean diet, which is recommended for weight management?	157 (47.4)	174 (52.6)
K20. Which of the following conditions is a common comorbidity in patients with obesity that pharmacists should be aware of?	195 (58.9)	136 (41.1)

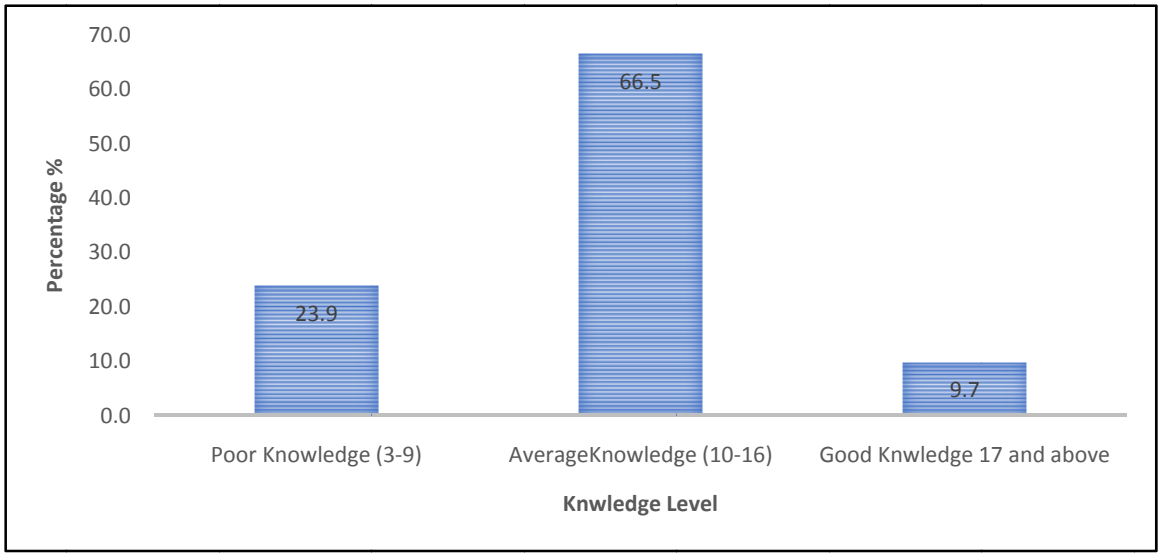

Figure 1. Summarizing the Knowledge level of participants

https://doi.org/10.15218/zjms.2026.003

As shown in Table 3, a significant consensus was noted among Pharmacists concerning their involvement in obesity and weight management. (90%) of responders concurred with statement A1, demonstrating their readiness to counsel patients on safe weight loss strategies. Statement A2 garnered significant consensus, with a substantial majority endorsing the necessity of counselling prior to the utilization of any weight loss product (90.3%). Concerning A5, the majority of participants concurred on the imperative for Pharmacists to have comprehensive information and partake in ongoing instruction regarding weight loss items (83.1%). A significant proportion concurred with A7, endorsing the involvement of Pharmacists in disseminating information regarding drugs, botanicals, and dietary supplements for weight loss (58%). Statement A9 indicated a favorable response, with a significant majority of Pharmacists (74.3%) acknowledging the necessity of providing motivational and behavioral counselling to overweight and obese patients. A significant consensus was observed for A10, indicating Pharmacists' endorsement of participation in establishing ideal weight objectives for patients (63.1%).

Figure 2 displays all affirmative responses to these propositions, illustrating the favorable dispositions of Pharmacists and emphasizing the promising results of the survey.

Table 3. Attitude of community Pharmacist in obesity and weight management (n = 331)

Statement	Strongly agree No. (%)	Agree No. (%)	Neutral No. (%)	Disagree No. (%)	Strongly disagree No. (%)
A1. Community pharmacists should be prepared to advise patients on the safest method to lose weight.	182 (55)	117 (35.3)	29 (8.8)	3 (0.9%)	0 (0)
A2. Advising the patient before utilizing any weight loss product is critical.	166 (50.2)	133 (40.2)	28 (8.5)	2 (0.6)	2 (0.6)
A3. Weight loss products should be reserved for obese individuals who have been unable to lose weight with exercise and nutrition alone.	47 (14.2)	166 (50.2)	94 (28.4)	22 (6.6)	2 (0.6)
A4. Pharmacists should avoid providing weight management advice because they do not have sufficient time to focus on such issues in a busy community pharmacy setting	23 (6.9)	48 (14.5)	77 (23.3)	123 (37.2)	60 (18.1)
A5. Community pharmacy employees must have extensive knowledge and ongoing education on weight loss products.	102 (30.8)	173 (52.3)	47 (14.2)	6 (1.8)	3 (0.9)

https://doi.org/10.15218/zjms.2026.003

A6. Pharmacists should collaborate with other healthcare providers (e.g., physicians, dietitians, exercise physiologists, behavioral psychologists) to help overweight/obese patients lose weight.	47 (14.2)	145 (43.8)	68 (20.5)	17 (5.1)	54 (16.3)
A7. Pharmacists should provide information and recommendations on weight loss medications, herbs, and dietary supplements.	45 (13.6)	163 (49.2)	66 (19.9)	13 (3.9)	44 (13.3)
A8. Pharmacists should offer nutritional/dietary advice to help overweight/obese patients lose weight.	85 (25.7)	161 (48.6)	69 (20.8)	12 (3.6)	4 (1.2)
A9. Pharmacists should offer motivational/behavioral counseling to help overweight or obese patients lose weight.	42 (12.7)	178 (53.8)	73 (22.1)	11 (3.3)	27 (8.2)
A10. Pharmacists should be involved in setting the optimal weight goal in overweight/obese patients.	45 (13.6)	164 (49.5)	105 (31.7)	14 (4.2)	3 (0.9)
A11. Pharmacists should use point-of-care devices in the pharmacy (e.g: weighing scale, blood pressure monitors, cholesterol testing etc ...)	41 (12.4)	129 (39)	100 (30.2)	33 (10)	28 (8.5)
A12.Pharmacists may prioritize recommending expensive weight loss products to increase pharmacy revenue, even if cheaper alternatives are available.	15 (4.5)	59 (17.8)	69 (20.8)	117 (35.3)	71 (21.5)
A13. Some pharmacists promote weight loss products for financial incentives from companies rather than focusing on patient needs.	17 (5.1)	90 (27.2)	98 (29.6)	71 (21.5)	55 (16.6)

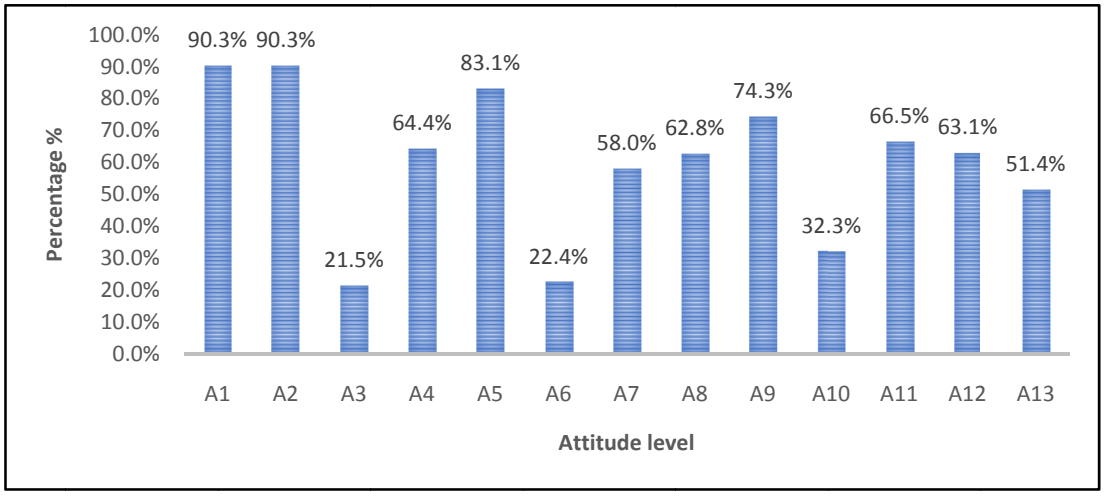

Figure 2. Respondent's positive attitude to Statements

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Essential activities for obesity management within the practice domain were assessed. A significant percentage of Pharmacists indicated conducting weight measurements (62.9%) and calculating body mass index (50.4%), both of which are critical in evaluating patients with overweight and obesity. A significant number reported that they elucidate the health hazards linked to obesity to patients P8 (75.2%), demonstrating an engaged approach to patient education. A significant percentage of Pharmacists indicated that they never or never participate in seminars or workshops about obesity and weight control (81.6%), underscoring a deficiency in continuing professional development. Moreover, over a quarter of respondents reported that they infrequently or almost never engage in collaboration with other healthcare professionals in the management of obese patients (38.4%), indicating restricted interdisciplinary coordination. The specific frequencies and percentages for these items are displayed in Table 4 and Figure 3.

Table 4. Practice of Community Pharmacist in obesity and weight management (n = 331)

Practice	Always No. (%)	Often No. (%)	Sometimes No. (%)	Rarely No. (%)	Never No. (%)
P1.Measure patient's weight	124 (37.5)	84 (25.4)	83 (25.1)	16 (4.8)	24 (7.3)
P2.Measure patient's height	83 (25.1)	64 (19.3)	75 (22.7)	60 (18.1)	49 (14.8)
P3.Calculate patient's body mass index	118 (35.6)	49 (14.8)	79 (23.9)	44 (13.3)	41 (12.4)
P4.Measure patient's waist circumference	85 (25.7)	83 (25.1)	78 (23.6)	47 (14.2)	38 (11.5)
P5.Measure patient's blood glucose	86 (26)	93 (28.1)	86 (26)	35 (10.6)	31 (9.4)
P6.Measure patient's blood pressure	102 (30.8)	101 (30.5)	76 (23)	22 (6.6)	30 (9.1)
P7.Identify patient or medication related factors that may contribute to weight gain	117 (35.3)	101 (30.5)	81 (24.5)	23 (6.9)	9 (2.7)
P8.Explain the risks associated with overweight and obesity	151 (45.6)	98 (29.6)	64 (19.3)	10 (3)	8 (2.4)
P9.Offer weight management related brochures or written educational information	51 (15.4)	79 (23.9)	105 (31.7)	58 (17.5)	38 (11.5)
P10.Counsel about weight monitoring for patients who are taking medications that can cause weight gain	93 (28.1)	115 (34.7)	84 (25.4)	24 (7.3)	15 (4.5)

https://doi.org/10.15218/zjms.2026.003

P11.Monitor patient adherence to weight loss medications, herbs or dietary supplements	86 (26)	95 (28.7)	92 (27.8)	37 (11.2)	21 (6.3)
P12. How often do you consult with other healthcare professionals regarding obesity management	22 (6.6)	41 (12.4)	141 (42.6)	98 (29.6)	29 (8.8)
P13. How frequently do you attend professional seminars or workshops on obesity and weight management?	8 (2.4)	18 (5.4)	35 (10.6)	99 (29.9)	171 (51.7)
P14. How often do you look at medical journals and textbooks for information on managing obesity?	9 (2.7)	57 (17.2)	182 (55)	58 (17.5)	25 (7.6)

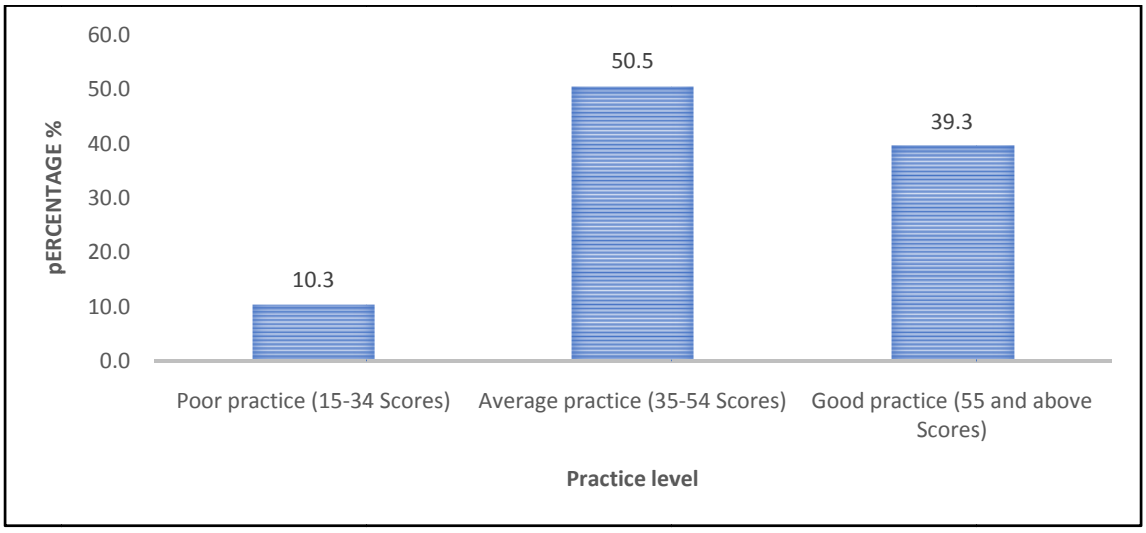

Figure 3. Showing the Frequency of the practice of Pharmacists

https://doi.org/10.15218/zjms.2026.003

A Chi-square test of independence was performed to investigate the correlation between Pharmacists' knowledge levels and their attitudes towards obesity and weight management. The study revealed no statistically significant correlation between the two variables (P = 0.79), indicating that variations in knowledge levels did not substantially influence the respondents' attitudes. The comprehensive crosstab findings are displayed in Table 5.

Table 5. Association between knowledge level and practice level of Community pharmacists

Practice level	Knowledge Level			Total	P-value
	Poor	Average	Good		
	No. (%)	No. (%)	No. (%)	No. (%)	
Poor	9 (26.5)	23 (67.6)	2 (5.9)	34 (100)	0.79
Average	43 (25.7)	108 (64.7)	16 (9.6)	167 (100)	
Good	27 (20.8)	89 (68.5)	14 (10.8)	130 (100)	
Total	79 (23.9)	220 (66.5)	32 (9.7)	331 (100)	

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A Chi-square test of independence was conducted to investigate the relationship between Pharmacists' knowledge of obesity and weight control and their opinions. The results indicated a statistically significant correlation between the two independent variables (P = 0.001), implying that Pharmacists with elevated knowledge levels were more likely to exhibit favorable views towards obesity management. Comprehensive details of the crosstab analysis are presented in Table 6.

A Chi-square test was performed to evaluate the correlation between Pharmacists' practice level and their attitudes towards obesity and weight management. The study revealed a substantial P-value of (P = 0.878), signifying an absence of statistically significant correlation between the two variables. This indicates that the Pharmacists' actual activities were not significantly correlated with their attitudes in this domain. The comprehensive results are presented in Table 7.

Table 6. Association between knowledge level and attitude level of community pharmacists

Knowledge level	Attitude Level		Total	P-value
	Negative	Positive		
	No. (%)	No (%)	No. (%)	
Poor	58 (31.2)	21 (14.5)	79 (23.9)	0.001
Average	114 (61.3)	106 (73.1)	220 (66.5)	
Good	14 (7.5)	18 (12.4)	32 (9.7)	
Total	186 (100)	145 (100)	331 (100)	

Table 7. Association between Practice level and attitude of community pharmacists

Attitude level	Practice level				P-value
	Poor	Average	Good	Total	
	No. (%)	No. (%)	No. (%)	No. (%)	
Negative	20 (6.0)	95 (28.7)	71 (21.5)	186 (56.2)	0.878
Positive	14 (4.2)	72 (21.8)	59 (17.8)	145 (43.8)	
Total	34 (10.2)	167 (50.5)	130 (39.3)	331 (100)	

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Discussion

This study evaluates community pharmacists' knowledge, attitudes, and practices regarding obesity management in Erbil city for the first time, emphasizing their involvement in patient education, medication counselling, and interprofessional teamwork. Despite the Kurdistan Pharmacists Syndicate reporting a total of 1,771 registered pharmacists in Erbil, the actual number present in community pharmacies was constrained due to inadequate regulatory oversight and inspection. The original desired sample size was 450 Pharmacists. To do this, more than 600 pharmacies throughout the city were surveyed. In certain instances, pharmacy proprietors working in governmental areas were solicited in their places of employment to facilitate wider participation. Nevertheless, the hesitance of certain Pharmacists to engage, the ultimate count of respondents surpassed the necessary sample size. This robust involvement is significant, especially when juxtaposed with a comparable study conducted in three major cities in Pakistan, which involved a lesser sample size achievement (12).

The demographic characteristics of the study participants offer essential context for analyzing the results. Among the 331 Pharmacists polled, the predominant age group was 25–34 years, comprising (60.4%), signifying a highly youthful and possibly adaptable workforce. Female Pharmacists constituted a greater percentage of the sample (59.5%) than their male counterparts (40.5%), mirroring prevailing gender trends in the pharmacy profession in the region, as shown in Jordan (14). A majority of participants (43.2%) indicated possessing 1–5 years of experience, implying that early-career Pharmacists were more readily available or inclined to engage in the study. The majority were employed in community pharmacy settings (77.9%), consistent with the study's emphasis on community pharmacy practices. Moreover, the predominant weekly working hours varied from 20 to 30 hours (35.3%), potentially affecting the degree of patient connection and involvement in weight management initiatives. The demographic factors are essential for comprehending the attitudes, knowledge, and practices documented in this study and may elucidate specific patterns identified in the data.

In comparison to a comparable study conducted in Lebanon,[15] which revealed a broad variance in Pharmacists' knowledge (17.3%–83.4% correct replies), our data demonstrate a more uniform pattern, with the majority of participants achieving a median score of 66.5%. This may indicate a more comprehensive yet balanced understanding among Pharmacists in our environment, albeit still deficient in depth in specific areas. Both findings

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underscore the enduring information deficiencies in critical areas, including clinical weight reduction objectives, maintenance therapy, and the pharmacological safety of herbal supplements. These parallels underscore the necessity for ongoing professional development programs designed to address the significant deficiencies in obesity and weight management practices among Pharmacists.

A number of enquiries uncovered substantial knowledge deficiencies among pharmacists. Numerous individuals did not identify leptin as the satiety hormone (K2) and were oblivious to the WHO's guideline of 150 minutes of moderate exercise each week (K4). Frequently overlooked counselling methods were the hand approach for portion management (K8) and the recognition that protein possesses the largest thermogenic effect (K10). Misconceptions regarding meal frequency and metabolism (K18) continued to exist. These deficiencies underscore the necessity for targeted education to enhance Pharmacists' involvement in obesity management.

The present study indicated that merely 46.5% of community Pharmacists exhibited a positive attitude towards obesity and weight management, whereas 53.5% displayed a negative attitude. This differs from past studies (9), in which most Pharmacists demonstrated positive sentiments towards their role in obesity management. The divergence in our results may indicate contextual variances, like changes in training, workload, or role clarification within pharmacy practice in Erbil. The existence of unfavorable sentiments in our group indicates potential obstacles, such as diminished confidence or the belief that obesity management is beyond the chemist's professional purview. These findings underscore the necessity for localized educational activities and systemic assistance to enhance Pharmacists' involvement in obesity-related treatment.

Contrary to the published study (15), which reported that 60% of community Pharmacists exhibited good practices, 40% displayed average-level practices, and none were categorized as having poor practices, our investigation reveals a divergent distribution. In our sample, 39.3% of Pharmacists exhibited good practice, 50.5% displayed average practice, and 10.3% were classified as poor practice. Multiple things may influence this variation. A primary factor may be the restricted availability of ongoing professional development programs or organized weight management training in our area, thereby diminishing Pharmacists' confidence and consistency in providing these services. Furthermore, variations in national health regulations, public knowledge of pharmacy-led weight management, and the accessibility of

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standardized clinical recommendations may affect practice behavior. Time limits, workload, and absence of reimbursement or incentives may serve as obstacles, hindering Pharmacists from completely participating in comprehensive weight counselling. These findings highlight the necessity for specific initiatives, including instructional workshops, protocol formulation, and policy endorsement to augment the role of Pharmacists in weight management.

To our knowledge, no published research has directly examined the association between community pharmacists' knowledge, attitudes, and practices regarding obesity management. The present analysis revealed no significant correlation between knowledge and practice, potentially due to several external impediments, including time constraints, resource scarcity, lack of organized weight management services, or limitations in professional roles that hinder Pharmacists from applying their knowledge in practice. The correlation between knowledge and attitude was determined to be significant, possibly due to the fact that heightened knowledge bolsters Pharmacists' confidence, awareness, and positive impression of their involvement in obesity management, hence cultivating more favorable attitudes. The correlation between practice and attitude was not significant, indicating that despite Pharmacists having a favorable attitude towards obesity management, practical execution may be impeded by systemic, logistical, or policy-related barriers that surpass individual motivation or readiness to engage.

This study has several limitations. The cross-sectional design prevents causal interpretation of relationships between pharmacists' knowledge, attitudes, and practices. Self-administered questionnaires may have introduced self-report and social desirability bias. The convenience sampling method limits generalizability beyond the study setting, and certain pharmacist subgroups may be underrepresented. Additionally, the absence of objective practice measures and the inherent limitations of the questionnaire may have affected the depth and accuracy of the findings.

Conclusion

This study evaluated community pharmacists' knowledge, attitudes, and practices concerning obesity and weight management. It revealed that most participants possessed moderate knowledge, while over half exhibited negative attitudes. A significant association between knowledge and attitude suggests that as pharmacists' knowledge about obesity management increases, their attitudes toward engaging in such practices also become more positive. This finding indicates that improving knowledge may be a key

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lever for shifting attitudes in a favorable direction. Educational interventions such as continuing professional development (CPD) workshops, certified obesity management training programs, guideline-based seminars, and interactive case-based learning modules can be effective in enhancing pharmacists' knowledge. By incorporating such interventions into professional training, pharmacists may be better equipped and more motivated to take active roles in weight management services within the community pharmacy setting. Notably, a substantial proportion demonstrated average to good practice levels, resulting in a significant association between knowledge and attitude, which is a favorable outcome of the study.

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Competing interest

The authors declare that they have no competing interests.

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