

Original Research

Readiness of community pharmacists to lead weight-management services: knowledge, practice, facilitators, and barriers

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Abstract

Background: Obesity is a chronic, multifactorial disease and a significant public health challenge in the Middle East, including the United Arab Emirates (UAE). Community pharmacists, due to their accessibility, are well positioned to support weight-management, yet their readiness to provide structured weight-management services (WMS) remains limited. This study assessed pharmacists' knowledge and practices related to anti-obesity pharmacotherapy and lifestyle counseling and explored facilitators and barriers to WMS implementation. **Methods:** A cross-sectional survey was conducted between November 2023 and January 2024 among licensed community pharmacists across all seven emirates. A total of 402 pharmacists were recruited by convenience sampling and completed a validated questionnaire. Data were analysed using SPSS version 29 Descriptive and inferential statistical analyses were conducted. Composite knowledge and practice scores were calculated and dichotomised at their respective sample medians. **Results:** Most participants were aged 25–35 years (64.4%) and female (57.2%). Good knowledge was observed in 71.1% of pharmacists, while 53.0% demonstrated good practice. Most recognized obesity as a chronic disease (85.8%) and correctly identified the BMI threshold for pharmacotherapy initiation (71.1%). Routine use of structured assessments was low, including BMI calculation (19.4%), waist measurement (9.2%), and follow-up (27.4%). Non-pharmacological (35.6%) support was more common than medication recommendations (8.5%). Key barriers included limited insurance coverage, time constraints, knowledge gaps, and staffing shortages, while major facilitators were access to educational resources, specialized training, and dedicated consultation space. Most pharmacists (90.3%) were willing to undertake additional training, and no demographic predictors of knowledge or practice were identified ($p > 0.05$). **Conclusion:** This study highlights that UAE community pharmacists are willing and reasonably knowledgeable to support weight-management services; however, gaps in practice behaviors indicate partial readiness. To move from potential to practice, efforts must focus on reducing operational barriers through targeted training, clear service protocols, consultation space, and appropriate reimbursement models, enabling consistent, evidence-based pharmacy-led services.

Keywords: Pharmacist readiness; Weight-management services; Community pharmacy; Anti-obesity medications; Implementation barriers; Facilitators; United Arab Emirates.

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INTRODUCTION

Obesity is a major public health issue and economic burden worldwide^{1,2}. It is defined as the abnormal accumulation of body fat that impairs health, often emerging from a sustained imbalance between energy intake and expenditure. The World Health Organization (WHO) and the American Medical Association (AMA) recognize obesity as a chronic, multifactorial disease^{3,4,5}. According to WHO criteria, adults with a body mass index (BMI) of 25.0–29.9 kg/m² are

classified as overweight, and those with a BMI of 30.0 kg/m² or greater are classified as obese⁴. Obesity is strongly associated with type 2 diabetes, cardiovascular disease, depression, and several cancers^{5,6}, and imposes substantial economic and societal strain on healthcare systems, underscoring the need for effective prevention and management strategies^{7,8}.

The global prevalence of overweight and obesity continues to rise, with the WHO estimating 2.5 billion adults to be overweight or obese and 890 million with obesity in 2022^{9,10,11,12}. The burden is particularly pronounced in the Middle East and North Africa (MENA) region; in the UAE, 63.4% of adults were reported as overweight or obese, including 68% of nationals and nearly half of women aged ≥40 years⁹. These trends, largely driven by sedentary lifestyles and calorie-dense diets, contribute to substantial morbidity, mortality, and over 3 million deaths annually¹¹.

Management of obesity generally combines lifestyle modification, pharmacological therapy, and, in selected cases, surgical intervention^{13,14}. Diet, exercise, and behavioral change remain the recommended first-line strategies, yet pharmacological treatment is warranted when lifestyle measures alone prove insufficient^{15,16}. Advances in the understanding of appetite regulation and energy metabolism have expanded the therapeutic landscape, leading to the approval of agents such as Orlistat, Liraglutide, Semaglutide, Tirzepatide, phentermine/topiramate, and Naltrexone/Bupropion by the U.S. Food



and Drug Administration (FDA)^{17,18,19}. Real-world evidence increasingly supports the effectiveness of newer incretin-based agents, particularly Semaglutide and Tirzepatide, which have demonstrated clinically meaningful weight reductions that surpass earlier pharmacotherapies^{20,21}.

Optimal obesity care requires a multidisciplinary approach, with physicians, dietitians, pharmacists, nurses, and psychologists playing vital roles. Community pharmacists are especially well-positioned due to their accessibility and frequent patient contact. Their involvement in counseling, promoting adherence, and supporting chronic disease prevention is well documented, and evidence indicates that pharmacist-led interventions significantly reduce body weight, BMI, and waist circumference. International experiences reinforce this potential: in the United Kingdom, the Counterweight programme demonstrated the value of structured pharmacist counseling in improving diet and weight outcomes. In Australia, pharmacy-based initiatives successfully identified individuals at risk and prioritized obesity as a public health issue. In Canada, pharmacist counseling combined with pharmacotherapy improved adherence and long-term management. Increasingly, community pharmacies are also recognized as public health hubs, particularly in advancing equity and digital health²².

In the MENA region, evidence suggests that community pharmacists are increasingly involved in weight-management through counseling and lifestyle support, yet their role remains constrained by systemic barriers such as limited training, time, and reimbursement structures^{23,24,25}. This indicates that their contribution to obesity care depends on supportive regulatory and organizational frameworks that enable consistent service delivery. Within the UAE, structured pharmacist-led weight-management initiatives remain scarce, and available surveys point to positive attitudes but also highlight notable gaps in knowledge and practice²⁶. This context highlights the importance of assessing pharmacists' readiness to expand their role in obesity care and to identify enablers that can strengthen their contributions within the healthcare system.

Accordingly, this study evaluated the readiness of community pharmacists in the UAE to lead pharmacy-based WMS by profiling current knowledge and practice related to anti-obesity pharmacotherapy and lifestyle support, and by exploring key facilitators and barriers to implementation. The findings aim to inform the design and commissioning of pharmacist-delivered WMS in the UAE.

METHODS

Study Design and Setting

This was a cross-sectional, questionnaire-based study conducted among community pharmacists in the United Arab Emirates (UAE) between November 2023 and January 2024. Community pharmacies in the UAE are widely distributed across all seven emirates and serve as the primary point of contact for patients seeking over-the-counter medications,

prescription dispensing, and health advice. They are frequently located in residential areas, shopping malls, and within medical centers or clinics, and are staffed predominantly by pharmacists holding at least a Bachelor of Pharmacy (BPharm) degree. The Ministry of Health and Prevention and local health authorities regulate these pharmacies.

Investigator Training

Before data collection began, all investigators participated in structured training sessions led by faculty members with expertise in research methodology, communication, and pharmacy practice. The training covered the study objectives, ethical considerations, recruitment strategies, and the standardized administration of the questionnaire. Practical demonstrations were used to illustrate best practices for engaging participants, explaining the study, securing informed consent, and responding to questions without introducing bias. A pilot run was then conducted to assess adherence to these procedures. Feedback from this exercise was incorporated to improve consistency further and ensure reliability across investigators.

Instrument Development and Validation

The questionnaire was developed in English following an extensive review of prior literature^{23,27,28,29}. Items were adapted from previous studies and contextualized to reflect the UAE pharmacy practice environment and the objectives of the present study.

Content validity was established through expert panel review, including faculty in pharmacy practice and clinical pharmacy, as well as practicing pharmacists with patient counseling experience. Panel members assessed the questionnaire for clarity, scope, and cultural appropriateness. Their feedback informed revisions that better aligned the tool with the study aims and local context. The instrument was pilot tested with 27 community pharmacists to assess clarity, relevance, and completion time. On average, participants required 12 minutes to complete the survey. Minor issues related to wording and formatting were identified and corrected to enhance usability. Reliability testing showed excellent internal consistency, with Cronbach's alpha values exceeding 0.90 across all domains.

The final instrument consisted of five sections:

- Demographics (7 items): Age, gender, education, country of qualification, years of experience, emirate of practice, and pharmacy location.
- Knowledge (8 items): Recognition of obesity as a chronic condition, BMI thresholds for initiating pharmacotherapy, and awareness of FDA-approved anti-obesity agents.
- Perceptions (2 items): Views on the effectiveness and safety of medications.



Table 1. Demographic characteristics of community pharmacists		
Demographic Characteristics	Total Number n = 402	(%)
Gender	Female	230 (57.2)
	Male	172 (42.8)
Age	< 25 years old	75 (18.7)
	25 - 35 years old	259 (64.4)
	35 - 45 years old	56 (13.9)
	> 45 years old	12 (3)
Highest Educational Level	BPharm	287 (71.4)
	MPharm	45 (11.2)
	Ph. D	6 (1.5)
	PharmD	64 (15.9)
Country of the Highest Education Qualification	Arab UAE	153 (38.1)
	Arab non-UAE	95 (23.6)
	Asia	148 (36.8)
	Others	6 (1.5)
Years of Experience	≤ 5 years	212 (52.7)
	6 - 10 years	111 (27.6)
	> 10 years	79 (19.7)
State of the Pharmacy	Abu Dhabi	130 (32.3)
	Dubai	135 (33.6)
	Sharjah	83 (20.6)
	Ajman	23 (5.7)
	Umm Al Quwain	2 (0.5)
	Ras Al Khaimah	20 (5.0)
	Fujairah	9 (2.2)
Location of the Pharmacy	Healthcare facility	110 (27.4)
	Residential area	183 (45.5)
	Shopping mall	91 (22.6)
	Hypermarket	14 (3.5)
	Others	4 (1)

- Practices (13 items): Counselling approaches, recommendation and dispensing patterns, assessment of medication history, provision of lifestyle advice, monitoring progress, and reporting adverse drug reactions.
- Professional Role and Training Needs (5 items)
- Barriers and Facilitators (11 items): Structural, professional, and patient-related barriers; and enabling factors such as training, resources, and collaboration with other providers.

Sample Size and Sampling

The study targeted licensed pharmacists working in community

Table 2. Knowledge of obesity and anti-obesity medications among community pharmacists¹			
Knowledge Questions		Correct answers n (%)	Incorrect answers n (%)
Obesity is a chronic medical problem		345 (85.8)	57 (14.2)
What is the recommended BMI range for considering anti-obesity medication in patients?		286 (71.1)	116 (28.9)
Select anti-obesity medications approved by the U.S. FDA	Orlistat (Alli®)	317 (78.9)	85 (21.1)
	Liraglutide (Saxenda®)	229 (57.0)	173 (43.0)
	Semaglutide (Ozempic®)	158 (39.3)	244 (60.7)
	Tirzepatide (Mounjaro®)	228 (56.7)	174 (43.3)
	Bupropion/ Naltrexone (Contrave®)	89 (22.1)	313 (77.9)
	Phentermine/ Topiramate (Qsvmia®)	70 (17.4)	332 (82.6)

1 Ozempic® was included as an incorrect answer. pharmacies across the United Arab Emirates (UAE). Pharmacists employed in hospitals, academia, or the pharmaceutical industry were excluded from the study. Using the Epi-Info calculator, a minimum sample size of 385 was estimated, assuming a 50% prevalence of adequate knowledge, with a 95% confidence interval and a 5% margin of error. Ultimately, 402 pharmacists participated, exceeding the minimum requirement and thereby improving statistical power.

A convenience sampling approach was adopted; however, multiple strategies were implemented to enhance representativeness and reduce sampling bias. Pharmacists were recruited from all seven emirates (Abu Dhabi, Dubai, Sharjah, Ajman, Fujairah, Ras Al Khaimah, and Umm Al Quwain), ensuring geographical diversity across the country. Recruitment was conducted across various community pharmacy settings, including large retail chains, independent pharmacies, and pharmacies affiliated with clinics and medical centers. Additionally, pharmacies were approached in various locations, including shopping malls, residential areas, hypermarkets, and street-side outlets. This multi-setting recruitment strategy was designed to capture a broad spectrum of pharmacy practice environments and patient populations, thereby strengthening the generalizability of the findings despite the non-probability sampling design.

Data Collection

Data were collected through an electronic questionnaire developed on Google Forms to ensure convenience,



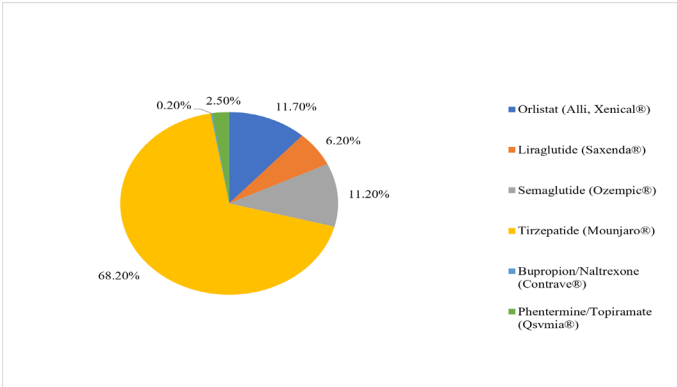


Figure 1. Pharmacists’ perceived effectiveness of anti-obesity medications

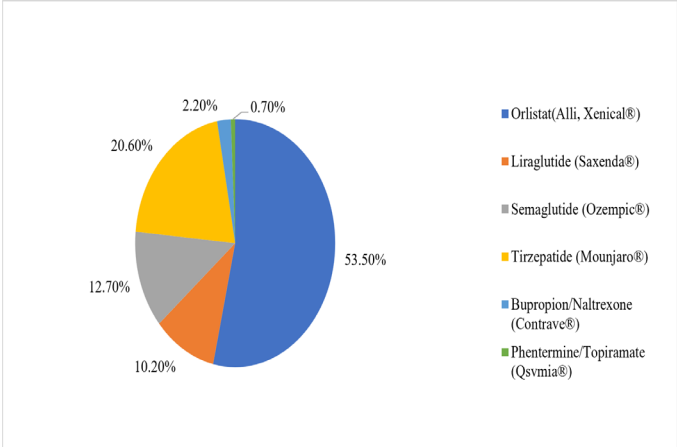


Figure 2. Pharmacists’ perceived safety of anti-obesity medications

Table 3. Pharmacists’ Counselling Approaches for Obesity Management	
How do you usually advise patients seeking obesity management guidance at your pharmacy?	n (%)
Recommend an anti-obesity medication	34 (8.5)
Recommend an herbal product	61 (15.2)
Advise against purchasing an anti-obesity medication	18 (4.5)
Offer advice on healthy diet habits	143 (35.6)
Offer advice on appropriate physical activity	167 (41.5)
Refer the customer to a clinical dietitian	197 (49.0)
Offer a leaflet or brochure on anti-obesity products/ anti-obesity advice	199 (49.5)
When recommending an anti-obesity medication, which medication do you usually recommend?	n (%)
Not applicable – I would never recommend a weight loss product	176 (43.8)
Orlistat (Alli, Xenical®)	105 (26.1)
Liraglutide (Saxenda®)	7 (1.7)
Semaglutide (Ozempic®)	23 (5.7)
Tirzepatide (Mounjaro®)	78 (19.4)
Bupropion/Naltrexone (Contrave®)	2 (0.5)
Phentermine/Topiramate (Qsymia®)	1 (0.2)
Other	10 (2.48)

accessibility, and broad participation. Investigators visited community pharmacies only to introduce the study and invite eligible pharmacists to participate. To prevent undue influence, investigators did not remain present during questionnaire completion. Pharmacists accessed the survey independently via a QR code that linked directly to Google Forms.

For pharmacists who expressed interest but were unable to participate at the time of the visit, a follow-up reminder was permitted only with their explicit approval. Investigators were available to clarify procedural questions but did not observe, supervise, or influence responses.

The questionnaire was self-administered and completed anonymously, with no identifiable information collected. These procedures were designed to minimize coercion, reduce social desirability bias, and protect participant confidentiality.

Data Analysis

All completed electronic questionnaires were compiled, cleaned, and checked for completeness before being exported to SPSS version 29 for analysis. Inconsistent or missing responses were excluded prior to statistical procedures. Descriptive statistics were used to summarize the data: categorical variables were expressed as frequencies and percentages, while continuous variables were reported as means with standard deviations. For knowledge assessment, each item was coded as correct or incorrect, and a composite knowledge score was calculated.

To ensure clarity and comparability, knowledge and practice scores were categorized using the median split method, a widely used approach in KAP (Knowledge, Attitude, and Practice) studies when standardized thresholds are lacking. As no universally accepted or validated cut-off points exist to define “adequate” knowledge or “good” practice regarding anti-obesity pharmacotherapy among community pharmacists in the UAE, a distribution-based (median) approach was adopted to provide an objective, sample-specific benchmark. This method avoids imposing arbitrary percentage thresholds and ensures internal consistency within the study population. Furthermore, dichotomization facilitated categorical inferential testing (e.g., chi-square analysis) and allowed balanced group comparisons.

For knowledge, the median score was 4 (out of 8); therefore, pharmacists scoring ≥4 were classified as having good knowledge, while those scoring <4 were classified as having poor knowledge. Practice scores were derived from items rated on a five-point frequency scale (1 = never to 5 = always), with a total median score of 36 used as the cut-off (≥36 = good practice, <36 = poor practice). This median-based classification ensures balanced group distributions and provides a context-specific benchmark for interpreting pharmacists’ knowledge and practice levels.

Perceptions, barriers, and facilitators were measured on a 5-point Likert scale (from strongly disagree to strongly agree).



Table 4. Pharmacists' Clinical Practices and Patient Demand for Anti-Obesity Medications

Indicate how frequently you do the following practices at your pharmacy before dispensing, prescribing, or recommending anti-obesity medication					
	Never n (%)	Rarely n (%)	Sometimes n (%)	Often n (%)	Always n (%)
Provide advice on physical activity, such as regular exercise	18 (4.5)	32 (8)	59 (14.7)	75 (18.7)	218 (54.2)
Provide dietary recommendations, such as a low-calorie diet	19 (4.7)	38 (9.5)	63 (15.7)	85 (21.1)	197 (49)
Review prior use of anti-obesity medication	23 (5.7)	34 (8.5)	63 (15.7)	88 (21.9)	194 (48.3)
Review a patient's medication history	20 (5)	36 (9)	66 (16.4)	87 (21.6)	193 (48)
Review medical history (e.g. other chronic diseases)	18 (4.5)	44 (10.9)	75 (18.7)	80 (19.9)	185 (46)
Assess potential drug-drug or food-drug interactions with anti-obesity medications	19 (4.7)	41 (10.2)	77 (19.2)	88 (21.9)	177 (44)
Measure the patient's weight	79 (19.7)	66 (16.4)	92 (22.9)	63 (15.7)	102 (25.4)
Calculate the patient's body mass index (BMI)	80 (19.9)	80 (19.9)	102 (25.4)	62 (15.4)	78 (19.4)
Measure the patient's height	102 (25.4)	89 (22.1)	84 (20.9)	61 (15.2)	66 (16.4)
Measure the patient's waist circumference	132 (32.8)	107 (26.6)	83(20.6)	43 (10.7)	37 (9.2)
Indicate how frequently you do the following practices at your pharmacy after dispensing, prescribing, or recommending anti-obesity medication					
Monitor the patient's progress	25 (6.2)	41 (10.2)	130 (32.3)	96 (23.9)	110 (27.4)
Follow up on any related adverse effects of the anti-obesity medication	22 (5.5)	39 (9.7)	98 (24.4)	101 (25.1)	142 (35.3)
Report any adverse reactions to anti-obesity medication if they occur	27 (6.7)	51 (12.7)	77 (19.2)	77 (19.2)	170 (42.3)
How frequently do patients at your pharmacy seek information or express interest in the following anti-obesity medications during the last year?					
Orlistat (Alli, Xenical®)	31 (7.7)	100 (24.9)	142 (35.3)	73 (18.2)	56 (13.9)
Liraglutide (Saxenda®)	33 (8.2)	77 (19.2)	133 (33.1)	95 (23.6)	64 (15.9)
Semaglutide (Ozempic®)	15 (3.7)	45 (11.2)	61 (15.2)	117 (29.1)	164 (40.8)
Tirzepatide (Mounjaro®)	17 (4.2)	33 (8.2)	38 (9.5)	72 (17.9)	242 (60.2)
Bupropion/Naltrexone (Contrave®)	164 (40.8)	118 (29.4)	65 (16.2)	37 (9.2)	18 (4.5)
Phentermine/Topiramate (Qsymia®)	182 (45.3)	113 (28.1)	57 (14.2)	33 (8.2)	17 (4.2)

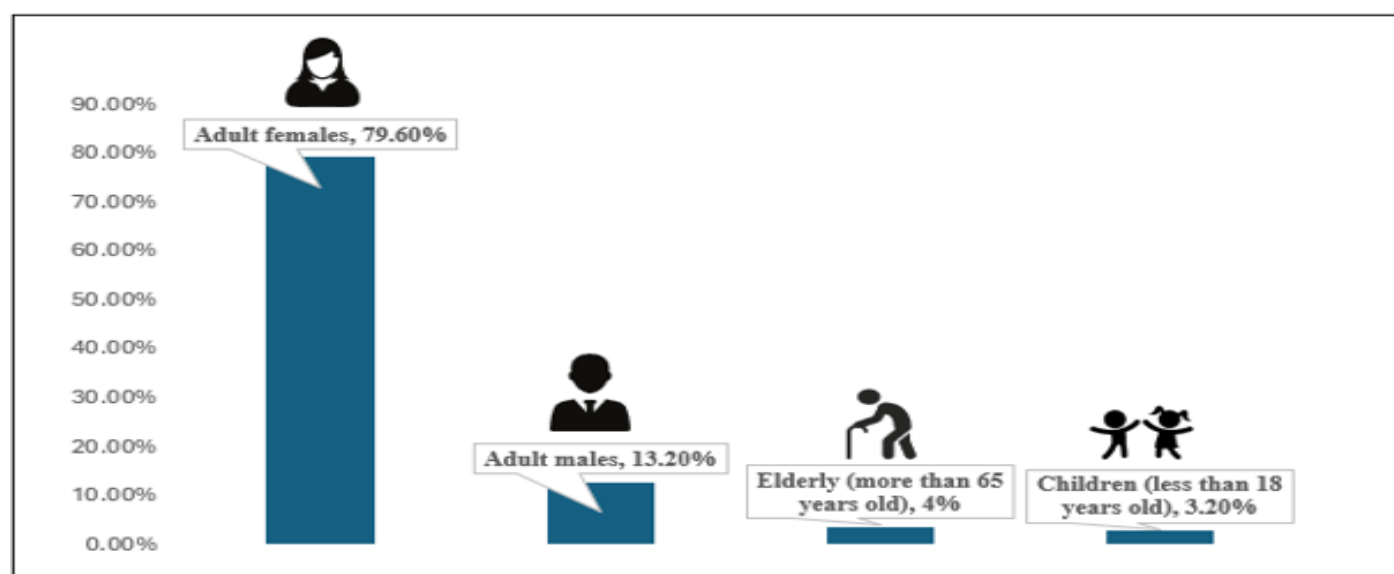


Figure 3. Pharmacists' observations of patient groups most frequently seeking anti-obesity medications

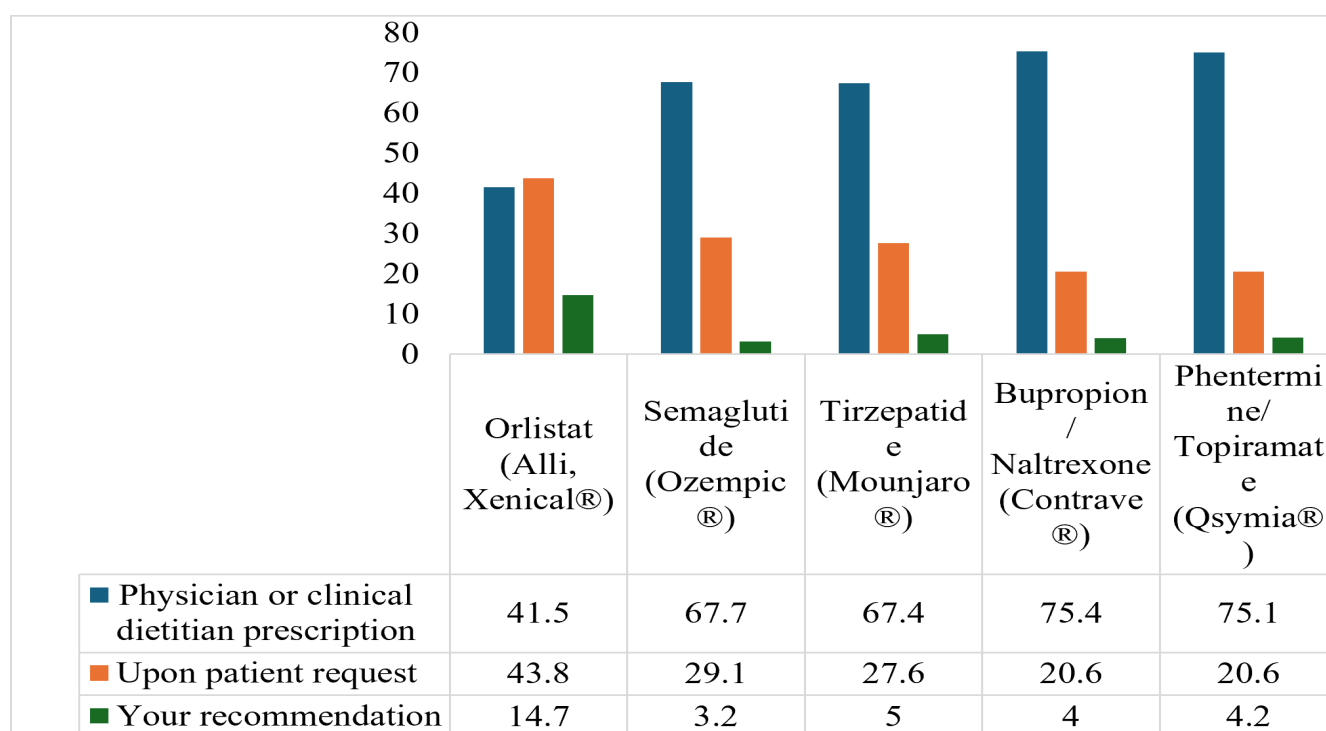


Figure 4. Mode of dispensing anti-obesity medications among community pharmacists.

Table 5. Pharmacists' views on their professional role in obesity management				
To what extent do you agree with the following statements?	Strongly Disagree/ Disagree n (%)	Neutral n (%)	Strongly Agree/ Agree n (%)	Mean $\pm$ SD
Pharmacists have a crucial role in obesity management	53 (13.2)	69 (17.2)	280 (69.6)	2.56 $\pm$ 0.715
Continuous education and training of pharmacists should include obesity management	46 (11.5)	48 (11.9)	308 (76.6)	2.65 $\pm$ 0.676
The media is playing a positive role in educating patients about anti-obesity medications	108 (26.8)	87 (21.6)	207 (51.5)	2.25 $\pm$ 0.851
Pharmacists should initiate a conversation regarding anti-obesity medication with individuals who are obese or overweight without the patient's request	136 (33.9)	81 (20.1)	185 (46.0)	2.12 $\pm$ 0.886

For analysis, these were collapsed into three categories (agree, neutral, disagree) to improve interpretability. Mean scores and standard deviations were also computed to reflect central tendencies.

Additional descriptive analyses were performed to assess demand for anti-obesity medications across patient groups (children, adults, and the elderly) and to evaluate pharmacists' practice patterns before and after dispensing, including reviewing medication histories, providing dietary and physical activity counseling, monitoring patient progress, and reporting adverse drug reactions. Finally, inferential analysis was conducted using chi-square tests to examine associations between pharmacists' demographic characteristics and their knowledge and practice scores. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of the College of Pharmacy, Dubai Medical University, UAE (Ref No: REC/UG/2023/03). All participants were informed of the study objectives, the voluntary nature of participation, and the confidentiality of their responses. Informed consent was obtained electronically (via Google Forms consent page). No personal identifiers were collected, and data were reported only in aggregate.

Table 6. Possible barriers to implementing obesity management services in community pharmacies				
To what extent do you agree with the following statements:				
Possible barriers to implementing obesity management services in community pharmacies				
	Strongly disagree /Disagree n (%)	Neutral n (%)	Strongly agree/ Agree n (%)	Mean $\pm$ SD
Insufficient staffing	82 (20.4)	132 (32.8)	188 (46.7)	2.26 $\pm$ 0.777
The pharmacist is not paid for offering this service	121 (30.1)	113 (28.1)	168 (41.8)	2.12 $\pm$ 0.841
Time limitations for offering these services	60 (14.9)	118 (29.4)	224 (55.7)	2.41 $\pm$ 0.736
Knowledge gaps affect the ability to offer this service	82 (20.4)	126 (31.3)	194 (48.2)	2.28 $\pm$ 0.781
Lack of interest by the pharmacist	161 (40.1)	124 (30.8)	117 (29.1)	1.89 $\pm$ 0.825
Insufficient insurance coverage and reimbursement	54 (13.5)	103 (25.6)	245 (61.0)	2.48 $\pm$ 0.721
The stigma surrounding obesity management limits the implementation of obesity management services	67 (16.6)	126 (31.3)	209 (52.0)	2.35 $\pm$ 0.750
To what extent do you agree with the following statements:				
Possible facilitators of implementing obesity management in community pharmacies				
Specialised training and certification for the pharmacist	20 (4.9)	72 (17.9)	310 (77.1)	2.72 $\pm$ 0.549
Allocate space for obesity management services	27 (6.7)	80 (19.9)	295 (73.4)	2.67 $\pm$ 0.598
Collaborations with local healthcare providers will positively influence the service implementation	17 (4.2)	66 (16.4)	319 (79.3)	2.75 $\pm$ 0.552
Improve the pharmacist's access to resources such as related educational materials and tools	19 (4.7)	53 (13.2)	330 (82.1)	2.77 $\pm$ 0.520

RESULTS

Participants Demographic Characteristics

A total of 402 community pharmacists participated in the study. Most were female 230 (57.2%), aged 25–35 years 259 (64.4%) and held a Bachelor of Pharmacy (BPharm) degree 287 (71.4%). More than a third had graduated in the UAE 153 (38.1%), and the majority had less than five years of professional experience 212 (52.7%). Pharmacies were mainly concentrated in Dubai 135 (33.6%), Abu Dhabi 130 (32.3%), and Sharjah 83 (20.6%). Nearly half of the pharmacies were located in residential areas 183 (45.5%) (Table 1).

Participants' Knowledge of Obesity and Anti-Obesity Medications

Most pharmacists 345 (85.8%) recognized obesity as a chronic disease. A large proportion, 286 (71.1%), correctly identified the BMI threshold for initiating pharmacological therapy. Awareness of FDA-approved medications varied: Orlistat was the most recognized, with 317 (78.9%) respondents, followed by Liraglutide with 229 (57.0%) and Tirzepatide with 228 (56.7%) respondents. In contrast, awareness was lower for Semaglutide 158 (39.3%), Bupropion/Naltrexone 89 (22.1%), and Phentermine/Topiramate 70 (17.4%) (Table 2).

Using the median split (cut-off score = 4 out of 8), 286 (71.1%) were classified as having good knowledge, while 116 (28.9%) were classified as having poor knowledge.

Participants' Perceptions of the Effectiveness and Safety of Anti-Obesity Medications

Regarding perceived effectiveness, Tirzepatide was most frequently identified as the most effective anti-obesity medication 274 (68.2%). This was followed by Orlistat 47 (11.7%) and Semaglutide 45 (11.2%), while fewer pharmacists selected Liraglutide 25 (6.2%), phentermine/topiramate 10 (2.5%), or Bupropion/Naltrexone 1 (0.2%) (Figure 1).

In terms of perceived safety, Orlistat was most commonly considered the safest option 215 (53.5%), followed by Tirzepatide 83 (20.6%) and Semaglutide 51 (12.7%). Smaller proportions selected Liraglutide 41 (10.2%), Bupropion/Naltrexone 9 (2.2%), and phentermine/topiramate 3 (0.7%) (Figure 2).

Pharmacists' Practice Patterns in Obesity Management

Pharmacists reported engaging in a variety of practices to support patients seeking weight-management advice, with non-pharmacological methods being the most common. Nearly half provided educational materials 199 (49.5%), referred patients to a clinical dietitian 197 (49.0%), or offered advice on physical activity 167 (41.5%) and healthy diet habits 143 (35.6%). In contrast, fewer reported recommending anti-obesity medications 34 (8.5%), herbal products 61 (15.2%),

or discouraging use altogether 18 (4.5%). When asked about specific medications, most participants 176 (43.8%) indicated they would never recommend a weight loss product. Among those who did, Orlistat was the most frequently recommended 105 (26.1%), followed by Tirzepatide 78 (19.4%), Semaglutide 23 (5.7%), and Liraglutide 7 (1.7%), with very few selecting Bupropion/Naltrexone 2 (0.5%) or Phentermine/Topiramate 1 (0.2%) (Table 3).

Pharmacists' practices in relation to obesity management were examined across three domains: activities before dispensing, after dispensing, and perceived patient demand for anti-obesity medications. Before dispensing, the most frequently reported practices were lifestyle counseling and safety checks. Over half of the participants 218 (54.2%) always provided advice on physical activity, and 197 (49.0%) always provided dietary recommendations. Nearly half also reviewed prior medication use 194 (48.3%), patients' medication histories 193 (48.0%), and medical histories 185 (46.0%). In contrast, objective physical assessments were less frequent, with only one-quarter of participants regularly measuring their weight 102 (25.4%), BMI (19.4%), or waist circumference 37 (9.2%) (Table 4).

After dispensing, 110 (27.4%) of pharmacists reported always monitoring patient progress, and 142 (35.3%) regularly followed up on adverse effects. Regarding demand, Semaglutide and Tirzepatide dominated patient interest, with 164 (40.8%) and 242 (60.2%) of pharmacists, respectively, reporting that patients always sought information about these agents. The demand for older medications, such as Orlistat 56 (13.9%) and Liraglutide 64 (15.9%), was moderate (Table 4).

Pharmacists observed distinct demographic trends in the demand for anti-obesity medications. Adult females accounted for the vast majority of requests, 320 (79.6%), compared to 53 (13.2%) from adult males. In contrast, only 13 (3.2%) requests came from children under 18 years, and 16 (4.0%) from elderly patients over 65 years (Figure 3).

Regarding dispensing practices, most pharmacists reported that anti-obesity medications were mainly provided following a physician or dietitian prescription, with rates ranging from 167 (41.5%) for Orlistat to 303 (75.4%) for Bupropion/Naltrexone. Orlistat was the only medication commonly dispensed upon patient request, 176 (43.8%), compared to 117 (29.1%) for Semaglutide and 111 (27.6%) for Tirzepatide. A smaller proportion indicated dispensing based on their own recommendation, ranging from 13 (3.2%) for Semaglutide to 59 (14.7%) for Orlistat (Figure 4).

Based on the median split (cut-off score = 36), pharmacists' practices regarding anti-obesity medications were almost evenly distributed. Out of the 402 participants, 213 (53.0%) were classified as having good practice, while 189 (47.0%) demonstrated poor practice.

Pharmacists' Roles, Training Needs, and Willingness

Most pharmacists acknowledged their professional role in weight-management. A total of 280 (69.6%) agreed that pharmacists play a crucial role in obesity care, and 308 (76.6%) supported integrating obesity management into continuing education programs. However, fewer pharmacists, 185 (46.0%), agreed that they should proactively initiate discussions with overweight or obese patients without a prior request. Slightly more than half, 207 (51.5%), perceived the media as contributing positively to patient education on (Table 5).

Regarding willingness to engage in training, the majority of pharmacists, 363 (90.3%), expressed willingness to receive further training in best practices for obesity management, while 17 (4.2%) reported no interest and 22 (5.5%) were unsure.

Barriers and Facilitators

Community pharmacists identified several barriers to implementing obesity management services. The most commonly reported obstacles were time limitations 224 (55.7%), insufficient insurance coverage and reimbursement 245 (61.0%), and knowledge gaps 194 (48.2%). Nearly half also cited insufficient staffing 188 (46.7%), while lack of compensation was highlighted by 168 (41.8%). Stigma surrounding obesity management was considered a barrier by 209 (52.0%), whereas a lack of interest was the least reported reason, at 117 (29.1%).

In contrast, several facilitators were strongly endorsed. The majority supported specialized training and certification 310 (77.1%), improved access to educational resources 330 (82.1%), dedicated space within pharmacies 295 (73.4%), and collaborations with local healthcare providers 319 (79.3%) (Table 6).

Demographic Predictors of Pharmacists' Knowledge and Practice in Obesity Management

Knowledge Associations

Chi-square tests were conducted to investigate potential relationships between pharmacists' demographic characteristics and their knowledge of anti-obesity medications. No statistically significant relationships were identified across all variables, including age, years of experience, emirate of practice, type of pharmacy location, gender, and educational level. Although some groups (e.g., younger pharmacists and PharmD holders) exhibited relatively higher proportions of good knowledge, these differences did not reach statistical significance. Based on these results, further regression analysis was conducted to examine potential adjusted effects (Table S2, Supplementary).

A binary logistic regression was conducted with knowledge (good vs poor, based on the median cut-off) as the dependent variable and gender, age, educational level, years of experience,



and emirate of practice as predictors. The model did not identify any statistically significant predictors of good knowledge ($p > 0.05$ overall). Pharmacists holding a PharmD degree had higher odds of possessing good knowledge than BPharm holders (OR = 1.79, 95% CI: 0.99–3.23, $p = 0.056$), although this trend did not reach statistical significance. Similarly, gender (OR = 1.39, 95% CI: 0.87–2.24, $p = 0.165$), years of experience, and age categories did not show significant effects. These results suggest that knowledge levels were broadly consistent across demographic groups (Table S3, Supplementary).

Practice Association

Chi-square analyses showed no significant associations between pharmacists' practice and demographic characteristics. Educational level ($p = 0.992$), age ($p = 0.112$), years of experience ($p = 0.846$), emirate of practice ($p = 0.681$), pharmacy location ($p = 0.405$), and gender ($p = 0.706$) were all non-significant (Table S4, Supplementary).

Although the overall model was not statistically significant ($\chi^2 = 16.84$, $df = 18$, $p = 0.534$), age categories showed statistically significant associations with practice within the model. However, given the non-significant overall model fit, these findings should be interpreted cautiously (Table S5, Supplementary).

DISCUSSION

This study assessed community pharmacists' knowledge, perceptions, and practices regarding anti-obesity medications in the UAE, as well as their willingness to implement weight-management services. Most participants were young, early-career professionals who showed generally good knowledge of obesity and its pharmacological management. Obesity was widely recognized as a chronic disease, and most pharmacists were aware of the BMI threshold for initiating pharmacotherapy. In terms of perceptions, Orlistat was most often viewed as the safest and Tirzepatide as the most effective, but practice was still largely centered on lifestyle advice or referrals rather than structured assessments. A minority reported dispensing restricted medications without a prescription, raising concerns about regulatory oversight.

The most important finding is the clear knowledge–practice gap. Pharmacists appear clinically capable but operationally constrained. This suggests that the barrier to structured obesity management in UAE community pharmacies is not primarily insufficient knowledge, but limited system-level opportunity, incentive alignment, and integration into formal care pathways.

The workforce profile is predominantly young, female, and metropolitan, mirroring global trends of feminization and urban clustering and is comparable to Lebanon and Saudi Arabia^{25,30,31}. While this expansion is encouraging, it may partly explain why high knowledge levels did not consistently translate into strong practice behaviors. Early-career pharmacists may possess contemporary academic preparation but limited experiential

confidence and reduced authority within traditionally physician-led healthcare hierarchies. Within the UAE healthcare context, which remains largely physician-centered, community pharmacists are not formally positioned as primary providers of chronic disease oversight. This structural positioning may limit both patient expectations and pharmacists' willingness to assume expanded roles^{32,33}.

Studies from neighboring Middle Eastern countries similarly report uneven familiarity with newer anti-obesity pharmacotherapies^{30,34,35}. International evidence indicates that pharmacist engagement in obesity services improves when supported by structured continuing professional development and formal primary care integration. Evidence from Malaysia further demonstrates that even short-term training can enhance knowledge and confidence²⁹.

Pharmacists' perceptions of anti-obesity medicines reflected both scientific evidence and external influences. For example, their preference for Orlistat as the safest option and Tirzepatide as the most effective reflects both clinical evidence and the media visibility of newer incretin-based therapies^{36,37}. However, Phentermine was consistently viewed as unsafe, a perception that aligns with international evidence³⁸. In rapidly evolving therapeutic areas, professional judgment may be influenced not only by guidelines but also by market exposure and patient demand, underscoring the importance of evidence-based continuing education.

Engagement in obesity management was moderate. Most pharmacists provided basic advice or educational materials, and referrals to dietitians were common. However, few conducted structured assessments, such as BMI or waist circumference measurements, despite having the knowledge to do so. Similar patterns have been reported in Jordan and Qatar^{23,24,25,27,30,35,39}, suggesting that translating knowledge into practice is frequently constrained by contextual factors rather than by competency alone.

Dispensing practices also highlighted regulatory and professional challenges. Most pharmacists dispensed medications only with physician or dietitian support, though Orlistat was often provided on direct request, reflecting its over-the-counter status³⁹. A minority reported dispensing GLP-1 receptor agonists without prescription, echoing findings from Turkey and the US, where commercial pressures have influenced access³⁴. Similar inequities in GLP-1 access linked to socioeconomic status and provider type have been reported in the US⁴⁰.

Patterns of demand reinforced these challenges. Women were consistently identified as the main consumers of anti-obesity medicines, aligning with global evidence^{41,42}. Sociocultural emphasis on body image and gendered health-seeking behavior may contribute to this distribution. Conversely, obesity stigma, particularly among men, may reduce engagement⁴³.



Monitoring and follow-up were limited. Few pharmacists routinely measured anthropometric parameters, and only a minority conducted structured follow-up after dispensing. Similar monitoring gaps have been reported internationally^{23,25,39}.

The absence of significant demographic predictors suggests that barriers may operate at systemic or organizational levels rather than being confined to individual characteristics. In the UAE's predominantly private and physician-centered healthcare model, community pharmacists are not formally positioned as primary providers of chronic disease oversight⁴⁴. Unlike healthcare systems such as the UK and Australia, where pharmacist-led weight-management services are commissioned, protocolled, reimbursed, and integrated into national primary care frameworks, UAE pharmacists operate without formal service designation, defined monitoring mandates, or reimbursement structures^{27,45}. Without defined service mandates, structured documentation requirements, and financial recognition, obesity counseling remains opportunistic rather than systematically embedded within care pathways^{23,24,25,29,46}. Strengthening pharmacist involvement in obesity management in the UAE will therefore require clearer regulatory guidance, formal service integration, recognition of reimbursement, and incorporation into national non-communicable disease strategies.

The principal barriers identified were time pressure, staffing constraints, lack of reimbursement, and knowledge gaps, challenges that mirror those reported across pharmacy settings worldwide^{47,48}. Previous evaluations of commissioned weight-management programs demonstrate that without financial recognition and formal service designation, sustainability remains limited²⁷. Broader international evidence highlights additional structural impediments, including short service duration, limited multidisciplinary collaboration, and heterogeneous implementation models⁴⁹. Furthermore, professional comfort, self-efficacy, and perceived competence have been shown to influence counseling behaviour⁵⁰ while persistent weight stigma among both healthcare providers and the public continues to undermine proactive engagement⁵¹.

Positively, the facilitators prioritized by pharmacists align with internationally recognized enablers, including structured training and certification, dedicated consultation spaces, standardized monitoring tools, and formal collaboration with dietitians and physicians. Evidence from integrated systems demonstrates that pharmacist-led telehealth, protocolised GLP-1 management, and digital follow-up frameworks can enhance continuity and outcomes^{52,53,54}.

Synthesizing these findings, a pragmatic pathway for pharmacist-led weight management in the UAE may rest on three pillars: (1) workforce development through targeted training in obesity pharmacotherapy and behavior change; (2) service design incorporating private consultation areas

and structured monitoring templates; and (3) policy levers including commissioning, reimbursement, and outcome-based evaluation⁵⁵⁻⁵⁹. Together, these measures could transform pharmacy practice from opportunistic counseling into structured, measurable, and sustainable weight-management services.

Strengths and Limitations

This study is among the first in the UAE to assess community pharmacists' knowledge and practice regarding anti-obesity medications, and a robust sample supports it. The inclusion of both descriptive and inferential analyses, including regression modelling, provided a comprehensive assessment of potential predictors.

However, the cross-sectional design limits causal inference, and reliance on self-reported data introduces potential recall and social desirability bias. Although pharmacists were sampled from multiple emirates, findings may not be fully generalisable to smaller or rural settings. The median cut-off approach, although methodologically consistent, may oversimplify variations in knowledge and practice; the absence of qualitative insights also limits the exploration of contextual barriers and facilitators.

CONCLUSIONS AND RECOMMENDATIONS

This study showed that UAE community pharmacists possess generally good baseline knowledge of obesity and its pharmacological management, yet this has not consistently translated into practice. Familiarity with newer pharmacotherapies was weaker, and engagement in structured weight-management activities such as monitoring and follow-up remained limited. Importantly, no statistically detectable subgroup differences were observed within the limits of this sample.

Overall, the findings reveal both readiness and barriers: pharmacists are willing to assume a more formal role in obesity care, but operational constraints, time pressure, limited training, limited consultation space, and inadequate reimbursement limit their ability to contribute. The persistence of the knowledge–practice gap reflects structural, commercial, cultural, and regulatory determinants rather than individual incompetence.

From a policy perspective, commissioning pharmacist-led services and embedding them within national obesity strategies may provide a structural mechanism to support implementation and sustainability. However, a prospective evaluation would be required to determine the impact on accessibility, equity, and patient outcomes. Future research should include qualitative studies to explore contextual challenges, alongside interventional trials to evaluate the effectiveness of targeted training and service redesign.

References

1. Abbade, E. B. (2018). The relationships between obesity-increasing risk factors for public health, environmental impacts, and health expenditures worldwide. *Management of Environmental Quality: An International Journal*, 29(1), 131–147. <https://doi.org/10.1108/MEQ-08-2016-0058>
2. James, W. P. T. (2018). Obesity: A Global Public Health Challenge. *Clinical Chemistry*, 64(1), 24–29. <https://doi.org/10.1373/CLINCHEM.2017.273052>
3. Jastreboff, A. M., Kotz, C. M., Kahan, S., Kelly, A. S., & Heymsfield, S. B. (2019). Obesity as a Disease: The Obesity Society 2018 Position Statement. *Obesity*, 27(1), 7–9. <https://doi.org/10.1002/OBY.22378>;PAGE:STRING:ARTICLE/CHAPTER
4. Kapantais, E., Athanasakis, K., Vlachopapadopoulou, E. A., & Tentolouris, N. (2023). Acceptance: 07.10.2023 *J Atherosclerosis Prev Treat. Evangelia Charmandari*, 14(2), 1–18. <https://doi.org/10.53590/japt.02.1044>
5. Lim, Y., Haq, N., & Boster, J. (2024). Obesity and Comorbid Conditions. *StatPearls*. <https://www.ncbi.nlm.nih.gov/books/NBK574535/>
6. Sarma, S., Sockalingam, S., & Dash, S. (2021). Obesity as a multisystem disease: Trends in obesity rates and obesity-related complications. *Diabetes, Obesity and Metabolism*, 23(S1), 3–16. <https://doi.org/10.1111/DOM.14290>;SUBPAGE:STRING:ABSTRACT;CSUBTYPE:STRING:VOLUME
7. Okunogbe, A., Nugent, R., Spencer, G., Ralston, J., & Wilding, J. (2021). Economic impacts of overweight and obesity: current and future estimates for eight countries. *BMJ Global Health*, 6(10), 6351. <https://doi.org/10.1136/BMJGH-2021-006351>
8. Wolfenden, L., Ezzati, M., Larijani, B., & Dietz, W. (2019). The challenge for global health systems in preventing and managing obesity. *Obesity Reviews*, 20(S2), 185–193. <https://doi.org/10.1111/OBR.12872>;SUBPAGE:STRING:FULL
9. Abdelgadir, E., Rashid, F., Bashier, A., Zidan, M., McGowan, B., & Alawadi, F. (2025). Prevalence of overweight and obesity in adults from the Middle East: A large-scale population-based study. *Diabetes, Obesity and Metabolism*, 27(7), 3676–3685. <https://doi.org/10.1111/DOM.16389>;PAGEGROUP:STRING:PUBLICATION
10. Haththotuwa, R. N., Wijeyaratne, C. N., & Senarath, U. (2020). Worldwide epidemic of obesity. *Obesity and Obstetrics*, 3–8. <https://doi.org/10.1016/B978-0-12-817921-5.00001-1>
11. Ryan, D., Barquera, S., Cavalcanti, O. B., & Ralston, J. (2021). The Global Pandemic of Overweight and Obesity. *Handbook of Global Health: With 362 Figures and 152 Tables*, 739–773. https://doi.org/10.1007/978-3-030-45009-0_39
12. El Shebini, S. M., Moaty, M. I. A., & Ahmed, N. H. (2025). Understanding obesity: History, epidemiology, causes, consequences and comprehensive solutions. *Liaquat National Journal of Primary Care*, 7(3), 275–282. <https://doi.org/10.37184/Injpc.2707-3521.7.54>
13. Bischoff, S. C., & Schweinlin, A. (2020). Obesity therapy. *Clinical Nutrition ESPEN*, 38, 9–18. <https://doi.org/10.1016/J.CLNESP.2020.04.013>
14. Kumar, M., Hussain, M. S., Sonu, Raj, S., Verma, R., Sharma, S., & Sahu, S. K. (2022). An Overview of Treatment Modalities and Management Aspects for Obesity. *Current Nutrition & Food Science*, 19(2), 105–113. <https://doi.org/10.2174/1573401318666220527124759/CITE/REFWORKS>
15. Cannon, C. P., & Kumar, A. (2009). Treatment of overweight and obesity: Lifestyle, pharmacologic, and surgical options. *Clinical Cornerstone*, 9(4), 55–71. [https://doi.org/10.1016/S1098-3597\(09\)80005-7](https://doi.org/10.1016/S1098-3597(09)80005-7)
16. Kushner, R. F. (2018). Weight Loss Strategies for Treatment of Obesity: Lifestyle Management and Pharmacotherapy. *Progress in Cardiovascular Diseases*, 61(2), 246–252. <https://doi.org/10.1016/J.PCAD.2018.06.001>
17. Iannone, A., Natale, P., Palmer, S. C., Nicolucci, A., Rendina, M., Giorgino, F., Laviola, L., Di Leo, A., & Strippoli, G. F. M. (2023). Clinical outcomes associated with drugs for obesity and overweight: A systematic review and network meta-analysis of randomized controlled trials. *Diabetes, Obesity and Metabolism*, 25(9), 2535–2544. <https://doi.org/10.1111/DOM.15138>;REQUESTEDJOURNAL:JOURNAL:14631326;PAGE:STRING:ARTICLE/CHAPTER
18. Lupianez-Merly, C., Dilmaghani, S., Vosoughi, K., & Camilleri, M. (2024). Review article: Pharmacologic management of obesity - updates on approved medications, indications and risks. *Alimentary Pharmacology & Therapeutics*, 59(4), 475–491. <https://doi.org/10.1111/APT.17856>
19. Tak, Y. J., & Lee, S. Y. (2021). Long-Term Efficacy and Safety of Anti-Obesity Treatment: Where Do We Stand? *Current Obesity Reports*, 10(1), 14–30. <https://doi.org/10.1007/S13679-020-00422-W/METRICS>
20. Blüher, M., Aras, M., Aronne, L. J., Batterham, R. L., Giorgino, F., Ji, L., Pietiläinen, K. H., Schnell, O., Tonchevska, E., & Wilding, J. P. H. (2023). New insights into the treatment of obesity. *Diabetes, Obesity and Metabolism*, 25(8), 2058–2072. <https://doi.org/10.1111/DOM.15077>
21. le Roux CW, Done N, Brnabic AJM, Zion A, Lipkovich I, Kadziola Z, Dunn JP, Desai U, Kirson N, Dimitriadis GK, Kan H. Comparative effectiveness of tirzepatide and semaglutide for obesity management in US clinical practice: a 6-month retrospective cohort study. *J Endocrinol Invest*. 2026 Feb;49(2):413-423. doi: 10.1007/s40618-025-02792-1. Epub 2026 Feb 9. PMID: 41661445; PMCID: PMC12924827.
22. Burrell, D. N. (2025). Pharmacists and Community-Based Pharmacies in an Expanded Role in Patient Care and Public Health in The U.S. *Bulletin of the Transilvania University of Brasov. Series VI: Medical Sciences*, 18(67), 1–22. <https://doi.org/10.31926/>



BUT.MS.2025.67.18.1.3

23. Almukdad, S., Zaghloul, N., Awaisu, A., Mahfoud, Z. R., Kheir, N., & Hajj, M. S. El. (2021). Exploring the role of community pharmacists in obesity and weight management in Qatar: A mixed-methods study. *Risk Management and Healthcare Policy*, 14, 2771–2787. <https://doi.org/10.2147/RMHP.S309142;PAGE=STRING:ARTICLE/CHAPTER>
24. AlOmeir, O., Almuqbil, M., Alhabshi, H. A., Alenazy, M. M. S., Masaod Hagwi, S. M. A. J., Alsanie, W. F., Alamri, A. S., Alhomrani, M., Alshammary, A. F., Gilkamenthi, R., & Asdaq, S. M. B. (2025). Exploring the role of community pharmacists in addressing obesity: a Saudi Arabian perspective. *Frontiers in Public Health*, 13, 1503260. <https://doi.org/10.3389/FPUH.2025.1503260/BIBTEX>
25. Hijazi, M. A., Shatila, H., El-Lakany, A., Al Rifai, H., Aboul-Ela, M., & Naja, F. (2020). Role of community pharmacists in weight management: Results of a national study in Lebanon. *BMC Health Services Research*, 20(1), 1–12. <https://doi.org/10.1186/S12913-020-05258-7/TABLES/8>
26. Naja, F., Alzubaidi, H., Ahmad, M., Abbas, N., Hamid, Q., Alzoubi, K. H., & Alameddine, M. (2025). The Role of Community Pharmacists in the Control of Non-Communicable Diseases: A National Survey From the United Arab Emirates. *World Medical and Health Policy*. <https://doi.org/10.1002/WMH3.70002;JOURNAL:JOURNAL:19484682;WGROU:STRING:PUBLICATION>
27. Newlands, R. S., Watson, M. C., & Lee, A. J. (2011). The provision of current and future Healthy Weight Management (HWM) services from community pharmacies: a survey of community pharmacists' attitudes, practice and future possibilities. *International Journal of Pharmacy Practice*, 19(2), 106–114. <https://doi.org/10.1111/J.2042-7174.2010.00080.X>
28. Supsongserm, P., Thin, S. M., Nerapusee, O., Sorofman, B. A., Watcharadamrongkun, S., & Kittisopee, T. (2023). Factors contributing to pharmacists' intention to provide weight management service in community pharmacy settings: A systematic review. *Pharmacy Practice*, 21(2), 1–19. <https://doi.org/10.18549/PHARMRACT.2023.2.2790>
29. Verma, R. K., Paraidathathu, T., Taha, N. A., & Chong, W. W. (2019). Attitudes, practices, and barriers of Malaysian community pharmacists toward provision of weight management services. *Frontiers in Pharmacology*, 10(February), 443406. <https://doi.org/10.3389/FPHAR.2019.00138/BIBTEX>
30. Alshahrani, A. (2020). Knowledge, attitudes, and practice of community pharmacists towards providing counseling on vitamins, and nutritional supplements in Saudi Arabia. *AIMS Public Health*, 7(3), 697. <https://doi.org/10.3934/PUBLICHEALTH.2020054>
31. Bates, I., John, C., Bruno, A., Fu, P., & Aliabadi, S. (2016). An analysis of the global pharmacy workforce capacity. *Human Resources for Health*, 14(1), 1–7. <https://doi.org/10.1186/S12960-016-0158-Z/FIGURES/5>
32. Ahmad, M., Naja, F., Alzubaidi, H., Alzoubi, K. H., Hamid, Q., & Alameddine, M. (2024). A stakeholders' perspective on enhancing community pharmacists' roles in controlling non-communicable diseases in the United Arab Emirates. *Journal of Pharmaceutical Policy and Practice*, 17(1). <https://doi.org/10.1080/20523211.2024.2404080>
33. Sadek, M. M., Elnour, A. A., Al Kalbani, N. M. S., Bhagavathula, A. S., Baraka, M. A., Aziz, A. M. A., & Shehab, A. (2016). Community pharmacy and the extended community pharmacist practice roles: The UAE experiences. *Saudi Pharmaceutical Journal*, 24(5), 563–570. <https://doi.org/10.1016/j.jsps.2015.03.023>
34. Aksoy, N., & Erdoğan, N. G. (2022). PERCEPTION OF COMMUNITY PHARMACIST TOWARD WEIGHT LOSS PRODUCTS: KAHRAMANMARAS CITY SAMPLE. *Journal of Faculty of Pharmacy of Ankara University*, 46(3), 955–966. <https://doi.org/10.33483/JFPAU.1147465>
35. Anan S. Jarab, W. A.-Q., D. F. M., S. R. A. H., A. Y. N. Y. N. A. H., A. A. (2024). View of Factors contributing to pharmacists' intention to provide weight management service in community pharmacy settings: A systematic review. <https://www.pharmacypractice.org/index.php/pp/article/view/2790/1080>
36. Henderson Lewis, K., Sloan, C. E., Bessesen, D. H., & Arterburn, D. (2024). Effectiveness and safety of drugs for obesity. *BMJ*, 384. <https://doi.org/10.1136/BMJ-2022-072686>
37. Mattingly, T. J., & Conti, R. M. (2025). Marketing and Safety Concerns for Compounded GLP-1 Receptor Agonists. *JAMA Health Forum*, 6(1), e245015–e245015. <https://doi.org/10.1001/JAMAHEALTHFORUM.2024.5015>
38. Lewis, K. H., Gudzone, K. A., & Ard, J. D. (2024). Phentermine in the Modern Era of Obesity Pharmacotherapy: Does It Still Have a Role in Treatment? *Current Obesity Reports*, 13(1), 132–140. <https://doi.org/10.1007/S13679-023-00546-9/METRICS>
39. Faki, S., Marriott, J. L., & Hussain, S. Y. (2015). A national mailed survey exploring weight management services across Australian community pharmacies. *Australian Journal of Primary Health*, 21(2), 197–204. <https://doi.org/10.1071/PY13118>
40. Moore, J., Ihome, N., Rebold, N. S., Kusi, H., Mere, C., Nwaogwugwu, U., Ettienne, E., Chaijamorn, W., & Rungkitwattanukul, D. (2025). Factors and Disparities Influencing Sodium-Glucose Cotransporter 2 Inhibitors and Glucagon-like Peptide 1 Receptor Agonists Initiation in the United States: A Scoping Review of Evidence. *Pharmacy (Basel, Switzerland)*, 13(2), 46. <https://doi.org/10.3390/pharmacy13020046>
41. Guglielmi, V., Dalle Grave, R., Leonetti, F., & Solini, A. (2024). Female obesity: clinical and psychological assessment toward the best treatment. *Frontiers in Endocrinology*, 15, 1349794. <https://doi.org/10.3389/FENDO.2024.1349794/XML>
42. Saxon, D. R., Iwamoto, S. J., Mettenbrink, C. J., McCormick, E., Arterburn, D., Daley, M. F., Oshiro, C. E., Koebnick, C., Horberg, M., Young, D. R., & Bessesen, D. H. (2019). Antiobesity Medication Use in 2.2 Million Adults Across Eight Large Health Care Organizations: 2009–2015. *Obesity*, 27(12), 1975–1981. <https://doi.org/10.1002/OBY.22581;WGROU:STRING:PUBLICATION>



43. Elliott, M., Gillison, F., & Barnett, J. (2020). Exploring the influences on men's engagement with weight loss services: a qualitative study. *BMC Public Health* 20:1, 20(1), 249-. <https://doi.org/10.1186/s12889-020-8252-5>
44. Palaian, S., Alomar, M., Hassan, N., & Boura, F. (2022). Opportunities for extended community pharmacy services in United Arab Emirates: perception, practice, perceived barriers and willingness among community pharmacists. *Journal of Pharmaceutical Policy and Practice*, 15(1). <https://doi.org/10.1186/s40545-022-00418-y>
45. Ballaram, S., Perumal-Pillay, V., & Suleman, F. (2024). A scoping review of continuing education models and statutory requirements for pharmacists globally. *BMC Medical Education*, 24(1), 1–15. <https://doi.org/10.1186/S12909-024-05322-4/TABLES/3>
46. Jovanović, M., Kovačević, M., & Ćulafić, M. (2024). Role of Pharmacists in the Management of Patients with Obesity. *Arh. Farm*, 74, 483–508. <https://doi.org/10.5937/arhfarm74-50561>
47. Okoro, R. N., & Nduaguba, S. O. (2021). Community pharmacists on the frontline in the chronic disease management: The need for primary healthcare policy reforms in low and middle income countries. *Exploratory Research in Clinical and Social Pharmacy*, 2, 100011. <https://doi.org/10.1016/J.RCSOP.2021.100011>
48. Udoh, A., Ernewati, D. K., Akpan, M., Galbraith, K., & Bates, I. (2020). Pharmacies and primary care: a global development framework. *Bulletin of the World Health Organization*, 98(11), 809. <https://doi.org/10.2471/BLT.19.248435>
49. Alhomoud, I. S., Cook, E., Patel, D., Brown, R. E., & Dixon, D. L. (2024). Effect of pharmacist interventions on the management of overweight and obesity: A systematic review. *Journal of the American Pharmacists Association*, 64(3), 102058. <https://doi.org/10.1016/J.JAPH.2024.102058>
50. Dastani, H. B., Brown, C. M., & O'Donnell, D. C. (2004). Combating the obesity epidemic: Community pharmacists' counseling on obesity management. *Annals of Pharmacotherapy*, 38(11), 1800–1804. <https://doi.org/10.1345/APH.1E205;PAGE:STRING:ARTICLE/CHAPTER>
51. Jolin, J. R., & Stanford, F. C. (2023). More to obesity than what meets the eye: a comprehensive approach to counteracting obesity stigma. *Postgraduate Medical Journal*, 99(1171), 367–369. <https://doi.org/10.1136/PMJ-2022-142082>
52. Crocetta, N., Guay, K., & Watson, A. (2023). Evaluation of a pharmacist's impact on the use of glucagon-like peptide-1 receptor agonists for weight management in a family medicine setting. *Family Practice*, 40(2), 255–260. <https://doi.org/10.1093/FAMPRA/CMAC110>
53. Gómez-Martínez, J., López-Pintor, E., & Lumbreras, B. (2020). Effectiveness of a patient-centered weight management model in a community pharmacy: An interventional study. *Patient Preference and Adherence*, 14, 1501–1511. <https://doi.org/10.2147/PPA.S260404>
54. Haverkamp, K., Newberry, P., & Baker, J. (2022). Impact of a pharmacist-run weight loss medication management service. *Journal of the American Pharmacists Association*, 62(3), 883–888. <https://doi.org/10.1016/J.JAPH.2021.11.022>
55. Bates, I., John, C., Seegobin, P., & Bruno, A. (2018). An analysis of the global pharmacy workforce capacity trends from 2006 to 2012. *Human Resources for Health*, 16(1), 1–9. <https://doi.org/10.1186/S12960-018-0267-Y/FIGURES/6>
56. Clements, J. N., Albanese, N. P., D'Souza, J. J., Misher, A., Reece, S., Trujillo, J., & Whitley, H. P. (2021). Clinical review and role of clinical pharmacists in obesity management: An opinion of the endocrine and metabolism practice and research network of the American College of Clinical Pharmacy. *JACCP Journal of the American College of Clinical Pharmacy*, 4(11), 1469–1484. <https://doi.org/10.1002/JAC5.1512;CTYPE:STRING:JOURNAL>
57. Natalie Raffoul. (2020). Australia's rising obesity burden: Can pharmacists help? | Australian Pharmacist. <https://search.informit.org/doi/abs/10.3316/informit.445993132472593>
58. Strand, M. A., Mager, N. A. D., Hall, L., Martin, S. L., & Sarpong, D. F. (2020). Pharmacy Contributions to Improved Population Health: Expanding the Public Health Roundtable. *Preventing Chronic Disease*, 17, E113. <https://doi.org/10.5888/PCD17.200350>
59. WHO. (2024). Body mass index (BMI). <https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/body-mass-index>

Supplementary

Table S2. Association between demographic characteristics and knowledge (Chi-square test results)			
Variable	χ^2 (df)	p-value	Significant Association
Gender	2.687 (1)	0.101	No
Age categories	4.023 (3)	0.259	No
Education level	4.356 (3)	0.226	No
Years of experience	2.412 (2)	0.299	No
Emirate of practice	5.676 (6)	0.46	No
Pharmacy location	9.374 (8)	0.312	No

Table S3. Binary logistic regression of factors associated with knowledge ^{1 2 3 4 5}					
Predictor	Wald χ^2	df	p-value	OR (Exp(B))	95% CI
Gender (Male vs Female)	1.927	1	0.165	1.39	(0.87 – 2.20)
Education level	4.566	3	0.206	—	—
• MPharm vs BPharm	0.052	1	0.82	0.91	(0.42 – 1.96)
• PhD vs BPharm	0.441	1	0.507	0.47	(0.05 – 4.40)
• PharmD vs BPharm	3.658	1	0.056	1.79	(0.97 – 3.31)
Emirate of practice	4.493	6	0.61	—	—
• Ajman vs Abu Dhabi	1.797	1	0.18	0.44	(0.13 – 1.46)
• Dubai vs Abu Dhabi	0.073	1	0.787	0.93	(0.53 – 1.61)
• Fujairah vs Abu Dhabi	0.347	1	0.556	1.56	(0.35 – 6.95)
• Ras Al Khaimah vs Abu Dhabi	0.006	1	0.94	1.04	(0.34 – 3.17)
• Sharjah vs Abu Dhabi	1.135	1	0.287	1.39	(0.76 – 2.52)
• Umm Al Quwain vs Abu Dhabi	0	1	0.999	—	—
Age categories	3.052	3	0.384	—	—
• >45 vs <25	1.857	1	0.173	2.87	(0.63 – 13.11)
• 25–35 vs <25	0.159	1	0.691	0.88	(0.47 – 1.64)
• 35–45 vs <25	0.351	1	0.554	1.36	(0.49 – 3.75)
Years of experience	2.071	2	0.355	—	—
• >10 vs <5 years	0.378	1	0.539	0.77	(0.34 – 1.73)
• 6–10 vs <5 years	2.047	1	0.153	0.66	(0.37 – 1.19)

- 1 Female gender
- 2 BPharm qualification
- 3 Abu Dhabi
- 4 Age <25 years
- 5 Experience <5 years



Table S4. Chi-square tests of association between demographic characteristics and pharmacists' practice toward anti-obesity medications (N = 402)

Variable	Categories Compared	χ^2 (df)	p-value
Educational level	BPharm, MPharm, PhD, PharmD	0.098 (3)	0.992
Age group	<25, 25–35, 35–45, >45 years	5.994 (3)	0.112
Years of experience	<5, 6–10, >10 years	0.335 (2)	0.846
Emirate	Abu Dhabi, Dubai, Sharjah, others	3.966 (6)	0.681
Pharmacy location	Residential, shopping mall, medical center, others	8.299 (2)	0.405
Gender	Female vs Male	0.142 (1)	0.706

Table S5. Logistic regression analysis of predictors of pharmacists' knowledge and practice towards anti-obesity medications

Predictor	Knowledge OR (95% CI)	p-value	Practice OR (95% CI)	p-value
Gender (Male vs. Female)	1.39 (0.87–2.24)	0.165	0.83 (0.55–1.26)	0.391
Educational level				
– MPharm vs. BPharm	0.91 (0.42–1.96)	0.82	1.12 (0.58–2.15)	0.75
– PhD vs. BPharm	0.47 (0.07–3.05)	0.507	0.63 (0.08–5.02)	0.629
– PharmD vs. BPharm	1.79 (0.99–3.23)	0.056	1.01 (0.57–1.78)	0.962
Age category				
– >45 vs <25 years	2.87 (0.69–11.8)	0.173	5.02 (1.14–22.1)	0.033*
– 25–35 vs <25 years	0.87 (0.44–1.75)	0.691	1.99 (1.09–3.64)	0.025*
– 35–45 vs <25 years	1.36 (0.49–3.79)	0.554	3.10 (1.18–8.16)	0.021*
Experience				
– <5 vs. >10	0.77 (0.36–1.63)	0.539	0.65 (0.34–1.26)	0.264
– 6–10 vs. >10	0.66 (0.36–1.22)	0.153	0.87 (0.49–1.55)	0.583
Emirate	ns	>0.05	ns	>0.05
Pharmacy location	ns	>0.05	ns	>0.05
Knowledge (Good vs. Poor)	–	–	1.16 (0.74–1.82)	0.524