
Knowledge, attitudes, and practices of community pharmacists in promoting lifestyle modifications for health promotion in Sulaymaniyah City

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Mohammed Jamal Ahmed¹

Kameran Hassan Ismail²

ABSTRACT

Background and objective: Lifestyle modification counseling by pharmacists is essential in managing chronic diseases. Community pharmacists are well positioned to conduct health promotion initiatives due to enhanced accessibility and the absence of a need for earlier appointments. This study aimed to evaluate community pharmacists' knowledge, attitudes, and practice roles regarding lifestyle modification counseling.

Methods: A structured questionnaire was used to survey community pharmacists in a cross-sectional study conducted in Sulaymaniyah city from November 2024 to February 2025. A convenience sampling method was used to include a diverse group of pharmacists. The survey evaluated knowledge levels, attitudes toward lifestyle change, adequacy of practice counseling, and barriers. Descriptive statistics and chi-square tests were used to analyze the data and identify associations.

Results: This survey garnered 311 responses from a pool of 500 community pharmacy professionals, a 62.2% response rate; 136 were male and 175 were female. Among respondents, 40.8% showed good knowledge, 54% had moderate knowledge, and 5.1% had poor knowledge of lifestyle change. Additionally, 76% demonstrated adequate practice. A significant association was found between higher knowledge levels and positive attitudes. Knowledge scores showed no significant association with place of graduation ($p = 0.13$) or employment sector ($p = 0.37$). Notably, 56% of pharmacists reported not having enough time, and more than 60% cited a lack of patient motivation as the primary barrier.

Conclusion: Community pharmacists in Sulaymaniyah have positive attitudes toward lifestyle modification counseling, but knowledge gaps and systemic barriers impede effective implementation. Improving pharmacists' contribution to health promotion will depend on addressing these issues through focused educational initiatives and interprofessional collaboration.

Keywords: Community pharmacists, Health promotion, Lifestyle modification, Physical activity, Nutrition

¹ Department of Clinical Pharmacy, College of Pharmacy, Hawler Medical University, Erbil, Kurdistan Region, Iraq.

² Department of Community Medicine, College of Medicine, Hawler Medical University, Erbil, Kurdistan Region, Iraq.

Correspondence: Mohammed Jamal Ahmed, Mohammed@pha.hmu.edu.krd

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INTRODUCTION

Health promotion is a global health service priority (1). The global role of community pharmacy professionals is advancing from medication formulation and dispensing to patient care and health promotion (2). Nutrition, ideal weight control, and physical activity to support physical health are all part of a combined measure for health promotion, aimed at improving health status and reducing personal and societal costs (1). Community pharmacists' willingness to act as health advocates lies in empowering patients to change their lifestyles and manage their health through lifestyle modification education and counseling (3). Community pharmacy professionals are an essential element of healthcare, carry considerable influence over public health practice, and play a significant role in patient education regarding both non-pharmacologic and pharmacologic treatment — a role reflected in trials showing that structured clinical pharmacist-led interventions can meaningfully improve treatment outcomes and medication adherence (4, 5).

Embracing a balanced diet, exercising regularly, quitting smoking, and reducing alcohol consumption all play a vital role in a healthy lifestyle. Evidence shows that lifestyle changes can help reduce the risk of chronic conditions and enhance patient wellness by lowering complications and healthcare costs (6). Community pharmacists and other healthcare providers are increasingly recognized as key members of multidisciplinary teams supporting lifestyle change through education and empowerment. When doctors, nurses, and other health professionals model healthy lifestyles themselves, they can play an essential role in advancing public health by inspiring patients to do the same (7).

Community pharmacists are immensely important for public health because they are easy to reach and provide important assistance with medicine management, patient education, and preventive care, including vaccinations and health checks. Their importance has been especially emphasized during health crises, as they have helped ensure the provision of essential health services to communities, including the most vulnerable populations (8), and they significantly enhance disease prevention and health promotion through point-of-care diagnostics and chronic illness support, even during pandemics and disasters (9). Applying a Knowledge, Attitude, and Practice (KAP) study among pharmacists is valuable for evaluating their current ability to understand and act on health promotion initiatives; pharmacists are also frequently the most accessible healthcare professionals, serving an important role in patient education and the distribution of health information (10).

By identifying these gaps through KAP studies, stakeholders can develop tailored solutions to support pharmacists, thereby enhancing the quality of healthcare services and patient outcomes. Research evaluating pharmacists' participation in public health initiatives has underscored the need for structural support and continuing professional development to empower pharmacists in their evolving responsibilities (11). This study aims to investigate the knowledge, attitudes, and practices (KAP) of community pharmacists in promoting lifestyle modifications for health promotion. It seeks to assess their role in patient counseling and the application of non-pharmacological interventions as part of primary prevention strategies.

METHODS

Study Design and Setting

A cross-sectional study was conducted in Sulaymaniyah city, Kurdistan Region of Iraq. The data collection period spanned four months, from November 2024 to February 2025.

Sample Size and Sample Selection

According to the Kurdistan Syndicate of Pharmacists, there are a total of 1,502 practicing pharmacists in Sulaymaniyah city. The minimum required sample size was calculated using Cochran's formula, $n = Z^2 \times p(1-p) / e^2$, with $Z = 1.96$ (95% confidence level), $p = 0.5$ (assumed proportion for maximum variability), and $e = 0.05$ (margin of error), giving $n = 384$. Since the total pharmacist population in Sulaymaniyah is finite ($N = 1,502$), this was adjusted using the finite population correction formula, $n_{adj} = n / [1 + (n-1)/N]$, giving $n_{adj} \approx 306$. The minimum required sample size for this study was therefore 306 pharmacists.

The study covered all geographic regions of Sulaymaniyah to ensure wide representation. Community pharmacies were selected randomly from the official registry of licensed pharmacies in the city, giving each pharmacy an equal chance of inclusion. From each selected pharmacy, 1 to 3 pharmacists were recruited using convenience sampling, based on availability and willingness to participate at the time of data collection. The questionnaire received 311 responses from a total of 500 community pharmacy professionals approached, a 62.2% response rate; 242 respondents worked in private pharmacies, 40 in hospitals, and 29 in polyclinics. The reliability and validity of the data collection process were supported by expert review, and the questionnaire was developed based on similar studies conducted in Saudi Arabia and Ethiopia, with some

modifications (12, 13). The questionnaire was pretested with 20 pharmacists to assess clarity, relevance, acceptability, and completion time; modifications were made accordingly, and data collection ran from November 18, 2024, to February 27, 2025.

Inclusion and Exclusion Criteria

The study included licensed pharmacists with at least one year of professional experience who were members of the Kurdistan Syndicate of Pharmacists. Pharmacists working part-time (fewer than 20 hours a week) were excluded, to ensure that all participants had a comparable level of professional experience.

Data Collection and Questionnaire

The questionnaire was available only in English, the official language of instruction in Iraq and the Kurdistan Region across all medical departments. It was divided into five sections: demographic characteristics, knowledge, attitudes, practices, and barriers and facilitators. The first section collected demographic information; the second assessed pharmacists' knowledge; and the third evaluated attitudes toward lifestyle modification counseling. The fourth section explored actual practices, including patient information, frequency of counseling, and follow-up. The final section examined barriers and enablers identified by pharmacists, including time constraints, insufficient training, and difficulties with patient engagement. All responses were reviewed for completeness and clarity.

The scoring system was adapted from a study conducted in Saudi Arabia¹⁴. Knowledge questions had only one correct answer; attitude items were measured on a 2-point Likert scale ('agree'/'disagree'); and practice questions were structured as 'yes/no/sometimes.' A score of one

was assigned for correct responses and zero for incorrect or uncertain answers. Scores below 40% (1–4) were considered poor, 41–75% (5–8) moderate, and 76–100% (9–13) good. Attitudes were scored on a scale from –7 to +7, with correct responses receiving +1 and incorrect or uncertain responses receiving –1; a positive score reflects a positive attitude, while a negative or zero score reflects a negative attitude. Practice scores ranged from 0 to 12 (yes/always = 2 points, sometimes = 1, no/never = 0), with a score of 6 or more considered adequate and below 6 considered inadequate.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS, Chicago, IL, version 26) was used for data entry and analysis. Descriptive statistics included frequencies, percentages, means, and standard deviations. The chi-square test of association was used to test associations between categorical variables. A p -value ≤ 0.05 was considered statistically significant.

Ethical Consideration

The Scientific Committee of the Clinical Pharmacy Department approved the study protocol (reference number HMU-PHEc 28/052025-556), and the ethical committee of the College of Pharmacy, Hawler Medical University, also approved the protocol. Participants were informed about the study's purpose and objectives, reassured of their anonymity, and informed of the procedures, potential risks and benefits, and their right to withdraw at any time, ensuring voluntary and informed participation.

RESULTS

The study sample comprised 311 pharmacists; more than half (68.2%) were under 30 years of age, with a mean ($\pm$ SD) age of 28.23 ± 4.35 years. Overall, 136 (43.7%) participants were male and 175 (56.3%)

were female. Regarding marital status, over half (53.7%) were single. The majority of respondents (81.0%) had 1–7 years of work experience, 14.5% had 8–14 years, and 4.5% had 15–21 years. Most pharmacists (89.7%) held a B.Sc. degree, with fewer holding an M.Sc. or PhD (10.3%). Nearly three-quarters (74.3%) graduated from local public universities, and 71.4% worked in the private sector. About half reported income satisfying their daily needs, as shown in Table 1.

Regarding academic preparation, 162 (52.1%) participants found their training comprehensive for lifestyle modification counseling, while 149 (47.9%) disagreed. Regarding knowledge, 54% of participants scored 5–8 (moderate), 40.8% scored 9–11 (good), and 5.1% scored 1–4 (poor).

There was no significant association between age and knowledge score ($p = 0.75$). Gender also showed no significant association ($p = 0.17$), although female pharmacists had somewhat better knowledge scores. Education qualification ($p = 0.83$), place of graduation ($p = 0.13$), and employment sector ($p = 0.37$) all showed no significant association with knowledge score, as shown in Table 2.

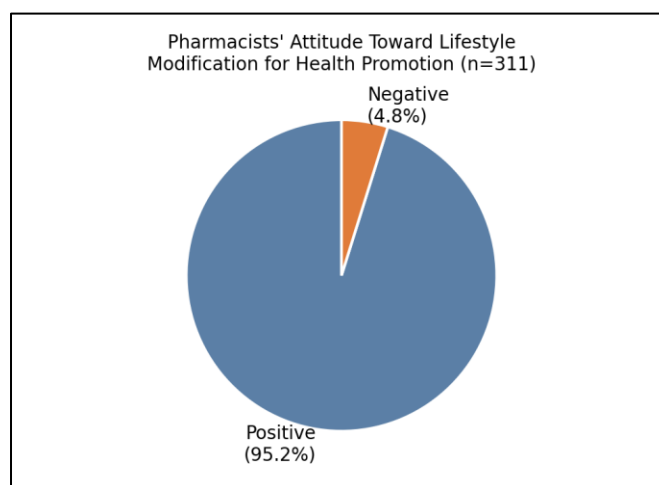
The majority of pharmacists ($n = 296$, 95.2%) had a positive attitude toward lifestyle change as a tool for overall health promotion, while a small proportion ($n = 15$, 4.8%) had a negative attitude. Nearly all pharmacists recognized the importance of lifestyle counseling in chronic disease management, and many also believed patients trust pharmacists for this advice (Figure 1).

Table 1. Sociodemographic characteristics of the study sample

Variable	Category	n	%
Age group	<30	212	68.2
	30-39	93	29.9
	>39	6	1.9
Gender	Male	136	43.7
	Female	175	56.3
Marital status	Single	167	53.7
	Married	138	44.4
	Divorced	6	1.9
Experience	1-7 years	252	81.0
	8-14 years	45	14.5
	15-21 years	14	4.5
Education	B.Sc.	279	89.7
	M.Sc. or PhD	32	10.3
Place of graduation	Local public univ.	231	74.3
	Local private univ.	47	15.1
	Abroad	33	10.6
Employment sector	Public	41	13.2
	Private	222	71.4
	Both	48	15.4
Monthly income (IQD)	<500,000	43	13.8
	500,000-1,000,000	185	59.5
	>1,000,000	83	26.7
Income satisfaction	Satisfied	160	51.4
	Not satisfied	125	40.2
	Exceeds needs	26	8.4

Table 2. Associations between knowledge score and sociodemographic characteristics

Variable	Category	Poor No. (%)	Moderate No. (%)	Good No. (%)	p
Age	<30	13 (6.1)	111 (52.4)	88 (41.5)	0.75
	30-39	3 (3.2)	53 (35.7)	37 (39.8)	
	>39	0 (0)	4 (66.7)	2 (33.3)	
Gender	Male	9 (6.6)	79 (58.1)	48 (35.3)	0.17
	Female	7 (4.0)	89 (50.9)	79 (45.1)	
Education	Bachelor	15 (5.4)	151 (54.1)	113 (40.5)	0.83
	Master/PhD	1 (3.1)	17 (53.1)	14 (43.8)	
Grad. place	Local public	11 (4.8)	128 (55.4)	92 (39.8)	0.13
	Local private	2 (4.3)	29 (61.7)	16 (34.0)	
	Abroad	3 (9.1)	11 (33.3)	19 (57.6)	
Employ. sector	Public	4 (9.8)	25 (61.0)	12 (29.3)	0.37
	Private	9 (4.1)	118 (53.2)	95 (42.8)	
	Both	3 (6.3)	25 (52.1)	20 (41.7)	
Income satisf.	Satisfied	8 (5.0)	79 (49.4)	73 (45.6)	0.12
	Not satisfied	7 (5.6)	78 (62.4)	40 (32.0)	
	Exceeds needs	1 (3.9)	11 (42.3)	14 (53.8)	

**Figure 1.** Pharmacists' attitude toward lifestyle modification for health promotion

Despite a high overall positive attitude among both females (96.6%) and males (93.4%), there was no statistically significant association between gender and attitude ($p = 0.19$). A significant association was found between attitude and years of experience ($p = 0.039$); pharmacists with 8–14 and 15–21 years of experience reported no negative attitudes. A significant association was also found between

attitude and employment sector ($p = 0.037$); pharmacists working only in the public sector reported no negative attitudes. Regarding knowledge, 81.2% of pharmacists with poor knowledge, 94% with moderate knowledge, and 98.4% with good knowledge had a positive attitude — a statistically significant association ($p = 0.006$), as shown in Table 3.

Table 3. Associations between attitude and sociodemographic characteristics and knowledge score

Variable	Category	Positive	Negative	p
Gender	Male	127 (93.4)	9 (6.6)	0.19
	Female	169 (96.6)	6 (3.4)	
Experience	1-7y	237 (94.0)	15 (6.0)	0.039
	8-14y	45 (100.0)	0 (0)	
	15-21y	14 (100.0)	0 (0)	
Employ. sector	Public	41 (100.0)	0 (0)	0.037
	Private	212 (95.5)	10 (4.5)	
	Both	43 (89.6)	5 (10.4)	
Knowledge	Poor	13 (81.2)	3 (18.8)	0.006
	Moderate	158 (94.0)	10 (6.0)	
	Good	125 (98.4)	2 (1.6)	

Note: for the "1-7 years" and "8-14 years" experience rows, the totals in the original table appeared to have been copy-pasted from an adjacent row (shown as 136 and 175); the corrected totals (252 and 45) are used here, matching Table 1's experience distribution.

The majority of pharmacists (n = 236, 76%) exhibited adequate practice (score ≥ 6 of 12) regarding lifestyle modification counseling, while a smaller proportion (n = 75, 24%) demonstrated inadequate practice. Regarding specific topics, 89.7% of pharmacists discussed dietary change with patients, 81.0% discussed physical activity, 59.8% discussed smoking cessation, and 38.6% discussed alcohol reduction. Regarding follow-up, 48.2% of pharmacists reported following up with patients on their progress. Regarding frequency, 19.9% of respondents always provided lifestyle advice, 78.5%

did so sometimes, and 1.6% never offered lifestyle modification counseling, as shown in Table 4.

The current study found no statistically significant association between practice scores and gender (p = 0.46), age group, place of graduation, or knowledge level (p = 0.13) — although the highest proportion of adequate practice was observed among pharmacists with moderate knowledge (80.4%). No significant association was found with attitude either, though pharmacists with a positive attitude showed the highest proportion of adequate practice (76%), as shown in Table 5.

Table 4. Practice questions and pharmacists' responses (n=311)

Practice question	Yes	No	
Discuss dietary change	279 (89.7)	32 (10.3)	
Discuss physical activity	252 (81.0)	59 (19.0)	
Discuss smoking cessation	186 (59.8)	125 (40.2)	
Discuss alcohol reduction	120 (38.6)	191 (61.4)	
Follow up on patients' progress	150 (48.2)	161 (51.8)	
How often advise on lifestyle change	Always	Sometimes	Never
	62 (19.9)	244 (78.5)	5 (1.6)

Table 5. Association between practice and sociodemographic characteristics, knowledge score, and attitude

Variable	Category	Adequate	Inadequate	p
Gender	Male	106 (77.9)	30 (22.1)	0.46
	Female	130 (74.3)	45 (25.7)	
Age	<30	160 (75.5)	52 (24.5)	0.90
	30-39	71 (76.3)	22 (23.7)	
	>39	5 (83.3)	1 (16.7)	
Grad. place	Local govt.	169 (73.2)	62 (24.5)	0.15
	Local private	40 (85.1)	7 (14.9)	
	Abroad	27 (81.8)	6 (18.2)	
Knowledge	Poor	11 (68.8)	5 (31.3)	0.13
	Moderate	135 (80.4)	33 (19.6)	
	Good	90 (70.9)	37 (29.1)	
Attitude	Positive	225 (76.0)	71 (24.0)	0.76
	Negative	11 (73.3)	4 (26.7)	

Pharmacists face challenges in delivering lifestyle modification counseling due to time constraints, low patient motivation, and the absence of consultation rooms. Further training was favored by

59.8% of pharmacists as a facilitator, while 54% supported more time allocation for counseling; patient interest was identified as the most important facilitator, as shown in Figure 2.

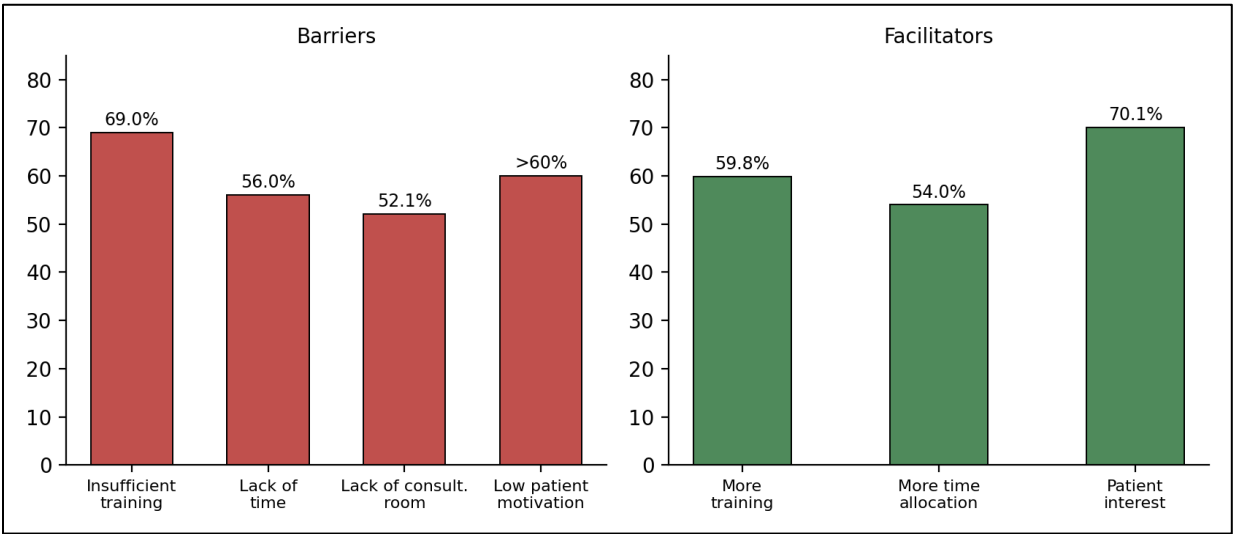


Figure 2. Primary barriers and facilitators in providing lifestyle modification counseling

Barrier and facilitator percentages are drawn from figures reported consistently across the Abstract, Results, and Discussion (insufficient training 69%, lack of time 56%, lack of consultation room 52.1%, low patient motivation >60%; more training 59.8%, more time 54%, patient interest 70.1%). One Discussion sentence in the original manuscript additionally reported "30%" for time constraints and a claim that "nearly half" of pharmacists felt prohibited by other healthcare professionals from counseling — neither figure is supported by the Results or by any table, so both have been omitted here pending verification against the source data.

DISCUSSION

A healthy lifestyle is an essential component of living a full and fulfilling life (15). This research investigated the knowledge, attitudes, and practices (KAP) of community pharmacists in Sulaymaniyah city regarding lifestyle modification as a tool for health promotion and chronic disease prevention. About half of the pharmacists in the current study (47.9%) reported that their academic training was insufficient to equip them to advise patients on lifestyle changes, highlighting a gap in the pharmacy curriculum around disease prevention and health promotion. This is in line with

a study in Jordan, which found that 78% of community pharmacists were aged 20–29, indicating that the pharmacy profession is similarly young there (16); a comparable pattern was reported in an Erbil-based KAP study of community pharmacists specifically focused on obesity management, underscoring how young, on average, the regional pharmacy workforce is across different counseling domains (17).

Regarding knowledge, the current study found that 40.8% of participants demonstrated good knowledge, 54% moderate knowledge, and only a small percentage limited knowledge of lifestyle

change. By contrast, an Iranian study found that pharmacists generally had low knowledge and practice levels, yet maintained a high attitude toward the issue (18). A study conducted in Ethiopia similarly reported that 50% of pharmacists had good knowledge of nutrition and a strong understanding of drug–food interactions (4), broadly in line with our findings. The current study also found that facilitators included more training (59.8%), more time (54%), and greater patient interest (70.1%); these findings are similar to a study in Gondar City, Ethiopia (4), which suggested addressing barriers by improving pharmacists' knowledge of therapeutic medical nutrition (9%), setting up a private consultation room (8%), and raising public awareness of pharmacists' counseling skills (7%).

The findings demonstrate that community pharmacists in Sulaymaniyah maintain a strong commitment to lifestyle change counseling. Nearly all pharmacists believed lifestyle changes were important for managing chronic diseases, and over 90% agreed that counseling patients on lifestyle modification falls within their professional duties. Pharmacists in Northwest Ethiopia similarly demonstrated willingness to counsel patients with non-communicable diseases, with 93.3% confirming that health promotion activities were part of their professional responsibilities (20). An Iraqi study similarly found that most community pharmacists agreed it was their responsibility to provide breast cancer health education, reflecting an overall favorable attitude (19).

Several barriers prevent proper implementation of lifestyle counseling despite generally positive attitudes toward it. Lack of time (56%) was the most frequently cited barrier in our study. Research in Yemen similarly found that time constraints (71%) and poor collaboration (70%) were major obstacles

preventing pharmacists from participating in public health initiatives (21). These results suggest that pharmacists need systematic changes — including interprofessional collaboration and workflow adjustments — to fulfill their role as health promoters.

Pharmacists' knowledge level and their attitude toward lifestyle change counseling showed a significant correlation in the current study; those with good knowledge were considerably more likely to agree that controlling chronic illness requires lifestyle change. Research in Lahore, Pakistan, similarly found that community pharmacists with sufficient understanding of chronic illness management showed more positive attitudes and behaviors toward disease management (22). Similarly, a study in Thailand showed that community pharmacists can effectively help patients quit smoking, a meaningful step toward reducing tobacco use and improving public health (23).

The present study identified significant barriers faced by community pharmacists in delivering lifestyle modification counseling, notably insufficient training (69%), lack of a consultation room (52.1%), and lack of time (56%). Regarding facilitators, 70.1% of pharmacists reported increased patient interest in counseling, and pharmacists were generally willing to provide lifestyle recommendations, though readiness and comfort with implementation varied. A study by Verma et al. in Malaysia identified similar organizational challenges, including the absence of private counseling rooms, inadequate personnel, and time limits, alongside a clear need for more training; those pharmacists believed they could contribute more through patient education on diet, exercise, and other lifestyle modifications, but emphasized that additional training and

resources (private space and support staff) would be required to expand such services (24). Similarly, an Iraqi study on health education found that lack of time was perceived by 68.2% of community pharmacists as a major barrier to providing patient education (19).

Overall, the current study's findings demonstrate generally strong knowledge, a high proportion of positive attitudes, and an overall adequate level of practice regarding lifestyle modification. These results contrast with a study conducted in Lebanon, where only 53.3% of pharmacists demonstrated good perceived knowledge, only 39% showed a positive attitude, and 47.3% reported good practice in the context of oral health promotion (25).

This study provides valuable insight into community pharmacists' knowledge, attitudes, and practices regarding lifestyle modification and health promotion, using a relatively large and regionally representative sample. It highlights associations between knowledge and practice and offers evidence-based recommendations for targeted interventions. However, limitations include the self-administered questionnaire's potential susceptibility to social desirability bias, the fact that not all approached pharmacists were cooperative, and the narrow data collection window, which may have affected response rates. As a descriptive cross-sectional study, it was also not designed to establish causal relationships or identify specific determinants of poor counseling practices. Reliance on self-evaluation is an important limitation, as is the use of a limited number of questions to assess knowledge objectively.

CONCLUSION

This study draws attention to the potential of community pharmacists to facilitate behavioral change through lifestyle interventions aimed at chronic disease prevention and health promotion.

Pharmacists showed good knowledge, positive attitudes, and adequate practice regarding lifestyle counseling, although important barriers — including inadequate education, lack of time, and insufficient patient motivation — still need to be overcome. Addressing these issues will require focused education, training, structural support, and ongoing professional development to optimize pharmacists' contribution to public health.

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COMPETING INTEREST

The authors declare that they have no competing interests.

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