






Knowledge, attitudes, and practice of community pharmacists towards providing counselling on acid suppressant medications in Eastern Province, Saudi Arabia

Mohammad Daud Ali¹, Danah Mubarak Aldhufairi¹, Lama Nadir Alharbi¹, Zahraa Yousif Qalaf¹, Maryam Adel Algheryafi¹, Lujain Essa Almarhoon¹, Fatimah Saleh Almohsen¹, Zainab Al Trefe¹, Nousheen Aslam¹, Nuzhat Banu¹, Ayaz Ahmad¹, Yousif A. M. Hassan¹

¹ Department of Pharmacy, Mohammed Al-Mana College for Medical Sciences, Abdulrazaq Bin Hammam Street, Al Safa, Dammam 34222, Saudi Arabia

Corresponding author: Mohammad Daud Ali (dali.niper@gmail.com)

Received 20 November 2024 ♦ Accepted 20 January 2025 ♦ Published 17 February 2025

Citation: Ali MD, Mubarak Aldhufairi D, Nadir Alharbi L, Qalaf ZY, Algheryafi MA, Almarhoon LE, Almohsen FS, Al Trefe Z, Aslam N, Banu N, Ahmad A, Amin Y (2025) Knowledge, attitudes, and practice of community pharmacists towards providing counselling on acid suppressant medications in Eastern Province, Saudi Arabia. *Pharmacia* 72: 1–9. <https://doi.org/10.3897/pharmacia.72.e142218>

Abstract

Acid suppressant medications, widely used to manage gastric acid secretions and related disorders, rely heavily on the expertise of community pharmacists. This underscores the importance of understanding community pharmacists' knowledge, attitudes, and practices regarding counseling on acid-suppressant medications. A cross-sectional survey-based study was conducted from the end of 23rd August 2024 to the beginning of 30th September 2024. This study showed that most participants, 146 (64.6%), were females. 119 (52.65%), participants have good knowledge regarding acid suppressants vs. 107 (47.35%) with poor knowledge. Additionally, 101 (84%) of participants who have good knowledge state that they have direct interaction or contact with patients/customers, while only 18 (15.13%) (p-value = 0.15) of participants have no direct interaction or contact with patients/customers. Patients in Saudi Arabia are typically prescribed acid-suppressant drugs by community pharmacists. Over-the-counter (OTC) acid suppressant pharmaceuticals used in community pharmacy settings must be managed to ensure patient and drug safety.

Keywords

Acid suppressant medications, community pharmacists, counselling, clinical guideline, Saudi Arabia

Introduction

The most common drugs used to treat increased or disturbed stomach acid secretions, H. Pylori, GERD (Gastroesophageal reflux disease), peptic ulcers, and other illnesses related to high levels of HCl acid are acid suppressants (Grube and May 2007; Kristie et al. 2009; Algabbani and Alangari 2023). Proton pump inhibitors (PPIs) are among

the most commonly used medications for managing gastric acidity (Shin and Sachs 2008). They work by irreversibly inhibiting the hydrogen-potassium ATPase enzyme system in the gastric parietal cells, leading to potent and long-lasting acid suppression (Begg et al. 2023). In addition to PPIs, there are other therapeutic options available. H2 receptor antagonists (H2RAs) competitively block histamine at H2 receptors on gastric parietal cells, which

helps reduce acid production (Begg et al. 2023). Conversely, antacids neutralize gastric acid through direct chemical reactions (Shim and Kim 2017). Proton pump inhibitors (PPIs) have emerged as the cornerstone of treatments related to high gastric acid secretion disorders globally, with a recent uptrend in their prescribing pattern (Bashford, Norwood, and Chapman 1998). By permanently inhibiting the H⁺/K⁺ ATPase pumps in parietal cells, proton pump inhibitors (PPIs) reduce the release of stomach acid. Since their introduction in 1989, PPIs have significantly enhanced the treatment of acid-related conditions such as GERD, erosive esophagitis, functional dyspepsia, *H. pylori* eradication, and the prevention of NSAID-induced ulcers (Turshudzhyan et al. 2022). PPIs are recommended for short-term use, usually for 8 weeks (Haastrup et al. 2021; Algabbani and Alangari 2023). According to a study conducted in Saudi Arabia, PPI prescriptions in a hospital setting account for up to 57.6% (Basheikh 2017).

Furthermore, a 2019 study in Saudi Arabia found that all community pharmacists routinely recommend PPIs to their patients (Boghossian et al. 2017). One reason for the widespread prescription of PPIs is their minimal side effects. However, several studies have revealed numerous adverse effects associated with inappropriate or long-term use. For patients at risk of these adverse effects, the benefit-risk analysis must be conducted before initiating the treatment (Schoenfeld and Grady 2016; Schubert 2020; Castellana et al. 2021). PPIs may also result in the malabsorption of a number of vitamins and minerals, including vitamin B12, calcium, and magnesium (Abraham 2012). Community pharmacists play a crucial part in enhancing the community's use of PPIs.

Pharmacists play an important role in proper medicine use, preventing adverse drug reactions, improving health outcomes in geriatric care, and better managing chronic diseases (Dyer et al. 1984; Brewster et al. 2020; Kamusheva et al. 2020). Similarly, community pharmacists play an important role in improving the usage of PPIs in the community. Their understanding, perspectives, and practices concerning PPIs are essential in avoiding side effects, drug interactions, and improper use. Community pharmacists play a vital role in providing medication counseling to patients. They must inform patients about the correct timing of PPI administration, the length of treatment, and possible long-term adverse effects (Okumura and Correr 2014; Boardman and Heeley 2015; Luo et al. 2019; Alameri et al. 2024). A study conducted in China found less knowledge of PPI among health professionals, although pharmacists scored higher compared to others (Luo et al. 2019).

Investigations have been carried out in Saudi Arabia to evaluate the knowledge and attitude of healthcare professionals toward PPI use, and these studies highlighted the importance of increasing the knowledge of healthcare professionals to cut down on PPI use (Alhossan et al. 2019; Luo et al. 2019). In Saudi Arabia, where acid-related disorders are prevalent, there is a growing need to evaluate the knowledge and role of community pharmacists in counseling patients on acid-suppressant medications. Studies

conducted in other countries found that the pharmacists' knowledge, attitudes, and practices regarding PPIs were generally satisfactory, but some knowledge gaps were identified (Luo et al. 2019; Asdaq et al. 2021). Various studies have reported the unjustified, irrational prescribing of PPIs to patients in Saudi Arabia (Albayrak and Yıldız 2024). Despite being a prescription medication, many pharmacists dispense PPIs without prescription (Alakhali et al. 2021).

Therefore, this study seeks to investigate the knowledge, attitudes, and practices of community pharmacists in the Eastern Province of Saudi Arabia regarding their counseling on acid-suppressant medications.

Methods

Study design, area, and population

This descriptive cross-sectional study was conducted among licensed community pharmacists certified at the bachelor's level or above across Eastern Province, Saudi Arabia. Community pharmacists outside Saudi Arabia and pharmacists working in hospitals, universities, industry, or other pharmacy departments were excluded. Within the study, community pharmacies are typically managed by one or two pharmacists, who work at least 8 to 12-hour shifts six days a week. The placement of community pharmacies across the Eastern Province is quite balanced, although many of these pharmaceutical establishments are located within the central business district.

Sample size

The sample size was calculated using the Raosoft calculator (Mohammad Daud Ali and Ebrahim Ahmed Jaber Al Hatef 2024), considering a 95% confidence level, a 5% margin of error, and an estimated 20% non-response rate. The target sample size is 350.

Study tools, sampling, and procedures

Researchers reviewed previous literature to design the original questionnaire. After a small-scale pre-investigation, the questionnaire was modified and improved to form the final version. A sample of 15 patients from the community evaluated the questionnaire's face validity, and all the researchers assessed its content validity. The questionnaire's Cronbach's alpha value is 0.6. The pilot study results will not be included in the final analysis. The first section of the questionnaire contains demographic information such as age, gender, educational attainment, and work status. The second section includes the pharmacist's understanding and knowledge of acid suppressants, using seven questions on a 5-point Likert scale (strongly disagree = 0 to strongly agree = 5). The third section probed the pharmacist's perspective towards dispensing advice for acid suppressant medications, while the last section investigated the actual practice of such counseling.

Data collection used a convenient sampling technique. The survey instrument was incorporated into a Google form for distribution to the proposed participants. It will take an average of 8–12 minutes to complete. The survey link was emailed conveniently to pharmacy chain managers and accompanied by a cover letter that clarified the study's nature and objectives. The data was collected between 23rd August 2024 and the beginning of 30th September 2024.

Statistical considerations and data analysis

The data was gathered and structured in an Excel sheet and exported to the Statistical Package for Social Sciences (SPSS) version 27 for analysis. The demographic attributes of the surveyed population were assessed and categorized based on their descriptive statistics. The total knowledge scores were calculated to evaluate pharmacists' knowledge. The participants who scored at least equal to or above the median score on all knowledge items featured in the study were considered to have "good knowledge." Pearson's Chi-squared, Fisher's exact, and Wilcoxon rank sum tests were used to evaluate the predictors of knowledge and practice. A "p" value of less than 0.05 is set as the significance threshold for this study.

Results

A total of 226 respondents completed the survey. Most were between 20 and 29 years of age 149 (65.9%). Most of the participants (64.6%) were females; the percentage of pharmacists participating in this research, 164 (72.6%), was higher compared to the technicians, with only 62 (27.4%), 90 (39.8%) have less than one year of practice and 73 (32.3%) 1–5 years of training, 125 (55.3%) work in chain pharmacy. In comparison, 101 (44.7%) work in independent pharmacies, and 184 (81.4%) of participants directly interact with patients/customers. Table 1 summarizes all demographic data collected.

As shown in Table 2, 119 (52.65%), precipitants have a good knowledge regarding acid suppressants vs. 107 (47.35%) with poor knowledge. The largest group of respondents were aged between 20 and 29 years; 83 (69.75%) had good knowledge, while 65 (60.75%) (p-value = 0.34) had poor knowledge. Additionally, no statistically significant correlation (p-value > 0.05) was discovered in this study between the participants' demographics and their knowledge of acid suppressants. Additionally, no statistically significant correlation (p-value > 0.05) was discovered in this study between the participants' demographics and their knowledge of acid suppressants.

Additionally, 101 (84%) of participants who have good knowledge state that they have direct interaction or contact with patients/customers, while only 18 (15.13%) (p-value = 0.15) of participants have no direct interaction or contact with patients/customers. Regarding the number

Table 1. Demographic and job-related characteristics of study participants.

Characteristic	N = 226 (%)
Age (Years)	
20-29	149 (65.9)
30-39	46 (20.4)
≥ 40	31 (13.7)
Gender	
Male	80 (35.4)
Female	146 (64.6)
Marital status	
Married	103 (45.6)
Unmarried	123 (54.4)
Highest qualification	
Diploma in Pharmacy	55 (24.3)
B.Sc Pharmacy	99 (43.8)
PharmD.	53 (23.5)
Master/PhD	19 (8.4)
Current professional level*	
Pharmacist	164 (72.6)
Technician	62 (27.4)
Type of community pharmacy do you work in	
Chain pharmacy	125 (55.3)
Independent Pharmacy	101 (44.7)
Employment contract status	
Full-time	149 (65.9)
Part-time	64 (28.3)
Temporary/casual	13 (5.8)
Working in shifts	
Yes	137 (60.6)
No	89 (39.4)
Years of experience in pharmacy.	
Less than 1 year	90 (39.8)
1-5 Years	73 (32.3)
6-10 Years	28 (12.4)
More than 10 years	35 (15.5)
Rate your job satisfaction.	
1 (Unsatisfied)	22 (9.7)
2	32 (14.2)
3	102 (45.1)
4	50 (22.1)
5 (Very satisfied)	20 (8.8)
Direct interaction or contact with patients/customers	
Yes	184 (81.4)
No	42 (18.6)
Number of prescriptions/customers served daily.	
< 100	107 (47.3)
100-200	98 (43.4)
> 200	21 (9.3)

*As per the Saudi Commission for Health Specialties

of prescription customers who served daily, 64 (53.78) of participants with good knowledge mentioned that they prescribed < 100 prescriptions per day Vs 43 (36.16%) prescribed between 100–200 and only 12 (10.08%) prescribed > 200 prescriptions per day (p-value = 0.06). Study participants used different resources for enhancing counseling for acid suppressant medications. The clinical guideline comes first in the list with 37 (31.09%) followed by social media platforms 30 (25.21%), 20 (16.81%) of participants used online articles, 14 (11.76%) mobile application, 12 (10.08%) used textbooks, while participating

Table 2. Determinants of knowledge regarding acid suppressants.

Characteristic	Good knowledge, n = 119 (%) (52.65%)	Poor knowledge, n = 107 (%) (47.35%)	p-value**
Age (Years)			
20-29	83 (69.75)	65 (60.75)	0.34
30-39	22 (18.49)	24 (22.43)	
≥ 40	14 (11.76)	18 (16.82)	
Gender			
Male	46 (38.66)	73 (68.22)	0.28
Female	73 (61.34)	34 (31.78)	
Marital status			
Married	57 (47.90)	45 (42.06)	0.59
Unmarried	62 (52.10)	52 (48.60)	
Highest qualification			
Diploma in Pharmacy	37 (31.09)	19 (17.76)	0.09
B.Sc. Pharmacy	51 (42.86)	48 (44.86)	
PharmD	23 (19.33)	29 (27.10)	
Master/PhD	8 (6.72)	11 (10.28)	
Current professional level*			
Pharmacist	81 (68.07)	83 (77.57)	0.10
Technician	38 (31.93)	24 (22.43)	
Type of community pharmacy do you work in			
Chain pharmacy	66 (55.46)	59 (55.14)	0.96
Independent Pharmacy	53 (44.54)	48 (44.86)	
Employment contract status			
Full-time	74 (62.18)	75 (70.09)	0.44
Part-time	37 (31.09)	27 (25.23)	
Temporary/casual	8 (6.72)	5 (4.67)	
Working in shifts			
Yes	76 (63.87)	61 (57.01)	0.29
No	43 (36.13)	46 (42.99)	
Years of experience in pharmacy			
Less than 1 year	48 (40.34)	42 (39.25)	0.88
1-5 Years	36 (30.25)	37 (34.58)	
6-10 Years	15 (12.61)	13 (12.15)	
More than 10 years	20 (16.81)	15 (14.02)	
Rate your job satisfaction.			
1 (Unsatisfied)	12 (10.08)	9 (8.41)	0.50
2	13 (10.92)	19 (17.76)	
3	52 (43.70)	50 (46.73)	
4	30 (25.21)	21 (19.63)	
5 (Very satisfied)	12 (10.08)	8 (7.48)	
Direct interaction or contact with patients/customers			
Yes	101 (84.87)	83 (77.57)	0.15
No	18 (15.13)	24 (22.43)	
Number of prescriptions/customers served daily.			
< 100	64 (53.78)	42 (42)	0.06
100-200	43 (36.13)	55 (55)	
> 200	12 (10.08)	10 (10)	
Resources for enhancing counseling for acid suppressant medications			
Textbooks	12 (10.08)	10 (9.35)	0.27
Clinical guideline	37 (31.09)	43 (40.19)	
Mobile applications	14 (11.76)	11 (10.28)	
Online articles	20 (16.81)	24 (22.43)	
Social media platforms	30 (25.21)	17 (15.89)	
Participating in programs and workshop	6 (5.04)	2 (1.87)	
Interested in participating in collaborative initiatives with other healthcare professionals to improve patient counseling for acid-suppressant			
Yes	99 (83.19)	79 (73.83)	0.08
No	20 (16.81)	28 (26.17)	

**Pearson's Chi-squared test; Fisher's exact test; * according to the Saudi Commission for Health Specialties.

in programs and workshop was the least of the resources used by participants, at just 6 (5.04%) (p-value = 0.27). In total, 99 (83.19%) of participants with sound knowledge regarding acid suppressants are interested in collaborating with other healthcare professionals to improve patient counseling for acid suppressants. In comparison, only 20 (16.81%) participants are not interested in such matters (p-value = 0.08).

This study showed that 162 (71.7%) community pharmacists prescribed acid-suppressant medications to their patients. Moreover, 95 (42%) participants mentioned that 11–20% of their patients require acid-suppressant medications (Table 3).

Additionally, this study showed that the most common indication for prescribing acid suppressants was Heartburn 128(56.6%), followed by Gastro-esophageal reflux disease 110 (48.7), Gastritis (43.8%), use of non-steroidal anti-inflammatory drugs 67 (29.6%) and the least common indication is stress ulcer 48 (21.2%). A total 95 (42%) of community pharmacists mentioned that Proton pump inhibitors are preferably prescribed as acid suppressant medication followed by Antacid and H2 receptor blockers 62 (27.4%); any herbals as antacids are the least prescribed acid suppressant medication 15 (6.6%).

Also, this study revealed that most of the community pharmacists 115 (50.9%) always asked patients about their symptoms and medical history before recommending acid-suppressant medications. Also, 116 (51.3%) pharmacy practitioners provide patients with information on the appropriate dosage and administration of acid-suppressant medicines. Only 89 (39.4%) of participants always discussed potential side effects and drug interactions of acid suppressant medications with their patients (Table 3).

Furthermore, this study showed that 106 (46.9%) of community pharmacists assessed patient understanding to ensure patient adherence to the prescribed acid suppressant medication regimen, 77 (34.1%) ensured patient adherence to the prescribed Acid suppressant medication regimen by following up with the patient, and 43 (19%) provided clear instructions to their patients to ensure patient adherence to the prescribed acid suppressant medication regimen.

As shown in Table 4 below, a higher percentage of community pharmacists, 162 (71.7%), practice acid suppressant medication prescription compared with 64 (28.3%) who did not practice acid suppressant medication prescription. Most community pharmacists who practice acid suppressant medication prescription are male 102 (62.96%), while only 60 (37.04%) are female (p-value < 0.05). 72 (44.44%) of community pharmacists who practice acid suppressant medication prescription are B.Sc. Pharmacy followed by PharmD 38 (23.46%), Diploma in Pharmacy 37 (22.84%), and the last one is Master/PhD 15 (9.26%) (p-value = 0.78). Moreover, no statistically significant correlation (p-value > 0.05) was observed in this study between the demographics of the participants and the prescription practice of acid suppressants.

Table 3. Practice of acid suppressant prescription by the community pharmacist.

Characteristic	N = 226 (%)
Do you prescribe acid-suppressant medications to your patients?	
Yes	162 (71.7)
No	64 (28.3)
Percentage of patients who require acid suppressant medications	
10%	57 (25.2)
11-20%	95 (42)
21-30	48 (21.3)
> 30%	26 (11.5)
The most common indication for prescribing acid suppressants*	
Gastritis	99 (43.8)
Heartburn	128 (56.6)
Stress ulcer	48 (21.2)
Indigestion	46 (20.4)
Gastro-esophageal reflux disease	110 (48.7)
Non-steroidal anti-inflammatory drugs	67 (29.6)
What acid suppressant medication is it preferably prescribed?	
Antacid	62 (27.4)
H2 receptor blocker	95 (27.4)
Proton pump inhibitors	95 (42)
Any Herbals, such as antacids	15 (6.6)
Asking patients about their symptoms and medical history before recommending acid-suppressant medications	
Always	115 (50.9)
Often	55 (24.3)
Sometimes	41 (18.1)
Rarely	7 (3.1)
Never	8 (3.5)
Providing information on the appropriate dosage and administration of acid-suppressant medications	
Always	116 (51.3)
Often	45 (19.9)
Sometimes	43 (19)
Rarely	13 (5.8)
Never	9 (4)
Discussing potential side effects and drug interactions of acid suppressant medications with patients	
Always	79 (35)
Often	58 (25.7)
Sometimes	62 (27.4)
Rarely	20 (8.8)
Never	7 (3.1)
Advising patients on lifestyle modifications or dietary changes to manage acid reflux or indigestion	
Always	89 (39.4)
Often	60 (26.5)
Sometimes	49 (21.7)
Rarely	22 (9.7)
Never	6 (2.7)
How do you ensure patient adherence to the prescribed acid suppressant medication regimen?	
Assess patient understanding	106 (46.9)
Follow up with the patient	77 (34.1)
Provide clear instruction	43 (19)

*Multi-choice questions

Table 5 describes perceived barriers and facilitators towards counseling for acid suppressants. This table shows that community pharmacists used different resources to enhance counseling for acid-suppressant medications.

Table 4. Determinants of the practice of acid suppressant prescription.

Characteristic	Acid suppressant medication prescription		
	No n = 64 (28.3)	Yes n = 162 (71.7)	p-value**
Age (Years)			
20–29	45 (70.31)	104 (64.20)	0.67
30–39	11 (17.19)	35 (21.60)	
≥ 40	8 (12.50)	23 (14.20)	
Gender			
Male	20 (31.25)	102 (62.96)	<0.05
Female	44 (68.75)	60 (37.04)	
Marital status			
Married	22 (34.38)	81 (50)	0.06
Unmarried	42 (65.63)	81 (50)	
Highest qualification			
Diploma in Pharmacy	18 (28.13)	37 (22.84)	0.78
B.Sc Pharmacy	27 (42.19)	72 (44.44)	
PharmD	15 (23.44)	38 (23.46)	
Master/PhD	4 (6.25)	15 (9.26)	
Current professional level*			
Pharmacist	43 (67.19)	121 (74.69)	0.25
Technician	21 (32.81)	41 (25.31)	
Type of community pharmacy do you work in			
Chain pharmacy	33 (51.56)	92 (56.79)	0.48
Independent Pharmacy	31 (48.44)	70 (43.21)	
Employment contract status			
Full-time	36 (56.25)	113 (69.75)	0.08
Part-time	25 (39.06)	39 (24.07)	
Temporary/casual	3(4.69)	10 (6.17)	
Working in shifts			
Yes	36 (56.25)	101 (62.35)	0.40
No	28 (43.75)	61 (37.65)	
Years of experience in pharmacy			
Less than 1 year	25 (39.06)	65 (40.12)	0.83
1–5 Years	22 (34.38)	51 (31.48)	
6–10 Years	9 (14.06)	19 (11.73)	
More than 10 years	8 (12.50)	27 (16.67)	
Rate your job satisfaction.			
1 (Unsatisfied)	5 (7.81)	17 (10.49)	0.07
2	12 (18.75)	20 (12.35)	
3	35 (54.69)	67 (41.36)	
4	10 (15.63)	40 (24.69)	
5 (Very satisfied)	2 (3.13)	18 (11.11)	
Direct interaction or contact with patients/customers			
Yes	51(79.69)	133 (82.10)	0.67
No	13(20.31)	29 (17.90)	
Number of prescriptions/customers served daily.			
< 100	31 (48.44)	76 (46.91)	0.31
100–200	30 (46.88)	68 (41.98)	
> 200	3 (4.69)	18 (11.11)	
Knowledge of acid suppressant medicine			
Yes	58 (90.63)	150 (92.59)	0.80
No	4 (6.25)	12 (7.41)	
Knowledge of adverse events during the administration of acid-suppressant medication			
Yes	56 (87.50)	157 (96.91)	0.02
No	6 (9.38)	5 (3.09)	
Knowledge of potential complications associated with long-term or excessive use of acid-suppressant medication			
Yes	58 (90.63)	161 (99.38)	0.007
No	6 (9.38)	3 (1.85)	

Table 5. Perceived barriers and facilitators towards counseling for acid suppressant.

Characteristic	n = 226 (%)
Resources enhance counseling for acid-suppressant medications.	
Textbooks	21 (9.3)
Clinical guideline	81 (35.8)
Mobile applications	25 (11.1)
Online articles	44 (19.5)
Social media platforms	47 (20.8)
Participating in programs and workshop	8 (3.5)
Perceived barriers toward counseling for acid suppressant medications*	
Lack of time during patient interactions	111 (49.1)
Limited patient interest in counseling	118 (52.2)
Language barriers with patients	81 (35.8)
Insufficient knowledge of acid medications	54 (23.9)
Perceived facilitators towards counseling for acid suppressant medications*	
Patient-centered communication skills	143 (63.8)
Supportive work environment and resources	113 (50.4)
Continuous professional development opportunities	70 (31.3)
Preferred method of receiving educational updates on acid suppressant medications*	
In-person workshops or training sessions	108 (47.8)
Journal publications or research articles	74 (32.7)
Attendance at conferences or seminars	68 (30.1)
Online webinars or electronic learning modules	112 (49.6)

*Multiple-choice questions.

Clinical guidelines come first on the list 81 (35.8%), followed by social media platforms 47 (20.8%), online articles 44 (19.5%), mobile applications 25 (11.1%), textbooks 21 (9.3%), and participating in programs and workshops come last on the list 8 (3.5%).

On the other hand, participants perceived many barriers toward counseling for acid suppressant medications. In total, 118 (52.2%) found that limited patient interest in counseling is a significant barrier, followed by lack of time during patient interactions 111 (49.1%), 81 (35.8%) found language barriers with patients is one of the challenges, and 54 (23.9%) of participants found that insufficient knowledge of acid medications was a factor in another barriers toward counseling for acid suppressant medications.

143 (63.8%) of community pharmacists found that patient-centered communication skills are the primary facilitators for counseling for acid suppressant medications. In comparison, 113 (50.4%) depend mainly on a supportive work environment and resources as facilitators, and 70 (31.3%) found that continuous professional development opportunities are another facilitator towards counseling for acid suppressant medications. Furthermore, the results show that 112 (49.6%) of participants preferred online webinars or electronic learning modules as a method of receiving educational updates on acid suppressant medications, followed by In-person workshops or training sessions 108 (47.8%), Journal publications or research articles 74 (32.7%) and 68 (30.1%) preferred attendance at conferences or seminars as a method of receiving educational updates on acid suppressant medications.

Discussion

The study recruited two hundred and twenty-six community pharmacists as study participants to assess their knowledge, attitudes, and practices regarding counseling on acid-suppressant medications. The results showed a promising youthful workforce of community pharmacists. However, a notable gender disparity was observed, with more female pharmacists working in community pharmacies. It shows a growing trend among female pharmacists to join community pharmacists, which was not reported in previous studies (Almaghaslah et al. 2019; Alomi et al. 2019). Interestingly, our findings also show that the concern reported by Alhadad et al. that most of the Saudi population feels embarrassed to discuss specific female queries with a male pharmacist can be addressed by this trend (Alhaddad et al. 2018).

Most participants had a professional qualification of four or more years (BSc Pharmacy, PharmD, and post-graduate). They were full-time pharmacists compared to the diploma holders, part-time and casual or temporary workers. The prevalence of a PharmD degree indicates an increasing trend of clinical pharmacy degree holders joining community pharmacy (Fathelrahman et al. 2022; Thabit et al. 2023). Despite moderate satisfaction with their job, most pharmacists did not interact directly with their patients and customers, which advocates the concern for effective patient counseling regarding acid suppressants and other medications, as reported by previous studies (Alaqeel and Abanmy 2015; Tadesse et al. 2023).

Most participants exhibited an excellent knowledge of acid suppressants, reflecting these pharmacists' robust education and training. However, an insignificant difference between the two groups of pharmacists (good knowledge Vs poor knowledge) indicates that their demographics, such as age, gender, academic qualification, professional experience, and job satisfaction, did not influence their knowledge about acid suppressants. This insignificant result may imply that all the participants had access to similar sources of information that resulted in a uniform baseline knowledge score. Despite having more pharmacists with good knowledge, the uniformity between the two groups indicates a need for educational initiatives to enhance their knowledge and information. This finding is consistent with previous studies, which reported no correlation between the pharmacists' demographics and their demographic characteristics. Alhossan et al. have reported that community pharmacists in Saudi Arabia often recommend and prescribe proton pump inhibitors (PPIs) (Alhossan et al. 2019; Siddique et al. 2022). Still, most of them need more knowledge about PPIs' indications and side effects. They have also recommended educational interventions to enhance pharmacists' knowledge regarding PPI dispensing to promote patient safety and disease management (Alhossan et al. 2019).

Regarding the prescribing practice of acid-suppressant medications, there has been an increase in the pharmacists' role in prescribing acid-suppressant drugs, mainly PPIs (Alhossan et al. 2019; Ajabnoor and Cooper et al. 2020; Korayem et al. 2021), which was found in the current study. Like previous studies,

most pharmacists in the current survey prescribed acid-suppressants, especially H2 receptor blockers and PPIs, to 11–20% of patients. The most common indications for prescribing were gastritis, heartburn, and gastroesophageal reflux disease. Most pharmacists reported taking medical history and symptoms and providing patients with information about side effects, potential drug interactions, and dosage administration. They also report to advise lifestyle modifications to their patients while prescribing and dispensing these medications. As a part of the pharmaceutical care process, they also assess patients' understanding of the information provided to ensure their adherence to these medications (Alhossan et al. 2019; Ajabnoor and Cooper et al. 2020).

The only determinants that influenced the prescribing practice were gender difference and the knowledge about adverse events and potential complications with long-term use of acid-suppressant medications. Female pharmacists and those pharmacists with a better understanding of adverse events and long-term use complications were significantly more involved in prescribing these medications than their respective groups (Azizah et al. 2021; Korayem et al. 2021).

Lack of patient interest and time constraints were the most common barriers towards counseling for acid suppressant medications, as reported by study participants, and this is evident from other studies as well. These barriers confine the ability and desire of pharmacists to be involved in the discussion about these medications. It may also result in truncated counseling by pharmacists that may not produce the desired patient outcomes (Ayesha et al. 2023; Khayyat et al. 2024). The language barrier was the next perceived barrier to effective counseling and strong communication. Sometimes, it may lead to misunderstanding by the patient or the pharmacist, compromising patient safety.

On the other hand, pharmacists perceived that patient-centered communication skills could be a strong facilitator of counseling for acid-suppressants, especially when pharmacists and patients do not share the same language or the patient is unable to understand some medical terms and language used by the pharmacist (Ghazi 2022; Almomani et al. 2024).

Similarly, a supportive work environment, such as encouragement or incentives from management and access to updated resources, was perceived as a strong facilitator for pharmacists toward effective counseling. The pharmacists also showed a positive attitude toward continuous professional development if they were provided with opportunities. However, most of them favored online learning and in-person workshops to learn how to deal with the challenges of patient counseling, improve their communication skills, and learning about the recent advancements in healthcare information and technology.

Conclusion

This study assessed community pharmacists' knowledge, attitudes, and practices regarding counseling on acid-suppressant medications in the Eastern Province of

Saudi Arabia. Although most of the study participants were young and reported professional education, good knowledge about acid suppressant medicines, and encouraging involvement in patient counseling, there were profound gaps in their counseling practices. These gaps were identified due to specific barriers, such as lack of patient interest and the pharmacist's time for counseling. The language barrier was also one of the constraints for effective patient counseling. The pharmacists showed a positive attitude towards improving their communication and counseling skills through online and in-person professional development programs.

Limitations

Several limitations have been identified for this study. Firstly, the observation period was short. Restrictions on the data collection window timeframe may have prevented some community pharmacists from participating in the survey, a noted limitation of this study. Secondly, the desired sample size was not able to be found within a defined timeline since this study was related to students' graduation projects, and they had to submit their projects within the stipulated timeline to accomplish their graduation project. As per study methods, we need at least a 385-sample size; however, we included in our study 226 survey response. Thirdly, a survey was conducted online instead of offline. If the survey could be conducted with physical visits to the respondents by the researcher, it could help minimize the biasing of the response. In the future, a related study could be conducted with significant responses, and a survey could be conducted by physical visits to the community pharmacist to minimize potential bias.

Recommendations

The authors recommend developing target training and educational programs for the community pharmacists to implement the standard counseling protocols and regularly evaluate the pervasiveness and effectiveness of the community pharmacists-led patient counseling service regarding acid-suppressant medications. The authors also recommend increasing public awareness about acid-suppressant medication utilization and the importance of counseling by a pharmacist.

Ethics approval and consent to participate

Before the commencement of the study, the Institutional Review Board of Mohammed Al-Mana College for Medical Sciences obtained ethical approval and prior permission (Ref: SR/RP/189). The respondents also provided online consent before participation. No financial incentive was provided for respondents. We confirm that the study adhered to the Helsinki Declaration of Human Participation principle.

Acknowledgments

All the author(s) would like to express their sincere thanks to all the community pharmacists of Eastern Province Saudi Arabia who participated in the survey and gave their valuable responses to the study within their busy schedules.

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statements

The authors declared that no clinical trials were used in the present study.

The authors declared that no experiments on humans or human tissues were performed for the present study.

The authors declared that no informed consent was obtained from the humans, donors or donors' representatives participating in the study.

The authors declared that no experiments on animals were performed for the present study.

The authors declared that no commercially available immortalised human and animal cell lines were used in the present study.

References

- Abraham NS (2012) Proton pump inhibitors: potential adverse effects. *Current Opinion in Gastroenterology* 28(6): 615–620. <https://doi.org/10.1097/mog.0b013e328358d5b9>
- Ajabnoor AM, Cooper RJ (2020) Pharmacists' prescribing in Saudi Arabia: cross-sectional study describing current practices and future perspectives. *Pharmacy* 8(3): 160. <https://doi.org/10.3390/pharmacy8030160>
- Alakhali KM, Bayoumi HM, Abunakhaa ES, Ahmed M, Alqahtani NS, Jaber RA, et al. (2019) Evaluation of Acid-Suppressive Medications Prescribing and Usage in Central Hospitals in Abha Region, Saudi Arabia. *ARS Pharma – Developing Biotechnology* 60(2): 125–131. <https://doi.org/10.30827/ars.v60i2.8687>
- Alameri MA, Gharaibeh L, AL-Hawamdeh MI, Atwan R, Daoud E (2024) Awareness, knowledge, and behaviour of Jordanian public regarding misuse and overuse of proton pump inhibitors. *Pharmacy Practice* 22(2): 1–6. <https://doi.org/10.18549/PharmPract.2024.2.2870>
- Alaqeel S, Abanmy NO (2015) Counselling practices in community pharmacies in Riyadh, Saudi Arabia: a cross-sectional study. *BMC Health Services Research* 15: 1–9. <https://doi.org/10.1186/s12913-015-1220-6>
- Albayrak A, Yıldız İ (2024) Knowledge, attitudes, and practices of community pharmacists about proton pump inhibitors. *Journal of Faculty of Pharmacy of Ankara University* 48(1): 118–126. <https://doi.org/10.33483/jfpau.1322001>
- Algabbani AM, Alangari AS (2023) Proton pump inhibitor prescribing patterns and utilization: A retrospective chart review analysis. *Saudi Pharmaceutical Journal* 31(12): 101841. <https://doi.org/10.1016/j.jsps.2023.101841>
- Alhaddad MS, Mudhish EA, Bukhari RA, Aladwani AAA, Asiri SM (2018) Assessment of female satisfaction with the role of male community pharmacists in the Kingdom of Saudi Arabia. *JCDR - Journal of Clinical and Diagnostic Research* 12(6): FC01-FC05. <https://doi.org/10.7860/JCDR/2018/33921.11662>
- Alhossan A, Alrabiah Z, Alghadeer S, Bablghaith S, Wajid S, Al-Arif M (2019) Attitude and knowledge of Saudi community pharmacists towards use of proton pump inhibitors. *Saudi Pharmaceutical Journal* 27(2): 225–228. <https://doi.org/10.1016/j.jsps.2018.11.002>
- Ali MD, Al Hatef EAJ (2024) Types of sampling and sample size determination in health and social science research. *Journal of Young Pharmacists* 16(2): 204–215. <https://doi.org/10.5530/jyp.2024.16.27>
- Almaghaslah D, Alsayari A, Asiri R, Albugami N (2019) Pharmacy workforce in Saudi Arabia: challenges and opportunities: a cross-sectional study. *International Journal of Health Planning and Management* 34(1): e583-e593. <https://doi.org/10.1002/hpm.2674>
- Almomani HY, Almomani EY, Qablan A, Al-Momany A (2024) Pharmacists' perspectives and perceived barriers to counselling patients with kidney stones. *Research in Social and Administrative Pharmacy* 20(6): 123–133. <https://doi.org/10.1016/j.sapharm.2024.02.018>
- Al-Mutairi A, AlFayyad I, Altannir Y, Al-Tannir M (2021) Medication safety knowledge, attitude, and practice among hospital pharmacists in tertiary care hospitals in Saudi Arabia: a multi-center study. *Archives of Public Health* 79: 1–13. <https://doi.org/10.1186/s13690-021-00616-1>
- Alomi YA, Rph FAB, Alsubaie RS, Alghuraybi BI, Aloumi BE (2019) Factors (gender, age, social status, and income) affecting the satisfaction of pharmacy career in Saudi Arabia. *Pharmacology and Toxicology* 5(2): 88–92. <https://doi.org/10.5530/PTB.2019.5.16>
- Alotaibi OG (2022) Evaluating the extent of language barriers among health professionals in the Saudi Arabian health system. *Galore*

Funding

No funding was reported.

Author contributions

Mohammad Daud Ali (MDA)- Idea and Conceptualization, Methodology, Data analysis. Lama Nadir Alharbi (LNA), Lama Nadir Alharbi (LNA), Zahraa Yousif Qalaf (ZYQ), Maryam Adel Algheryafi (MAA), Lujain Essa Almarhoon (LEA), Fatimah Saleh Almohsen (FSA)- Data Collection, Data acquisition. Zainab Al Trefe (ZAT), Nousheen Aslam (NA), Nousheen Aslam (NA)- Interpretation, Writing – original draft preparation, review and editing. Ayaz Ahmed (AY), Yousif Amin (YA)- Manuscript proofreading. All authors: MDA, DMA, LNA, ZYQ, MAA, LEA, FSA, ZAT, NA, NB, AY and YA. I reviewed and approved the final version of the manuscript and approved it for communication.

Author ORCIDs

Mohammad Daud Ali  <https://orcid.org/0000-0003-3752-2331>

Zainab Al Trefe  <https://orcid.org/0000-0001-8944-6831>

Nuzhat Banu  <https://orcid.org/0000-0001-6253-5463>

Ayaz Ahmad  <https://orcid.org/0000-0003-3137-637X>

Yousif Amin  <https://orcid.org/0000-0003-4227-5849>

Data availability

All of the data that support the findings of this study are available in the main text.

- International Journal of Applied Sciences and Humanities 6(3): 139–152. <https://doi.org/10.52403/gijash.20220716>
- Asdaq SMB, ALbasha M, Almutairi A, Alyabisi R, Almuhaishi A, Faqih R, et al. (2021) Use of proton pump inhibitors: An exploration of awareness, attitude and behavior of health care professionals of Riyadh, Saudi Arabia. *Saudi Pharmaceutical Journal* 29(7): 713–718. <https://doi.org/10.1016/j.jsps.2021.04.033>
- Basheikh MA (2017) The use of proton pump inhibitors and prescription pattern by practicing physicians at an academic hospital. *Journal of King Abdulaziz University* 24(4): 9–14. <https://doi.org/10.4197/Med.24.4.2>
- Bashford JN, Norwood J, Chapman SR (1998) Why are patients prescribed proton pump inhibitors? Retrospective analysis of link between morbidity and prescribing in the General Practice Research Database. *BMJ* 317(7156): 452–456. <https://doi.org/10.1136/bmj.317.7156.452>
- Boardman HE, Heeley G (2015) The role of the pharmacist in the selection and use of over-the-counter proton-pump inhibitors. *International Journal of Clinical Pharmacy* 37: 709–716. <https://doi.org/10.1007/s11096-015-0150-z>
- Begg M, Tarhuni M, Fotso MN, onzalez NA, Sanivarapu RR, Osman U, Latha Kumar A, Sadagopan A, Mahmoud A, Khan S (2023) Comparing the Safety and Efficacy of Proton Pump Inhibitors and Histamine-2 Receptor Antagonists in the Management of Patients With Peptic Ulcer Disease: A Systematic Review. *The Cureus Journal of Medical Science* 15(8): e44341. <https://doi.org/10.7759/cureus.44341>
- Boghossian TA, Thompson W, Welch V, Moayyedi P, Rojas-Fernandez C, Pottie K, et al. (2017) Deprescribing versus continuation of chronic proton pump inhibitor use in adults. *Cochrane Database of Systematic Reviews* 3: 1–54. <https://doi.org/10.1002/14651858.CD011969.pub2>
- Brewster S, Holt R, Portlock J, Price H (2020) The role of community pharmacists and their position in the delivery of diabetes care: an update for medical professionals. *Postgraduate Medical Journal*;96(1138): 473–479. <https://doi.org/10.1136/postgrad-medj-2020-137511>
- Castellana C, Pecere S, Furnari M, Telese A, Matteo MV, Haidry R, et al. (2021) Side effects of long-term use of proton pump inhibitors: practical considerations. *Polish Archives of Internal Medicine* 131(6): 541–549. <https://doi.org/10.20452/pamw.15997>
- Dyer CC, Oles KS, Davis SW (1984) The role of the pharmacist in a geriatric nursing home: a literature review. *Drug Intelligence & Clinical Pharmacy* 18(5): 428–433. <https://doi.org/10.1177/106002808401800522>
- Fathelrahman AI, Alrobaian M, Altowayan WM, Maghrabi I, Asiri YA (2022) Pharmacy education in Saudi Arabia: Achievements and challenges during the last two decades with a focus on Taif University as a case study. *Saudi Pharmaceutical Journal* 30(6): 649–654. <https://doi.org/10.1016/j.jsps.2022.04.001>
- Grube RRA, May DB (2007) Stress ulcer prophylaxis in hospitalized patients not in intensive care units. *American Journal of Health-System Pharmacy* 64(13): 1396–1400. <https://doi.org/10.2146/ajhp060393>
- Haastrup PF, Jarbøl DE, Thompson W, Hansen JM, Søndergaard J, Rasmussen S (2021) When does proton pump inhibitor treatment become long term? A scoping review. *BMJ Open Gastroenterology* 8(1): e000563. <https://doi.org/10.1136/bmjgast-2020-000563>
- Kamusheva M, Ignatova D, Golda A, Skowron A (2020) The potential role of the pharmacist in supporting patients with depression—a literature-based point of view. *Integrated Pharmacy Research and Practice*, 49–63. <https://doi.org/10.2147/irpr.s239672>
- Khayyat SM, Haseeb A, Alkaabi ZH, Bahaziq AM, Alhomayani AM, Alhifany AA, et al. (2024) Clinical Services, Barriers, and Public Perspectives of Community Pharmacies in Saudi Arabia: A Cross-Sectional Study. *Journal of Patient Experience* 11: 23743735241273564. <https://doi.org/10.1177/23743735241273564>
- Korayem GB, Alkanhal R, Almass R, Alkhunaizan S, Alharthi G, Bin Sheraim N, et al. (2021) Patients, prescribers, and institutional factors associated with inappropriate use of acid suppressive therapy in medical wards: an experience of a single-center in Saudi Arabia. *International Journal of General Medicine*, 5079–5089. <https://doi.org/10.2147/IJGM.S328914>
- Luo H, Fan Q, Bian T, Li X, Chen K, Zhang Q, et al. (2019) Awareness, attitude and behavior regarding proton pump inhibitor among medical staff in the Southwest of China. *BMC Health Services Research* 19: 1–9. <https://doi.org/10.1186/s12913-019-4725-6>
- Okumura LM, Rotta I, Correr CJ (2014) Assessment of pharmacist-led patient counseling in randomized controlled trials: a systematic review. *International Journal of Clinical Pharmacy* 36: 882–891. <https://doi.org/10.1007/s11096-014-9982-1>
- Ramser KL, Sprabery LR, Hamann GL, George CM, Will A (2009) Results of an intervention in an academic Internal Medicine Clinic to continue, step-down, or discontinue proton pump inhibitor therapy related to a Tennessee Medicaid formulary change. *Journal of Managed Care & Specialty Pharmacy* 15(4): 344–350. <https://doi.org/10.18553/jmcp.2009.15.4.344>
- Schoenfeld AJ, Grady D (2016) Adverse effects associated with proton pump inhibitors. *JAMA Internal Medicine* 176(2): 172–174. <https://doi.org/10.1001/jamainternmed.2015.7927>
- Schubert ML (2020) Proton pump inhibitors: misconceptions and proper prescribing practice. *Current Opinion in Gastroenterology* 36(6): 493–500. <https://doi.org/10.1097/MOG.0000000000000676>
- Shim YK, Kim N (2017) The effect of H2 receptor antagonist in acid inhibition and its clinical efficacy. *The Korean Journal of Gastroenterology* 70(1): 4–12. <https://doi.org/10.4166/kjg.2017.70.1.4>
- Shin JM, Sachs G (2008) Pharmacology of proton pump inhibitors. *Current Gastroenterology Reports* 10(6): 528–534. <https://doi.org/10.1007/s11894-008-0098-4>
- Siddique A, Ahmed E, Al Zoghabi M, Alsaif E, Alhawshani F (2022) Exploring community pharmacist's knowledge, attitude, and practice toward the provision of pharmaceutical care. A prospective cross-sectional study from Saudi Arabia. *Journal of Pharmacy and Bioallied Sciences* 14(1): 13–28. https://doi.org/10.4103/jpbs.jpbs_16_21
- Tadesse YB, Sendekie AK, Mekonnen BA, Denberu FG, Kassaw AT (2023) Pharmacists' Medication Counseling Practices and Knowledge and Satisfaction of Patients With an Outpatient Hospital Pharmacy Service. *Inquiry* 60: 00469580231219457. <https://doi.org/10.1177/00469580231219457>
- Thabit AK, Alghamdi DI, Alaqi RO, Alsufyani MA, Bagalagel AA (2023) Factors influencing future career interests of pharmacy interns in Saudi Arabia: a survey from 25 colleges of pharmacy. *BMC Medical Education* 23(1): 35. <https://doi.org/10.1186/s12909-023-04022-9>
- Turshudzhyan A, Samuel S, Tawfik A, Tadros M (2022) Rebuilding trust in proton pump inhibitor therapy. *World Journal of Gastroenterology* 28(24): 2667. <https://doi.org/10.3748/wjg.v28.i24.2667>
- Yasmeen A, Syed MH, Alqahtani SS, Syed NK, Meraya AM, Wazairy M, et al. (2023) Suspected inappropriate use of prescription and non-prescription drugs among requesting customers: A Saudi community pharmacists' perspective. *Saudi Pharmaceutical Journal* 31(7): 1254–1262. <https://doi.org/10.1016/j.jsps.2023.05.009>