Patient Knowledge, Attitudes, and Expectations Regarding Over-the-Counter Medications: A Survey-Based Study in Tehran Community Pharmacies

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Abstract

Background: The present study aimed to evaluate patient knowledge, attitudes, and expectations concerning over-the-counter (OTC) medications and to investigate the impact of demographic characteristics on patients' choices when buying these medications. Gaining insight into these elements is essential for encouraging the safe use of OTC drugs and mitigating the potential dangers linked to their improper use or misinterpretation.

Methods: This descriptive cross-sectional study investigated Tehran community pharmacies between April 2022 and March 2023. A validated 25-item questionnaire was distributed to 384 participants, resulting in 306 complete responses for analysis. Statistical analysis was performed using SPSS version 22. Pearson correlation (r), independent-samples t-test, and one-way analysis of variance (ANOVA) were employed, with statistical significance set at $P < 0.05$.

Results: In a study investigating OTC medication information, pharmacists were identified as the leading source for most participants (71.6%). The research revealed moderate mean scores for participant knowledge (3.3 ± 0.6) and attitudes (3.3 ± 0.5), while relatively high expectations (3.8 ± 0.7). Further analysis indicated a significant association between a participant's education level and their knowledge ($P = 0.001$) and expectations ($P = 0.022$) concerning OTC medications. Participants aged 45 and older demonstrated significantly higher expectations ($P = 0.015$). However, no significant differences were observed in knowledge or attitudes based on gender, the presence of chronic illness, or regular medication use.

Conclusion: These results highlight significant knowledge deficits, especially concerning the appropriate dosage and administration of medications, even though pharmacists are the primary source of such information. Consequently, there is a clear need for public health education campaigns specifically designed for older adults and individuals with lower levels of education. Furthermore, pharmacist-led interventions should be enhanced to better reconcile patient expectations with evidence-based pharmaceutical practices.

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Introduction

The Food and Drug Administration (FDA) formally classifies over-the-counter (OTC) medications as pharmaceutical products accessible to consumers without a prescription, with their regulation overseen by FDA monographs (1). Complementing this, another perspective characterizes OTC medications as compounds demonstrably safe and efficacious for broad public consumption, negating the necessity of a healthcare professional's directive (2).

The global rise in OTC medication utilization in recent years indicates a growing inclination toward self-management of minor health issues. Investigations conducted in North America, Europe, and Asia consistently reveal that this trend is predominantly influenced by considerations of convenience, economic efficiency, and a preference to

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bypass professional medical consultations (3–5). The evolving landscape of consumer behavior necessitates a thorough investigation into public knowledge, attitudes, and expectations regarding OTC products. This understanding is crucial for both promoting appropriate usage and developing effective, targeted educational initiatives (3, 6).

Although generally considered safe, the misuse of OTC medications can culminate in several adverse outcomes, such as improper administration, inappropriate dosage, or an improper selection of treatment, which may obscure the symptoms of more severe underlying medical conditions, risk of developing dependence or engaging in abuse, and adverse drug reactions or harmful interactions with other medications (7, 8). The dangers linked to OTC medications primarily stem from their incorrect application, often due to insufficient knowledge and awareness of potential risks (9). Specific populations face heightened risks from OTC medication misuse, including children, older adults managing multiple health conditions and medications, pregnant or breastfeeding individuals, and those with pre-existing health issues (10, 11).

Medication knowledge is a key determinant of appropriate drug utilization (12). Numerous studies, however, indicate that various populations, particularly patients managing chronic conditions, often possess inadequate knowledge of their medications, with a notable deficiency in knowledge regarding potential side effects (12, 13). While pharmacies are widely recognized by the general public as trusted sources for purchasing medications, the selection of OTC medications is frequently guided by the recommendations of pharmacists and physicians (14, 15). Consumer decisions when acquiring OTC medications, and their subsequent attitudes, are shaped by factors such as perceived effectiveness, familiarity with the name or brand, and safety of the product (16).

Pharmacists play a crucial role in advising consumers on self-medication (17), helping to guarantee that the benefits of OTC medications outweigh their associated risks. Consequently, pharmacists are an invaluable resource for involving patients in the safe selection and appropriate use of medications. Enhancing patient education is essential for improving safety, and more robust systems for reporting adverse drug reactions are necessary (18, 19).

The ready availability and ease of access to OTC medications, despite their clear benefits, necessitate a closer examination of patient comprehension, perspectives, and attitudes regarding these products. A thorough understanding of these elements is vital for healthcare providers, policymakers, and pharmaceutical manufacturers to champion the safe and effective utilization of OTC medications and to mitigate the inherent risks associated with their improper use or misinterpretation.

This research aims to address a significant void in the existing literature by investigating patient knowledge, attitudes, and expectations concerning OTC medications. Concurrently, it will analyze the influence of demographic variables, including age and education level, on these patient behaviors. Ultimately, the insights gained from this study are intended to inform the creation of focused interventions and public health initiatives designed to encourage safer self-medication practices.

Methods

Study Design and Setting

The present descriptive, cross-sectional study, conducted in Tehran pharmacies between April 2022 and March 2023, investigated patient knowledge, attitudes, and expectations concerning OTC medications. A 25-item paper questionnaire was directly administered to participants at selected local pharmacies. The pharmacies were chosen using a convenience sampling method, with an emphasis on ensuring public accessibility and representation across diverse socioeconomic areas of the city.

Ethical Approval

This study was conducted in strict adherence to ethical guidelines. Prior to their participation, prospective participants were fully informed of the study's objectives and significance. Confidentiality, privacy, and anonymity were rigorously maintained for all participants throughout the research. Informed consent was obtained from each participant before data collection. The study received ethical approval from the Research Ethics Committee of the Pharmacy and Pharmaceutical Branches Faculty, Islamic Azad University, Tehran Medical Sciences Branch (approval ID: IR.IAU.PS.REC.1401.008).

Development of Study Measurements

Initially, a 45-item questionnaire was designed following an extensive review of both Persian and English literature concerning OTC medication use. This instrument encompassed key constructs, including knowledge, attitudes, and expectations, with its items adapted from previously validated tools utilized in comparable research (28–30). To ensure the questionnaire's appropriateness for the Iranian healthcare system, five practicing pharmacists were consulted for item refinement.

To ensure the content validity of the questionnaire, five pharmacists evaluated each item using both the Content Validity Index (CVI) and the Content Validity Ratio (CVR). An item was deemed acceptable if its CVI score was at least 0.79 and its CVR score was at least 0.99. Items falling below these thresholds were either revised for improvement or removed entirely. Following this expert review, items were excluded if they exhibited low CVI or CVR scores, demonstrated conceptual

overlap with other items, or possessed limited relevance to the study's context. This rigorous refinement process ultimately yielded the final 25-item questionnaire, thereby confirming its content validity, clarity, and applicability to the intended population.

Table 1 displays the calculated CVI and CVR for each item.

Table 1. Content Validity Index (CVI) and Content Validity Ratio (CVR) value for each questionnaire item

Questionnaire items	Item count in the revised questionnaire	Question importance CVI	Clarity of question meaning CVR (Importance)	Question transparency CVR (Clarity)	Question simplicity CVR (Transparency)	Question relevance CVR (Relevance)
1	1	1	1	1	1	1
2	Delete	0.6	0.8	0.8	0.8	0.8
3	2	1	1	1	1	1
4	Delete	0.6	1	1	1	1
5	2	1	1	1	1	1
6	3	1	1	1	0.8	1
7	4	1	1	1	1	1
8	Delete	0.6	0.8	0.8	0.8	0.8
9	Delete	0.6	1	1	1	0.8
10	Delete	0.6	1	1	1	1
11	6	1	1	1	1	1
12	Delete	0.6	1	1	1	1
13	Delete	0.6	1	1	1	1
14	7	1	1	1	1	0.8
15	8	1	1	1	1	1
16	9	1	1	1	1	1
17	Delete	0.6	1	1	1	0.8
18	10	1	0.8	0.8	1	١
19	Delete	0.2	1	1	1	0.8
20	11	1	0.8	0.8	0.8	0.8
21	Delete	0.6	1	1	1	0.8
22	12	1	1	1	1	1
23	Delete	0.6	1	1	1	0.8
24	13	1	1	0.8	1	1
25	Delete	0.6	0.8	0.8	0.8	0.8
26	14	1	1	1	0.8	1
27	15	1	1	1	0.8	1
28	16	1	1	1	0.8	1
29	Delete	0.6	1	1	1	1
30	Delete	0.6	1	1	0.8	1
31	17	1	1	1	1	1
32	18	1	1	1	1	1
33	Delete	0.6	1	1	1	1
34	Delete	0.6	1	1	1	1
35	19	1	1	1	1	1
36	20	1	1	1	1	1
37	Delete	0.6	1	1	1	0.8
38	Delete	0.6	1	1	1	0.8
39	Delete	0.2	1	1	1	0.8
40	Delete	0.6	1	1	1	0.8

Subsequent to content validation, a reliability analysis was performed. The test-retest method was employed, involving 20 patients who completed the questionnaire on two separate occasions, with a one-week interval between administrations. The absence of statistically significant differences ($P > 0.05$) between the two administrations indicates the questionnaire's temporal stability. Furthermore, an item-level analysis revealed that all correlation coefficients exceeded 0.5, demonstrating moderate to high reliability.

Following rigorous validation and reliability analyses, 20 items deemed either less relevant or redundant were eliminated. The resulting questionnaire, in its definitive form, comprised 25 items systematically organized into four distinct sections: (1) Demographic and clinical characteristics, (2) knowledge assessment, (3) attitude assessment, and (4) patient expectations. All sections of the questionnaire, excluding the demographic section, utilized a five-point Likert scale (1 = "completely disagree" to 5 = "completely agree"). The knowledge section also incorporated a single multiple-choice question. The complete questionnaire is available as Supplementary Material (S1). This study examined OTC medications commonly found in Iran. The categories of products included analgesics (such as acetaminophen and ibuprofen), antacids, antihistamines, cold and flu remedies, vitamin supplements, mineral supplements, herbal preparations (such as thyme syrup and echinacea), and topical agents. These specific categories were selected because they represent the wide array of OTC products frequently utilized by the general public and readily accessible in Iranian community pharmacies.

Demographic Data

In this study, demographic information, such as age, gender, education level, history of chronic illness, and regular medication use was collected.

The core constructs investigated were precisely defined as follows:

- Knowledge: Participants' objective comprehension of OTC medication use, encompassing aspects like appropriate dosage, contraindications, and proper administration.

- Attitudes: Individuals' personal beliefs, perceptions, and behaviors concerning OTC medications, which were influenced by prior experiences. This included their trust in pharmacists and their appraisal of perceived risks.

- Expectations: Patients' anticipated outcomes and inherent values related to the use of OTC medications, such as their perceived effectiveness, safety, and cost-effectiveness.

Knowledge

The Knowledge Scale consisted of nine items designed to assess participants' factual comprehension of OTC medications, encompassing appropriate dosage, contraindications, and storage protocols. Although routine product familiarity may influence behavior, this specific section focused on evaluating patients' cognitive grasp of OTC medication utilization, specifically concerning dosage regimens, storage guidelines, and potential contraindications. The assessment evaluated participants' comprehension across several key areas related to OTC medications, including understanding of OTC availability, appropriate dosage and administration, and capacity to identify suitable alternative medications when a primary option was unavailable, awareness of potential misuse risks, knowledge of dosages and contraindications, and understanding of appropriate storage practices and expiration guidelines. Participants' ability to recognize delayed allergic reactions and their knowledge of proper actions in the event of adverse reactions were also scrutinized. Additionally, this section incorporated a multiple-choice question designed to assess their methods for acquiring medication information.

Attitudes

This study investigated patient attitudes regarding OTC medications through seven Likert scale items. These items were designed to capture patients' personal beliefs and reported behaviors, which are largely shaped by their prior experiences with OTC medications. The questions specifically focused on several critical facets of patients' perceptions and practices concerning OTC drug use. Core areas of inquiry encompassed the extent of trust in pharmacists' professional knowledge, the appropriateness of using OTC medications for minor health concerns, the comprehension of appropriate usage and dosage instructions, and beliefs about the efficacy of OTC medications, informed by previous use.

Expectations

The expectations section evaluated patients' anticipated results and primary concerns regarding OTC medication use. This section focused on patients' future-oriented beliefs about favorable effects of OTC drug use, including their perceived effectiveness and safety. The items in this section were developed to assess patients' perceptions of OTC medications' effectiveness, safety, ease of use, and

cost-effectiveness. Participants evaluated their level of agreement with various statements, including 'I expect OTC medications to mitigate symptoms quickly' and 'I expect OTC medications to be safe with the least adverse effects.' Furthermore, the survey explored how contextual factors, such as price and accessibility, influenced participants' decision-making processes, acknowledging their role in shaping these expectations.

Sample Size and Respondents

Participants in this study were recruited from 22 districts across Tehran using a convenience sampling method. To ensure representation from various socioeconomic strata, pharmacies were strategically chosen as recruitment sites. The sample size of 384 was calculated using Krejcie and Morgan's table, a standard methodology for determining sample sizes for population proportions, based on a 95% confidence level and a 5% margin of error. The determined sample size for this study (n = 384) was predicated on an assumed response rate of 50.0%, aiming to achieve sufficient statistical power. A 5.0% margin of error and a 95.0% confidence interval (CI) were applied to minimize potential biases in the findings. To maintain the study's focus and avoid confounding variables, the physicians, nurses, pharmacists, dentists, pharmaceutical and health technicians, medical students, and other healthcare professionals were explicitly excluded. Individuals possessing professional healthcare training, encompassing physicians, nurses, pharmacists, dentists, pharmaceutical and health technicians, medical students, and other healthcare professionals, were systematically excluded from participation in this research. The rationale for this exclusion was rooted in the recognition that their specialized knowledge and professional training could potentially introduce a systematic bias into the assessment of OTC medication knowledge, attitudes, and expectations, thereby compromising the generalizability of findings to the broader public. Participants were recruited from 22 districts within Tehran. To ensure representation across various socioeconomic strata of the city, pharmacies were strategically selected. While this approach aimed to achieve diversity within the sample, it is recognized that employing a random sampling method could have mitigated potential selection biases. Pharmacies that were readily available to the public were selected to guarantee participants' consistent access to OTC medications. The interviewer informed the participants about the research objectives and nature, inquired about their inclination to take part in the study, and assured them that their personal information would remain confidential. Of the 384 paper-based questionnaires collected, 78 were deemed unusable due to either incompleteness or the presence of multiple responses. Consequently, the final analysis encompassed 306 questionnaires.

Statistical Analysis

Patient knowledge, attitudes, and expectations were quantified by calculating the mean scores from their respective questionnaire sections. SPSS version 22 was used for data analysis. Descriptive statistics were employed to summarize the demographic characteristics of the study participants. The Shapiro-Wilk test was utilized to assess the normality of the data distribution. Results from this test indicated that the data for knowledge ($P < 0.001$), attitudes ($P < 0.001$), and expectations ($P < 0.001$) were not normally distributed, as evidenced by all p-values being less than the predetermined significance level of $\alpha = 0.05$. Given the substantial sample size (n = 306), parametric tests were employed. This approach was justified by the known robustness of t-tests and analysis of variance (ANOVA) when applied to larger datasets. To explore the relationships between continuous variables, Pearson's correlation coefficients were calculated, aligning with the nature and distribution of the data. For comparisons of mean scores across various demographic subgroups, independent-samples t-tests and one-way ANOVA were utilized. All statistical analyses were conducted with a predetermined significance level of $P < 0.05$.

Results

Participants' Characteristics

Table 2 provides a comprehensive overview of the demographic attributes of the 306 individuals comprising the study sample. Most of the participants were female (58.8%), with the largest age cohort being over 45 years old. Education level varied, with the predominant categories being an undergraduate degree (35.3%) and a high school diploma or less (34.0%). Furthermore, the data indicate that 40.2% of respondents reported living with a chronic illness, and 58.8% were on regular medication regimens.

The findings suggest that a significant proportion of OTC medication users are middle-aged women, irrespective of their education level or the presence of chronic health conditions. This demographic insight underscores the necessity for educational interventions that are specifically designed to address self-medication practices within this age group, taking into account their health status.

Table 2. Respondent characteristics

Characteristics	N	Percentage (%)
Gender		
Male	126	41.2
Female	180	58.8
Age		
<25	14	4.6
25-35	70	22.9
36-45	66	21.6
>45	156	51
Education		
High school diploma and lower	104	34
Associate degree	38	12.4
Bachelor's degree	108	35.3
Master's degree or higher	56	18.3
Chronic disease history		
Yes	123	40.2
No	183	59.8
Permanent medication consumption		
Yes	126	41.2
No	180	58.8

Levels of Knowledge, Attitudes, and Expectations

Participants exhibited moderate knowledge and attitudes, reflected by mean scores of 3.3 ± 0.6 for knowledge and 3.3 ± 0.5 for attitudes. Conversely, their expectations were notably elevated, with a mean score of 3.8 ± 0.7. This discrepancy suggests a potential gap between participants' confidence in the effectiveness of OTC medications and their actual comprehension of their proper application. Such variations may indicate a propensity to overestimate the safety and efficacy of non-prescription products, thereby underscoring the necessity for focused educational initiatives.

Figure 1 demonstrates that pharmacists serve as the predominant source of information regarding OTC medications (71.6%). Physicians followed as the second most frequently reported source (54.9%). These findings underscore the critical role pharmacists play in guiding patients on the appropriate use of OTC products.
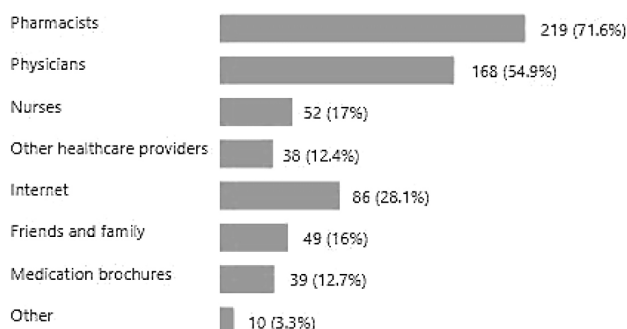

Figure 1. Sources of information for non-prescription medications

Relationships Among Demographic Factors, Knowledge, Attitudes, and Expectations

Table 3 reveals a statistically significant correlation between patient age and expectations regarding OTC medications ($P < 0.01$). This study identified significant associations between various demographic factors and patients' knowledge, attitudes, and expectations concerning OTC medications. Specifically, patients aged 45 and older exhibited higher expectations ($P = 0.014$), which may be attributable to elevated health needs or extensive prior experience with medication use. Moreover, education level demonstrated a significant association with both knowledge ($P = 0.001$, 95% CI: 0.25 to 0.45) and expectations ($P < 0.01$, 95% CI: -0.40 to -0.05). Specifically, individuals with master's degrees or higher exhibited greater knowledge (3.48 ± 0.55), while those possessing a high school diploma or lower reported higher expectations (3.76 ± 0.75). Individuals possessing master's degrees or higher exhibited superior knowledge regarding OTC medications, while those with lower education levels, such as high school diplomas, reported elevated expectations concerning OTC products, possibly stemming from insufficient comprehension of their limitations and appropriate administration. These observations indicate that both age and education levels are significant determinants of patients' perceptions of OTC medications.

Table 3. Comparison of participant characteristics with mean knowledge, attitude, and practice scores

Characteristics		Knowledge (Mean ± SD)	P- Value	Attitude (Mean ± SD)	P- Value	Expectations (Mean ± SD)	P- Value
Gender	Male	3.30 ± 0.61	>0.05	3.33 ± 0.52	>0.05	3.91 ± 0.62	>0.05
	Female	3.35 ± 0.58		3.30 ± 0.58		3.8 ± 0.78	
Age	<25	3.37 ± 0.78	>0.05	3.44 ± 0.41	>0.05	3.88 ± 0.52	0.014
	25-35	3.34 ± 0.59		3.29 ± 0.66		3.64 ± 0.78	
	35-45	3.45 ± 0.55		3.31 ± 0.48		3.84 ± 0.67	
	>45	3.22 ± 0.58		3.31 ± 0.54		3.93 ± 0.72	
Education	High school diploma and lower	3.04 ± 0.52	0.001	3.28 ± 0.52	>0.05	4.03 ± 0.53	0.022
	Associate degree	3.34 ± 0.55		3.37 ± 0.51		3.78 ± 0.63	
	Bachelor's degree	3.51 ± 0.60		3.33 ± 0.59		3.73 ± 0.86	
	Master's degree or higher	3.48 ± 0.55		3.29 ± 0.58		3.76 ± 0.75	
Chronic disease history	Yes	3.21 ± 0.58	>0.05	3.30 ± 0.56	>0.05	3.94 ± 0.70	>0.05
	No	3.40 ± 0.59		3.31 ± 0.55		3.78 ± 0.73	
Permanent medication consumption	Yes	3.31 ± 0.59	>0.05	3.41 ± 0.55	>0.05	4.02 ± 0.73	>0.05
	No	3.33 ± 0.59		3.24 ± 0.56		3.73 ± 0.72	

No statistically significant differences in knowledge levels were observed between patients with and without chronic diseases or those on continuous medication regimens (P = 0.9), suggesting these factors are not primary determinants of OTC knowledge. Similarly, the research found no significant differences in knowledge, attitudes, or expectations across other demographic variables. This finding underscores the significant influence of age and education level on patient perceptions. Although these findings provide valuable perspectives, future research should investigate a greater number of factors, such as health literacy or socioeconomic status, to develop a more comprehensive understanding of patient behavior regarding OTC medications.

Correlation Coefficients of Study Variables

The Shapiro-Wilk test revealed a non-normal distribution of the data. Pairwise correlation coefficients were then computed for the scores of knowledge, attitude, and expectations as follows:

Knowledge and attitudes: 0.44

Attitudes and expectations: 0.21

Expectations and knowledge: -0.01

The evidence reveals that while knowledge and attitudes are moderately associated, the relationship between attitudes and expectations is weak, and there's no discernible relationship between knowledge and expectations.

Discussion

The current research investigated patient knowledge, attitudes, and expectations concerning OTC medications within Tehran pharmacies. The results revealed moderate knowledge scores (3.3 ± 0.6), low attitude scores (3.3 ± 0.5), and comparatively high expectations (3.8 ± 0.7). These findings collectively underscore significant gaps in patient understanding and identify key areas for targeted interventions. The results demonstrated moderate overall levels of knowledge and attitudes, with relatively high expectations among participants. We found significant correlations between education level and both knowledge and expectations. Participants with higher education levels exhibited superior knowledge and more realistic expectations. Older participants, particularly those over 45, reported higher expectations. However, there were no significant differences in knowledge or attitudes based on gender, chronic disease status, or the use of ongoing medication. Correlation analysis revealed a moderate positive association between knowledge and attitudes, a weak association between attitudes and expectations, and no clear association between knowledge and expectations.

Consistent with existing literature, our study reveals a notable deficit in public understanding concerning the appropriate use of OTC medications. It is possible that regional disparities in healthcare access and educational resources may contribute to the observed variations in this understanding (2, 20–22).

Most participants (71.6%) recognized pharmacists as the primary source of OTC information. However, the mean knowledge scores were only moderate (3.3 ± 0.6), suggesting that having access to pharmacists does not necessarily culminate in improved understanding. Comparable results have been observed in studies conducted in other countries, such as Qatar and Switzerland, where patients often depend on pharmacists for advice on OTC medications, yet still show significant knowledge gaps (23, 24).

Pharmacists are crucial in guiding patients on OTC medications, a finding supported by both our research and existing literature. For instance, Seiberth et al. highlighted that while patients gather medication information from various sources, they generally express satisfaction with the input received from pharmacists (25). Additionally, patients trust pharmacists to recognize drug-related issues and appreciate their utilization of clinical decision-support systems to improve medication safety (26). Pharmacists are ideally positioned to fill the gap between patient knowledge and evidence-based practices. However, our research findings indicate their role should encompass more than just dispensing medications; it needs to extend to proactive counseling and education. Incorporating digital tools, such as decision support systems, into routine pharmacy practice could further facilitate personalized and safe medication use (26, 27).

The limited public understanding of OTC medication observed in this study aligns with international research findings. Specifically, participants demonstrated an inadequate grasp of appropriate dosage and administration, a deficiency consistently reported in studies from Brunei Darussalam and Qatar (23, 28). These deficiencies are frequently due to a lack of structured educational practices, highlighting the necessity of targeted public health initiatives to enhance medication knowledge (29). Although pharmacists were identified as the primary source of information, the moderate knowledge scores indicate that insufficient current communication strategies. This emphasizes the necessity for increased pharmacist-led education, especially in developing nations where healthcare infrastructure is restricted.

Patient expectations concerning OTC medications were mostly influenced by their perceived efficacy, safety, and ease of use, not solely by cost or accessibility. Interestingly, older participants and individuals with lower education levels reported higher expectations, with affordability and availability being principal determinants in their decision-making. These findings align with existing literature, which identifies price and accessibility

as key determinants of OTC medication use (30, 31). Furthermore, research indicates that tailored educational campaigns dealing with patient expectations can enhance understanding and mitigate potential hazards associated with self-medication (32). Therefore, educational initiatives should prioritize aligning patient expectations with evidence-based practices, particularly for high-risk populations.

The low attitude scores in this study suggest that patients have limited confidence in the efficacy and safety of OTC medications, even though these medications are widely used. Similar findings have been reported in Swedish research, which indicated that patient attitudes were affected by factors such as education level, income, self-care orientation, medication knowledge, and overall health status (33). In this research, there was no significant link between taking ongoing medication and patient attitudes, indicating that simply using medication regularly does not necessarily lead to more positive views of OTC products. Existing literature demonstrates that pharmacist-led interventions, particularly through structured and proactive counseling, can effectively improve patient attitudes (33, 38). These findings highlight the critical need for sustained pharmacist engagement to empower informed decision-making and ensure the safe and effective utilization of OTC medications.

Our research revealed no significant differences in knowledge, attitudes, or expectations according to gender, history of chronic disease, or current medication use. The findings revealed a moderate correlation between knowledge and attitudes, suggesting that readily available information might shape patient attitudes. However, patient expectations regarding OTC medications exhibited only a weak correlation with attitudes and a negligible correlation with knowledge.

Pharmacists are consistently regarded as highly credible and authoritative sources of information concerning OTC medications, a perception corroborated by numerous international studies. Across diverse contexts, pharmacists' expertise in guiding patients on the safe, effective, and economical utilization of nonprescription therapies has been widely acknowledged. For example, a study conducted in Yinchuan, China, revealed that while patients had high expectations for pharmacists' recommendations, unfulfilled expectations concerning the quality of counseling and service delivery correlated with reduced trust in pharmacists' qualifications, subsequently leading to an increase in self-medication practices (21). Conversely, a Slovenian study demonstrated high patient satisfaction with pharmacists' approach, services,

and expertise regarding both prescription and OTC medications. The majority of participants in this study perceived pharmacists as reliable medication experts and placed considerable trust in their advice, leading to high expectations during the purchasing process (34).

This study revealed moderate gaps in patient knowledge of OTC medications, particularly concerning appropriate dosage and administration. Although such knowledge gaps are not unusual, they highlight the necessity of implementing targeted educational initiatives, particularly for individuals with lower education levels or restricted access to dependable information sources. Patients frequently base their medication decisions on prior experiences, rather than evidence-based practices, highlighting the critical need for pharmacists to intervene and provide accurate, comprehensive medication information (7). Nevertheless, studies indicate that a patient's education level and previous counseling experiences positively impact their medication knowledge (35).

Future research ought to investigate additional factors influencing OTC medication use, including cultural attitudes, economic status, and the impact of digital health resources. Both observational and qualitative studies could offer more profound insights into patient behaviors and decision-making processes. Furthermore, broadening the geographical scope of similar studies would enhance the generalizability of the findings.

Limitations

Several limitations should be considered when interpreting the results of this study. The quantitative measures may have been impacted by various response biases, including leniency error, central tendency bias, and the halo effect, all of which could have impacted participants' answers.

Time constraints inherently limited participation to individuals with sufficient availability and interest to complete the questionnaire. This likely introduced a self-selection bias, potentially affecting how representative the participant sample is of the broader population.

Although pharmacies were selected from diverse socioeconomic districts (including both urban and suburban areas), the use of convenience sampling indicates a potential sampling bias, thus limiting the generalizability of the study's findings.

The study's failure to report Cronbach's alpha or other measures of internal consistency limits the evaluation of the reliability of the knowledge, attitudes, and expectations subscales. Future research should therefore incorporate psychometric assessments, such as Cronbach's alpha or

intra-class correlation coefficients (ICCs), to ensure scale reliability.

Finally, despite efforts to control for potential biases, the validity of the self-reported data may have been affected by pre-existing beliefs, prior healthcare experiences, or varying levels of trust in pharmacists among participants.

Implications

The study's findings reveal that patients possess moderate knowledge and limited positive attitudes regarding OTC medications. However, their expectations are predominantly influenced by personal factors, notably age and education level. These results highlight the critical need for improved patient education, especially targeting older adults and individuals with lower education levels, to ensure that their expectations align with evidence-based practices.

Pharmacists are crucial in shaping patient understanding and behavior concerning OTC medications because they are the main source of information. However, this research indicates that the current level of communication and counseling may be inadequate. Future interventions ought to prioritize more proactive and personalized counseling. This counseling should not only cover the correct usage of OTC medications but also address patients' attitudes toward their safety and efficacy. Furthermore, integrating digital health tools, such as decision support systems, into pharmacy practices could augment pharmacists' role in guaranteeing safe and effective medication use.

Conclusion

The current research found that patients in Tehran's community pharmacies exhibited moderate levels of knowledge and attitudes toward OTC medications, coupled with relatively high expectations. The research also revealed statistically significant correlations between education level and both knowledge and expectations. Furthermore, older age was associated with higher expectation scores. Even though pharmacists were the primary source of information, patients' knowledge levels regarding OTC medications remained at a modest level, indicating a possible gap between having access to information and truly understanding it. These findings highlight the need for customized public education programs and improved interactions between pharmacists and patients to ensure that OTC medications are used safely and with good understanding. Further investigations are necessary to assess additional factors that may influence patient behavior and decision-making regarding self-medication initiatives.

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