

Evaluation of Knowledge, Attitude and Practice of Pharmacists in Tehran Pharmacies regarding Environmental Health Issues to Increase Good Pharmacy Practice

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Abstract

Background: In addition to being the most accessible medical center in the community, the pharmacy is a center for storing and providing medicines and cosmetics that are directly related to people's health. Therefore, observing environmental health issues in the pharmacy, which is managed by the pharmacist, is considered necessary. In this study, considering the direct and high impact of observing various aspects of environmental health on the good pharmacy practice and its value, it has been tried by examining the level of knowledge, attitude and practice of pharmacists in the pharmacies of Tehran city and presenting it, the necessary ground for promotion The environmental health status of pharmacies should be provided.

Methods: In this research, standard researcher-made questionnaires were designed and after checking its validity by clinical pharmacists, environmental health and biostatistics experts and its reliability with Cronbach's alpha test, It was completed by the pharmacists of Tehran community pharmacies in the period of April to September 2022, observing ethical points and preserving their identity, in order to show their knowledge, attitude and performance towards environmental health issues in the pharmacy where they operate. Then the obtained data were analyzed in SPSS version 23.0 statistical software.

Results: Examination of the data obtained from this study showed that the pharmacists in the study have the appropriate level of knowledge and attitude, but their performance in pharmacies is different.

Conclusion: Observation of the results of the study shows that due to the lack of appropriate practical training and the lack of strict rules by regulatory authorities, despite the appropriate level of knowledge of pharmacists, in practice do not consider themselves very obliged to observe health principles.

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Introduction

Environmental education refers to the process of educating people about issues related to the environment to find solutions to deal with them, acquire the necessary knowledge and skills to acquire a positive attitude towards the environment, and improve motivation in describing environmental issues (1, 2).

From a contemporary policy context in the world of pharmacy, it has been debated that pharmacy education and practice have switched from an early narrow product-

centered focus to the current patient-centered focus in numerous countries of the world, albeit to varying degrees. Today, there is an order from governments and various health professions to educate and practice health care based on public health that frames the current health care practitioner, including pharmacists, to see beyond each patient to their community and society (3, 4).

A systemic shift has happened in community pharmacy practice during the past decades, so that a pharmacist with little public health concentration in times of epidemics or national initiatives has morphed into a health educator, medications

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evaluator, immunizer, and healthcare partner (5-7).

To offer pharmaceutical care, druggists should assume practice standards that enable them to have a good view of patients' health issues like the promotion of health, the supply of medicines, medical devices, patient self-care and improving prescribing and medicine use by pharmacists' activities (8,32). The International Pharmaceutical Federation (FIP) proposed standards for pharmacy practice underneath the heading GPP in hospitals' inpatient and outpatient pharmacies and community pharmacies. GPP guidelines have been designed by FIP and World Health Organization (WHO) to enable all countries to extend pharmacy practice least standards, and these guideline binds all pharmacists to confirm that the provided services have acceptable quality (8, 9).

Druggists are the considerable available health care professionals in the community. Pharmacies also are continuously in contact with society, and there is no requirement to create a meeting for receiving consultancy. Healthy people meet with health professionals also patients in pharmacies, therefore having a significant potential for public health (10-12).

Because there is little information about how pharmaceutical practices are implemented in developing countries (13), The purpose of this study is evaluation of knowledge, attitude, and practice of community pharmacists in Tehran regarding environmental health issues in pharmacy.

Methods

This knowledge, attitude and practice (KAP) study was conducted from April to September 2022 to measure the level of awareness, the type of attitude and to examine the functioning of pharmacists working in pharmacies in Tehran regarding environmental health issues.

The data collection method was a standardized questionnaire, which included 53 multiple-choice questions in 4 general categories: demographic information (9 questions), knowledge section questions (19 questions), attitude section (9 questions), and performance section (16 questions), which evaluated various aspects of environmental health including physical health, personal health, social health, and mental health.

The questionnaire questions were written according to the existing international and domestic laws governing the establishment and management of pharmacies. The questions in the attitude section are designed with the Likert scale method. In this method, the participant gives his answer to the propositions with 5 options in order (completely agree, agree, neither agree nor disagree, and

completely disagree) (33).

After preparing the questionnaires by the researcher, the validity of the questionnaires was checked and modified and confirmed by seven experts of clinical pharmacists, environmental health and biostatistics.

The reliability of the questionnaires was measured by Cronbach's alpha test. In this way, 30 pharmacists with study conditions were randomly selected and a questionnaire was given to them to complete. Then, 2 weeks later, the same questionnaire was given to the same people, and they completed it again.

Considering that at the time of conducting the study, according to the statistics of the Food and Drug Organization, there were 1734 pharmacies in Tehran, and taking into account that each pharmacy must have at least one pharmacist, the number of pharmacists in the target community is equal to the number of pharmacies in Tehran. became. Also, since it is not possible to study the entire target population, the statistical population of this research was calculated using Cochran's formula (34, 35).

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left(\frac{z^2 pq}{d^2} - 1 \right)}$$

n: Minimum required sample size

N: The total volume of the statistics community

p: Trait distribution ratio in society

z: The value obtained from the standard normal distribution table (which in this research and considering P-value = 0.05, the value obtained from the standard normal distribution table is 1.96) (36).

d: The error accepted by the researcher or the tolerable interval of the estimation of the desired parameter (usually considered equal to 0.05% in biological sciences) (37).

The number of pharmacists was randomly selected by systematic random sampling among pharmacies in all parts of Tehran.

To complete the questionnaires, the researcher visited different pharmacies in different parts of Tehran, but due to the difficulty of traveling and the time limit to complete the study, about one third of the questionnaires were also sent through the Google form in the virtual space or to the e-mails of active pharmacists in Tehran, and it was completed.

In this study, the names and personal information of the participants were not asked to obtain more unbiased and appropriate answers while considering their privacy.

Data were analyzed by using SPSS version 23 software.

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Mann-Whitney and Wilcoxon tests were used to examine the relationship between data and variables. Also, in this study the p-value was considered equal to 0.05 in all stages and statistical analyzes and “Statistically significant” means $p < 0.05$.

Results

All 204 pharmacists who were sent the questionnaire have responded, resulting in a 100% response rate. The questions displayed an acceptable reliability value of 0.785, as per the Cronbach’s alpha test. The demographic information was collected using 9 questions and it was found that most participants in the study were female and worked in pharmacies during the day, as shown in Table 1. As our study shows, 4-5 people work in most pharmacies. Around 39.7% of the pharmacies had a floor space of between 40 and 60 square meters. It is worth mentioning that most pharmacies were equipped with toilets and air conditioning. In terms of cleaning frequency, most pharmacies cleaned the floors and medicine shelves only once a day. The pharmacies were distributed as follows: north (18.6%), south (20.6%), west (23%), east (19.1%) and center (18.6%). (Table 1).

Pharmacists’ knowledge of environmental health issues in pharmacy was assessed using 19 questions. Table 2 shows pharmacists’ correct and incorrect answers to each question in this area. Only 4.9% were aware of environmental health problems. 44.6% of pharmacists believe that bleach and color removers are the most suitable cleaning products for cleanliness. In a survey of 204 pharmacists, 95.6% answered the first question correctly and 97.5% answered the second question correctly. Pests were observed in 74% of pharmacies included in the study and 58.3% of pharmacists believed that daily cleaning and hygiene were the most effective means of eliminating these pests. 21.1% of pharmacists recommended the use of devices that send signals to ward off animals and insects as the most effective method to ward off these animals. No contamination with microorganisms was observed in 88.7% of pharmacies that used bulk products for drug preparation. According to a survey, 70.1% of pharmacists are fully aware of the personalities of their employees. In addition, all pharmacists surveyed believe that employee involvement and empathy are crucial to advance the pharmacy’s work and services and promote social health. 88.7% of pharmacists consider the monitoring, control and processing of health matters in the pharmacy to be one of their tasks. In this section, the pharmacists’ total score was 1456.6 and their average score was 90.725 each.

Table 1. Demographic profile of the pharmacies.

Characteristics	answers	Frequency (n (%))
Gender	Female	137 (67.2)
	Male	67 (32.8)
Shift work	Day shift	67.2
	Night shift	32.8
The total number of pharmacy personnel	2-3	36 (17.6%)
	4-5	81 (39.7%)
	6-7	31 (15.2)
	8-9	56 (27.5)
The area of the pharmacy (m ²)	<40	17 (8.3%)
	40-60	81 (39.7%)
	60-80	53 (26%)
	80<	53 (26%)
There is toilets in the pharmacy	Yes	176 (86.3%)
	No	28 (13.7%)
There is air conditioning in the pharmacy	Yes	165 (80.9%)
	No	39 (19.1)
The number of times the pharmacy floor is cleaned per day	Zero	28 (13.7%)
	One	115 (56.4%)
	Two	53 (26%)
	>Four	8 (3.9%)
The number of times drug shelves is cleaned per month	Zero	31 (15.2%)
	One	88 (43.1%)
	Two	39 (19.1%)
	>Four	46 (22.5%)
Geographical region in Tehran	North	38 (18.6%)
	South	42 (20.6%)
	West	47 (23%)
	East	39 (19.1%)
	Center	38 (18.6%)

Table 2. Knowledge of environmental health issues by pharmacists.

Number of questions	Question	Answer	Frequency (n (%))
1	Do you know what is environmental health issues?	Yes	10 (4.9%)
		No	124 (60.8%)
		Somewhat	70 (34.3%)
2	The pharmacist is responsible for protecting staff	Correct	195 (95.6%)
		Incorrect	9 (4.4%)
3	Pharmacists responsible for the preparation and production of pharmaceutical and cosmetic products are required to comply with environmental health rules and regulations in their place of practice.	Correct	199 (97.5%)
		Incorrect	5 (2.5%)
		Solid and liquid soaps	36 (17.6%)
4	Could you please tell me which material you use for cleaning?	Synthetic cleaners	31 (15.2%)
		Special shampoos	42 (20.6%)
		Washing powders	4 (2%)
		Bleach	91 (44.6%)
5	The frequency of cleaning the pharmacy floor should be proportional to the number of patients in the pharmacy.	Correct	169 (82.8%)
		Incorrect	35 (17.2%)
6	Pharmacy shelves should be regularly and regularly cleaned and free of contamination.	Correct	196 (96.1%)
		Incorrect	8 (3.9%)
7	Refrigerated medicines should be refrigerated, other medicines should be stored at normal room temperature (25 ± 5 °C).	Correct	204 (100%)
		Incorrect	0
8	Have you seen vermin and rodents in the pharmacy?	Yes	53 (26%)
		No	151 (74%)
9	What is the best way to get rid of harmful and annoying animals?	Daily cleaning and hygiene	119 (58.3%)
		Use of powdered poisons	28 (13.7%)
		Use of liquid and paste poisons	14 (6.9%)
		Using animal repellent signal transmitter device	43 (21.1%)
10	Have you observed microorganisms and bacteria in the place where bulk products are stored?	Yes	23 (11.3%)
		No	181 (88.7%)
11	A thermometer suitable for the pharmacy room and heating and cooling equipment are required.	Correct	200 (98%)
		Incorrect	4 (2%)
12	Pharmacy warehouses should have regular shelves, be free of contamination, and have appropriate temperature and humidity.	Correct	204 (100%)
		Incorrect	0
13	Expired medical waste should be collected regularly and disposed of in a safe place.	Correct	180 (88.2%)
		Incorrect	24 (11.8%)
14	Do you know the personality of your staff?	Yes	143 (70.1%)
		No	0
		Somewhat	61 (29.9%)
15	Is supervision, control and handling one of your duties?	Yes	181 (88.7%)
		No	23 (11.3%)
16	In addition to maintaining hygiene in the pharmacy environment, pharmacy staff are also obliged to maintain personal hygiene.	Correct	169 (82.8%)
		Incorrect	35 (17.2%)
17	Wearing appropriate clothing and gowns is part of the leadership requirements in pharmacies.	Correct	190 (93.1%)
		Incorrect	14 (6.9%)
18	Is the participation and empathy of personnel necessary in the advancement of affairs and work?	Yes	204 (100%)
		No	0
19	Pharmacies have social responsibilities of providing pharmaceutical and consulting services as well as satisfying patients.	Correct	197 (96.6%)
		Incorrect	7 (3.4%)

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In the next section of the questionnaire, pharmacists' attitudes toward environmental health problems were assessed using a 5-point Likert scale. There were 9 questions regarding pharmacists' attitudes toward environmental health issues. In general, respondents had positive attitudes toward environmental health issues. Questions and answers from pharmacists are shown in Table 3. On average, 43.09% of pharmacists strongly agree on environmental health, 36% agree, 12.63% have no opinion, 8.06% disagree, and 0.22% strongly disagree. There were 16 questions regarding pharmacists' approach to environmental health issues. In general, respondents expressed positive attitudes toward environmental health issues. Questions and answers from pharmacists are shown in Table 4. In general, pharmacists' performance is generally evaluated positively or neutrally.

Based on the results of our study, which presents the relationship between awareness, attitudes and practices among study participants in terms of demographic characteristics, there is a statistically significant relationship between awareness score and gender, with the exception of questions 9 and 14, where this was not the case significant difference. There was a statistically significant relationship between attitude score and gender. Except for question 2, where there was no significant difference. The connection between exercise results and gender was also statistically significant. Additionally, there is a statistically significant relationship between awareness rating and type of pharmacy shift, except for questions 1, 9, and 13 where there was no significant difference. There was a statistically significant relationship between attitude score and type of pharmacy shift. Except for question 15, where there was no significant difference. The relationship between practice rating and pharmacy shift type was also statistically significant.

Table 3. Responses of pharmacists to the attitude related questions.

Number of questions	Question	Answer	Frequency (n (%))
1	Taking preventive actions can be helpful in avoiding or reducing human and financial losses.	Completely agree	109 (53.4%)
		Agree	91 (44.6%)
		No idea	4 (2%)
		Disagree	0
		Completely disagree	0
2	Daily hygiene activities prevent the implantation of vermin	Completely agree	88 (43.1%)
		Agree	74 (36%)
		No idea	28 (13.7%)
		Disagree	14 (6.9%)
		Completely disagree	0

3	In order to provide quality service, it is important to understand the personality traits of pharmacy staff.	Completely agree	124 (60.8%)
		Agree	70 (34.3%)
		No idea	10 (4.9%)
		Disagree	0
		Completely disagree	0
4	Pharmacists need to be mindful of the work responsibilities and workload of their team members.	Completely agree	95 (46.6%)
		Agree	91 (44.6%)
		No idea	14 (6.9%)
		Disagree	4 (2%)
		Completely disagree	0
5	Dealing with the work stress of pharmacy personnel is not only the responsibility of technical managers. All employees must be involved in finding a solution.	Completely agree	74 (36.3%)
		Agree	74 (36.3%)
		No idea	31 (15.2%)
		Disagree	21 (10.3%)
		Completely disagree	4 (2%)
6	The accuracy of the pharmacy staff is excellent	Completely agree	49 (24%)
		Agree	80 (39.2%)
		No idea	46 (22.5%)
		Disagree	29 (14.2%)
		Completely disagree	0
7	healthcare for personnel is a voluntary choice based on their personal desires.	Completely agree	56 (27.5%)
		Agree	54 (26.5%)
		No idea	53 (26%)
		Disagree	41 (20.1%)
		Completely disagree	0
8	Pharmacy staff need appropriate training and programs to effectively manage health-related issues.	Completely agree	63 (30.9%)
		Agree	60 (29.4%)
		No idea	42 (20.6%)
		Disagree	39 (19.1%)
		Completely disagree	0
9	Observing health principles is crucial to maximize client satisfaction.	Completely agree	133 (65.2%)
		Agree	67 (32.8%)
		No idea	4 (2%)
		Disagree	0
		Completely disagree	0

Table 4. Environmental health issues reporting in workplace (practice).

Number of questions	Question	Answer	Frequency (n (%))
1	Is there a sewage outlet located within the warehouse and pharmacy premises?	Pharmacy environment yes / pharmacy warehouse yes	96 (47.1%)
		Pharmacy environment yes / pharmacy warehouse No	21 (10.3%)
		Pharmacy environment No / pharmacy warehouse yes	60 (29.4%)
		Pharmacy environment No / pharmacy warehouse No	27 (13.2%)
2	Is the temperature and humidity recorded for each 6-hour shift?	Always	14 (6.9%)
		Most of the times	21 (10.3%)
		Sometimes	32 (15.7%)
		Rarely	70 (34.3%)
		Never	67 (32.8%)
3	How to prevent the entry of vermin?	Daily hygiene	109 (53.4%)
		Use of powdered poisons	28 (13.7%)
		Use of pesticides and paste	21 (10.3%)
		Using animal repellent signal transmitter device	14 (6.9%)
		none	32 (15.7%)
4	How do you destroy vermin?	Chlorine toxins	35 (17.2%)
		Phosphorus poisons	11 (5.4%)
		Carbamates	4 (2%)
		Pyrethroids	0
		Other poisons	41 (20.1%)
		Physical methods	113 (55.4%)
5	How do you get rid of rodents such as mice?	Compound poisons	77 (37.7%)
		Acute baits	7 (3.4%)
		Anticoagulants	14 (6.9%)
		Use of adhesives	56 (27.5%)
		Trap	46 (22.5%)
		Nesting method	4 (2%)
6	What method do you use to clean and disinfect the pharmacy?	Solid and liquid soaps	53 (26%)
		Synthetic cleaners	28 (13.7%)
		Special shampoos	32 (15.7%)
		Washing powders	7 (3.4%)
7	How often do you clean the floor and shelves of the pharmacy?	Bleach	84 (41.2%)
		Always	42 (20.6%)
		Most of the times	88 (43.1%)
		Sometimes	56 (27.5%)
		Rarely	18 (8.8%)
	Never	0	

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Table 4. Continued

Number of questions	Question	Answer	Frequency (n (%))
8	Is the cleaning process of the warehouse similar to that of the pharmacy?	Always	46 (22.5%)
		Most of the times	80 (39.2%)
		Sometimes	53 (26%)
		Rarely	21 (10.3%)
		Never	4 (2%)
9	Is the temperature and humidity in the pharmacy within the standard range (temperature below 35 and humidity below 35)?	Always	63 (30.9%)
		Most of the times	109 (53.4%)
		Sometimes	31 (15.2%)
		Rarely	1 (0.5%)
		Never	0
10	Are the dishes stained with medicinal substances washed in the sewage connected to the municipal sewage?	Yes	158 (77.5%)
		No	46 (22.5%)
11	How do pharmacies dispose of their expired products?	They are destroyed in a safe place	42 (20.6%)
		They are referred to pharmaceutical distribution companies	120 (58.8%)
		They enter the cycle of urban waste	42 (20.6%)
12	Is the storage area where Balk products are kept cleaned on a regular basis?	Always	74 (36.3%)
		Most of the times	74 (36.3%)
		Sometimes	34 (16.7%)
		Rarely	21 (10.3%)
		Never	1 (0.5%)
13	Do the pharmacy staff have regular clothes and overalls?	Always	81 (39.7%)
		Most of the times	77 (37.7%)
		Sometimes	35 (17.2%)
		Rarely	8 (3.9%)
		Never	3 (1.5%)
14	Is the assignment of responsibility to personnel based on their ability?	Always	68 (33.3%)
		Most of the times	104 (51%)
		Sometimes	32 (15.7%)
		Rarely	0
		Never	0
15	Who solves pharmacy problems?	It is managed by you and is not transferred to the personnel	28 (13.7%)
		It is fixed with the help of personnel	148 (72.5%)
		It will be resolved by the personnel and you will not interfere.	28 (13.7%)
16	Do the pharmacy staff observe personal hygiene?	Always	39 (19.1%)
		Most of the times	88 (43.1%)
		Sometimes	67 (32.8%)
		Rarely	7 (3.4%)
		Never	3 (1.5%)

Discussion

The present study was conducted using a questionnaire and focused on pharmacists in Tehran. This is the first study in Tehran to examine environmental health issues in pharmacies. The results of the examination of the knowledge part of the study of pharmacists in total for each questionnaire score is 1456.6, the average for each question is 90.7% of the knowledge of all participants, which shows their very good knowledge and information about the environmental health issues of the pharmacy. Today, due to increasing comfort facilities, the quality of life and the level of public health are increasing in various dimensions, including environmental health (14). These include physical health, personal health, mental health and social health. The need to apply special measures and laws in this area is becoming more noticeable (15). Medical centers such as hospitals, medical clinics, health centers and pharmacies are the most accessible treatment centers in the community (16) It is crucial to prioritize the mental health of medical center staff who are in direct contact with patients and bear the burden of a sensitive work position (17). Pharmacies are one of the most important health centers due to their direct interaction with people and the provision of medical services, pharmaceutical products, and hygiene and cosmetic products (18). An acceptable level of environmental health in such places can improve the health status of society and prevent the spread of many infectious diseases (19).

Also, in a study published in 2013, All three dimensions of knowledge, attitude and practice to issues related to environmental health are mentioned as effective factors in Good Pharmacy Practice (20).

Health, safety and environment (HSE) are of critical importance in pharmacies due to their economic, human and ethical impact (21). The study results showed that pharmacists' awareness of pharmacy health principles and issues such as mental, physical and social health is high, which is close to the results of Mihanpour *et al.*, (22) and Dalal Youssef is similar to This was about the level of awareness of the hospital staff (23).

Nowadays, the widespread use of mass media and communication technologies, together with the existence of various environmental crises, has led to governments investing heavily in the production of television, radio and printed programs in this area. This is done with the aim of raising awareness among the general public (24). Therefore, it seems more advantageous to use this medium in the further development of health programs, especially health education, and to produce attractive environmental documentaries in which experts explain relevant topics at the end of the programs (22,25).

In the next part of the questionnaire, we examined pharmacists' attitudes. Although most pharmacists claim that they are not sufficiently informed about health issues, the results of the questionnaire show their positive attitude towards health issues. These results were similar to the study by Rezaei *et al.*, (26). These results demonstrate the importance of rules (27). A study conducted at Golestan Hospital found that staff had poor attitudes toward environmental health problems. This finding contradicts our results (28).

According to knowledge data, pharmacists need more training and better access to information in this area. Consequently, academic planners face increased responsibilities (29).

Research suggests that pharmacists have good knowledge and a positive attitude, but their performance in this area is weak, as observed in Mohinpour's study. This poor performance can be attributed to several factors, such as the lack of strict rules from regulatory bodies such as the Ministry of Health, the Food and Drug Administration and the Vice Presidents of Food and Drugs of the Faculty of Pharmacy. In addition, the lack of adequate training of pharmacy students and their practical understanding of health sciences also contribute to this problem (30).

The most important problem in all societies is changing wrong behavior that is ingrained in the culture. Education and information programs based on the cultural foundations of different communities in different regions of Iran can be extremely effective in increasing pharmacists' awareness of pollution control facilities. Such programs can also promote collaboration with these institutions to ensure efficient management of environmental pollution control (31). It appears that encouraging pharmacists and pharmacy staff to become involved in environmental health issues may be beneficial. Inter-organizational collaboration in institutions working in the field of environmental pollution control and the provision of sufficient financial resources in this area can help advance the goals of these organizations.

The findings of this study indicate that pharmacists working in community pharmacies in Tehran possess commendable knowledge and attitudes toward environmental health concerns in pharmacies; however, upon evaluating their practical performance, it was observed that their knowledge was not fully operational or implemented. This suggests that while the laws and legal supervision of pharmacies in Iran are in place, they are not stringent enough to ensure optimal compliance. Consequently, pharmacies and pharmacists in Iran do not exhibit exemplary performance commensurate with their level of knowledge and attitudes towards environmental

health issues. In light of this, it is recommended that pharmacists' training programs be enhanced with practical sessions and stricter rules regarding environmental health in pharmacies be emphasized, given the crucial role these centers play in promoting public health and wellbeing.

It is evident that the pharmacy profession would benefit from enhanced financial incentives and a reorganization of their working conditions, as this would have a favorable impact on their productivity, job satisfaction, and overall well-being (13).

We must acknowledge that our study has limitations. One of the main limitations was the non-cooperation of pharmacists and the difficulty in collecting the number of pharmacists calculated based on Cochran's formula to achieve a standard study and correct statistical analysis. In addition, since our study was self-reported, it may be biased by factors such as recall bias and social desirability bias. From this point of view, pharmacists who refused to answer the questionnaire can also affect the interpretation of the study results.

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Conflict of interest

The authors confirm that there are no actual or potential conflicts of interest related to their manuscript.

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