Community Pharmacists' Practice Regarding Vitamin D Products: A Simulated Client Method

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ARTICLEINFO	ABSTRACT
Article type: Original Article	**Introduction:** One common method to evaluate healthcare professionals' practice is to develop a simulated client (SC) scenario. The present study was designed to assess community pharmacists' practice level regarding vitamin D products by an SC method.
Article History: Received: 04 Mar 2023 Accepted: 10 Apr 2023	**Materials and Methods:** Present study was a cross-sectional survey of 200 community pharmacists. SC scenario was designed and validated by an expert panel. The scenario consists of 22 questions to assess pharmacists' practice. This instrument includes four sections, demographic history taking, medical history taking, professional discipline, and clinical judgment, which are scored based on the 20-scoring system in each section. After data collection, an independent T-test was used to compare the mean ± standard deviation. The Mann-Whitney test was used to compare median and percentiles for non-parametric variables.
Key words: Professional Practice, Client Simulation, Pharmaceutical services, Pharmacists	**Results:** The overall practice score was 19.03 ± 9.08 out of 80. The scores were 0.55 ± 1.43 for demographic history taking, 2.13 ± 2.32 for medical history taking, 10.54 ± 5.38 for discipline, and 5.75 ± 3.87 for clinical judgment. Results showed that the pharmacists' vitamin D practice was lower than expected. The main limitation of the current study was the crowdedness of some pharmacies. **Conclusion:** The SC survey results showed that Iranian community pharmacists received poor scores in technical and professional practice fields.

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Introduction

Vitamin D is an essential nutrient found in common nutriments; however, it can be synthesized by exposing uncovered skin to sunlight's ultraviolet. Many studies found a relationship between vitamin D deficiency and osteoporosis; also, some studies have shown the relation between vitamin D deficiency and other medical disorders and complications such as multiple sclerosis, diabetes mellitus, rheumatoid arthritis, and mental disorders. Groups with decreased sunlight exposure, including the elderly and pregnant women or those with veils worn (Islamic veils), are more prone to vitamin D deficiency (1,2). In some cases, vitamin D and calcium supplementation would be necessary (3). There is a considerable rate of vitamin D supplement intake in Iran (4). According to official records from the Iranian Food and Drug Organization (FDO), the sale of vitamin D dosage formulations consumed in 12 months from March 2020 to March 2021 was around 446,000,000 (50,000 IU) pearls and 29,000,000 (300,000 IU) ampules for a population of nearly 80 million people. This high consumption level occurred based on intense notifications in the media about the prevalence and cautions of vitamin D deficiency (5).

Receiving the consultation of pharmacists is efficacious for those who requested dietary and sports supplements (6,7).

However, strong encouragement for preventing vitamin D deficiency shifted people's attitude to extensive vitamin D intake, especially during the Covid-19 pandemic (8).

Recently, we have emphasized the concern of irrational and unsupervised vitamin D consumption as a double edge sword, which would raise the toxicity risk (9). Pharmacists' role in controlling drug use is a central role that can prevent possible complications caused by the use of drugs. For example, advertising vitamin D products during the SARS-CoV-2 pandemic led to the public's attitude towards self-medication and increased the risk of hypervitaminosis (10,11).

Many patients visit pharmacists to seek free valuable advice. Among them, some customers request dietary supplements with inadequate knowledge; they need to be sufficiently counseled to ensure the safety and rationality of using these products (12). Pharmacists can help patients to make informed and reliable choices of supplements. Unfortunately, many pharmacists do not provide professional service to their applicants due to their heavy workload, insufficient knowledge, lack of practical skills, inadequate job satisfaction, and other factors (13).

Supplement manufacturing companies invest considerably in promoting their market, encouraging pharmacies to sell more (14). A recent study in Tehran has revealed that pharmacists' knowledge about dietary supplements would affect their practice (15). The knowledge and practice regarding dietary supplements among community pharmacists were reported to be poor (16-18).

Hence, these studies were limited to questionnaires. Hence, it was decided to conduct our study using the simulated client (SC) method. Applying the SC is a well-known method to assess healthcare professionals' practice. It is also known as the mystery shopper, pseudo-patron, pseudo-patient, and simulated patient. This study aimed to investigate the pharmacists' practice in dispensing vitamin D products and their skills in technical and professional aspects.

Materials and Methods

Study Design

The present study was a descriptive cross-sectional survey in selected community pharmacies in Tehran, Iran, between July and August 2021. The best-practice standard published by the Association of Standardized Patient Educators was utilized to assess the practice of pharmacists by SC (19).

Participants and Role Playing

The expert-panel meetings were held several times to generate a scenario of 11 clinical pharmacists and pharmacy practice experts. The most frequently expected questions and challenges were written as an interactive algorithm. Also, a scoring system

was designed to convert four aspects of pharmacists' practice into scores.

These aspects included demographic history taking, medical history taking, discipline, and clinical judgment. The content validity index (CVI) was calculated to evaluate the validity of questions in simplicity, clarity, and relevancy of the questions in the scenario. Questions with less than 0.79 of CVI were excluded from the scenario. The content validity ratio (CVR) was calculated to assess the necessity of any question in the SC scenario, and questions with less than 0.59 of CVR were also excluded. The SC was a well-trained young man who played the designed scenario several times in one of the expert panel meetings to optimize the conversation and body posture. He entered the selected pharmacies, requesting a box of 50,000 IU containing vitamin D soft gels. Based on the scenario, the SC could only provide information per request. If the pharmacist asked him about the main drug consumer, he would explain that his 50-year-old mother was interested in using this supplement.

In addition, if the pharmacist wanted to review his mother's medications, the SC would explain that she used the following medicines: hydrochlorothiazide (25 mg daily) to control her blood pressure and calcium + vitamin D tablets (500 mg/200 IU twice daily).

If the pharmacist asked about the vitamin D level, the SC showed a recent result of a serum 25(OH) vitamin D test on his smartphone, which was 49 ng/ml. If the pharmacist dispensed the supplement directly, the SC was allowed to give hints by asking questions about the supplement. While permission consents were not obtained from pharmacists to record the roll play voices and decrease missing data, the forms were filled when SC left the pharmacy. The community pharmacies without responsible pharmacists were excluded.

Ethical Consideration

This study was approved by the Ethical Community of the Shahid Beheshti University of Medical Science (code: IR.SBMU.PHARMACY.REC.1397.256). Profiles of pharmacists, pharmacies, and study results were used confidentially.

Sample Size

At the time of study design, there were 2418 registered pharmacies in Tehran. Cochran's formula was used to estimate sample size. Given dropping out samples, random pharmacies were selected using an online random number generator. For accurate sampling, Tehran districts were divided into central, northwest, northeast, southwest, and southeast in the cluster sampling method.

Outcome Measurements

An auto-calculator was developed to score precisely the pharmacist's practice based on a prepared algorithm by the expert panel mentioned in Microsoft Excel, which included 22 items regarding the aspects mentioned earlier. The total score for the pharmacist's practice ranged between 0 and 80.

Data Analysis

For statistical analysis, the Kolmogorov-Smirnov test was used to determine the normality of quantitative variables, and the independent T-test was used to compare the mean ± standard deviation (SD) values. P-values below 0.05 were considered statistically significant. The Mann-Whitney test was used to compare median and percentiles for non-parametric variables. The results were analyzed with IBM SPSS Statistics for Windows (Version 16.0; IBM, Armonk, NY).

Results

The SC went to 234 pharmacy locations; four pharmacies had been moved, and 11 pharmacies were excluded due to the absence of their pharmacist. In 10 pharmacies, the SC could not complete the scenario due to unexpected interruptions, and nine pharmacies were locked at the time of the SC visit. Finally, 200 pharmacies were included in this study. Figure 1 presents the flow chart of registered community pharmacies.
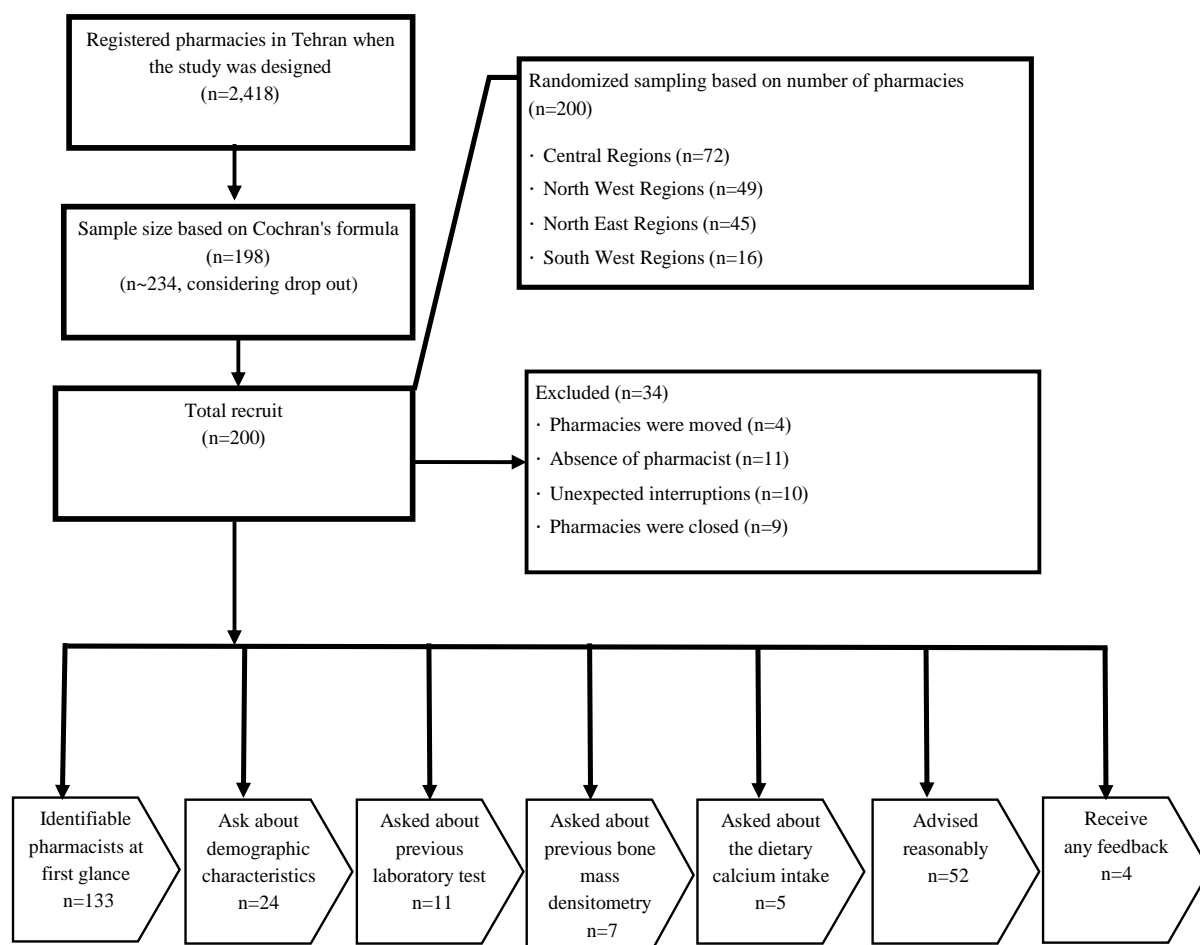
Figure 1: Flowchart of the included participants

Participating pharmacists included 98 (49%) male and 102 (51%) female pharmacists. Thirteen pharmacies (6.5%) were 24 hours/seven days, and the rest of them (187, 93.5%) were daytime (12 hours open during the day) pharmacies. Ninety-one pharmacies (45.5%) were located on the main street, and the rest were local pharmacies and pharmacies in medical centers. Table 1 summarizes the demographic parameters of the included pharmacists.

The SC could promptly identify the pharmacist as he entered the pharmacy in 133 (66.5%) cases; in 67 (33.5%), the pharmacists could not be promptly identified at first glance at the time of SC entrance. Most pharmacists (89%) did not ask whether he required vitamin D for himself or anyone else.

Eleven (5.5%) pharmacists asked about previous laboratory tests; the rest did not ask about laboratory reports. The results

also indicated that 193 (96.5%) pharmacists did not take the history of bone fractures, menopause, or any report of bone mass densitometry. Only five (2.5%) participants also asked about calcium intake as supplements or dietary regimens. The results showed that 52 (26%) pharmacists were advised reasonably at the end of their conversation.

Twelve (6%) needed to meet the criteria of good skills, such as communicating with the SC and searching medical databases. Our study indicated that 196 (98%) pharmacists received no feedback from the SC to confirm his conception.

In this survey, the score (mean ± SD) of the pharmacists' practice in demographic history taking, medical history taking, discipline aspect, and clinical judgment aspects were 0.55 ± 1.43, 2.13 ± 2.32, 10.54 ± 5.38, and 5.75 ± 3.87, respectively, revealing the poor practice score. Figure 2 shows these scores in detail.

Table 1: Characteristics of participated community pharmacists.

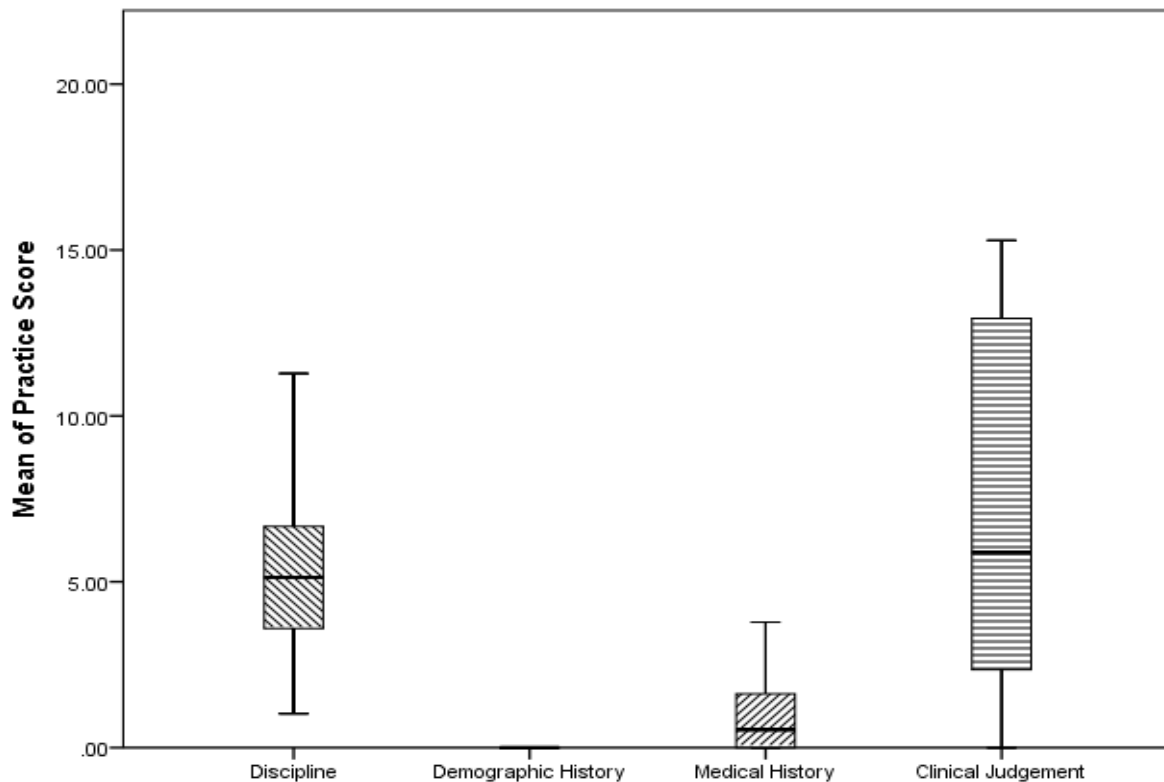| Items	Categories	Number (Percent)
Gender	Male	98 (49%)
	Female	102 (51%)
Region	Center	49 (24.5%)
	Northwest	49 (24.5%)
	Northeast	63 (31.5%)
	Southwest	22 (11%)
	Southeast	17 (8.5%)
Pharmacy's Type	Day Time	187 (93.5%)
	24 hours/7 Days	13 (6.5%)
Location	Main Street	91 (45.5%)
	Local Access	81 (40.5%)
	Medical Center	28 (14%)

Figure 2: Mean scores in different fields of pharmacy practice about vitamin D.

Based on the results, participating pharmacists' demographic history-taking practice was the most forgotten aspect. Furthermore, the clinical judgment segment had a better status. Nevertheless, all the aspects were in the weak to moderate range. Further analysis revealed that the practice score was significantly different between men and women ($P < 0.001$). The region has no significant impact on the pharmacist practice score ($P = 0.547$). In addition, pharmacy service type and location of pharmacies had no significant impacts on the pharmacist practice scores ($P = 0.635$

and P = 0.534). These results are shown in Table 2.

Table 2: Results of evaluating the practice in different aspects.

Parameters Mean± SD	Discipline (out of 20)	Demographic History (out of 20)	Medical History (out of 20)	Clinical Judgement (out of 20)	Total Score (out of 80)
Gender					
Men (n=98)	8.42 ± 4.88	0.38 ± 1.15	1.56 ± 1.88	5.21 ± 3.27	15.57 ± 8.03
Women (n=102)	12.65 ± 5.03	0.72 ± 1.66	2.69 ± 2.58	6.30 ± 4.33	22.36 ± 10.51
P Value	<0.001	0.094	<0.001	0.046	<0.001
Region					
Central Regions (n=72)	10.95 ± 5.15	0.55 ± 1.37	2.02 ± 2.10	5.26 ± 3.93	18.78 ± 9.32
North West Regions (n=49)	10.68 ± 4.60	0.47 ± 1.46	2.41 ± 2.50	6.22 ± 3.98	19.78 ± 9.44
North East Regions (n=45)	10.94 ± 6.21	0.76 ± 1.64	2.05 ± 2.27	6.08 ± 3.76	19.83 ± 10.99
South West Regions (n=16)	9.18 ± 5.84	0.18 ± 0.85	2.36 ± 2.92	4.23 ± 3.46	15.95 ± 10.81
South East Regions (n=18)	9.15 ± 4.09	0.47 ± 1.33	1.59 ± 1.80	6.59 ± 3.95	17.79 ± 9.59
P value	0.115	0.373	0.088	0.787	0.547
Pharmacy Service items					
Daytime (n=187)	10.49 ± 5.36	0.53 ± 1.42	2.13 ± 2.30	5.89 ± 3.91	19.04 ± 9.91
24-Hours/7 Days (n=13)	11.19 ± 5.80	0.85 ± 1.62	2.00 ± 2.74	3.77 ± 2.65	17.81 ± 10.56
P value	0.247	0.134	0.370	0.097	0.665
Location					
Main Street (n=91)	10.61 ± 5.80	0.67 ± 1.56	2.32 ± 2.55	5.52 ± 4.03	19.12 ± 11.11
Local Access (n=109)	9.92 ± 5.03	0.42 ± 1.20	2.06 ± 2.08	5.81 ± 3.63	18.22 ± 8.56
P	0.192	0.552	0.423	0.596	0.534

* SD: standard deviation, *P*: probability. * Mann-Whitney test was used to compare the median and percentiles of non-parametric variables. * Kolmogorov-Smirnov test was used to determine the normality of quantitative variables. * Independent T-test was used to compare the mean ± standard deviation (SD) values. * P-values below 0.05 were considered statistically significant.

Discussion

Vitamin D-containing products are a part of the popular nutraceutical market. The rate of vitamin D deficiency and hypervitaminosis D is considered worldwide; based on the Iranian lifestyle, vitamin D deficiency and hypervitaminosis D are among the major nutritional disorders of the health system. The rate of consuming vitamin D in Iran is considerable (6,7). Pharmacists should play a beneficial role in dispensing and providing accurate information on the rational use of vitamin D. Pharmacists could help patients to choose a suitable product based on their nutritional and medical status.

Some studies have speculated pharmacists' practice through self-reported questionnaires. Assessing the practice using SC methods is superior to self-reported questionnaires. This study demonstrated that the pharmacists' practice score regarding vitamin D was generally poor. Furthermore, female pharmacists had a better score than male pharmacists. This finding should be interpreted cautiously since both groups had poor scores, even

below 25%. It was expected that the SC identified the pharmacists promptly after he entered the pharmacy, though 67 (33.5%) pharmacists were not identifiable to the SC at first glance. The first step of professional discipline for community pharmacists is to be identifiable in the first contact with pharmacy applicants. Most pharmacists dispensed products containing a high dose of vitamin D (50,000 IU pearl) without taking medical history; among them, 45% still needed to provide advice regarding the consumption of this product. None of the pharmacists asked about family and allergy history. This study's result was comparable to that of Carly Kippist et al. showing that 5% of Australian pharmacists asked about allergies (20).

In addition, in several cases, the SC was allowed to provide some hints for pharmacists to the go-forward scenario. Some aspects, such as the patient's behavioral habits and lifestyle, were asked by 1% of the pharmacists. Nevertheless, another study conducted in Kerman by Dabaghzadeh et al. showed that approximately 5% of the pharmacists asked about their patients' smoking habits (21). Although the patients' age is vital for clinical judgment and the necessity of vitamin D consumption, only 3% of the pharmacists asked about the patient's age. However, Ibrahim et al.'s study on pharmacists' and general practitioners' performance reported a rate of 12% (20). Carly Kippist et al. reported that 61% of pharmacists asked about the patient's medication history, and 44% asked about family and illness history (20).

In the present study, most pharmacists ignored this issue. Here, the SC was not the patient, and he played the role of the patient's son, and 88.88% of the pharmacists did not ask whether he required vitamin D for himself or someone else. This issue is fundamental since the diet enrichment of the actual patient could affect the clinical judgment regarding the necessity of vitamin D consumption. Most pharmacists in this study needed to spend more time consulting the SC. Furthermore, in one study by Hussain et al., the average time pharmacists devoted to patient counseling was 1.11 min, probably due to a heavy workload (22). The main limitation of the current study was the

crowdedness of some pharmacies. This study was conducted only in Tehran and did not cover other cities in Iran. In this survey, pharmacists' knowledge could not be measured because the pharmacist identified SC; crowding in some pharmacies disrupted the scenario implementation process.

Communication skills, intelligibility of the questions, and straightforward answers were among the parameters affecting the score in the field of discipline. Almost all the pharmacists in this study needed more communication skills, and even 64 (32%) received a score of zero. In other words, they did not provide informative counseling in clear terms and fathomable path and ignored summarizing the points at the end of their conversation with the SC. In this study, most pharmacists received no educational feedback from the SC to assess the SC's awareness and his enlightening about the provided contents.

The pharmacists' poor practice may be owing to various factors. The heavy workload in pharmacy, the high number of prescriptions per pharmacist, pharmacists' out-of-pharmacy activities, and lack of adequate knowledge and skills are likely causes. The most crucial parameter is the need for a national framework for pharmacists to engage them in their professional responsibilities, as expressed in good pharmacy practice standards. More than dispensing medicine to consumers is needed to achieve good pharmacy practice goals, and pharmacists should accept greater responsibilities to enhance the outcomes of pharmacotherapy. In this regard, pharmacists should provide an optimal, evidence-based service based on their domestic quality standards and guidelines framework. To ensure the maintenance of standards and to comply with the requirements for constant professional practice, not only self-monitoring would be an essential element for pharmacists working lives but also procedures should be designed by pharmacy organizations for better inspection. The current study showed that applying a simulated client method to assess the pharmacy practice could detect defects properly.

Conclusion

The simulated client survey results showed that Iranian community pharmacists needed better scores in technical and professional practice fields regarding vitamin D dispensing.

Acknowledgments

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