Assessment of students' pharmacist competency in dispensing cough medicines for self-medication: a simulated patient study

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Background

Cough is a symptom for which patients present to community pharmacists for relief. As future pharmacists, pharmacy students must be evaluated for their competence in providing self-medication services.

Aims

To measure the Indian pharmacy students' capability (competency) in delivering self-medication consultation service (SMCS) to simulated cough patients and to identify the factors associated with the provision of appropriate advice.

Settings and design

A prospective, interventional, cross-sectional study using a simulated patient method describing the product and symptom-based request of chronic cough was used on students from a pharmacy school in India. The type and quantity of information gathered and advice delivered by student pharmacists were recorded.

Materials and methods

The data collected before and after pharmacy students received SMCS training were summarized.

Statistical analysis used

A descriptive-statistics was performed to identify the factors associated with the provision of advice.

Result

Participated students gathered information from simulated patients before providing advice to them. Direct medical referral which is considered optimized advice was provided by 46.7% and 91.1% of the 90 participants, before and after receiving self-medication consultation training (SMCT), respectively. Participants who gathered information on the duration and the nature of cough, past medical conditions, and medication use were positively associated with the delivery of optimum recommendations.

Conclusion

After receiving SMCT, pharmacy students' competency to provide SMCS improved. Future studies are required to determine the elements that influence pharmacy students' competence in providing SMCS.

Keywords:

competency, consultation, cough, over-the-counter medication, self-medication, simulated patient study

Key Message:

The provision of pharmaceutical consultation for patients with cough in community pharmacies is suboptimal, including India. Developing the competency of pharmacy students in providing self-medication consultation to the cough patients in community pharmacies provide better patient care. Self-medication consultation training provided to the pharmacy students-initiated opportunity to interact with the patient and provided appropriate situation to ask clinical questions to predict the key factor associated with the provision of advice. The effectiveness of simulation-based learning in dispensing over-the-counter medication to cough patients were demonstrated.

Introduction

India is one of the largest populated countries in the globe with a population size of around 1.5 billion, in more than half of the population self-medicates to alleviate their sufferings in their lifetime [1]. The most common illnesses for which patients self-medicate themselves include cough and cold, diarrhea, strep throat, headache, and fever. Because of this habit, most people are suffering from unwanted

effects such as undiagnosed conditions, unnecessary anxiety, adverse effects, and propagated toxicity, etc. [2]. Self-medication without a valid diagnosis would not result in a full recovery. Patients or caregivers go to neighborhood pharmacies to purchase medications for their primary healthcare needs [3]. Most often, prescription drugs are given without a thorough history being taken, and pharmacies fail to give customers the right information or direction.

Pharmacists working in pharmacies should be enlightened with clinical knowledge and play a crucial role in gathering patients' histories and providing appropriate advice and guidance to the patient [4]. In India, D. Pharm is considered the minimum qualification to become a registered pharmacist [5]. There are around 700 000 registered pharmacists practicing at both community and hospital pharmacies [6]. In the current situation, Community pharmacies are hugely managed by D Pharm graduates followed by B Pharm and Pharm D [5]. However, the B Pharm curriculum focuses on industrial knowledge and lacks sufficient clinical knowledge when compared with Pharm D curriculum. In the early 19th century, drugs were compounded in pharmacies and dispensed to patients for their use. So, pharmacists working in pharmacies were expected to have a wide industrial knowledge regarding the preparation, packaging, and labeling of drugs. In current settings, drugs are manufactured, packed, and labeled in industries and finally delivered to pharmacies for dispensing, which makes the pharmacists well-versed with clinical knowledge to ensure the safety of the patient [7].

Pharmacists are in the place to direct the patient in the right direction to achieve maximum health benefits and minimize the risk due to drugs [8]. Training pharmacy students in providing self-medication consultation services (SMCS) and implementing the same in a real scenario are essential to avoid the hazards of self-medication.

In general, dispensing medications and providing advice on those medications are the components of services provided by community pharmacists. For providing advice, pharmacists should collect relevant information, including the details on the patient's name, symptoms (such as the kind, duration, and accompanying symptoms), actions have done to treat the symptoms, underlying medical issues, currently used drugs, and allergies etc. The information obtained must then be analyzed by pharmacists using their skills to determine the best advice to give to the patients. This might be a physician referral, over

the counter product recommendations with product information, lifestyle counselling, and/or other suggestions relevant to the patient's clinical presentations, etc.

Self-medication: It is a use of drugs to treat self-diagnosed disorders or symptoms, or the intermittent or continued use of prescribed drugs for chronic or recurrent disease or symptoms. These medicines are sometimes referred to as 'nonprescription' or 'over-the-counter (OTC)' drugs. These drugs may be purchased at drug stores and grocery stores without a prescription.

SMCS: Education provided to the consumer/patients regarding how to use prescription and non-Rx drugs to address common health issues without the guidance or advice of a doctor.

In developing countries, consuming over the counter medications is very common for the conditions such as cough and cold, diarrhea, strep throat, headache, and fever etc. Misuse of OTC drugs used for the treatment of cough is alarming and it is an international burden [9]. There was 72% increase in the sale of number of cough and cold drugs in the Indian market compared with previously published study. Irrational combination of formulations may rise a concern regarding adverse events and associated morbidities [10]. Pharmacist should be competent enough to provide self-medication consultation services while dispensing cough medicines so as to avoid the misuse of drugs.

In this study, we assessed and compared the competency of pharmacy students' undergoing different programmed in providing SMCS for the dispensing of cough medicines in community pharmacy.

Materials and methods
Study design and participant selection
A 3-month interventional (pretest and posttest) simulated patient study was carried out at JSS College of Pharmacy in Ooty, Tamil Nadu, India, between January 2022 and March 2022. Sample size was calculated using the Cochran formula:

$$N = (Z\alpha/2)^2 X\ P(1 - P)/E^2$$

The sample size was calculated as 88 with 95% confidence interval, a margin of error (7.5%), a population proportion (50%), and a population size as 180 (110, 30, and 40 students from the fourth B

Pharm, third Pharm D, and fourth Pharm D, respectively).

Students in their third and fourth years of Pharm D programme who had taken the community pharmacy course in their second year, students in their fourth year of B Pharm programme who are currently enrolled in their eighth semester, and first-year Pharm D (PB) students who had taken the pharmacy practice course in their seventh semester of B Pharm met the inclusion criteria. The study excluded the students who did not pass their community pharmacy or pharmacy practice course.

The recruitment of pharmacy students for our study was announced, and the study's specifics were thoroughly described to the qualified students who had expressed an interest in taking part. The students were recruited after receiving informed consent from them. Simulated community pharmacy setup was created and confidentiality of students data were maintained.

Study instrument and data collection
The data collection form was prepared which consisted of participant demographics, a checklist of type of information gathered and the advice suggested by student pharmacist. Participant demographic details were collected by the principal researcher and were entered in data collection form and the same were cross-examined by the co-researcher.

Ten simulated patients including three pharmacists pursuing PhD, five recent graduates (PharmD and M Pharm degree), and two Pharm D Interns were enrolled and provided training beforehand. The training was divided into 3 parts namely, explanation of scenarios, how to fill the data collection checklist, and role plays. Training was continued till the simulated patients were able to enact the scenario and fill in the data collection checklist.

The students were assigned with one simulated patient. At the time of simulation, simulated patient approached the student pharmacist and request him/her to dispense cough medicine. After the request was made, no information(s) were provided to the student pharmacist, unless it was demanded. Data collection form was handed over to the respective simulated patient before the simulation starts and they were made to fill it during the simulation. Data were collected in the same manner, before and after providing training to the participants regarding dispensing cough medicines.

Simulated patient scenario
The simulated patient is the one who was experiencing cough for the past 4 weeks. He/she presented themselves to the pharmacy with dry and irritating cough and no other accompanying symptoms. The patient bought Bisolvon syrup (Syrup Bromhexine: 4 mg/5 ml) from the pharmacy and consumed the same 2 weeks before and the cough did not suppress.

Also, 2 months ago patient was diagnosed with hypertension and prescribed with Tab. Captopril 25 mg TDS and no accompanying symptoms, consumption of any other medicines including supplements/herbal medicines, etc. were seen. Patient follows healthy lifestyle and exercise regularly. The blood pressure is normal (130/80 mmHg) and does not have any allergy.

Self-medication consultation training
Self-medication consultation training (SMCT) is a type of educational program that is designed to teach healthcare professionals to handle self-medication request by the consumers and access health-related services. It provides information need to be collected from patient and advise to be delivered to the respective patient in a safe and responsible manner.

During self-medication consultation training, presentations (ppt) were used to train students' pharmacist under the supervision of senior academicians. The first training session comprised of understanding the cough and its types, etiology, pathogenic mechanism, pharmacological and non-pharmacological management, complications and prevention of various types of cough. Second session comprised of introduction to self-medication and its rationality, advantages and disadvantages of self-medication, self-medication practice within the Indian population, purpose for self-medication and handling of self-medication request etc. Each session lasts about 40 min After each session, students' pharmacist was asked for any doubts and clarifications were made for the same. All the participants recruited in this study attended this training.

Data analysis
Categorical data were represented as numbers and percentages. Continuous data were represented as mean±standard deviation. To compare the data obtained before and after providing training, paired sample T-test was used. The study results were analyzed using SPSS (Version 21) software and the

P value less than 0.05 was considered to be statistically significant.

Ethical approval

This study was approved by the Institutional Ethics Committee, Department of Pharmacology, Government Medical College, The Nilgiris, Tamil Nadu (IRB Approval number: IRB GMCTN012 Dated: 20-4-2022).

Result

According to the college register, the strength of third year PharmD students who had completed community pharmacy course in 2021 was 30 and the strength of fourth year PharmD students who had completed community pharmacy course in 2020 was 28 and the strength of fourth year B Pharm students who had completed Pharmacy practice course in 2022 was 110. Of these, 29, 28, and 33 students from third PharmD, fourth PharmD and fourth B Pharm respectively gave consent to participate in this study. The response rate was calculated as 96.6% and 100% in third and fourth Pharm D, respectively and 30% in Fourth B Pharm. Information pertaining to participants' characteristics were represented in Table 1.

In both before and after SMCT, all the students (100%) participated in our study asked questions to the simulated patient before providing advice to them. In the before training scenario, the average number of queries asked was 6 (±2.9). The common types of information fetched were related to patient identity, cough nature (≥ 75% of the participants). In contrast, allergies, color of phlegm and family history were the least type of information gathered (≤ 30%) by the student pharmacist from the simulated patient.

In the after SMCT, the average number of queries asked were 10 with the standard deviation of 1.1 (10 ±1.1). The common types of information fetched were related to patient identity and nature of cough, duration of cough, social history, and accompanying clinical presentation (≥ 90% of the participants). In contrast, color of phlegm was the least type of information gathered (55.6%) by the student pharmacist from the simulated patient. Details regarding to the type and amount of information collected in before and after SMCT were represented in Table 2.

The type and amount of advice offered by participating student pharmacist in before and after providing SMCT were tabulated in Table 3. In before SMCT, medical referral was suggested by 42 students' pharmacist (46.7% of the 90 student participants). Of these 42 participants, 14 students' pharmacist provided only medical referral, 11 students provided nonpharmacological advice with medical referral, 9 students suggested medicines with medical referral and 8 students suggested medicines and non-pharmacological advice with medical referral. In after SMCT, 81 (90% of the 90 student participants) students suggested direct medical referral. Of these, 45 students provided only medical referral, 29 students provided nonpharmacological advice with medical referral and 4 students suggested medicines with medical referral and 3 students suggested medicines and nonpharmacological advice with medical referral.

Table 1 Demographic characteristics of the study population

Demographic characteristics	Sample *n*=90 (%)	Population *n*=168 (%)
Age in years; mean	21 (0.95)*	21(0.85)*
Sex		
Male	50 (55.6)	89 (53)
Female	40 (44.4)	79 (47)
Current education		
Third Pharm D	29 (32.2)	30 (17.9)
Fourth Pharm D	28 (31.1)	28 (16.6)
Fourth B Pharm	33 (36.7)	110 (65.5)
Experience of the participants working or training in community pharmacy		
Yes	0	10 (0)
No	90 (100)	158 (100)
Average GPA; mean (SD)	7.5 (0.64)	7.6 (0.41)
Grade / Marks obtained in community pharmacy / pharmacy practice course in Pharm D / B. Pharm program		
≥75	23 (25.6)	37 (22)
60–75	46 (51.1)	91 (54.2)
<60	21 (23.3)	40 (23.8)

+* – Standard deviation.

Table 2 Details of information gathered from the study participants on self-medication Request

Types of information gathered	Before n=90 (%)	After n=90 (%)	Odd's Ratio (95% CI)	P Value
Patient Identity	83 (92.2)	89 (98.9)	7.51 (0.90–62.32)	0.4254
Nature of cough	78 (86.6)	88 (97.8)	6.77 (1.47–31.19)	0.2904
Duration of cough	60 (66.7)	87 (96.7)	14.5 (4.23–49.69)	0.0642
Accompanying symptoms	51 (56.6)	81 (90)	6.88 (3.08–15.40)	0.0411*
Action taken	46 (51.1)	77 (85.6)	5.67 (2.76–11.62)	0.0396*
Previous medications	32 (35.6)	65 (72.2)	4.71 (2.51–8.86)	0.0364*
Medical conditions	32 (35.6)	69 (76.7)	5.96 (3.10–11.43)	0.0197*
Allergies	23 (25.5)	64 (71.1)	7.17 (3.72–13.84)	0.0107*
Color of phlegm	17 (18.8)	50 (55.6)	5.37 (2.74–10.51)	0.0330*
Social history	34 (37.7)	85 (94.4)	28 (10.33–75.93)	0.0045*
Family history	27 (30)	77 (85.6)	13.82 (6.59–28.99)	0.0026*
Severity of cough	39 (43.3)	76 (84.4)	7.10 (3.50–14.38)	0.0180*

*- Statistically significant ($P < 0.05$).

Table 3 The type of advice suggested by the study participants on self-medication request

The type of advice provided	BEFORE n=90 (%)	AFTER n=90 (%)	Odd's Ratio (95% CI)	P Value
(1) Direct medical referral	14 (15.6)	45 (50)	5.43 (2.68–10.98)	0.0405*
(1) Direct medical referral and (2) suggesting medicines	9 (10)	4 (4.4)	0.42 (0.12–1.41)	1.3264
(1) Direct medical referral, (2) suggesting medicines, and (3) suggesting non pharmacological advice or other advice.	8 (8.9)	3 (3.3)	0.35 (0.09–1.38)	1.3369
(1) Direct medical referral and (3) suggesting non-pharmacological advice, or other advice	11 (12.2)	29 (32.2)	3.41 (1.58–7.38)	0.1757
(2) Suggesting medicines.	12 (13.3)	2 (2.2)	0.15 (0.03–0.68)	1.3387
(2) Suggesting medicines and (3) suggesting non-pharmacological advice, or other advice.	13 (14.4)	2 (2.2)	0.13 (0.03–0.62)	1.3238
(3) Suggesting non-pharmacological advice or other advice.	10 (11.1)	4 (4.4)	0.37 (0.11–1.23)	1.3476
(4) No advice suggested.	13 (14.4)	1 (1.1)	0.07 (0.01–0.52)	1.3243

*- Statistically significant ($P < 0.05$).

Direct medical referral was the appropriate advice that was expected to be provided by the participating students to the simulated patients. In our study, 14 and 45 participating students suggested medical referral only to the simulated patient in before and after providing SMCT, respectively ($P < 0.05$). Participants who questioned about the severity, medical conditions and previous/current medications in the simulated patients provided appropriate advice than students' pharmacist who did not enquired these questions.

Discussion

The current study assessed students' pharmacist for their competency in dispensing cough medicine in simulated pharmacy setup, before and after providing SMCT to them. The expectation of this study was that SMCT would enhance the competency of students' pharmacist in dispensing cough medicines. As expected, this study had shown positive results, where the competency to dispense cough medicines got improved in the study participants after receiving SMCT. In the study conducted by Dymek and colleagues [11] aimed 'to compare students' pharmacist self-assessment outcomes before and after the Objective Structured Practical Examination (OSPE)', which resembles the similar result of our study, where the professional competencies were higher in students' pharmacist after the OSPE.

We also observed from our study that collecting appropriate information is positively linked in delivering appropriate advice to the patient which was also emphasized by an Indonesian study Brata and colleagues [12], where the pharmacy student competency in handling request to dispense self-medication for a cough was assessed.

It was proven by studies conducted by Akande-Sholabi and colleagues [13] and Tuyishimire and colleagues [14] that community pharmacy is a place, where more than half of the participants approached to purchase drugs intended for self-medication and cough was one

of the conditions for which the participants mostly self-medicate, which made us to simulate a community pharmacy setup, where a simulated patient request for a cough medicine. Dispensing drugs without collecting proper information regarding patient is considered inappropriate. Patient taking allopathic medicine(s) might also take ayurvedic preparations at the same time period, leading to drug interaction that worsen patient condition Sharma and colleagues [15].

Seiberth and colleagues [16] observed that when self-medication enquiries were handled by German pharmacy staff, only minimal quantity of information gathered and provided, which might reflect the similar current scenario in Indian pharmacy setup. They also revealed that information gathered and provided were negatively influenced by factors like patient disinterest or specific medication request by patient and suggested to facilitate strategies to handle the same.

This is the first study in India to investigate the competency of students' pharmacist in gathering information and providing appropriate counselling to the simulated patients suffering with cough. All students who involved in this study were novice learners. In short, they just learned about self-medication counselling in a pharmacy program. In India, pharmacy students are theoretically educated about dispensing drugs during their study period. Unfortunately, they were not trained to implement the same in real-time pharmacy setup. This study proved that, due to lack of practical training during their study period, considerable number of pharmacists could not be able to deliver patient care to their fullest. Apart from the incomplete information collected by these participating students before SMCT, they had a good knowledge of the disease and treatment and can analyse the collected information.

Exposing students' pharmacists to virtual simulated patient are an add-on to improve and build their communication, knowledge, confidence, skills and competency skills. By using simulated patient, various scenarios could be created by the preceptors to train pharmacy students Richardson and colleagues [17]. By using simulated patient, various scenarios could be created by the preceptors to train pharmacy students. Exposing students to various scenarios will make them well trained and experienced to handle and dispense medicines. Adapting to this, in the current study, we used simulated patient instead of real patients.

Pharmacy students should be considered as dedicated contributors to the public healthcare system, referencing the same we firmly suggest future pharmacist should be adequately educated on Good Pharmacy Practice (GPP) and responsible self-medication dispensing Alduraibi and Altowayan [18].

Conclusion
Competency of students' pharmacist in delivering self-medication consultation to the simulated patient with cough got enhanced after receiving practical training regarding the same. Asking questions appropriate to their clinical situation is a key predictor in providing appropriate advice. This study shows that the information gathering process had improved among students' pharmacist after providing appropriate training with self-medication consultation services. The effectiveness of simulation learning depends on each learner's practice and feedback, so steps must be taken to optimize the teacher-student relationship. Future research identifying the factors which affect the competency of pharmacy students in delivering SMCS is needed.

Study limitations
This study was only conducted in one pharmacy college (A new initiative) in India. Because the quality of Indian pharmacy colleges has been reported to differ, these findings may not be generalizable for all pharmacy students in India. Furthermore, the study included novice students and it may not reflect the real-world practice and generation of Hawthorne effect is highly possible because the participating students knew their assessment.

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Conflicts of interest
There are no conflicts of interest.

References

1 Bennadi D. Self-medication: A current challenge. J Basic Clin Pharm 2014; 5:19–23.

2 Ruiz ME. Risks of self-medication practices. Current drug safety 2010; 5:315–23.

3 Chautrakarn S, Khumros W, Phutrakool P. Self-medication with over-the-counter medicines among the working age population in metropolitan areas of Thailand. Front Pharmacol 2021; 12:726643.

4 Loh P, Lee JW, Karuppannan M, Chua SS. Practice of pharmaceutical care by community pharmacists in response to self-medication request for a cough: a simulated client study. BMC Health Serv Res 2023; 23:1–10.

5 Basak SC, Sathyanarayana D. Pharmacy education in India. Am J Pharm Educ 2010; 74:68.

6 Venkata SP, Kielgast P, Udhumansha U, Airaksinen M. Public health and patient care aspects in Indian pharmacy curricula: A comparison with USA, Finland and Denmark. Indian J. Pharm. Educ. Res 2016; 50:1–8.

7 Watson CJ, Whitledge JD, Siani AM, Burns MM. Pharmaceutical compounding: a history, regulatory overview, and systematic review of compounding errors. J Med Toxicol 2021; 17:197–217.

8 Dalton K, Byrne S. Role of the pharmacist in reducing healthcare costs: current insights. Integr Pharm Res Pract 2017; 6:37–46.

9 Mohan D. Controversies in cough management: An Indian perspective. Indian J Community Med 2019; 44:303–6.

10 Roy V, Malhotra R, Tayal V, Bansal A, Gupta KS. Fixed-dose combinations for cough and common cold in India: an assessment of availability and rationality. Fundam Clin Pharmacol 2011; 25:258–66.

11 Dymek J, Kowalski TM, Golda A, Nowakowski M, Skowron A. The influence of OSPE and PBL on competency-based pharmacy student self-assessment. BMC Med Educ 2022; 22:1–7.

12 Brata C, Halim SV, Setiawan E, Presley B, Wibowo YI, Schneider CR. The competency of Indonesian pharmacy students in handling a self-medication request for a cough: a simulated patient study. Pharm Pract 2021; 19:1–10.

13 Akande-Sholabi W, Ajamu A, Adisa R. Prevalence, knowledge and perception of self-medication practice among undergraduate healthcare students. J Pharma Policy Pract 2021; 14:1–11.

14 Tuyishimire J, Okoya F, Adebayo AY, Humura F, Lucero-Prisno IIIDE. Assessment of self-medication practices with antibiotics among undergraduate university students in Rwanda. Pan Afr Med J 2019; 33:307.

15 Sharma AK, Kapoor VK, Kaur G. Herb-drug interactions: A mechanistic approach. Drug Chem Toxicol 2022; 45:594–603.

16 Seiberth JM, Moritz K, Herrmann NS, Bertsche T, Schiek S. What influences the information exchange during self-medication consultations in community pharmacies? a non-participant observation study. Research in Social and Administrative Pharmacy 2022; 18:2444–56.

17 Richardson CL, White S, Chapman S. Virtual patient technology to educate pharmacists and pharmacy students on patient communication: a systematic review. BMJ Simul Technol Enhanc Learn 2020; 6:332–338.

18 Alduraibi RK, Altowayan WM. A cross-sectional survey: knowledge, attitudes, and practices of self-medication in medical and pharmacy students. BMC Health Serv Res 2022; 22:1–10.