



Competency Assessment in Dispensing and Incompatibilities Laboratory

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Research Article

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Abstract

Objective: An objective structured clinical examination (OSCE) was used for the first time in Dispensing and Incompatibilities laboratory at the University of the Philippines Manila College of Pharmacy. It is believed that traditional methods of assessment may not adequately evaluate the competencies acquired by the students in the said course. This paper described the conduct of the OSCE and the results, evaluation and recommendations for future improvement were also presented.

Methods: The teaching team identified the topics and skills to be covered and prepared a test blueprint for the examination. Thirteen stations were prepared with a time allotment of 5 min per station. The examination was administered to 71 students enrolled in Dispensing and Incompatibilities at the end of the second semester, academic year 2010-2011. During the OSCE, students rotated to designated stations where they were asked to perform certain tasks such as counsel/instruct a patient, answer a series of questions or solve computational problems. An evaluation questionnaire was sent to the students via email. The scores and evaluation of the students were encoded, processed and analyzed with Microsoft Office Excel 2007.

Results: Only 33.8% of the student population passed the given examination. Majority of the respondents commented that the time allotment of 5 min was inadequate most especially for the action stations. The question pertaining to the adequacy of time allocated per station, obtained the lowest mean score of 2.12. Most of the students who completed the questionnaire agreed that the OSCE adequately evaluated their competencies and that they would recommend the OSCE as an assessment tool for future batches.

Conclusion: Although the passing rate for the examination was low, the use of OSCE in Dispensing and Incompatibilities laboratory was recommended by the students. It was also effective in assessing competencies acquired by the students but the suggestions and recommendations for its improvement must be considered.

Key words: competency assessment, dispensing and incompatibilities laboratory, OSCE

Introduction

The recent trends and advancements in the practice of pharmacy, place due emphasis on the clinical roles of a pharmacist. Colleges of pharmacy are encouraged to implement curricular changes based on the concept and philosophy of pharmaceutical care⁽¹⁾. Thus, the University of the Philippines Manila College of Pharmacy revised its undergraduate curricula into 5-year competency-based programs. The nine terminal competencies developed for the programs are listed in Table 1. Among the curricular reforms was the abolition of the 5-unit course *Pharmacy Practice*. This was replaced by the 3-unit course, *Dispensing and Incompatibilities* and the 4-unit course, *Hospital Pharmacy*. Dispensing and Incompatibilities aims to teach the fundamentals of handling medications in the community and hospital settings as well as the traditional roles of compounding and dispensing. Moreover, the course aims to equip the students with the proper skills in detecting and addressing incompatibilities (both physicochemical and therapeutic), adverse drug reactions and drug therapy problems. These changes were implemented because although the paradigm shift is geared towards a patient-oriented practice, the pharmacist's dispensing role will continue to be a part of his/her duties as a distinct yet an equal member of the healthcare team. It is therefore a prerequisite that a pharmacy student who is to pursue clinical practice must first be competent in dispensing and addressing drug incompatibilities. The course in Dispensing and Incompatibilities is taken by fourth year students during the second semester and is composed of 2-units lecture (2 hours/week) and 1-unit laboratory (3 hours/week). It is a core subject taken by both BS Pharmacy (BSP) and BS Industrial Pharmacy (BSIP) students.

The laboratory part is where most of the practice competencies are taught. Instructional strategies in the



laboratory include didactic lectures, simulated dispensing, group presentations and small group case discussions. Assessment methods employed by the faculty include case discussion participation, group and individual reports, simulated prescription processing, written examination and an objective structured clinical examination (OSCE). The OSCE was used for the first time in the said course by the teaching team. This evaluation tool was adopted since traditional methods of assessment such as multiple-choice and essay questions may not adequately evaluate the mastery of essential skills and measure cognitive learning in clinical settings⁽²⁾. This paper described the experience of conducting an OSCE in a dispensing and incompatibilities laboratory class. The results and evaluation of the examination as well as the recommendations for future improvement were presented.

Methodology

An OSCE consists of a chain of work stations through which students rotate according to a fixed schedule. Its designs vary according to the number of work stations and the amount of time allotted at each station⁽³⁾. The OSCE in Dispensing and Incompatibilities was given as part of the assessment of the laboratory component of the said course at the end of the second semester, academic year 2010-2011. The teaching team identified the topics and skills to be covered and prepared a test blueprint for the examination. A month prior to the OSCE, the mechanics and coverage of the examination were discussed to the students. Thirteen stations were prepared (8 paper cases/prescriptions, 2 action stations and 3 rest stations). A summary of the stations is presented in Table 2. The time allotment for each station is 5 minutes. The examination was conducted in four adjacent rooms at the University of the Philippines Manila College of Pharmacy. The first room served as the holding area where the final instructions and the starting stations of the students were given. The first action station was located at the smaller second room. The third and fourth rooms housed the rest of the stations. A divider was used to separate the second action station from the rest of the stations located at the fourth room. Two of the three faculty members handling the course served as the standardized patients for the action stations. The other faculty member and one laboratory assistant were the proctors during the examination. Another laboratory assistant served as the timekeeper. A day prior to the OSCE, the students were grouped into three batches. The first batch took the examination in the morning while the subsequent batches were scheduled in the afternoon of the same day. During the OSCE, students rotated to designated stations where they were asked to perform certain tasks such as counsel/instruct a patient, answer a series of questions or solve computational problems. The students wrote their answers on an answer sheet and the faculty members who acted as patients used structured

and standardized checklists to grade the students at the action stations. After the allotted time, students moved to the next station until they finish all thirteen stations. A call bell was used by the timekeeper to signal the movement. The laboratory instructors collected the answer sheets right after the examination. The papers were corrected manually by the instructors. An evaluation questionnaire was sent to the students via email. They were requested to voluntarily answer five questions using a 5-point Likert scale and one open-ended question to generate qualitative data for the improvement of the OSCE. Data were analyzed and processed using Microsoft Office Excel 2007. The qualitative data were analyzed using thematic content analysis.

Results

A total of 71 students enrolled in Dispensing and Incompatibilities took the OSCE. Majority of the students are females and are under the BS Pharmacy program (Table 3). The total score of the examination was 68 points. The passing mark was set at 70%. Only 33.8% of the student population passed the given examination. Fifty one (51) students completed the evaluation questionnaire. The results of the OSCE evaluation are presented in Table 4. Majority of the respondents commented that the time allotment of 5 min was inadequate most especially for the action stations. This was consistent with the lowest mean score of 2.12 obtained for question 4 in the evaluation. According to Salih, et al, the typical time of 5 to 10 min spent at each station is usually sufficient for an average student to complete the task at hand⁽³⁾. But as observed by the faculty, the students were already finished performing the task in less than 5 min in some stations, but not in stations involving patient counseling and computations. There was also a similar finding in a study conducted by Awaisu, et al, where the examinees recommended that the time allocated at each station be increased for future OSCEs, especially in stations involving calculations⁽²⁾.

A few students reported the examination to be stressful due to the time pressure. The faculty also deemed that their presence in the action stations could have caused anxiety for the students. Another recurring theme from the recommendations of the students was the addition of more stations involving patient counseling, compounding and prescription processing. This was consistent with the suggestion of previous studies that longer OSCEs, comprised of more stations, may be required to obtain a more accurate measure of student competencies⁽²⁾. The other recurring suggestions for future improvements include the demonstration of the proper use of more devices prior to the examination and discussion of the correct answers right after the OSCE.



Table 1: Terminal competencies of the BS Pharmacy and BS Industrial Pharmacy programs of the UP College of Pharmacy

1.	Promote and contribute to the quality use of medicines
2.	Dispense medicines
3.	Prepare pharmaceutical products
4.	Develop pharmaceutical products
5.	Provide primary health care
6.	Provide drug information
7.	Practice pharmacy in a professional and ethical manner
8.	Apply organizational skills in the practice of pharmacy
9.	Utilize research skills in the practice of pharmacy

Table 2: Summary of OSCE Stations

Station	Competency(ies)	Objective	Description
1*	<ul style="list-style-type: none"> Dispense medicines Provide drug information 	To evaluate student's ability to process a given prescription and provide patient counseling	A patient presented a prescription of amoxicillin 250mg/5mL suspension for his 10-y/o son.
2	Rest Station		
3	<ul style="list-style-type: none"> Prepare pharmaceutical products 	To assess the computational skills of the student as applied to compounding	A prescription for isotonic solution was given and the required amount of isotonicity adjusting agent is to be computed. A scientific calculator was provided at the station.
4	<ul style="list-style-type: none"> Promote and contribute to the quality use of medicines Utilize research skills in the practice of pharmacy 	To determine the ability of the student to identify medication errors	Two prescriptions with errors (wrong dosage form and wrong signa) were given. A reference was provided at the station.
5	<ul style="list-style-type: none"> Promote and contribute to the quality use of medicines 	To determine the knowledge of the student in detecting counterfeit medicines	Questions pertaining to counterfeit medicines were provided.
6	<ul style="list-style-type: none"> Dispense medicines 	To evaluate student's ability to identify the three types of incorrect prescriptions according to pertinent laws	Six incorrect prescriptions were provided and the student was asked to classify each one.
7	<ul style="list-style-type: none"> Dispense medicines 	To assess student's skill in evaluating prescriptions for dangerous drugs	Two prescriptions for dangerous drugs were given and the student was asked to justify if the prescriptions are to be dispensed or not.
8	Rest Station		
9*	<ul style="list-style-type: none"> Provide drug 	To evaluate student's	A patient presented a prescription of

	information	ability to counsel and instruct the patient on the proper use of a medical device	budesonide/formoterol 160mcg/4.5 mcg inhaler
10	<ul style="list-style-type: none"> Dispense medicines Prepare pharmaceutical products 	To assess student's competence in processing prescription for divided powders	A prescription which requires the pharmacist to prepare divided powders was given. The student was presented with a series of questions related to the prescription. A scientific calculator was provided at the station.
11	<ul style="list-style-type: none"> Promote and contribute to the quality use of medicines 	To determine the knowledge of the student in reporting adverse drug events	A prepared adverse drug event form was provided and a series of questions related to the case was given.
12	<ul style="list-style-type: none"> Promote and contribute to the quality use of medicines Utilize research skills in the practice of pharmacy 	To evaluate the ability of the student to detect and address drug interactions	A prepared drug therapy case and relevant references were provided in the station. Questions related to the given case were asked.
13	Rest station		

* Action stations with a standardized patient

Discussion:

The teaching team encountered no major problems during the implementation of the OSCE. The grouping of the students into three batches was effective in managing the limited space and available resources. Based on the evaluation of the students as well as the observation of the teaching team, the time allotment for each station will be varied depending on the complexity of the tasks in future OSCEs. This is because the complexities of competencies tested at different OSCE stations may vary significantly and the level of learning required to achieve the competency being evaluated may also differ from one station to another ⁽²⁾. It is likewise recommended to employ trained actors as standardized patients instead of the faculty members acting as patients.

Overall, the students accepted the OSCE in Dispensing and Incompatibilities laboratory. Majority of the respondents agreed that the examination adequately evaluated their acquired skills. Most of them also recommended the OSCE as an assessment tool for future batches of students who will enroll in the course. This was validated by the mean scores from the evaluation. A number of students commented that the OSCE was able to evaluate their competence in patient counseling, prescription processing and the use of appropriate



references for drug interactions. Some respondents stated that the OSCE allowed them to put into practice the theories they learned in the laboratory discussions.

Table 3: Demographics of students who took the OSCE

Sex	Male	21
	Female	50
Course	BS Pharmacy	38
	BS Industrial Pharmacy	33

The low passing rate but high acceptance of the OSCE from the students may have demonstrated the deficiency in the acquired competencies of the students from the laboratory course. This may be attributed to insufficient exercises that could have improved their knowledge and skills prior to the examination or a higher degree of learning was needed to achieve the required competencies.

Table 4: Evaluation results for Phar 154 Laboratory OSCE

Questions	Mean Score (n = 51)
1. The OSCE adequately evaluated the essential skills I acquired in Phar 154 Laboratory.	1.92
2. The coverage of the OSCE was adequate for the laboratory course.	1.76
3. The questions in the OSCE were reasonable.	1.71
4. The time allocated for each station was adequate.	2.12
5. I would recommend the OSCE as an assessment tool in evaluating essential skills in Phar 154 Laboratory for future batches.	1.41

strongly agree					strongly disagree	
1	2	3	4	5		

Conclusion

Although the passing rate for the examination was low, the use of OSCE in Dispensing and Incompatibilities laboratory was recommended by the students in evaluating acquired competencies. The study showed that the OSCE may have demonstrated the inability of the students to acquire the competencies set for the course, the deficiency in acquiring the competencies due to insufficient training in the laboratory or the need to improve teaching strategies.

Nevertheless, the OSCE in Dispensing and Incompatibilities laboratory is effective in assessing competencies but the suggestions and recommendations for its improvement must be considered.

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AUTHORS' CONTRIBUTIONS

Authors contributed equally to all aspects of the study.

PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests