

# Standardization of Course Plan and Design of Objective Structured Field Examination (OSFE) for the Assessment of Pharm.D. Student's Community Pharmacy Clerkship Skills

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## ABSTRACT

**Purpose:** This study was aimed to design Objective Structured Field Examination (OSFE) and also standardize the course plan of community pharmacy clerkship at Pharmacy Faculty of Tabriz University of Medical Sciences (Iran).

**Methods:** The study was composed of several stages including; evaluation of the old program, standardization and implementation of the new course plan, design and implementation of OSFE, and finally results evaluation.

**Results:** Lack of a fair final assessment protocol and proper organized educating system in various fields of community pharmacy clerkship skills were assigned as the main weaknesses of the old program. Educational priorities were determined and student's feedback was assessed to design the new curriculum consisting of sessions to fulfill a 60-hour training course. More than 70% of the students were satisfied and successfulness and efficiency of the new clerkship program was significantly greater than the old program ( $P < 0.05$ ). In addition, they believed that OSFE was a suitable testing method.

**Conclusion:** The defined course plan was successfully improved different skills of the students and OSFE was concluded as a proper performance based assessment method. This is easily adoptable by pharmacy faculties to improve the educational outcomes of the clerkship course.

## Introduction

The principal mission of Pharm.D. course is educating skilled students in pharmaceutical aspects of health related organizations as a researcher and or a community pharmacist. The overall goals of implementing Pharm.D. course are listed below:

- Improving pharmacy science understanding
- Presenting scientific and practical researches in pharmaceutical science
- Providing knowledge and skill in various related fields such as:

- Understanding Pharmacopeial drug specifications
- Management of pharmacies in private and or public sectors
- Effective communication with patients and physicians to improve the logical use of medicines
- Preparing extemporaneous preparations
- Formulating new preparations in pharmaceutical industries
- Performing quality control of pharmaceuticals, cosmetics and food

- Prophylaxis of drug toxicities, etc.<sup>1</sup>

In our university, the aforementioned goals are complemented by passing 210 credit-hours during 6 years. In this regard the whole pharmacy lessons in Pharm.D. course can be classified in four main groups; essential (basic) sciences, main courses, specific fields and community pharmacy and hospital clerkship programs.<sup>1</sup>

Community pharmacy clerkship program provides practical and scientific experiences for pharmacy students to achieve an acceptable performance in community pharmacies. According to our faculty's rules, pharmacy clerkship program is implemented in 3 individual parts:

- Various course related workshops (4 hour each)
- Occupational training in local private community pharmacies
- Occupational training in the pharmacy and drug information center of the pharmacy faculty.

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Evaluation of the program described above, revealed teachers and students disfavor due to lack of an organized educating system for training in various and necessary fields such as appropriate processing of prescriptions, patient counseling and communication, providing appropriate drug information, monitoring patient-specific disease states and documenting pharmaceutical care outcomes.

Standardization of the community pharmacy clerkship course plan was performed to overcome these shortages and also to improve the overall educational outcomes. Another main source of trainers' objections was raised from the inappropriate assessment methods. It was believed that the examinations were only based on theoretic evaluation of the student's knowledge and were only capable of simple recalling of the memorized information and therefore were not useful in some practical aspects such as patient counseling and or health related problem solving.<sup>2</sup> One of the proper methods which is also suitable for the pharmacy clerkship course skill assessment is named OSCE (Objective Structured Clinical Examination) and was first defined by Harden at 1975.<sup>3,4</sup> This method has been selected as an acceptable multilateral way of assessment by numerous universities all over the world.<sup>5-10</sup> Many researchers have utilized an OSCE type assessment to evaluate mastery of essential skills of pharmacy students but as OSCE are mainly about clinical abilities, in community pharmacy clerkship; researcher has named it as OSPE (Objective Structured Practical Examination)<sup>11</sup> and OSFE (Objective Structured Field Examination).<sup>12</sup> OSPE and OSCE are gold standard for assessing pre-clinical and clinical laboratory skills.<sup>11</sup>

OSFE is a slightly modified type of OSCE. In 2005, Jalili et al. reported acceptable satisfaction of the medical students from the OSCE method.<sup>13</sup> In addition, Noohi et al. reported that 86 percent of the teachers in Kerman University of medical sciences preferred OSCE to any other types of clinical evaluation of the trainee's skills.<sup>14</sup> OSCE has been an instrumental part of clinical competence assessment in the faculty of pharmacy at the international Islamic University Malaysia since 2006 and is defined as a performance-based assessment method preferred to conventional methods.<sup>6</sup>

In the current study, the standardization of the community pharmacy clerkship course plan for Pharm.D. student's was performed and an OSFE type assessment was designed, implanted and evaluated according to the student's satisfaction rates.

### Materials and Methods

This study was carried out at the faculty of pharmacy, Tabriz University of Medical Sciences, Tabriz (Iran) in 2012. Fifty one students (male=25, female=26; 24.2±2.2 years old) that had contributed in community pharmacy clerkship course were all participated in this study.

The study was implemented in four below stages:

#### **Stage 1: Evaluation of the old program and characterizing its advantages and weaknesses**

In this stage, 12 meetings and group discussions with trainers (Teaching professors) were arranged to find out the current status of the clerkship program. Student's opinions were also collected using a questionnaire. The results of stage 1 were utilized in designation of the stage 2.

#### **Stage 2: Preparation and standardization of the course plan, defining the goals and educational content and implementation of the new program**

This stage was performed in 7 levels:

- 1- Teaching professors (n=7) determined educational superiorities, new lessons and session plans based on the national standards and national guidelines of Planning Council of Medical Sciences in the pharmacy course.
- 2- Responsible trainers were defined for each session and collaborations were organized.
- 3- Discussions were made to select best educational methods
- 4- Each responsible teacher prepared and introduced the specified session plans along with the useful texts and references in group meetings. All approved plans were documented by the research head.
- 5- Performance based assessment for measuring competency was approved to be performed according to the OSFE method.
- 6- Special explanation sessions were prepared for participating students in which the new program was defined and formative and summative evaluation methods were fully explained, before the establishment of the new program.
- 7- Time table was prepared according to the course plan and each teacher presented 5 hours per day in total 12 days (60 hours).

#### **Stage 3: Design and implementation of the OSFE**

A multi station, multi task process of skill assessment (OSFE) compromised a circuit of totally 7 stations. All examinees were assessed using exactly the same stations. Detailed written instructions and scenarios were provided to ensure that the given information is the same to all participants. Seven examiners located in each station and presented their question on an A<sub>4</sub> paper. Each student had a 5 minute period to complete each station, thus it takes half an hour for each participant to complete the whole exam.

The below considerations have fundamental importance in the design and implementation of the new course and also the final assessment:

- 1- Complete explanation of the assessment method should be available for all candidates at the beginning of the course
- 2- Examination schedule (time, date and place) announcement must be available at least one month before the test.

- 3- Student attendances should be checked and possible deficiencies due to excused absences should be compensated whenever needed.
- 4- The students with that did not uncompensated deficiencies, have to be subjected to retake the course as a penalty and must be excluded from the final assessment list.
- 5- Detailed coordination have to be made at least a week before the exam. The number of staff and their responsibilities should be determined and documented. Stations circuit has to be prepared appropriately and any necessary materials and equipments have to be settled at each station.
- 6- Students name should be recorded at the exam entrance center.
- 7- Two days before the exam, each station questions should be designed by the responsible examiners and the approved questions should be documented.

#### **Stage 4: Evaluation of the results**

Student's satisfaction and perception about course implementation and final skill assessment was evaluated by a 5 point scale questionnaires (Likert scale). Questions of the questionnaires were primarily prepared by the research head and then reconsidered in group meetings. The best questions were selected and documented as final standardized questionnaires. Considering ethical issues, writing the name in the questionnaire was optional and all the completed questionnaires and the students' opinions were kept confidential. The responses were scored and analyzed using SPSS 16 and finally presented as Mean percentages  $\pm$  SEM. Independent t-student test was used to determine any significant differences between the old and new clerkship programs. Differences were considered significant at a level of  $P < 0.05$ .

### **Results**

#### **First Stage: Evaluation of the old program and characterizing its advantages and weaknesses**

##### *The educational status of the old program*

According to the old program rules, at the beginning of the clerkship course, 2-4 students were being introduced to each trainer who were academic staffs with PhD degrees and simultaneously were as responsible pharmacists in the university's pharmacy. Each student performance during the course was being measured using a questionnaire that was filled out by the responsible trainer at the end of the course. There was no written course plan or lesson plan to be followed up and the trainers were free in selecting the topics for teaching. The undefined training time was dependent on the trainer's free time in the pharmacy. The students were only seeking the trainer's advice whenever they encounter a problem during reviewing the medicines in the shelves or evaluating the prescriptions. Their questions were usually about indications, mechanism of actions, routes of administration, dosage forms, brand names and some financial workouts.

#### **Attendance checking**

The student's attendance during the course was checked using a fingerprint Timex machine available in the pharmacy. The course was assigned as complete when 60 hours period was fully passed.

#### **Scoring**

The old program had no final skill assessment and students ranking were assigned according to their total activity during the course and was completely dependent on his/her individual trainer opinion.

#### **Advantages**

- 1- Cooperation of academic staff as expert trainers
- 2- Presence of appropriate facilities and environment such as physical space and adequate personnel in the pharmacy.
- 3- Easy access to any other useful training facilities such as books, software and internet connection, whenever needed.
- 4- Providing real working conditions and creating massive information by training the students in the central pharmacy and medical information of the northwest region with a large variety of prescriptions along with the abundance of referring patients.
- 5- Introducing a classical pharmacy managing system and providing specific knowledge for students in different fields such as; patient reception, independent drug depot with inflow and outflow systems.
- 6- Presenting various ordering systems for medicines, cosmetics and medical devices.
- 7- Availability of specialized and fully computerized management systems such as accounting and administration.
- 8- Training students in professional ethics.

#### **Weaknesses**

- 1- Training each student in a different way dependent on the trainer's desires and special fields of his/her expert.
- 2- Lack of specific and standard lesson plans.
- 3- Low level of gained knowledge and skills.
- 4- Inadequate training time due to numerous referring patients occupying trainers as responsible pharmacists.
- 5- Repeating scientific issues and theoretical aspects during the course.
- 6- Insufficient attention to the skills and professionalism of pharmacy affairs, including patient communication, clinicians' consultation, ethics, narcotics legislations, and pharmacy management skills such as insurance regulations, financial issues, ordering system from licensed distributors and supervising the staff.
- 7- Lack of a reliable and fair method for summative and formative assessment of the trainees.

### **Second Stage: Preparation and standardization of the course plan and defining the goals and educational content of community pharmacy clerkship course and implementation of the new program**

After several group meetings, curriculum design was performed based on educational priorities and also trainers and students feedback. A 60-hour period during 12 training sessions (5 hours each) was defined and implemented. The main competencies tested in the OSFE can be divided into two main parts; one, technical affairs and two, administrative and financial aspects of pharmacy. The detailed description of each part has been listed below:

#### **Technical affairs**

Technical affairs were comprising of the following parts:

- 1- Dosage forms and pharmacologic classes of the medicines
- 2- Specific storage conditions of pharmaceutical products with main focus on refrigerator condition.
- 3- Multi-ingredient dosage forms
- 4- Drug information resources
- 5- Filling out the prescriptions (Insurance supported and free ones) and dispensing prescribed medicines to the patients
- 6- Patient or physician counseling and communication
- 7- Evaluating the prescriptions in some areas such as indications, contraindications, interactions, and route of administration (prescription analysis).
- 8- OTC drugs administration rules and precautions
- 9- Administration of herbal medicines, supplements and diet formulas
- 10- Pharmaceutical compounding (extemporaneous preparation and dispensing)
- 11- Dispensing cosmetics and toiletries
- 12- Special dosage forms administration
- 13- Understanding Adverse drug reactions (ADR) and the way of their reporting

#### **Administrative and financial aspects of pharmacy**

- 1- Pharmacy management
- 2- Pharmacy shelving and providing drugs in correct order
- 3- Computerized management and reception
- 4- Accounting
- 5- Price legislations, different insurance coverage and franchises
- 6- Drug, medical devices and cosmetics ordering from licensed distributors
- 7- Ministerial regulations on pharmacies

#### **Third Stage: Design and implementation of the OSFE**

As the complexities of competencies tested at different stations have a clear effect on examination<sup>4</sup>, attempts were done to remain the stations in the same level. In this study OSFE comprised a circuit of totally 7 stations (5 minutes each). The general contents and OSFE stations design were as follow:

**Station 1:** Dosage forms, pharmacological classes, refrigerated drugs, special storage conditions, prescription reading and dispensing

**Station 2:** Regulations on prescriptions, reception, method of administration for special dosage forms, ADR and its reporting, ministerial regulations on pharmacies

**Station 3:** Analyzing the prescriptions (indications, contraindications, interactions, routes of administration and etc.) and utilizing Informational resources

**Station 4:** Multi-ingredient dosage forms, OTC drugs administration, herbal medicines, supplements and diet formulas

**Station 5:** Extemporaneous preparation and dispensing cosmetics and toiletries

**Station 6:** Pharmacy management, accounting, drug depot, medical devices and cosmetics as well as drugs ordering from licensed distributors

**Station 7:** Dispensing medicines to a model patient and communicating with patients

Practically the test steps were as below:

- 1- Registration of the participants
- 2- Taking the personal baggage and cell phones outside the examination place and labeling them
- 3- Entering to explanation room to remind the candidates about the number and duration of stations and other examination details and also clarifying the instructions.
- 4- Administering questionnaire forms to examinees (about the whole course and extemporaneous preparation section but not the final exam)
- 5- Entrance to the stations and implementing the examination
- 6- Waiting place for remaining candidates in a separate and previously specified place
- 7- Administering special questionnaires about OSFE at the end of examination.
- 8- Leaving the examination site and getting back the baggage and cell phones.
- 9- Ranking of the students by calculating an average of all 7 stations and recording as 50 percent of the total mark (The remaining 50% was about in-course activities and had been assigned by the teachers previously).

#### **Fourth Stage: Evaluation of the results**

The study items in questionnaires were assessed to evaluate the results. Student's satisfaction about course implementation and also the final skill assessment method was evaluated by their answers. Statistical analysis of the results was also performed to determine the overall success rate. Student satisfactions (expressed as percentages mean  $\pm$  SEM) in different issues are shown in Table 1 and Table 2. Satisfaction rate in four different areas (Pharmacy clerkship program, trainers, OSFE and extemporaneous preparation) was calculated as mean percentages  $\pm$  SEM and shown in Figure 1. In addition, successfulness and efficiency of the new clerkship program was compared to the old program. As depicted in Figure 2, in the viewpoints of the students, successfulness and efficiency of the new clerkship program was significantly greater than the old program ( $P < 0.05$ ).

**Table 1.** Pharm.D. pharmacy students' perception about the newly implemented clerkship program and OSFE.

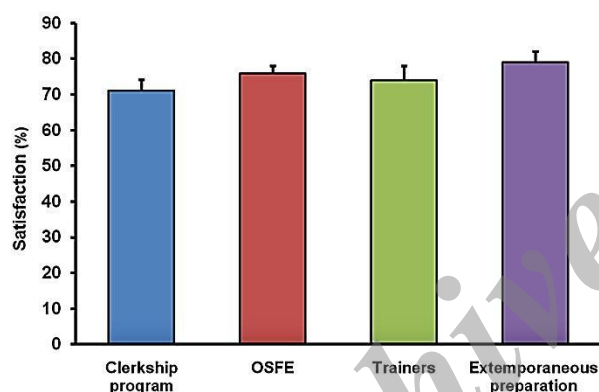
	Study Item	Scores of satisfaction	
		Mean (%)	SEM
Pharmacy clerkship program	Educational content was proper and useful	60	6
	Arrangement and sequence of skills training was logical	70	4
	Location facilities were well managed	64	5
	Duration of the course was appropriate	59	7
	Course curriculum was clear	84	9
	Detailed written program was provided at the beginning of the course	95	5
	Explanation of educational goals was comprehensive	100	0
	Student's attendance checking method was designed well	54	5
	Collaboration of responsible staffs were acceptable	78	4
Useful assistance was present in probable problems	75	6	
OSFE	Appropriate and sufficient venue	78	3
	Availability of facilities	78	4
	Suitability and scientific content of the questions in each station	79	4
	Ability of defined questions to distinguish professional skills	72	5
	Consistency of the OSFE to the materials or skills learned during the course	70	5
	Coincidence of the test with students knowledge	75	3
	Elimination of confounders during the OSFE	68	5
	Examiners cooperation	95	2
Overall quality of the new program implementation	71	3	

**Table 2.** Pharm.D. pharmacy students' perception about trainers, extemporaneous preparation and efficiency of the old and the new clerkship programs.

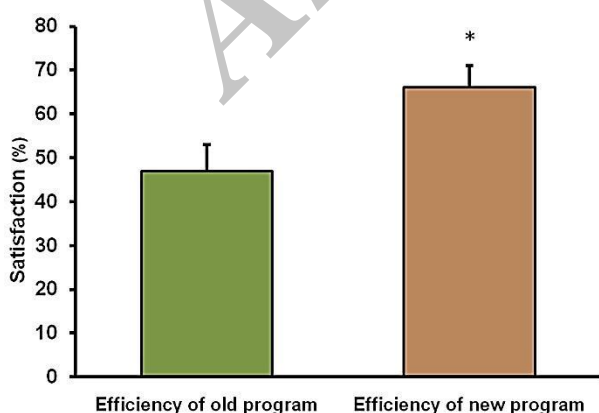
	Study Item	Scores of satisfaction	
		Mean (%)	SEM
Trainers	Enthusiasm was supporting for students	70	5
	Respectful behavior was admirable	86	4
	The trainers were interested in training	88	5
	They participation in training was active	76	5
	Explanation about the necessity of each skill was well presented	78	5
	Ability to respond and solve scientific and technical problems were satisfactory	80	3
	Punctuality	86	5
	Enough time was specified for questioning	59	6
	There were enough opportunity to practice learned skills	83	3
	Teaching methods were suitable	68	6
	Suitable training was available in the field of knowledge	66	4
	Suitable training was available in the field of attitude	63	5
	Suitable training was available in the field of skill	63	5
	Activity assigned to students Was match with defined educational goals	67	5
	Student's were encouraged to apply gained knowledge in their future real work environment	74	4
	There was a Beneficial use of the specified clerkship course	65	7
	Students had significant enthusiasm to attend training	74	6
Scientific References were available and used correctly	68	5	
Improving knowledge	83	4	
Extemporaneous preparation	Training	79	3
Efficiency of the old program	Previous related trainings courses were well-presented	49	8
	Previous related courses were successful enough to prepare students to get their role in clerkship program	44	6
Successfulness and efficiency of the new program	The implanted program Improved skills	64	5
	Educational content was in accordance with professional skills	69	4
	Schedule	66	5

## Discussion

In this study, course objectives and learning outcomes for community pharmacy clerkship program were developed and standardized to improve different skills and knowledge of the participants. A performance based assessment as a final evaluation of the students competency, was performed by OSFE design. According to Table 1 and Figure 1, the results showed that a total of more than 70 % of students were satisfied with new clerkship program and OSFE were accepted by more than 75 % of the examinees. The students also believed that successfulness and efficiency of the new clerkship program was significantly greater than the old program ( $P < 0.05$ ). Extemporaneous preparations and dispensing which has never been offered in old clerkship program, satisfied about 80 % of students collaborated in the new course. Unfortunately, the presentation quality of previous lessons related to clerkship and also their success in preparing students to get their role in clerkship program was rated less than 50 % which indicates the necessity of serious attention to reconsidering the offered course.



**Figure 1.** Percentage of pharmacy students' overall satisfaction on the newly implemented clerkship program, OSFE, trainers and extemporaneous preparation in the course of community pharmacy clerkship skills. Data represented as mean $\pm$ SEM.



**Figure 2.** Percentage of pharmacy students' overall satisfaction on the efficiency of the old and the new clerkship programs in the course of community pharmacy clerkship skills. Data represented as mean $\pm$ SEM. \*  $P < 0.05$  versus the old program.

## Study strengths and opportunities ahead

1. The new program designed to highlight the previous program advantages and tried to eliminate its weaknesses.
2. The new program trains different candidates with the same topics and prevents the misleading, and also has a great emphasis on the special fields of the trainer's expert.
3. The main program goals can be achieved by the defined lesson plan.
4. The new program focuses on the real scenarios of community pharmacy as the graduate's future job and develops necessary skills such as counseling patients and physicians, instructing patients, pharmacy management, accounting and finance and also ordering medicines.
5. There was little repeating of scientific issues and theoretical aspects.
6. A serious attention was applied to candidate's attendance.
7. Fair and identical summative and formative assessments were conducted.
8. Active participation in teaching and learning led to time saving.
9. This program can be applied to hospital and or industrial clerkship course of pharmacy students in the faculty or other pharmacy faculties.
10. Justifications can be made by pharmacy faculty authorities to provide necessary facilities and to eliminate the existing weaknesses in the implementation of the new program.
11. This study also revealed the lack of sufficient physical space for training inside the only one pharmacy of the university and thus suggests the necessity of private pharmacies collaboration in the training program.
12. Based on the student's believes, the number of sessions specified for the extemporaneous preparation and dispensing should be increased. This finding indicates that the previously gained knowledge were insufficient to produce desired skills and there is a need to reconsideration.

## Study limitations

1. A relatively long time and also energy is needed to teach.
2. Trainers are simultaneously the responsible pharmacists in the pharmacy; this makes some complications for trainers as well as patients.
3. The final skill assessment defined in this study is time consuming and a little expensive.
4. Some stress is defined with examinees taking the OSFE.
5. There is a need for continuous monitoring and precise implementation and designation of the training program by clerkship office staffs in the faculty.
6. Full explanation of the course in each semester should be performed to reduce the student's stress.

### Conclusion

Community pharmacy clerkship program is one of the most important courses that provides practical and scientific experiences for Pharm.D. students to achieve an acceptable performance. In this study, standardization of its course plan was performed and OSFE assessment model was designed, implanted and evaluated. Regarding the results, it may be concluded that the defined course plan was successfully improved different skills of the students and OSFE was as a suitable performance based assessment method. This is easily adoptable by pharmacy faculties to improve the educational outcomes of different clerkship courses such as community pharmacy and hospital clerkship programs.

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### Conflict of interest

The authors report no conflicts of interest.

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