ORIGINAL RESEARCH

The evaluation of prescription dispensing scores of the pharmacy students before and after the problem-based "rational drug use" course: Results of the two years' experience

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ABSTRACT: Pharmacists have a crucial role in promoting rational use of drugs. Therefore, pharmacy schools should prepare a realistic program that is competent with the changing role of the pharmacist. Pharmacy education should provide ability for critical thinking, improve problem-solving skills and decision making during pharmacotherapy. Problem-based pharmacotherapy teaching methods help pharmacy students gain the skill to implement theoretical knowledge into practice. The present study evaluates the efficacy of a problem based "rational drug use course" in the pharmacy curriculum of Near East University and reviews the results of this two year experience. An elective practical rational pharmacotherapy course was given in 2011 and 2012, to 3rd year pharmacy students at Near East University by a method based on simulated patients and evaluation of dispensing scores. A pre-test was conducted to evaluate the baseline dispensing score by OSPE (objective structured practical examination) and it was repeated at the end of the course (post-test). It was seen that the average dispensing score of group A (n=34) students was 34.26 ± 13.6, whereas it was 34.94 ± 11.6 for group B (n=17) in the pre-test (before the course). It increased almost twice to 62.18 ± 13.0 and 67.06 ± 15.6, respectively in Group A and B at the end of the semester (post-test). This improvement in the dispensing scores of the pharmacy students after the practical rational pharmacotherapy course were statistically significant ($p<0.001$). Thus, the unique OSPE score sheet/ checklist (that has been developed by Turkish Pharmacological Society) seems user-friendly and useful.

KEYWORDS: Dispensing score; pharmacy practice; rational use of medicine; problem- based pharmacotherapy; pharmacist; pharmacy student; simulated patient, Cyprus

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INTRODUCTION

Pharmacists are healthcare professionals who dispense medications and are responsible of the patients's safe and effective medication use.

Traditionally the role of the pharmacist mainly consisted of compounding, but compounding functions were significantly reduced in the last decade, and replaced by the dispensing functions (1,2). The mission of the pharmacy practice is to provide medication as well as other health care products and services, and to help people and society make the best use of their medication (3, 4). The role of today's pharmacists needs to be expanded to include pharmaceutical care concepts (5) which involves identifying, preventing, and resolving drug-related problems, as well as encouraging the proper use of medications, general health promotion and education, thus improving clinical outcome (6). The changing role of the pharmacist as patient counselor/educator in the ambulatory setting must be taken into consideration for achieving a better outcome and thus provide the rational use of drugs (7,8). Therefore new pharmacotherapy teaching models have been developed for teaching pharmacotherapy to pharmacists (4,9).

As in many developing countries, in the Turkish Republic of Northern Cyprus (TRNC) pharmacists have a distinct role in pharmaceutical care and patient education since many patients attend pharmacies as a primary care in the health system (10). The need for qualified pharmacy services enforce for the improvement of teaching methods in pharmacy education. Pharmacy schools need to prepare programs that are competitive with the changing role of the pharmacist. Thus the education should provide ability for critical thinking, improve problem-solving skills and decision making during pharmacotherapy. Therefore students should be trained to create, transmit, and apply new knowledge based on latest research in the pharmaceutical, social, and clinical sciences; collaborate with other health professionals and enhance the quality of their patients' life thus resulting in improved health for people in our society as well as the global community (8,11).

In many countries, including Turkey and Northern Cyprus, pharmacotherapy courses are generally given as lectures by the pharmacologists in the medical and pharmacy schools. Some medical schools have developed new teaching methods (e.g. Groningen model) for promoting rational use of medicine among the prescribers (12). These methods are also used in medical schools in Turkey (13,14).

However pharmacy students often face the similar problems as medical students in implementing theoretical pharmacotherapy knowledge into practice. Therefore, a novel pharmacotherapy teaching method based on simulated patients and evaluation of dispensing scores was developed by 'Turkish Pharmacological Society' (9, 15) and recommended to be used in schools of pharmacy in Turkey (9, 16). This novel pharmacotherapy teaching model has also been implemented at the Near East University, Faculty of Pharmacy TRNC since 2011 (11).

At Near East University pharmacy education consists of 10 semesters. Pharmacology courses are completed by the end of 5th semester. The rational pharmacotherapy course was offered in the 6th semester and it was pre-acquisitive to the completion of the pharmacology courses. And the students have summer training at the end of the 4th semester. Therefore, the students were familiar with the drugs and patient counseling. However, the course aimed to improve behavior and possess attitude change in addition to knowledge. Thus, it was evaluated with pre and post-tests. The present study reviews the results of this two year experience.

METHODS

The rational pharmacotherapy course is an elective for 3rd Year students (6th semester) of Near East University, Faculty of Pharmacy in TRNC. Of the eligible 2011 class 35 students (Group A) chose the course, but only 34 completed it. Of the eligible 2012 class 17 students (Group B) took the course and completed. The dispensing score of each student was calculated twice: in the pre-test (before taking the course) and post-test (at the end of the course).

The checklist used in the medical schools is called "OSCE (objective structured clinical examination). To develop teaching methods for pharmacy students, a model OSPE (objective structured practical examination) sheet (Appendix 1) for assessing the dispensing score of pharmacy students and pharmacists was prepared by the pharmacology lecturers of the 'Turkish Pharmacological Society' (9). "Rational Drug Use" courses employing this method (based on simulated patients and dispensing score) enables problem based learning and are also used by some of the schools of pharmacy in Turkey. The course was approved by the institutional educational board and has been included in the curriculum.

The checklist consists of three main parts:

1. The first part evaluates "checking the properties of the patient and the prescription".
2. The second part is mainly for evaluating "the information supplied to the patient about his/her medical condition and the medication".
3. The third part consists of the evaluation of "the communication skills of the pharmacist".

The total score is 100 points.

OSPE sheet was validated and used in Rational Drug Use course in Marmara University School of Pharmacy. The previous experience showed that there were no significant difference between the scores of the independent evaluators.[9] However, in the present study all ratings were done by a single trainer.

The trainer observed the dispensing and communication process between the patient (role player) and student. The grading system consisted of the following categories:

The communication skills grading was evaluated according to the interaction, use of professional vocabulary, language quality, fluency, pronunciation and presentation.

0 Lacks the features of an acceptable presentation.

1 Poor: Difficulty in keeping up with the discussion and contributes only occasionally. Frequent hesitations and pauses. Keywords are mispronounced, communication characterized by frequent inaccuracies and misunderstanding. Student is unfamiliar with the topic.

2 Moderate: Some structural weaknesses and only limited transitional elements. Basic level of acquaintance with the topic. Generally acceptable but often hesidant. Successful though limited in terms of accuracy. Some unresolved misunderstanding.

3 Good: Maintains contact with the audience. Level is appropriate, but the listener is not totally convinced that the presenter knows his/her topic well.

4 Excellent: Correct and adequate information is given confidently with a fluent, understandable vocabulary. Presentation is well structured, uses transitional elements, and follows the conventions of the field. Level is appropriate for intended audience.

Simulated patients were the role playing students of the Faculty of Performing Arts Department of Theatre.

During the course simulated cases are role played and discussed. The trainer acts as a facilitator. The students have to identify and solve the problem itself while the others are watching. The student has 5 minutes for each case and approx-

TABLE 1: The dispensing scores of the students in Group A (n=34) and Group B (n=17) evaluated by Objective Structured Practical Examination

	Dispensing score				
Description	**Pre-test Mean ± SEM (Range)**	**Post-test Mean ± SEM (Range)**	**Minimum change**	**Maximum change**	**Student's t-test**
Group A (n=34)	34.26 ± 13.6 (15-78)	62.18 ± 13.0 (45-85)	5	44	P<0.0001
Group B (n=17)	34,94 ± 11.6 (18-57)	67,06 ± 15.6 (38-100)	8	51	P<0.0001

imately an average of 15 minutes discussion is done afterwards. The students are allowed to use the computer based drug database (RxMediaPharma, Interactive Drug Information Source, editor Prof. Levent Ustunes, developed by Gemas Engineering) or pharmacotherapy books and drug lists. Educational intervention consists of combination of role playing, inquiring, decision making, counseling, brain storming and discussions.

SPSS for windows v 13.0 was used for statistical analysis. Student's t-test was done for comparing the pre-and post-test scores. Difference as $P<0.05$ was accepted as significant.

RESULTS

Before starting the pharmacotherapy course all students were subjected to a simulated case scenario and their dispensing behaviors were scored in accordance to the OSPE form (pre-test).

The results have shown that the average dispensing score of group A was 34.26 ± 13.6 in the pre-test, whereas it was 34.94 ± 11.6 for group B. After the completion of the course all students were again subjected to a simulated case scenario and dispensing scores were calculated (post-test). The average dispensing score were increased almost twice to 62.18 ± 13.0 and 67.06 ± 15.6 respectively in Group A and B at the end of the course (post-test). The improvement in the dispensing score was statistically significant ($p<0.001$) (Table 1).

At the end of the course after the post-tests were done, a short questionnaire was given to the students. The students' opinions about the course are presented in Table 2**.**

DISCUSSION AND CONCLUSION

The duration and content of pharmacy education differs among countries (17,18). Although the basic pharmaceutical courses are similar, the pharmaceutical care concept has variations in regard to the practice applied in the region/ country (19-24). Pharmacotherapy courses are generally given as lectures by the pharmacologists in the medical schools and schools of pharmacy. However students often face problems in implementing theoretical pharmacotherapy knowledge to practice. Thus, new models need to be developed. Recently, it has been demonstrated that simulation centers for health professional schools may offer a novel method of teaching and evaluating health care processes at the micro level (25).

Some medical schools have developed teaching methods (e.g. Groningen model) for the prescribers and it is also applied in Turkish Medical Schools (13, 14). Because of the need for a similar rational pharmacotherapy teaching on a problem based learning basis, The Turkish Pharmacological Association has developed a module and recommended it to be applied in schools of pharmacy for pharmacotherapy courses (9, 15, 16). The module covers the use of simulated patients for selected cases and it is based on case discussions. The method was used in the courses conducted with different groups (pharmacy students in Marmara and Near East Universities,

TABLE 2: Evaluation of the rational use of drugs (RUD) teaching course in regard to the questionnaire (group A (year 2011): n=34; group B (year 2012): n=17)

	Group	(Strongly) agree N (%)	No idea N (%)	(Strongly) disagree N (%)
The knowledge given in the rational use of drugs (RUD) course was permanent.	A	28 (82.4)	6 (17.6)	0 (0)
	B	16 (94.1)	1 (5.9)	0 (0)
RUD course positively impressed my opinion towards prescription dispensing process.	A	26 (76.5)	7 (20.6)	1 (2.9)
	B	34 (100)	0 (0)	0 (0)
The course supplied me knowledge on prescription dispensing in regard with RUD principles.	A	23 (73.5)	11 (26.5)	0 (0)
	B	16 (94.1)	1 (5.9)	0 (0)
The course has improved skills on prescription dispensing in regard with RUD principles.	A	24 (70.5)	9 (32.4)	1 (2.9)
	B	15 (88.2)	2 (11.8)	0 (0)
The course has produced attitude change on prescription dispensing in regard with RUD principles.	A	21 (61.7)	11 (32.4)	2 (5.9)
	B	14 (82.4)	3 (17.6)	0 (0)
I believe that the course improved my self-confidence on prescription dispensing.	A	24 (70.6)	8 (17.6)	4 (11.8)
	B	16 (94.1)	1 (5.9)	0 (0)
I believe that I will better communicate with the patients.	A	28 (82.3)	4 (11.8)	2 (5.9)
	B	16 (94.1)	1 (5.9)	0 (0)
I had enough benefit from the trainers throughout the course.	A	21 (61.7)	4 (11.8)	9 (26.5)
	B	16 (94.1)	1 (5.9)	0 (0)
I will attend this course again in case it is conducted again in different topics.	A	32 (94.2)	2 (2.9)	2 (2.9)
	B	100 (100)	0 (0)	0 (0)

community pharmacists, pharmacology lecturers). Data obtained in these courses demonstrated that in all cases, the dispensing scores of participants significantly improved (almost twice in the pre- and post-tests) (9).

OSCE/OSPE assesses problem solving, clinical skills, communication, and social skills, as well as knowledge, while the written examination predominantly tests knowledge and problem solving. OSCEs also present an increased level of stress inherent in any type of oral presentation. In a study it was shown that students performed better on the multiple-choice examination, which is a traditional and more familiar form of assessment in most undergraduate courses (26).

Students have fun while learning. Moreover, inquiring and problem solving, participating in discussions and brain storming may help to make the knowledge more permanent. Consistently a majority of the students stated that the knowledge they gained in the course was permanent. On the other hand, in a study with pharmacy students it was shown that participants' responses on a multiple-choice test and a survey instrument administered before the case, immediately after the case, and 25 days later indicated that participation in the simulated patient case did not result in greater knowledge retention or comfort level than participation in the written patient case. But, the authors concluded that enthusiasm was better in the simulated learning methods (27).

One of our students stated that "the course is just like a rehearsal before confronting the real patients". This leads to the increase in self-confidence and better communication with the patients. The majority of the students agreed that the course had a positive impact on their dispensing practice. The course maintained attitude change and improved skills, besides providing information. Our score sheet evaluated the behavior and attitude besides knowledge. It may be called as "OSPE (objective structured practical examination)", and it may be useful for objectively evaluating the dispensing behavior of the students as well as the pharmacists. However it may be improved or revised in regard to specific needs.

All ratings were done by a single trainer. If that was not the case, nothing would change, since the previous experience (9) showed that there were no significant differences between the scores of the independent evaluators.

On the other hand, some of the students did not agree that they could adequately benefit from the trainers. This was probably due to a crowded workshop group. There were 34 students and 2 trainers in 2011, and in 2012 there was one trainer and 17 students. Therefore a trainer had to deal with a group of 17 students, which may be considered as crowded for a problem based workshop. The enrollment dropped 50% in the second year of offering. This may be due to the refraining of the students for it was an interactive course. In many pharmacy schools, the majority of the pharmacotherapy courses are given as lectures. Students were discreet to choose an interactive course, while there were classical alternatives. On the other hand, we believe that more students will prefer it as the got more acquainted with it.

The main limitation of the study is the small sample size. However, we wanted to share this experience. Although it was conducted with a small group of students, the present results show that the course had a short term benefit for the students. Also, some other courses as continuing professional education were conducted with the community pharmacists by this method. The short term results in the post tests, showed an improvement (9). However, the real improvement should be examined in the real life while dispensing in their pharmacies, since the retaining of the knowledge and attitude change needs to be evaluated in the long term. A study which evaluated the pharmacy students' drug-drug interaction knowledge retention over one year showed that there was a decrease (28).

Problem based rational pharmacotherapy courses should be included in the curriculum of the pharmacy schools. Moreover, it should also be conducted with the community pharmacists for continuing professional development. Thus, it will help to increase awareness, enhance good dispensing practice, and promote rational use of drugs.

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Eczacılık fakültesi öğrencilerinin reçete karşılama skorlarının değerlendirilmesi- iki yıllık deneyimin sonuçları

ÖZET: Eczacıların ilaçların akılcı kullanımının sağlanmasındaki önemi büyüktür. Bu nedenle eczacılık fakülterindeki eğitimin farmakoterapi sürecinde problem çözme ve karar verme yetilerini kazandıracak nitelikte olması gerekir. Probleme dayalı yöntemlerle yapılan eğitim öğrencinin edindiği teorik bilgiyi uygulamada kullanma becerisini kazanmasına yardımcı olabilir. Bu çalışmada Yakın Doğu Üniversitesi Eczacılık Fakültesi'nde 3. Sınıf öğrencileri için 2011 ve 2012 yıllarinda açılan "Akılcı İlaç Kullanımı" dersinin reçete karşılama skoruna etkisi Türk Farmakoloji Derneği tarafından geliştirilen OSPE değerlendirme ölçeği ile araştırılmıştır. Öğrencilerin derse başlamadan önceki reçete karşılama skoru A grubundaki 34 öğrenci için 34.26 ± 13.6 ve B grubundaki 17 öğrenci için 34.94 ± 11.6 iken bu değerler kurs bitiminde yapılan değerlendirmede anlamlı olarak ($p<0.001$) artmış; sırasıyla 62.18 ± 13.0 ve 67.06 ± 15.6'a çıkmıştır. Simüle hasta kullanılarak probleme dayalı yöntemle yapılan farmakoterapi dersleri reçete karşılama davranışının iyileştirilmesi açısından yararlı gözükmektedir.

ANAHTAR KELİMELER: Reçete karşılama; eczacılık, akılcı ilaç kullanımı, problem dayalı, rasyonel farmakoterapi, eğitim, simüle hasta, Kıbrıs

Appendix 1: The "OSPE (objective structured practical examination)" score sheet for the evaluation of the quality of dispensing[15]

OBJECTIVE STRUCTURED PRACTICAL EXAMINATION (OSPE) FORM FOR "RATIONAL DRUG USE" COURSE

(EVALUATION OF PRESCRIPTION DISPENSING)

Name and Surname: Date:
Assessor:

Evaluate the course of prescription dispensing :

0. No information 1. Poor 2. Moderate 3. Good 4.Excellent

I) Controls on Patient/Prescription (12)

Prescription control (Name, sex and age of the patient, date of prescription, doctor's signature and seal etc)	0	1	2	3	4
Appropriateness (Indication-drug consistency)	0	1	2	3	4
Patient's history (Allergy, co-existing diseases, other drugs/supplements used etc)	0	1	2	3	4

II) Information given to the patient/ relative about the drug/treatment (64)

Name of the drug	0	1	2	3	4
Pharmaceutical form of drug	0	1	2	3	4
Dosage of the drug	0	1	2	3	4
Aim of drug therapy/purpose of using this drug	0	1	2	3	4
Initiation and duration of effect	0	1	2	3	4
Instructions for use	0	1	2	3	4
Treatment duration	0	1	2	3	4
Emphasizing the importance of compliance	0	1	2	3	4
Contraindications	0	1	2	3	4
Side effects and warning (driving or operating vehicles/machinery, special precautions if necessary)	0	1	2	3	4
Warning about use in pregnancy/lactation	0	1	2	3	4
Drug interactions	0	1	2	3	4
Food interactions	0	1	2	3	4
Non-drug treatment	0	1	2	3	4
Labeling and written information on the drug package	0	1	2	3	4
Storage	0	1	2	3	4

III) ***Communication skills (24)***

Clear and understandable	0	1	2	3	4
Integrity, fluency and configuration of speech	0	1	2	3	4
Allow the patient to express him/herself and to ask questions	0	1	2	3	4
Confirm and clarify that patient/relative understood the information given	0	1	2	3	4
Make patient/relative repeat the instructions	0	1	2	3	4
Compliance with time	0	1	2	3	4

Total:

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