Designing, Implementation, and Evaluation of an Online Modular Course on Patient Education and Counseling at the Community Pharmacy

Naser Ostad[1,2], Mehdi Mohammadi[3], Kheirollah Gholami[2,4], Soleyman Ahmadi[5], Soha Namazi[4], Sholeh Ebrahimpour[6*]

[1] Department of Toxicology and Pharmacology, School of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran.

[2] Research Center for Rational Use of Drugs, Tehran University of Medical Sciences, Tehran, Iran.

[3] Department of Clinical Pharmacy, School of Pharmacy, Alborz University of Medical Sciences, Karaj, Iran.

[4] Department of Clinical Pharmacy, School of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran.

[5] Virtual School of Medical Education and Management, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

[6] Department of Clinical Pharmacy, Virtual University of Medical Sciences, Tehran, Iran.

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ABSTRACT

Background: The role of pharmacists has evolved from drug provision to patient care. Considering the Doctor of Pharmacy curriculum in Iran and the small number of programs on pharmaceutical care, Iranian pharmacy graduates may not be able to adjust to their new roles.

Methods: A comprehensive online modular course was prepared by a group of well-experienced faculty members of eight universities of medical sciences in Iran. The course included 12 practical and challenging submodules on commonly encountered disorders and commonly used medications in the community pharmacy. Each submodule was followed by an online forum in which the teachers and participants discussed the educational questions. The increase in participants' knowledge was evaluated using pre-and post-test. The usefulness of submodules and acceptance of the entire course were also evaluated by two specifically designed questionnaires.

Results: After the announcement, 154 participants registered in the course. The knowledge of the participants increased significantly in all the 12 submodules. The majority of participants stated that all the submodules were useful. Moreover, the majority of respondents to questionnaires declared that the course has increased their confidence in providing patient counseling in the pharmacy.

Conclusion: The comprehensive online course on patient counseling in the community pharmacy increased participants' knowledge. Besides, the course was useful and well accepted by the participants.

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Introduction

In recent decades, the role of pharmacists has evolved dramatically. Their new roles have developed from the provision of drug products to the provision of patient care services. Therefore, pharmacists are not only involved in supervising the operating staff but also to ensure safe and effective medication use (1). To comply with the novel roles, corresponding changes have been made in the educational course of pharmacy to incorporate patient care aspects and ensure the qualification of pharmacy graduates to provide medication therapy management services (2).

Comparison of the Doctor of Pharmacy curriculum of Iran

Corresponding Author: Dr Sholeh Ebrahimpour
Address: No 3, 1st Alley, Sarafraz St., Shaheed Beheshti St., Tehran.
Tel: +982188504056, Fax: +982188504056.
Email: hawar_327ph@yahoo.com

with the top-ranked pharmacy colleges of the world revealed that pharmaceutical care programs in Iran are much less than the current standards. While more than 60 percent of the educational programs in the United States pharmacy colleges were related to pharmaceutical and clinical care, this was only 20 percent in Iran (3). Therefore, it is anticipated that pharmacy graduates in Iran do not have sufficient knowledge and skill to provide pharmaceutical care services to patients.

During the last decade, computer-based virtual programs have been used successfully to fulfill the educational needs of health-care providers (4). These programs include but are not limited to online multimedia resources, gamifications, and virtual patients (5). Despite the disadvantages mentioned for e-learning, such as the high rate of dropout, insufficient teacher-student interaction, and inadequate student support, this method of education also has many advantages. E-learning methods improve access to educational material, ensure the provision of educational services to non-full-time students, and provide an environment for equitable access to high-quality education (6).

Although the continuing pharmacy education programs have always been held for pharmacists, there has been no comprehensive, systematic, and centralized virtual program to date. To provide an equal educational opportunity for pharmacy graduates in Iran, the e-learning training course entitled "Principles of patient education and counseling at the pharmacy" was prepared and implemented in cooperation with eight medical universities under the supervision of the Virtual University of Medical Sciences (VUMS). The purpose of the course was to increase the knowledge and improve the ability of pharmacists to provide patient care services at the community pharmacy.

Methods

This was the first online modular course to educate pharmacy graduates and students in Iran. This educational research study evaluated the knowledge increase and user acceptance of pharmacists in a modular course on patient counseling at the community pharmacy. The educational content of the modular course was prepared by 25 faculty members of eight universities of medical sciences in the country under the supervision of the clinical pharmacy department of the VUMS. The course consisted of 12 practical and challenging submodules; "Principles of patient education and counseling at the pharmacy", "Maternal and child health", "Pharmacotherapy of musculoskeletal diseases", "Pharmacotherapy of obesity & weight loss", "Pharmacotherapy of cardiovascular disease", "Supplements & herbal medicine", "Pharmacotherapy of respiratory diseases and smoking cessation", "Pharmacotherapy of gynecological diseases and sexual disorders", "Pharmacotherapy of gastrointestinal diseases", "Pharmacotherapy of skin disorders and cosmetic products", "Pharmacotherapy of endocrine disorders", and "Practical information on chemotherapy agents, contrast media, and antibiotics". These disorders were selected

based on the opinion of the faculty members who all had expertise and experience in the field of pharmacy education.

Educational materials of each submodule were prepared by a group of faculty members who specialized in that specific field. The materials consisted of educational multimedia, supplementary handouts, and videos. To ensure the consistency of educational contents, a training session was held on how to prepare the educational materials for all faculty members. They were asked that the contents should include sections on history taking, diagnosis of the referral cases, non-pharmacologic interventions, prescribing over-the-counter medications, patient follow-up, and patient counseling on prescription drugs. (Figure 1) Moreover, after the preparation, each of the educational materials was peer-reviewed by two clinical pharmacists of the VUMS to ensure consistency.
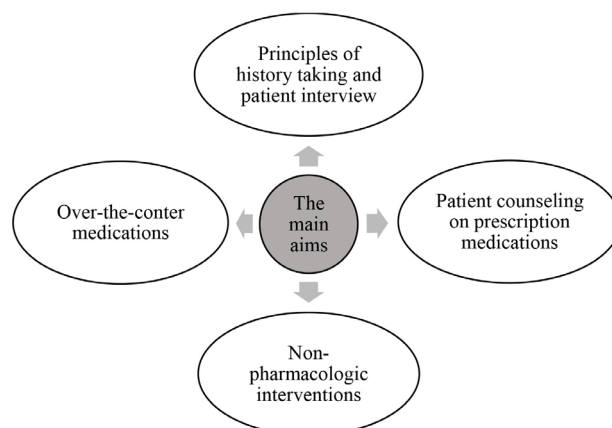

Figure 1. The main aims in designing the submodules

The course was announced through the official website of the VUMS (https://vums.ac.ir) and all registrants entered the study. Registration was performed for the entire course and participants had access to all 12 submodules.

The submodules were then uploaded to Navid, the Learning Management System (LMS) of the VUMS (https://navid.vums.ac.ir/). The participants were allowed to sign in and use educational materials. The running time of each submodule was one month and the participants' questions were answered by teachers in an open online forum.

The primary outcome of the study was knowledge increase of the participants. Usefulness of the submodules and user acceptance of the entire course were secondary outcomes.

The increase in the participant's knowledge was evaluated by conducting a pre-test/post-test and homework for each submodule. The pre-test of each submodule consisted of 40 questions and was given before access to the educational materials and the post-test, with the same questions as pre-test, was given after completion of the submodule.

The participants were requested to voluntarily complete two online questionnaires. The first one was a five-item questionnaire based on the Likert scale that aimed to evaluate the usefulness of each submodule in terms of

five indicators: content fluency, attractiveness, pragmatism, being up-to-date, and usefulness of the online forum. Each of the five items could be scored between 0 and 10; the worst score was 0 and the best was 10. The second questionnaire was completed after the completion of the entire course and was specifically designed and validated to evaluate the user acceptance. This questionnaire included 20 questions on demographic data, user experience with the course, and the usefulness of the course; nine of them were based on Likert scale. The questionnaires were adopted from a previous survey (7) and modified based on the opinion of a committee specifically organized to develop them. The content validity of the questionnaires was evaluated by 8 experts.

Both questionnaires were uploaded to the polling system of Navid. The URLs of both questionnaires were sent to the participants through their email addresses and their Navid profiles.

Statistical analysis was performed using the SPSS statistics software (Version 25.0. IBM Corp. Armonk, NY, USA). The paired sample t-test was used to compare the participants' knowledge scores before and after the conduction of each submodule. P values less than 0.05 were considered statistically significant. The participants'

acceptance was analyzed using descriptive statistics.

Results

After the announcement, 154 participants registered in the course; 148 of them were pharmacy graduates, of whom 4 had a Ph.D. degree in pharmacy, and 2 were pharmacy residents. The remaining 6 were pharmacy students. The mean age of the participants was 36.8 ± 9.5 years, and on average, they graduated from the university 10.2 ± 8.6 years before participation in our modular course. The majority of the participants were females (112 people, 72.7%). They spent an average of 5.0 ± 8.3 hour per week to study the educational materials.

At the end of the course, 90 multimedia files and 24 handouts were uploaded to the Navid LMS. Moreover, the participants were given 14 home works, and 22 online forums were also held.

The first set of analyses examined the knowledge increase of the participants in each submodule. The results of the paired sample t-test are presented in Table 1. As shown, the respondents' knowledge increased significantly in all submodules.

Table 1.Results of the pre-test/post-test of each submodule.

Submodule	Number of respondents	Mean pre-test score (out of 40)	Mean post-test score (out of 40)	P value
Principles of patient education and counseling at the pharmacy	107	6.8	22.3	<0.01
Maternal and child health	88	4.3	21.7	<0.01
Pharmacotherapy of musculoskeletal diseases	96	6.2	31.8	<0.001
Pharmacotherapy of obesity & weight loss	93	5.9	23.8	<0.01
Pharmacotherapy of cardiovascular disease	73	8.3	24.2	<0.01
Supplements & herbal medicine	101	5.1	23.8	<0.01
Pharmacotherapy of respiratory diseases and smoking cessation	67	6.2	27.3	<0.01
Pharmacotherapy of gynecological diseases and sexual disorders	112	4.3	32.6	<0.001
Pharmacotherapy of gastrointestinal diseases	86	9.1	32.3	<0.01
Pharmacotherapy of skin disorders and cosmetic products	117	8.1	31.1	<0.001
Pharmacotherapy of endocrine disorders	89	8.2	28.4	<0.01
Practical information on chemotherapy agents, contrast media, and antibiotics	103	3.9	26.4	<0.001

The five-item questionnaire measured the usefulness of each submodule. These questionnaires were filled out by 67 respondents (43.5% of the participants). Table 2

presents the mean scores that the respondents gave to all submodules in the five areas questioned.

Table 2. The mean score of the evaluated indicators for each submodule (out of 10).

Submodule	Content fluency	Attractiveness	Pragmatism	Being up-to-date	Usefulness of the online forum
Principles of patient education and counseling at the pharmacy	7.7 ± 2.8	7.2 ± 2.9	7.4 ± 2.9	7.8 ± 2.8	7.0 ± 3.3
Maternal and child health	8.9 ± 1.6	8.9 ± 1.3	9.0 ± 1.3	9.0 ± 1.3	7.9 ± 2.8
Pharmacotherapy of musculoskeletal diseases	8.8 ± 1.6	8.8 ± 1.6	8.6 ± 1.8	8.8 ± 1.9	7.7 ± 2.9
Pharmacotherapy of obesity & weight loss	8.6 ± 1.8	8.2 ± 2.1	8.3 ± 2.1	8.3 ± 2.0	7.2 ± 3.3
Pharmacotherapy of cardiovascular disease	8.7 ± 1.7	8.3 ± 2.0	8.8 ± 1.7	8.9 ± 1.8	7.9 ± 2.7
Supplements & herbal medicine	8.4 ± 2.2	7.9 ± 2.3	8.0 ± 2.3	8.2 ± 2.1	7.6 ± 2.8
Pharmacotherapy of respiratory diseases and smoking cessation	8.4 ± 2.2	8.3 ± 2.2	8.6 ± 2.0	8.9 ± 1.9	7.1 ± 3.3
Pharmacotherapy of gynecological diseases and sexual disorders	8.6 ± 1.6	8.9 ± 1.5	9.0 ± 1.5	9.0 ± 1.6	7.6 ± 2.8
Pharmacotherapy of gastrointestinal diseases	9.0 ± 1.4	8.9 ± 1.2	9.1 ± 1.4	9.1 ± 1.4	7.7 ± 2.8
Pharmacotherapy of skin disorders and cosmetic products	8.8 ± 1.8	8.8 ± 1.7	8.8 ± 1.8	8.6 ± 2.0	7.7 ± 2.8
Pharmacotherapy of endocrine disorders	8.7 ± 1.7	8.8 ± 1.5	8.5 ± 1.7	8.9 ± 1.5	7.7 ± 2.7
Practical information on chemotherapy agents, contrast media, and antibiotics	8.9 ± 1.7	8.9 ± 1.7	8.6 ± 1.8	8.9 ± 1.6	7.7 ± 3.1

Ninety-four of the participants completed the online questionnaire of user acceptance at the end of the course, 67 of them were females (71.3%). More than half of them (50 participants, 53.2%) had not participated in any e-learning program before our study. The majority of the respondents (57 people, 60.6%) favored combined use of supplementary handouts and multimedia files, followed by multimedia files alone (19 people, 20.2%) and handouts alone (18 people, 19.2%). Eighty-two of them (87.2%) stated that they "strongly agreed" or "agreed" that the course could meet their needs at the pharmacy. Fifty-four respondents (57.4%) stated that they "strongly agree" or "agree" that the discussions performed in the online forum led to a more in-depth understanding of the topics. Interestingly, 86 respondents (91.4%) declared that participation in the course has increased their interest in providing pharmaceutical counseling to patients, and 89 (94.7%) stated that the course led to more confidence when providing patient counseling. Nearly all respondents (90 out of 94, 95.7%) would like to recommend participation in the modular course to others. The main reasons for their interest in online programs were "easy access to educational material" (84 respondents, 91.3%), "no need to attend classes" (60, 65.2%), and "the attractiveness of the educational technology used during the course" (11, 12.0%).

Discussion

This project was the first comprehensive modular course on clinical pharmacy conducted as a virtual program in Iran. The initial aims of the project were to identify whether the module could increase the knowledge of the participants and was accepted by them.

On the question of knowledge increase, the participants scored significantly higher in the post-test compared with the pre-test in all submodules. A possible explanation for this might be that the participants had been informed on the post-test in advance, and this may have led to their increased attention. This was confirmed by about half of the participants who stated that taking the post-test improved their concentration (results not shown). The present finding seems to be consistent with a study by Luetsch and Burrows who conducted a pre-and post-test for five modular courses on clinical pharmacy (8). Their results showed that the mean number of correct answers increased significantly in all five modules. They also asked the students to rate their confidence in finding the correct answer on a 4-point Likert scale. The mean certainty score was also higher in the post-test compared with the pre-test. These results are in line with our finding that nearly all participants (94.7%) stated that participation in the course led to a higher confidence in providing patient counseling at the pharmacy.

Our findings also mirror those of a previous study that aimed at validating two e-courses in continuing pharmacy education (9). Nesterowicz et al., validated two e-courses on antibiotic therapy and new antidiabetics in terms of knowledge increase and user acceptance. The pharmacists' knowledge increased by 16 points in a 35-points pre- and post-test. Moreover, 91% of the participants stated that they enjoyed the course. Hence, it could conceivably be suggested that virtual learning methods are acceptable in terms of knowledge increase and user acceptance.

Another important finding was that the course was useful for the participants, as evidenced by the high scores that they gave to the five specified indicators. Moreover, 87.2% of respondents agreed that the course met what they needed to counsel patients in the pharmacy. This finding is important because the participants had an average of 10 years of experience in pharmacy and clinical practice and were well aware of their knowledge and skill deficiencies. Our finding supports previous studies in this area (7, 9, 10). In a survey conducted by Lean and coworkers on 124 pharmacy students in Malaysia, the usefulness of an online learning module on patient counseling was evaluated. More than 90 percent of the students agreed that the course was useful and helped them to understand the topic better (7). There are several explanations for this result. First, the online modules are highly acceptable considering their time flexibility. Second, the topics of our modules were selected based on the opinion of a group of faculty members who were well experienced in the field of pharmacy education. Third, online courses cost less than face-to-face sessions. Finally, the online forums helped the students in case of any questions.

Of note, among the five indicators, the least scores were given to the "usefulness of the online forums". It is probably due to the inappropriate timing of the forums, as there was no pre-determined time frame for the questions & answers, and the forums were open throughout the running time of each submodule. Thus, although half of the respondents believed that online forums contributed to their in-depth understanding, it was difficult for others to follow the conversations.

It is interesting to note that about two-thirds of the respondents favored the combined use of multimedia and handouts. It is difficult to explain this result, but it might be related to the VUMS policy which prohibited downloading multimedia files. Therefore, the participants tended to download the handouts for future study.

The current study has only examined the knowledge increase of the participants, which may not necessarily result in their improved skill of patient counseling. Therefore, more research is required to better evaluate the change in participants' skills, as there is a significant difference between "knowledge" and "action" according to the Miller framework for clinical competence (11). Another possible area of future research would be to investigate the effectiveness of "questions & answers" sessions held as a live webinar. Theoretically, it is possible to evaluate students better in these sessions and give feedback to them.

The results of our investigation found that the knowledge of the participants increased significantly in all 12 submodules, and the majority of the respondents found it useful for their pharmacy practice.

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