

Original Research

Incorporating a medication therapy management course in a pharmacy undergraduate curriculum: description of implementation and outcomes

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Abstract

Background: The objective of the study is to describe the implementation of a medication therapy management course into the PharmD curriculum with an objective standardized clinical examination, and to assess the impact on students' knowledge, skills, and satisfaction. **Methods:** A new medication therapy management course was started for undergraduate pharmacy students. It was then altered to incorporate more active learning and skill-assessment measures; one such alteration was the addition of an objective standardized clinical examination to assess medication therapy management skills. A cross-sectional survey was used to assess the students' perceptions and satisfaction with the medication therapy management course and the evaluation method. **Results:** Most students agreed that the weekly medication therapy management simulation activities helped them achieve the course learning outcomes (83%). When asked about the objective standardized clinical examination, most of them also agreed that they were well-oriented and prepared (78%). Students reported few drawbacks like lack of time (41%) and having different assessors at objective standardized clinical examination stations (56%). **Conclusion:** Implementation of medication therapy management course within the undergraduate pharmacy curriculum help shape the students' clinical skills and introduce them to this emerging field.

Keywords: Medication therapy management, OSCE, MTM, curriculum design

INTRODUCTION

Medication therapy management (MTM) is a distinct service or range of services provided by healthcare providers to optimize therapeutic outcomes in an individual patient.¹ Pharmacists play a major role in collaborating with patients, physicians, and other healthcare providers to develop and achieve optimal MTM goals. A pharmacist can take various courses and obtain various certifications to become an expert or specialist in MTM. According to the Accreditation Council for Pharmacy Education (ACPE), a pharmacy graduate should be trained with the essential clinical skills that are necessary to assess, manage, and monitor medication regimens.² The American Pharmacists Association (APhA) suggests that the advancement of MTM requires student pharmacist participation in performing such services, as there is a lack of qualified pharmacists. Therefore, it is important for pharmacy students to not only be exposed to MTM but also develop all the essential skills that support pharmacists in delivering MTM.

To date, MTM skills at the undergraduate level have been primarily confined to elective and experiential courses.³ Moreover, the literature lacks a description of MTM as a core course in undergraduate pharmacy courses. Therefore, to

optimize graduates' MTM-related clinical skills and knowledge, we implemented a 3-credit-hour MTM core course that included both theory and practice in the second semester of a fourth-year PharmD curriculum. We used Bloom's taxonomy of education objectives to construct the course objectives.

The Objective Standardized Clinical Examination (OSCE) is a versatile, multipurpose, evaluative tool that can be utilized to evaluate healthcare professionals in a clinical setting.⁴ Although it has been used to assess a variety of pharmacy courses—such as nonprescription medicine, clinical pharmacy, and critical care courses—its use in MTM courses has not been well described.⁵⁻⁷

In this study, we detail our experience in implementing a new core MTM course in an undergraduate pharmacy curriculum and in using OSCE to fill the gap between students' factual knowledge and their practical application of MTM principles, and we assessed students' satisfaction and feedback regarding this change.

METHODS

Design of MTM course

Our College of Clinical Pharmacy offers a 6-year Pharm.D. degree program with a total of 180 credit hours. In this program, it offers a series of pharmaceutical care courses starting from the second semester of the third year; as part of this course series, a 3-credit-hour MTM course was recently added to the curriculum of fourth-year undergraduate pharmacy students.

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The mode of course instruction involved 25–30% traditional and case lectures followed by weekly small-group case discussions, role play, and simulations. The course is taught concurrently with one of the fourth-year pharmacotherapy courses, which covers the pharmacotherapy of endocrinology, neurology, and psychiatry.

The new course started by introducing students to the principles of MTM and emphasizing both the role of pharmacists in the provision of MTM services and the essential skills for MTM, including communication skills. Later, to promote the deep learning of concepts and skills, every week a new disease was taught from the MTM perspective, followed by a case discussion (or, as we call them, “simulated patient encounters”). In the case discussion, students were able to practice the five core elements of MTM: comprehensive medication review (CMR), personal medication list (PML), medication action plan (MAP), intervention and/or referral, and documentation and follow-up. During the case discussion, students were divided into small groups and given a case with intentionally-withheld information. The students then had ten minutes to review the case and identify the important missing information. Then, the simulation section started: the instructor acted as a patient, whom the students interviewed to gather the missing information—applying the interviewing skills they learned—by which they completed the CMR. Thereafter, the students resumed their small-group discussions and used their open resources to formulate the MAP. Here, the instructor performed the role of a healthcare provider, with whom students discussed interventions or referrals. At this stage, the instructor gave the students the necessary feedback to optimize the plan. Next, the students counseled the simulated patient about any change in medications, non-pharmacological therapy, monitoring, follow-up, and any other necessary education points. In this phase, they also created a PML (which includes all the patient’s medications, doses, frequency, and special instructions in lay language) and provided it to the “patient”. Finally, to facilitate sound documentation skills, students were asked to document the necessary information in a predeveloped documentation form and submit it for further evaluation by the instructor. To provide students with continuous feedback, each week the rubrics were returned to the students prior to the next case scenario.

When we first implemented the MTM course, students’ knowledge and skills were assessed with both formative and summative assessments. In terms of formative assessments, weekly case discussions and/or patient encounters were graded weekly, using different rubrics that cover the five core elements of MTM. Summative assessments were administered as midterm and final written exams and included different types of multiple-choice, true/false, fill-in-the-blanks, and short-answer questions.

However, in our summative assessment, we identified a gap in the assessment of individual students’ ability to provide MTM services. Therefore, we introduced an OSCE as a summative assessment plan for the MTM course.

Planning and Preparation of OSCE

An OSCE was implemented as the final practical examination of the MTM course, to assess specific learning outcomes related to skills and values. These outcomes included gathering the required patient information by asking the right questions in the allocated time, summarizing drug-related problems by applying the MTM model, designing a patient’s MAP, constructing written and verbal provider communication, counseling the patient about medication, and demonstrating the ability to work in teams to analyze the appropriate intervention to solve a drug therapy problem.

The instructors who taught the course attended workshops and training programs on the OSCE. Furthermore, a team of clinical pharmacy instructors was formed, which subsequently developed an OSCE manual for the College of Clinical Pharmacy. OSCE cases were developed by a clinical pharmacist who was an expert in the subject area, reviewed by a second expert, and sent for further review to the OSCE team. The students were familiarized with the OSCE using a different method: the course instructors conducted an OSCE orientation day at the beginning of the semester, on which they clearly explained all steps of OSCE, sample scenarios, and rubrics for evaluation. Later, the college’s OSCE manual was shared with the students in advance of the assessment. In addition, many other supporting documents and online resources for the OSCE were uploaded to Blackboard.

Implementation of OSCE

The OSCE was designed to highlight the five basic core elements of MTM. It consisted of six stations, of which three were interactive and three preparatory. In the first station, the student received a case scenario and had 10 minutes to review it and prepare for a focused medication history-taking. After that, they went to the second station, where they were asked to take a full medication history from a simulated patient or caregiver. At the third station, the student prepared the optimal treatment plan by critically analyzing the information given at station one and the information gathered at station two; at this stage, students were allowed to use any resources, as knowledge is not an outcome assessed in the OSCE. Once the optimal plan was ready, they moved to the fourth station, where a mock healthcare provider (HCP) was present, and they communicated the patient care plan to the HCP. At this station, the HCP could give the students any necessary feedback and correct their plans if needed. At the fifth station, the students prepared to counsel the simulated patient, which occurred at the sixth station; they also prepared a PML, to hand to the patient after counseling.

Assessment in the OSCE used a checklist of the expected tasks to be performed. At every interactive station, an observer evaluated the student using the checklist that was provided to the students during the orientation session. Overall, the OSCE accounted for 15% of the course evaluations.

Study Design

Upon authors’ approval, a cross-sectional study was conducted using a validated survey adapted from Al-Haqan et al. to assess students’ perceptions of the MTM OSCE.⁸ Students’ satisfaction



with the MTM weekly activities was also measured. The survey was distributed to the pharmacy students who took the new course. This study was approved by the Ethics Committee of Imam Abdulrahman bin Faisal University (Reference number: IRB-2022-05-505).

Data Analysis

Data analysis was performed using Microsoft Excel. Frequency and percentages were used to report students’ satisfaction and perceptions regarding the MTM weekly activities and the OSCE.

RESULTS

Eighty students took the MTM course and were assessed using summative OSCEs. Sixty students completed the survey (a response rate of 75%). The majority of students in the course were female (n = 48, 60.61%). Most students agreed that the weekly MTM simulation activities helped them achieve the course learning outcomes (83%) and shape their clinical skills (78%) (Table 1). However, there was no consensus among students on whether such simulated activities could serve as an alternative to hospital visits, with 38% disagreeing and 33% agreeing.

With regard to their feedback on the OSCE, most students felt that they were well-oriented and prepared (78%) and that the OSCE was conducted and organized well (71%). At the same time, 41% of students reported that the time allocated for the stations was inadequate. Students also felt that having different actors (51%) and assessors (56%) at every station may have affected their grades (Table 2).

Overall, the course received positive feedback from students. Their comments emphasized the importance of the course, of the simulated weekly activity, and of their first OSCE experience, and they shared some suggestions for improvement. A collection of student suggestions for improvement is presented in Table 3.

DISCUSSION

MTM is a constantly-developing area of pharmacy services, both globally and in Saudi Arabia. Currently, MTM expertise

is self-motivated and accomplished in postgraduate settings, either through job-oriented training, certificate programs, or residencies and fellowships. However, statistics from the ASHP, ACCP, and ACPE indicate that there is a lack of manpower to provide an extensive MTM residency position that can serve as additional training for pharmacists.⁹ Therefore, it is vital to integrate MTM-specific training into the PharmD curriculum, as pharmacy student graduates will be looked to for providing these services for an ever-growing MTM-eligible population.¹⁰

The establishment of a new course for a program is not easy—particularly if it is related to students’ assessment, which is crucial. With regard to pharmacy students’ competence in providing MTM, traditional assessment methods may not adequately reflect competency in MTM skills. Course instructors perceive that it is important to assess student competence through additional, more authentic assessments. Thereby, we introduced an OSCE to the assessment criteria. Students’ feedback was obtained to discover its strengths and weaknesses and the impact of this change on students’ performance.

During the weekly simulation activities, students experienced a simulation of an actual hospital MTM clinic and constructed a skill or clinical experience, in full or in part, without being exposed to patients. The vast majority of the students agreed that the weekly simulation activity was able to fulfil the learning objective, and students affirmed that it improved their knowledge, confidence, and clinical skills. A similar trend has also been observed in other studies.¹¹ However there was no consensus as to whether this simulated activity could serve as an alternative to hospital visits.

More than three-fourths of the students had a positive view of the attributes, structure, and organization of the OSCE. Similarly, general satisfaction with OSCEs has also been reported in previous studies.¹²⁻¹³ Nevertheless, inadequate time and standardization were indicated as factors that may affect students’ grades. A similar result was reported in other studies, where inadequate time and standardization were proposed to be the causes of stress, proposed alongside the need for preparation.¹⁴ However, our students were happy with the preparation that we provided through the weekly activities.

Table 1. Students’ Responses to the MTM Weekly Activity Questionnaire				
No.	Statement	Agree N (%)	Neutral N (%)	Disagree N (%)
1	I think the activity helped me to achieve the learning outcomes of the course.	50 (83.33)	8 (13.33)	2 (3.33)
2	The simulations helped me develop practical knowledge.	49 (81.67)	10 (16.67)	1 (1.67)
3	Conducting the weekly activity helped shape my clinical skills.	47 (78.33)	10 (16.67)	3 (5)
4	Simulation enabled me to be involved in nearly real-life scenarios for learning.	46 (76.67)	11 (18.33)	3 (5)
5	It provided me complete participation and a hands-on experience.	43 (71.67)	13 (21.67)	4 (6.67)
6	The activity was better than only a theoretical course.	53 (88.33)	5 (8.33)	2 (3.33)
7	There was no need for the weekly activity.	7 (11.67)	4 (6.67)	49 (81.67)
8	I recommend simulations as one of the methods to improve clinical skills in pharmacy.	53 (88.33)	4 (6.67)	3 (5)
9	The weekly activities serve as an alternative for hospital visits.	20 (33.33)	17 (28.33)	23 (38.33)



Table 2. Students' responses to the OSCE evaluation questionnaire				
No.	Statement	Agree N (%)	Neutral N (%)	Disagree N (%)
Assessment of OSCE settings				
<u>1</u>	The OSCE stations were structured and organized well.	43 (71.67)	7 (11.67)	10 (16.67)
<u>2</u>	The actors (patient/physician) were believable and realistic.	26 (43.33)	15 (25)	19 (31.67)
<u>3</u>	Having staff or pharmacy faculty as actors induced nervousness.	23 (38.33)	20 (33.33)	17 (28.34)
<u>4</u>	Having interns as actors induced nervousness.	14 (23.33)	16 (26.67)	30 (50)
<u>5</u>	A wide range of MTM-related clinical skills was covered.	42 (70)	12 (20)	6 (10)
Assessment of Quality of Performance in the OSCE				
<u>6</u>	I was fully aware of the nature of the exam.	47 (78.3)	5 (8.3)	8 (13.3)
<u>7</u>	The tasks reflected those we were taught.	48 (80)	6 (10)	6 (10)
<u>8</u>	The time at each station was adequate.	23 (38.3)	12 (20)	25 (41.6)
<u>9</u>	The setting and context at each station was realistic with current MTM practice.	33 (55)	16 (26.6)	11 (18.3)
<u>10</u>	The instructions for performing each activity were clear.	38 (63.3)	12 (20)	10 (16.6)
<u>11</u>	The tasks we were asked to perform were fair.	41 (68.3)	12 (20)	7 (11.6)
<u>12</u>	The sequence of stations was logical and appropriate.	50 (83.33)	5 (8.3)	5 (8.3)
<u>13</u>	The OSCE provided opportunities to learn real-life scenarios.	41 (68.33)	13 (21.67)	6 (10)
<u>14</u>	The OSCE helped me identify my weakness in performing MTM.	38 (63.33)	13 (21.67)	9 (15)
Perception of the Validity and Reliability of the OSCE				
<u>15</u>	The OSCE measures the true MTM-related skills.	34 (56.67)	15 (25)	11 (18.33)
<u>16</u>	Personality, ethnicity, and gender do not affect OSCE scores.	40 (66.67)	13 (21.67)	7 (11.67)
<u>17</u>	Different patient actors do not affect student performance/ scores.	17 (28.33)	12 (20)	31 (51.67)
<u>18</u>	Different assessors do not affect student performance/scores.	17 (28.33)	9 (15)	34 (56.67)

Table 3. Students' suggestion for improvement	
Teach the students persuasive skills & techniques to deal with difficult patients, and I think it would be good to have a few sessions in the Arabic language, since we will be dealing with Arabic patients most of the time.	
Bring real samples, such as insulin and inhalers.	
Weekly activities and hospital visits are both very important. I suggest doing both, for example, one week for a weekly activity and one week for a hospital visit.	
Have more practice without grades to know what the weaknesses are that they need to improve.	
Increase the duration of the activity.	

Overall, students gave feedback that we highly recommend in the future: suggesting a change in language. They believed that conducting the OSCE in a local language may improve performance levels, scores, and overall understanding. In addition, a few students requested the addition of more individualized weekly simulation activities, along with adding more time.

CONCLUSION

In conclusion, integrating MTM courses into the undergraduate pharmacy curriculum can have far-reaching benefits for

students. With the increasing emphasis on value-based care and patient outcomes, pharmacy students with MTM training are better equipped to contribute to the overall healthcare team and improve patient adherence, outcomes, and satisfaction.

Declaration of Competing Interest:

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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