RESEARCH/EDUCATION BRIEF

Impacting Student Self-Efficacy and Beliefs of Medication Therapy Management through a 2-Week Elective

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ABSTRACT

Objective. The primary purpose of this study was to determine if a 2-week intensive Foundations of Medication Therapy Management (MTM) elective course increased students' self-confidence in their abilities to perform MTM services. A secondary purpose was to assess if the course impacted students' future plans and beliefs regarding the practice of MTM.

Methods. A 20-item survey was created to measure students' confidence in learned skills, future plans, and beliefs in MTM before and after the course. The survey was based on a five-point Likert Scale. Ten items addressed ability outcomes, three addressed future plans, and seven addressed attitudes and beliefs related to the provision of MTM services.

Results. Students reported a significant improvement in 10 MTM specific skill domains. There were statistically significant pre- and post-test changes for subscale 1, "Self-confidence in their ability to

provide Medication Management (MTM) services" and for subscale 3, "Beliefs about MTM related

services". Students reported overall improvement in self-perceived MTM specific skills. Subscale 2,

"Willingness for future MTM related practice," showed no significant differences.

Conclusion. The findings showed that following participation in the MTM elective course, students had

an overall increase in their perceived ability to deliver MTM care and in beliefs about MTM services.

Providing a brief MTM Elective course and utilizing first-person case studies may empower student

pharmacists to confidently perform MTM services in their future careers.

Keywords: student pharmacists, attitudes or perceptions, pharmacy education coursework, pharmacist
role

INTRODUCTION

Various pharmacy organizations including pharmacy colleges have recognized that pharmacists

may need additional instruction and experiences in order to raise their awareness of the roles and

responsibilities essential to providing patient-centered care.[1-2] The practice area of Medication Therapy

Management (MTM) is not an exception to this recommendation. In addition to expanding pharmacist's

knowledge of MTM within the pharmacy profession post-graduation, it is also believed that there should

be greater emphasis on MTM education within the pharmacy school curriculum.[3]

Researchers suggested that the formation of professional identity is essential during the transition

from student to professional and that this obligation falls on universities to ensure that the pharmacy

workforce is adequately prepared to address patients' needs. The prospect of adding electives, such as

MTM, within an already full pharmacy curriculum has not been well received.[4-6] The literature focuses on

how coursework, in general, impacts student attitudes about pharmacists' roles within a patient-centered

practice model. For example, one group concluded that providing support within a professional pharmacy

degree program may better prepare graduates for entry into the healthcare workplace by establishing

student competence, relatedness, and autonomy.[4] The increased desire for advocates to "promote the

pharmacy profession" describes a common objective between our study and these publications. Unlike

other studies that have focused on traditional non-accelerated classroom models, our study occurred in an

active learning environment that used a flipped classroom model. This innovative approach to learning creates strong ties between students and instructors and allows students to work together to gain a deeper understanding of the material.[7]

The specialty of MTM encompasses a range of health care services. These services include, but are not limited to, assessing and evaluating drug use and side effects, improving adherence, and managing disease states for all patients. Third-party payers, including certain Medicare Part D and Medicaid plans, reimburse pharmacists for providing medication reviews through MTM.[8-9] Exploring what we know about MTM implementation within the pharmacy curriculum and student pharmacists' perception of MTM, has shown that, to date, there are no studies which directly assessed students' perception of MTM following an accelerated block two-week elective course. Additionally, there have been few studies which have explored pharmacists' interests in MTM expansion to advance public health priorities.[10] Using a survey of a sample of Ohio pharmacists, one such study by Casserlie and colleagues identified the potential barriers to providing MTM services including staffing concerns, time constraints, and lack of reimbursement.[11] Developing solutions to these barriers are imperative and must occur early within student pharmacist's curriculum so that they are prepared to respond to the demands of an ever changing and challenging health care setting.

This study measured student achievement following a 2-week intensive Foundations of MTM elective course and sought to determine if student self-confidence in their abilities to perform MTM services increased. A secondary purpose was to determine if the course impacted students' plans and beliefs regarding the preparation for and practice of MTM.

METHODS

In 2015, the University of Florida's College of Pharmacy transitioned to a Team Based Learning curriculum which involved "flipping the classroom." Prior to attending class, students watch prerecorded lectures and read pertinent material. When they attend live classes, instructional time is used for active learning. Students are expected to comprehend background material before the live session and attend class prepared to use and apply that knowledge with patient cases.

The Foundations of Medication Therapy Management was initially presented in the last few weeks of spring 2016 as a 2-credit hour elective to second and third-year student pharmacists at UF COP. By this time in the curriculum students have a strong foundational clinical knowledge, including cardiovascular, pulmonary, gastric, renal, endocrine and reproductive studies. Though MTM is mentioned in other didactic coursework where students learn about the creation/development of MTM and may work through a patient case that happens to be in a setting of an MTM session, students entered this course with minimal MTM knowledge and experience with related skills. This course was designed and implemented to provide student pharmacists with a fundamental knowledge of MTM and to provide exposure to the many components involved in performing Comprehensive Medication Reviews (CMRs). On the first day of the course, students completed a Pre-Course Survey to assess baseline self-efficacy in providing MTM services (successfully achieving most course objectives), their beliefs regarding MTM services, and their plans of providing MTM services in their upcoming career. They were invited to participate in the study using the professional and encrypted version of Survey Monkey. Week one of the elective incorporated 3.5 hours of active learning live-class sessions and 15.5 hours of online or individual study. During week two, students were to attend a 3-hour live-class session, complete 9.5 hours of online or individual study, and participate in an End-of-Course Survey (identical to pre-course survey). The second week concluded with a 2-hour final exam, in which students were required to complete a patient case. Live sessions incorporated group discussions, introduced a computer platform that is used to perform MTM, so that students could review and response to patient cases. Independently, students were expected to complete supplemental readings, and watch online lectures that were subsequently followed by online assessments. Online independent assessments included typical MTM activities such as creating a patient Medication Action Plan, a Personal Medication List, and a prescriber communication fax. Total instructor contact hours for this course included 31.75 hours.

The study received IRB approval from the university. The researcher-constructed scale was comprised of 20 items, categorized into three subcategories, using a five-point Likert scale (1=strongly disagree, 5=strongly agree). The first subscale, consisting of 10 items, measured students' self-confidence

in their ability to provide MTM services (items 1.1 to 1.10). The second subscale, consisting of 3 items, measured students' willingness for future MTM related practice (items 2.1 to 2.3). The third subscale, consisting of 7 items measured students' beliefs about MTM related services (items 3.1 to 3.7). Participant demographic information including their gender and age as well as information about their prior experiences in pharmacy practice was also collected. The researchers attempted to validate the pre-/post-student survey by initially asking for feedback from experts, including a survey expert, a research expert, and three MTM content experts. Based on their feedback the survey was revised and then piloted with two fourth-year student pharmacists that attended the author's clinical rotation. After the student pharmacists completed the survey, the corresponding author conducted a detailed discussion on each survey item and asked each student to explain what they thought the question was asking and to state their reasons for the answers provided. Survey items were revised to reduce any confusion that students noted, to assure that the survey questions did indeed ask the question that was intended and elicited the response desired.

Descriptive statistical analysis was performed using SPSS 23. The a priori level of significance was set at $p < .05$. The post hoc power analysis of Wilcoxon signed-rank tests were employed to test the significant difference between pre-/post-test data across all items. The power to compare pre-/post-test means is 0.68 which is less than the recommended 0.80 level, but still considered acceptable.[12]

RESULTS

A total of twenty-six student pharmacists (16 females,10 males) completed both the pre and post-course surveys administered by researchers. Since the course was offered during the first year of the new curriculum, only second-year pharmacy students were enrolled in the course and eligible for study inclusion. The entire cohort of students enrolled in the spring 2016 MTM course consented to participate in this pre- and post-test study. Table 1 showed the descriptive and test statistics for all 26 MTM students during both pre- and post-test period. For subscale 1, self-confidence in their ability to provide MTM services, the mean scores of all the items are significantly different between pre- and post-test. That is,

students' self- efficacy in their ability to perform MTM services significantly improved from pre-test to post test.

For subscale 2, willingness for future MTM related practice, no significant differences were found. For subscale 3, beliefs about MTM related services, students' beliefs that "Pharmacists should be the main providers of MTM services" and "Reimbursements should be increased for pharmacists providing MTM services" are significantly improved from the pre-to the post-test.

DISCUSSION

This study identified a statistically significant difference in all areas within subscale 1 and 3 suggesting that implementing a 2-week elective course in MTM impacts students' self-efficacy in abilities and beliefs of providing patient-centered MTM services. It was important to assess this, since all electives in the "flipped classroom" curriculum are now only two-weeks in length. Other colleges of pharmacy can be encouraged that providing an accelerated course in MTM can impact students' beliefs and self-efficacy in performing MTM services upon graduation.

Among the most significant changes produced by the students' participation in the course were in subscale 1, "Item 1.6: Create a patient-directed Medication Action Plan (MAP) that guides the patient in self-addressing their health and well-being" and "Item 1.7: Complete a Personal Medication List that adheres to the Centers for Medicare and Medicaid Services standardized format." These findings suggest that, after participating in the elective, MTM specific terms and procedures became more familiar and that students gained confidence in performing these tasks. The students developed confidence in understanding all requirements to defining terms such as a MAP, DTP (drug therapy problem), CMR, or PML (personal medication list) and their roles in providing patient-centered care.

No significant difference was found in subscale 2; assessing the students' willingness to provide MTM services in the future. This may have been due to the observation that initially, students held a highly favorable and clear perception of the extent that they will integrate MTM into their future career since they self-selected themselves into this elective course. Students may also be aware that most community pharmacies often require pharmacists to perform MTM as a part of their duties. The students

may have already been aware of this requirement and may have thus been willing to learn from the start. This may have had the effect of making it more difficult to find a difference between pre- and post-course surveys.

As shown by the students' ratings of subscale 3 items, students felt more strongly that pharmacists should be the main providers of MTM services and that reimbursements should be increased for pharmacists providing MTM services at the end of the course compared to the beginning. However, it should be noted that the students who participated in this study had highly favorable viewpoints of these issues even at the beginning of the course. Nonetheless, the response to this subscale may highlight student pharmacists' desire to promote the pharmacy profession, to insist upon appropriate compensation, and to advocate for additional roles for pharmacists in improving patient-centered healthcare.

In general, our findings demonstrate how our unique two-week MTM elective was successful in increasing students' abilities to complete MTM services. Doing so allowed students to improve their self-efficacy in providing MTM services and may encourage them to choose additional MTM experiences in the traditional classroom settings and through experiential learning. These findings supplement the current literature, by specifically adding to the value to the importance of introducing MTM specific electives to the current didactic curriculum.[13-23] Previous authors who developed MTM educational experiences similar to our course have described analogous findings in improving student pharmacists' self-efficacy and influencing their beliefs regarding the benefits and value of MTM services.[13-24] Other experiences were offered through an MTM based elective, lab-based courses and experiential rotations. However, none were a two-week intensive MTM course. Poole et al. and Hall et al. both designed an MTM course based on APhA's MTM program at their respective colleges and evaluated student readiness, competence, and importance in student's ability to provide MTM services through pre/post survey assessments. Poole focused on fourth-year students, whereas Hall, assessed self-efficacy across all four years of student pharmacists. They concluded that post-graduate MTM training without pharmacy curricular practice experience is not sufficient to address graduates' perceived deficiencies in this area.[13-14] Our course effectively established that MTM training within students' academic career may help close

this gap and address these deficiencies. Our course was not based on APhA's MTM program, as we were focused more on providing a hands-on, realistic experience in a community pharmacy, utilizing actual MTM software to simulate the process of performing CMRs with patients. As student pharmacists are provided courses that promote high levels of self-efficacy in providing MTM services, they will likely progress to future pharmacists that provide higher quality CMRs.

Kuhn et al. and Eukel et al. utilized a survey instrument to evaluate similar MTM elective course objectives, but instead assessed students' perceived value of real-life, face-to-face MTM counseling sessions. Kuhn surveyed 18 students in a 15-week elective MTM course where on two separate occasions students visited a local senior center that hosted low-income and homeless patients and they provided supervised MTM services. In contrast, Eukel evaluated eighty-five third-year student pharmacists performing CMRs utilizing MTM on faculty members. Training prior to the faculty interview included MTM lectures and practice cases provided through a Pharmaceutical Care Laboratory course. Both groups successfully evaluated students' abilities to utilize key elements of MTM after instruction. Using a a standardized rubric, course facilitators confirmed these findings.[15-16] Compared to our study that facilitated MTM discussions with simulated, mock-patient cases, we conclude that both face-to-face MTM services and simulated services assisted students in developing the skills and knowledge necessary to become proficient in MTM. The use of a flipped classroom and a two-week elective course offers alternative options to colleges of pharmacy who may have limited resources and struggle with patient participation.

Several limitations should be considered when interpreting results to this study. First, only one cohort of students at a single site participated in this our study. The study investigators decided to publish results after the initial course offering due to the statistically significant results noted and to supplement available literature on MTM in the pharmacy curriculum. Future evaluations could address ways that this course can be improved to ensure increasingly better preparation for pharmacy students seeking to provide MTM services. Additionally, although this survey was a required course assignment, students were given the option to exclude their responses from the dataset. It is possible that students regarded the

survey as a basic assignment and did not seriously evaluate their responses. This may have led to either highly positive or highly negative answers to simply to complete a requirement. To avoid the potential of this type of bias, this can be addressed by asking students to provide their rationale for each survey response in future studies. Notably, none of the student chose to have his or her responses excluded from the analysis. The potential for students to overestimate their skills and talents is another limitation. For example, students tend to confidently inflate their own abilities. This may have affected the pre-course survey data. Thus, our results may have shown more significance if this bias could have been removed. Because the study only included second-year pharmacy students, the findings are not generalizable beyond second year student pharmacists. Another limitation is the authors' use of a marginally-validated scale. As the tool is used in the future, efforts to determine its reliability and validity will be needed.

Future research should explore MTM-specific curricula and determine which learning activities correlate with students' perceived increased confidence and competence levels. Sustained data gathering with future cohorts may legitimize this methodology and help evaluate impact on deep learning and the use of authentic assignments in this population. This study failed to identify a significant difference in subscale 2. This finding may warrant that researchers further investigate the limited impact on students' desire to provide MTM services even after they have demonstrated a better understanding of the specialty. However, this finding may also reflect students' self-selection to participate in an MTM elective with the purpose of obtaining a position where MTM could be practiced. Future studies should assess the effect that this course has on students' preparedness to develop and implement MTM services and evaluate the benefit of taking an accelerated 2-week block MTM elective using students who ultimately become MTM providers.

CONCLUSION

A Foundations of MTM Elective, delivered in a flipped classroom over an intensive two-week period, positively contributed to student pharmacists' perceived confidence and perceived competence in completing MTM services. Overall, students believed that pharmacists should be the main providers for MTM services and receive compensation in this role. Students who enrolled in the course initially

indicated a strong willingness to provide MTM services in their future role as a pharmacist. However, our results do not suggest that by virtue of completing the course that students have expressed interest in providing MTM services as prospective pharmacy providers. Pharmacy colleges who are looking to incorporate MTM into an already dense curriculum, may consider incorporating a similar MTM elective to enhance student confidence in future MTM experiences as a pharmacist. Future studies may consider re-evaluating course content based on student execution of most course objectives.

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Table 1. Pre- and Post-Survey Results for Students Attending MTM Elective Course (n=26)

Item Number and Survey Question	Pre-test Mean Response	Post-test Mean Response
Item 1.1. "Utilize my clinical knowledge to provide Medication Therapy Management (MTM) services"[a]	3.5	4.3
Item 1.2. "Reduce barriers that interfere with providing MTM services"[a]	3.3	4.2
Item 1.3. "Conduct a pre-analysis of a patient's MTM profile to recognize potential drug therapy problems (DTPs)"[a]	3.4	4.6
Item 1.4. "Formulate appropriate MTM interview questions to assess the significance of potential DTPs"[a]	3.7	4.6
Item 1.5. "Utilize appropriate communication skills when performing a comprehensive medication review (CMR)"[a]	4.0	4.6
Item 1.6. "Create a patient-directed Medication Action Plan that guides the patient in self-addressing their health and well-being"[a]	3.3	4.6
Item 1.7. "Complete a Personal Medication List that adheres to the Centers for Medicare and Medicaid Services standardized format"[a]	3.2	4.8
Item 1.8. "Prioritize clinically-significant DTPs after performing a CMR"[a]	3.5	4.3
Item 1.9. "Devise a plan to address DTPs with the appropriate individual(s)"[a]	3.5	4.5
Item 1.10. "Write effective recommendations to healthcare providers that would likely resolve DTP interventions [a]	3.3	4.4
Item 2.1. "Additional training on providing MTM services"	4.6	4.5
Item 2.2. "To acquire a position where I can practice MTM following graduation"[a]	4.3	4.5
Item 2.3. " To implement MTM in future practice"	4.7	4.7
Item 3.1. "Pharmacists should be the main providers of MTM services"[a]	4.7	4.9
Item 3.2. "Reimbursements should be increased for pharmacists providing MTM services[a]	4.6	4.9
Item 3.3 "MTM services can be effective via various methods of delivery"	4.7	4.8
Item 3.4 "MTM services improve patients' therapeutic outcomes"	4.8	4.9
Item 3.5 "MTM services decrease the likelihood of medication-related events"	4.7	4.8
Item 3.6 "MTM services will lead to legalized recognition of pharmacists as health care providers"	4.4	4.6
Item 3.7 "Pharmacy school curriculum is preparing me to provide MTM services"	4.3	4.6

[a] Clinically significant