ILLUMINATIONS

Using active pedagogies to advance learning for lifestyle medicine: an approach for medical students

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Submitted 25 October 2018; accepted in final form 14 March 2019

INTRODUCTION

Lifestyle medicine (LM) is the evidence-based science that uses changes in normal physiological behaviors (nutrition, sleep, activity, etc.) to manage or prevent chronic disease. There is strong evidence that using LM increases patient’s quality of life and decreases health care cost (1, 3–5, 11). Despite the evidence, recent studies report that physicians are not making LM a standard of care (3, 10), in part due to lack of knowledge and skills in this area (3, 6). However, participation in local, national, and international workshops offering guides for integrating LM into the health profession curriculum suggests that medical schools are willing to introduce LM into their curriculum, both in preclinical years to teach normal physiology and in clinical years to teach how to change these behaviors to improve health. Our team conducted two Lifestyle Medicine Education workshops at the 2018 Annual Conference for Medical Student Education of the Society for Teachers in Family Medicine and the Annual Conference of the International Association for the Medical Science Educators, respectively. Since this is a relatively new movement, there is limited access to educators with expertise in the field of LM education (2, 6, 9). To bridge this gap, a physician with a PhD in Nutrition and a psychologist with a PhD in Counseling and Educational Psychology, both with extensive expertise in using LM with patients, created a clinical active learning curriculum based on national LM competencies, for use by both unexperienced and seasoned educators to teach medical students, residents, and physicians. This provided the much needed component of physician modeling, which we had previously identified (7) as essential for students building skills in a topic recently integrated in management guidelines. The component of the LM curriculum presented here focuses on taking a comprehensive lifestyle history, articulating the lifestyle profile, and setting lifestyle behavior change goals. The goal of this study is to determine if the intervention was feasible and engaging, and if it was associated with students’ perception of, and actual, learning. This study was approved by the Institutional Review Board of the University of Central Florida.

Our intervention presents LM as global, whole patient care. We used a comprehensive approach that targets simultaneous change in multiple behaviors and deployed it using active learning methodologies. We suggest that this approach represents the new recommended guidelines (6), and this is the gap we are addressing.

METHODS

Description of the educational interventions. The educational learning outcomes for this resource were to conduct a comprehensive lifestyle history; summarize and interpret the lifestyle information into a concise lifestyle profile; compare the lifestyle profile to evidence-based recommendations to prevent/manage chronic diseases; identify target areas for lifestyle intervention; and establish SMART (specific, measurable, attainable, relevant, timely with short- and long-term follow-up) lifestyle change goals. As a prerequisite, students should have basic medical interviewing skills. All of the learning outcomes were accomplished in two sessions (see Fig. 1). First, students had asynchronous access to a self-learning module that introduced the basic concepts and provided opportunities for skill practice using a virtual case of a patient in need of lifestyle changes (APPENDIX A).

We chose a case of a patient with obesity in need of lifestyle changes, because students had been introduced to evidence-based guidelines for the management of obesity in a previous session (8). Second, students had additional skill practice during an in-class session (APPENDIX B), using collaborative role-play and peer and instructor feedback. Because this was a role-play, students were encouraged to act as patients with problems commonly seen in their clinical rotation, like uncontrolled diabetes, uncontrolled blood pressure, smoking cessation, sexually transmitted diseases, or excessive alcoholic consumption.

APPENDIX A, “Lifestyle Medicine–Obtaining a complete lifestyle history and setting behavior change goals,” is a self-contained learning module that utilizes Articulate technology (Articulate Global, Inc. 2017). It is accessible on any web browser that supports HTML. The self-learning module can be used for independent study, as an online exercise, or as an in-class individual or collaborative exercise during didactic sessions. The module can be completed in 20–30 min. The module uses a progressive clinical case with immediate feedback. Students navigate through the module on demand, conducting a comprehensive lifestyle history; summarizing and interpreting the lifestyle information into a concise lifestyle profile; comparing the lifestyle profile to the evidence-based recommendations to prevent/manage chronic diseases; targeting areas for lifestyle intervention; and establishing SMART lifestyle change goals. Each question builds on the previous question, so learners should attempt to answer each question to the best of their ability and study the provided feedback.

For tracking purposes, this mandatory module was deployed in Webcourses, our learning management system. Initially, the two instructors deployed this intervention during a mandatory, in-class didactic session in the Internal/Family Medicine Clerkship during the third year of a 4-yr curriculum. However, to decompress the didactic time in the clerkship (based on student feedback) and stimulate self-directed learning, we converted the in-class intervention to this self-learning module.
Fig. 1. Schematic of the sessions.

APPENDIX B, the checklist for the role-play session, was given to the students at the beginning of the in-class session to score their partner’s performance. Students were instructed to complete the following tasks:

**Task 1**: Work in pairs to obtain a comprehensive lifestyle history from your partner. It can be a fictitious history or a real patient history (10 min). One student acts as the “provider” and should ask the lifestyle history questions. One student acts as the “patient” and should use the handout checklist to score the “provider.”

**Task 2**: “Provider” shares the lifestyle profile with the “patient” and proposes a lifestyle change SMART goal for optimal wellness (5 min).

**Task 3**: The “patient” uses the checklist to score the provider on the completeness of the goal.

**Task 4**: “Provider” and “patient” debrief (5 min). The “provider” reviews the checklist to identify what needs to improve to achieve the targeted outcomes.

**Tasks 5, 6, and 7**: The learners reverse the role and perform the same tasks (20 min). Throughout the session, the instructor listens and observes student interactions and facilitates learning as needed. After these tasks are completed, the instructor debriefs the large group with take-home messages from the learner’s interactions (10 min).

These educational interventions improved after each iteration, with feedback from both the content experts and the learners. Other educators at workshops, posters, and oral talks presented at international and national professional meetings also provided feedback for this approach. Initially, the skills presented in the self-learning module were taught in class, where students solved one of four patient cases in which lifestyle modifications were indicated. In the first iteration, each of the four cases was presented at different didactic sessions, with the case presentation mirroring the focus of the respective didactic session: for example, a patient with celiac disease in the gastrointestinal didactic session, and a patient with diabetes in the endocrinology didactic session. Students solved the cases by answering faculty questions on a volunteer basis. Minor improvements to subsequent cohorts included transferring content delivery to an asynchronous self-learning module and adding a skill practice role-play during the class session. Feedback from students and faculty highlighted three concerns. Concern 1 pinpointed the repetitive nature of the skill practice in the different cases. To address this concern, we condensed the four cases into one case: patient with obesity, which is a common presentation in the clinical environment. Concern 2 highlighted the overall lack of student engagement in the case when only students who volunteer participate in the history-taking practice. To address this concern, we utilized the chat feature in web courses and required all students to enter responses as a chat post. This resulted in more students practicing the skills and allowed faculty to address identified misconceptions in real-time. Concern 3 addressed the issue of the topic, perceived as “not very difficult,” represented a low-yield, in-class activity. To address this concern, we converted the in-class session into a self-explanatory, self-paced, self-learning module that students could access and complete at their own pace, depending on their previous skills and confidence.

**Assessment of the interventions.** Engagement was measured only during the in-class session by 1) counting the number of shared completed tasks from the total number of learners in class at that time; and 2) subjective observation of the instructor moderating the activity.

Transfer of learning was measured by scoring the seven components of the SMART goals (specific, measurable, attainable, relevant, timely, short-term evaluation, long-term evaluation) that learners
entered in Webcourses using the chat feature during the in-class session. A content expert scored student’s entries using a rubric previously content validated by a group of medical educators. If the goal component was correct and complete, a score of 1 was assigned. If the goal component was incorrect and/or incomplete, a score of 0 was assigned. The percentage of correct goal components from the total number of goals entered was calculated to determine the average transfer of learning for each component of the SMART goal.

Learner’s perception of learning after the completion of the self-learning module was evaluated using a survey (APPENDIX C) with three 5-point Likert scale questions (1 = strongly disagree to 5 = strongly agree) and one free text question for suggestions. The following statements were scored: “Overall this module was valuable as an educational tool to increase my ability to obtain a comprehensive lifestyle history”; “Overall this module was valuable as an educational tool to increase my ability to assist patients with setting personalized, clear lifestyle change goals”; “It was easy to navigate this SLM.” The survey was adapted from a validated published survey. The survey was completed online by one block of students (n = 27) in 2018.

RESULTS

Feasibility. This approach was feasible at the authors’ institution. It has been used in the training of medical students since May 2016 (n = 240 students in 8 subsequent cohorts) as part of the Internal/Family Medicine Clerkship curriculum. After each delivery (every 12 wk), the authors further refined the material using insights gained from student feedback, faculty reflection, and lessons learned.

Engagement. The self-learning module was required and, consequently, completed by all students. The attendance for the in-class session was required, and all students attended. For the in-class session, all students completed the tasks, including entering their SMART behavior goal in the Webcourses chat platform for the clerkship. The instructors observed high engagement between the learners during the role-play task.

Transfer of learning. The transfer of learning (level 3 of behaviors on Kirkpatrick’s pyramid) was evaluated by grading student’s SMART behavior change goals (Table 1). On average, the learners created SMART goals that included all of the seven components, and most were correctly described (average score is 5.2 out of 7). Most students scored highly on the first five components. The worst performance was observed for the short-term and long-term follow-up evaluation, where only 28 and 48% of students, respectively, created a complete and correct answer. Most learners submitted an incomplete answer, mentioning an appropriate time period, but not including the method for evaluation. These issues were subsequently clarified with students by the instructor in real time during the large-group debrief.

Perception of learning and satisfaction. Evaluation of the self-learning module (Table 2) included students’ perception of learning and satisfaction (at the level 1 of reaction on Kirkpatrick’s pyramid). The majority of learners (93%) agreed or strongly agreed with the statement: “Overall this module was valuable as an educational tool to increase my ability to obtain a comprehensive lifestyle history” (median = 4, mean = 4.3). The majority of learners (96%) agreed or strongly agreed with the statement: “Overall this module was valuable as an educational tool to increase my ability to assist patients with setting personalized, clear lifestyle change goals” (median = 4, mean = 4.4). The majority of learners (93%) agreed or strongly agreed with the statement: “It was easy to navigate this SLM,” whereas 3% of them disagreed (median = 5, mean = 4.4).

Almost one-half the students reported liking the module and had no further suggestions. For example, one student reported: “The vignette was a good idea to incorporate specific topics to address in terms of addressing lifestyle goals.” Changes made to future iterations of the curriculum, based on student feedback, include more specific education on lifestyle management of diseases and motivational interviewing (with patient videos), more clarification of some of the questions in the self-learning module, and a complete list of lifestyle history questions before the module, now provided to students as part of the “patient” checklist (APPENDIX B).

DISCUSSION

The need for effective and easy-to-use, active learning resources for teaching LM to medical students prompted the creation of this resource based on LM-defined national competencies (6). This study suggests that it is feasible to teach medical students advanced LM skills in only 90 min of curriculum, with associated engagement, as well as both actual and perceived learning. This intervention has multiple strengths. It is a resource for the education of medical students and residents created and delivered by a physician in collaboration with a psychologist, which provides the much needed physician modeling component (7). It is based on learning outcomes, derived from national learning objectives. It exposes students to multiple interactive pedagogies to stimulate life-long learning.

Table 2. Student evaluation of the self-learning module

| Question                                                                 | Strongly Agree, % | Agree, % | Neutral, % | Disagree, % | Strongly Disagree, % |
|-------------------------------------------------------------------------|-------------------|----------|------------|-------------|----------------------|
| Overall, this module was valuable as an educational tool to increase    | 37                | 56       | 7          | 0           | 0                    |
| my ability to obtain a comprehensive lifestyle history                   |                   |          |            |             |                      |
| Overall, this module was valuable as an educational tool to increase     | 41                | 56       | 3          | 0           | 0                    |
| my ability to assist patients with setting personalized, clear          |                   |          |            |             |                      |
| lifestyle change goals                                                  |                   |          |            |             |                      |
| It was easy to navigate this self-learning module                        | 56                | 37       | 4          | 3           | 0                    |
Feasibility of the study. The intervention was deployed multiple times and incorporated feedback from a variety of experts. It was easy to use and feasible to implement with 30 students at a time by two instructors. The limitations of this intervention were identified as part of our quality improvement approach and speaks to the feasibility of the intervention. A limitation includes need for stakeholder buy-in. Since LM has yet to hold a preeminent role in the licensing board exams, it may be difficult to secure assigned curricular time. To address this limitation, we created the self-learning module version to limit the need for time- and place-bound curriculum delivery. Another limitation relates to students’ willingness to pay attention to a nonmandatory, ungraded educational activity. As these are new skills that require practice, feedback, and modeling, they cannot be learned from a book. Our experience suggests making this a mandatory curriculum component. The self-learning module is asynchronously accessible by an unlimited number of users. The in-class session should be limited to no more than 30 learners for maximal benefit and interaction. The in-class session can be completed in 50 min with a group no larger than 30 students working in pairs. At least one instructor is needed to facilitate the session. We found that, if two instructors are present, the debrief is much richer. We noted that 3% of the students disagreed with the statement related to the ease of use of the self-learning module. We discovered this was due to the fact that the students were accessing the module via a platform that allowed student activity tracking but was more cumbersome for students to navigate. With this feedback, we transferred the self-learning module to an easy-to-use technology, which is the form presented here. Please note that this technology does not allow for tracking performance.

Learner engagement. Our results suggest that the intervention generated engagement of learners, identified by the assignment completion, staying on task, and instructor observations. This is an important aspect of the activity, as the observed trends with the current student generation highlight a critical decrease in engagement with educational interventions in our school, and most likely at the national level.

Learning transfer and perception. On average our students scored very high (5.2 out of 7) on the targeted skills, suggesting adequate transfer of learning. In addition, most students (93% and 96%) perceived that this intervention improved the targeted skills, suggesting adequate perception of learning. We recognize that a limitation of this study is that learners were not exposed to an alternate delivery of the same learning outcome in a control versus intervention comparison, but also note this is common in pilot educational interventions initiated to address local, observed pedagogical concerns. Though future studies should assess long-term retention of skills and detailed application in clinical practice, we interpreted both the transfer of learning and perception of learning as significant given the limited curricular time.

Lessons learned for future improvement. With additional curricular time, students’ clinical LM skills could be further developed by including patient videos or a standardized patient encounter and/or discussions with students about actual patient encounters in clinic. The checklist (Appendix B) could be used for scoring, and providing feedback, for student’s performance in clinical practice.

This teaching resource could be implemented “as is” at other institutions seeking to enhance the education of future health-care providers on LM, a science grounded in physiology and evidence-based medicine. In addition, primary care physicians and medical residents could benefit from this resource. As more resources for teaching LM become available, there are higher chances that LM will be integrated into the medical curriculum, with the long-term goal that physicians will have the needed skills and knowledge to integrate LM into the standard of care for increasing patients’ quality of life and decreasing healthcare cost.

APPENDIX A

The educational self-learning module, “Lifestyle Medicine—Obtaining a complete lifestyle history and setting behavior change goals,” can be found at online at https://edtech.med.ucf.edu/files/2018-19/pasarica/historygoals/presentation_html5.html.

APPENDIX B

Below is the checklist for the role-play and peer feedback session.

Task 1: You will be asked questions about “your” lifestyle history as the “patient.” Use the following checklist to score the “provider’s” performance:

- You were asked if you tried to change your lifestyle before. If yes, when and how? What were your barriers for maintaining those lifestyle changes? What was helpful for maintaining those changes?
- You were asked what beverages you most often (typically) drink.
- You were asked about your daily diet, including specific meals.
- You were asked about your exercise habits.
- You were asked about your sleeping habits.

Task 2: You will be provided an impression of your lifestyle profile. This should be brief, and information should be synthesized. Write it below:

Task 3: The “provider” will work with you to define a SMART goal for healthy lifestyle and wellness. Write it below using the checklist provided:

- Specific:
- Measurable:
- Attainable:
- Relevant:
- Timely:

Evaluation plan for short and long term:

Task 4: Provide feedback to the “provider.” Debrief in your team.
Tasks 5, 6, and 7: Reverse the role and perform the same activities.

APPENDIX C

Below is the survey instrument for the assessment of the learner’s perception of the self-learning module and suggestion for improvements.

Please rate your level of agreement with the following statement:

1. Overall this module was valuable as an educational tool to increase my ability of obtaining a comprehensive lifestyle history.
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

2. Overall this module was valuable as an educational tool to increase my ability of assisting patients with setting personalized, clear lifestyle change goals.
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

3. It was easy to navigate the self-learning module.
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

4. Do you have any feedback for the self-learning module? We appreciate your comments.

ACKNOWLEDGMENTS

We thank Matthew Malone for formatting the self-learning module, and Ryan Dickerson for designing the graphics in the self-learning module.

GRANTS

This study was funded by a competitive grant from the Medical Education Department, University of Central Florida College of Medicine.

DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the authors.

AUTHOR CONTRIBUTIONS

M.P. and D.K. performed experiments; M.P., D.K., and R.C. analyzed data; M.P., D.K., and R.C. interpreted results of experiments; M.P. prepared figures; M.P. drafted manuscript; M.P., D.K., and R.C. revised manuscript; M.P., D.K., and R.C. approved final version of manuscript.

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