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Creating and Evaluating the Over-the-Counter Coach App to Assist Pharmacy Students in Their Education

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Abstract

This challenge is described as follows: it is intended that pharmacy students would study how condition and patient-specific variables impact pharmaceutical decision-making. Our goal in developing this interactive learning tool was to help students better understand the many personal aspects that influence the recommendations for over-the-counter (OTC) medications.

Innovation description: Student pharmacists may practice making recommendations regarding over-the-counter drugs with the help of OTC Coach. The OTC Coach, an optional resource for first-year pharmacy students taking the mandatory self-care therapeutics course, offered computerized decision algorithms covering ten different areas. The opinions of the students were gathered by means of an online survey.

Evaluate thoroughly: OTC Coach accounts were activated by two-thirds of the first-year students engaged in the self-care treatments course (n=53/79, 67%). Participants who used the tool and filled out the survey (n=60/75, 80%) agreed that it helped them understand the material (78%), felt more confident in making good therapeutic recommendations (78%), were more comfortable answering exam questions (63%), and performed better on exams (61%).

What comes next: Students self-reported that they learned more about over-the-counter medicine recommendations after using an electronic application. An ability to create a series of scenarios with randomly assigned patient and condition characteristics is being added to the application so that students may practice producing patient-centered recommendations more effectively.

Medications available without a prescription, therapeutic decision-making, student pharmacists, and simulation

Description of the Problem

As they acquire the knowledge and abilities to prescribe OTC medications, student pharmacists may refer to the Pharmacists' Patient Care Process (PPCP) for guidance.1 All the therapeutic decision-making processes are part of the PPCP, including information gathering, data appraisal, recommendation making (including weighing the pros and cons of potential treatments), and plan execution and monitoring.1- 4 While this procedure is generic and may be used in any practice environment, it lacks specific instructions on what data must be gathered and evaluated before an over-the-counter advice can be made.5 Student pharmacists must learn to offer patient-centered recommendations for over-the-counter drugs (OTCs) due to the large number of these items (300,000+) sold in the US, representing more than 80 therapeutic classes.6,7 Scientific research has shown that students may enhance their knowledge and abilities via the use of engaging virtual simulations.From 8 to 14 Typically, students in current virtual simulation programs for student pharmacists are only allowed to interact with one virtual patient at a time while learning decision-making skills.fifteen, sixteen Unfortunately, this hinders students' ability to understand how many patient and medication-related aspects impact therapy recommendations. Students might benefit from rapid decision-making exercises where they can manipulate patient and condition inputs to test out various hypotheses and determine the effects on the validity of over-the-counter medicine recommendations. We developed OTC Coach to help student pharmacists learn to make evidence-based judgments about over-the-counter treatments by providing them with a framework to systematically assess patient- and condition-related aspects. This paper's goal is to detail the process of creating the OTC Coach and how students feel about using it.

Information about the New Development

Students were able to apply what they learned using the OTC Coach, an online resource for over-the-counter medicine recommendations, to ten common medical issues, including: allergies, atopic dermatitis, constipation, diarrhea, fever, fungal skin infections, headaches, heartburn, insect bites and stings, and ophthalmic disorders. Using a combination of institutional resources and funds awarded by the American Association of Colleges of Pharmacy Scholarship of Teaching and Learning Grant, we worked from January to December 2021 to build the tool.

According to Alinier, our tool meets the requirements of a "level 2" simulation as it is a computer-based, interactive simulation that lets students develop cognitive abilities on their own, with the help of feedback, but in an unrealistic environment.17 For first-year pharmacy students, who may do better with more advanced activities presented in paper-based cases (level 0) but still lack the background knowledge and abilities to make good use of more advanced simulations (like level 5, high-fidelity simulations), this is an ideal level of simulation.17

A written record called a decision tree was prepared for each therapeutic issue. We identified patient- and condition-related factors (such as age, allergies, and co-existing medical issues) for each topic that could impact a patient's ability to self-treat a minor illness and, if so, which medications would be safe and effective. Because each decision tree was tailored to a distinct subject, the queries and possible answers in each algorithm were unique. The length of pain symptoms was recorded in days, whereas allergic rhinitis symptoms were measured in weeks. The students' task was to determine whether the patient might potentially treat himself. The output was tailored to indicate whether the student properly determined that the patient could self-treat or if they required a referral to another medical expert. Along with that, a statement indicating whether each medicine or therapy class was suitable based on the particular inputs was provided to patients who were candidates for self-treatment. Unless an exceptional circumstance necessitated including specific prescriptions (such as varying minimum age requirements for non-steroidal anti-inflammatory meds), the output consists of a summary of drug classes. This procedure included incorporating data from a variety of sources, including but not limited to a textbook, clinical recommendations, clinical experience, and the FDA-approved labeling for over-the-counter medications.ages 18–20 Then, using Shiny Applications, the software developer (KD) digitally transformed each method (Figure 1).21 Each algorithm was rigorously checked by the academic member, student research assistant, and software developer to guarantee it matched the original material and that the outcome was in line with clinical practice guidelines.

The Over-the-Counter Coach

The OTC Coach was presented to first-year students in a class session regarding headaches. Since then, they have had accessibility to this website on their computers, tablets, and phones all day, every day, making it convenient for them to utilize. We saw the instrument in action and spoke about how it may help with our studies. Immediate feedback on the suitability of typical ways to self-treatment for minor diseases may be provided when students frequently modified the mix of components in a short amount of time. Acetaminophen and non-steroidal anti-inflammatory medicines (NSAIDs) are two appropriate therapeutic alternatives for a tension headache that a virtual adult patient without any preexisting conditions may be suffering for one day. Afterwards, they might continue treating the same patient with the addition of hypertension medicine, leading to the prescription of acetaminophen. They would advise referring the patient to a doctor if the pain level were to be raised to eight out of ten while keeping the same patient. In less than five minutes, a learner might learn from all three of these patients. The instrument was again exhibited, this time with fevers as the subject, a few weeks later. Afterwards, the tool was brought up again and again during the rest of the semester to remind students. The OTC Coach might be used if desired.

Information gathering and evaluation

In the latter weeks of class, students were invited to fill out a survey using Qualtrics (Qualtrics, LLC, Provo, UT) on their experiences with the OTC Coach or the reasons for their decision not to utilize it. In exchange for taking part in the survey, students might earn 5 additional points (the same as 0.1% of their final mark) and yet have their information used in the study if they did not want it to be. The amount of times students used the tool was inquired about. In a short answer question, we asked students who hadn't used the tool before to explain why. We used a sliding scale from 0 to 180 minutes to measure how much time users spent on OTC Coach. We also used a 6-point Likert scale with 1=strongly disagree and 6=strongly agree to gauge users' agreement with statements regarding the tool's availability, ease of use, and whether or not it included relevant patient-related and condition-related factors. Next, we solicited student input about the tool's strengths and suggestions for enhancement. To make the quantitative data easier to understand, we used descriptive statistics in Stata SE 17.0 (StataCorp) to

summarize the findings using dichotomized values for many variables (disagree = 1, 2, and 3; agree = 4, 5, and 6). One last step: the senior author (SV) went over the student's feedback and put it into categories. After reviewing the research, the Institutional Review Board for Health Sciences and Behavioral Sciences at the University of Michigan decided that it did not need approval.

Findings

OTC Coach accounts were activated by two-thirds of the first-year students engaged in the self-care treatments course (n=53/79, 67%). The survey had a high response rate (n=76/79, 96%) and a high percentage of consent (95%) among the students who participated (75 out of 79). Fifteen students (or 20% of the total) said they didn't use the OTC Coach in the poll. Reasons given included: not having enough time (n=3, 20%), experiencing technical difficulties (n=3, 20%), or just forgetting about the tool (n=2, 13%), as well as the fact that they already had adequate study tools or established study habits (n=9, 60%). The poll found that 60 out of 75 pupils, or 80%, had used the program. Of the 60 students surveyed, 48 (or 80%) said they used it once to four times over the semester, while four students (7%) said they used it eleven times or more. Twelve students (20%) used it for thirty-one minutes or more, four students (7%) for five minutes or less, and the vast majority of students (n=44/60, 73%) utilized it for ten to thirty minutes at a time. The majority of students (n=57/60, 95%) and a sizable minority (n=59/60, 98%) felt that the instrument adequately addressed patient- and condition-specific aspects that impact therapy recommendations. Additional perspectives are shown in Figure 2.

Students' Perceptions of the OTC Coach's Impact on Their Learning (n=60) (Figure 2)a

The tool's strengths were highlighted by 52 students who responded to an open-ended inquiry. The ease of use (n=18/52, 35%) and the speed with which patient and clinical characteristics could be changed (n=24/52, 46%) were two aspects that students praised. A few of students found the data entry screen's integrated list of reasons to refer a patient to a healthcare practitioner useful (n=5/52, 10%). The tool could be improved according to the suggestions of 52 students. One group, number thirteen out of fifty-two, or 25% of the total, suggested an overhaul of the user interface that would allow users to save cases, upload images, expand the list of variables that could affect treatment recommendations, and provide more context for patients regarding whether they should or should not self-medicate. Adding other subjects or conditions was suggested by a few students (n=10/52, 19%).

Analyzing Critically

Because it provides a risk-free setting for adult learners to participate in active, deliberate practice with targeted feedback, computer simulation is widely employed in health professions education. Using the OTC Coach, first-year student pharmacists were able to investigate the aspects pertaining to patients and their conditions that affected the choices made for over-the-counter pharmaceutical therapy. Several other online resources exist with the express purpose of assisting future pharmacists in honing their analytical and clinical reasoning abilities. Students may practice community pharmacy duties including prescription verification, order fulfillment, and over-the-counter product suggestion using My Dispense. Still, tasks may range from a few minutes to an hour or more in duration, all dependent on how involved they are.14 Using a branched-narrative architecture, DecisionSim / vpSim guides the user through a series of decisions affecting a single patient, providing feedback as they discover the outcomes of their choices.8,13 By including the patient's point of view, EHRGo serves as an educational electronic health record that teaches students how to order and verify medications.22 Differentiating the OTC Coach from similar virtual simulation tools, it allows students to practice making multiple decisions for a single therapeutic topic for multiple patients in a short amount of time. As a result, they learn how minor changes in patient presentation can impact the treatment plan.

What to Do Next

While some students found the technology useful, they also noted that they had access to standardized study resources covering all therapeutic topics. Not all test topics were covered in the OTC Coach; for example, dose, possible side effects, counseling points, and monitoring plans were not. However, the coach did concentrate on assisting students with prescription decision-making. In response to student requests, we are updating the tool to let them create their own multiple-choice questions covering more ground under each therapeutic area. On each formative test, you may expect to see about ten one-sentence scenarios with several treatment alternatives, randomized patient and condition specific characteristics, and more. After students choose a course of therapy for each situation, they will get instantaneous comments on their choices. Students will be able to practice developing patient-centered suggestions more effectively as a result.

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