Use of a Nonprescription Medicine Formulary Assignment to Help Fulfill an Ability-Based Outcome

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This paper describes how the development of a formulary helped students achieve an outcome ability in a nonprescription medicines course. For the nonprescription medicines course, ability-based outcomes were determined that were integrated, developmental and transferable. One outcome was an ability to make justifiable nonprescription medicine recommendations. The formulary assignment provided two and often three opportunities to extensively practice the desired outcome with feedback on performance criteria. The results of student evaluations regarding the usefulness of such an assignment as an effective learning tool are positive.

INTRODUCTION

This paper addresses the use of an ability-based educational approach in an undergraduate course in nonprescription medicines. One outcome ability and its related practice opportunities, criteria, and feedback is presented. Pharmacists need highly developed critical thinking skills in the area of nonprescription medicines, where pharmacists are involved in assessing patient's complaints or self-diagnosis and making recommendations regarding appropriate treatment. Courses dealing with nonprescription medicines need to encompass decision-making skills, in addition to providing facts. Nonprescription medicine courses therefore lend themselves to an ability-based strategy.

ABILITY OUTCOMES BACKGROUND

This course used material on ability-based outcomes (in contrast to knowledge-based outcomes) from the 1996 AACP Teacher's Seminar and literature from Alverno College Institute on student assessment. With such an approach, abilities are integrated, developmental, and transferable(1). Abilities bring together or integrate the student's knowledge, skills and attitudes. Learning becomes developmental when it is cumulative and builds upon prior knowledge. Abilities are transferable when students can apply what they have learned outside the classroom to new problems. The basic components of a course built upon outcome abilities are four fold: outcome, practice, criteria and feedback(2). Even when faculty become committed to the use of ability-based outcomes, it is still tempting to first decide the most efficient way to cover the most content. With ability-based outcomes, it is imperative to begin by deciding on what outcomes are desired; in other words, defining a clear picture of what the student will be able to do. Secondly, assignments must be developed that provide students with multiple opportunities to practice the desired abilities. The students should be given clear indicators (criteria) of what will constitute successful performance. Finally, specific feedback information on what students did well, along with recommendations on ways to improve should be given in a timely manner. Such assessment can be carried out not only by experts (faculty) but also by peers and by the students themselves.

COURSE BACKGROUND

The nonprescription medicines course considered in this paper is a required, two credit-hour course taught during the last didactic semester prior to clerkships. By this time, the students have completed all required courses in pathophysiology, pharmacology, and kinetics, three out of four semesters in therapeutics, and a patient counseling course. Prior to 1996, nonprescription medicines was a content-based, lecture-oriented course. That year the course was revised to encompass primarily active learning strategies to allow students increased opportunities to practice their problem solving skills. The class size has remained unchanged at about 130 students.

The decision to change the teaching format of the course involved a trade-off between developing skills and scope of content. On one hand was the desire for students to achieve the skills required by a pharmacist when dealing with patients' requests for nonprescription medications. If students were to be ready to hone their problem solving skills during their clerkship experiences, they needed opportunities to practice the problem solving process in a controlled environment prior to clerkships. Skill development needed to be balanced on the other hand with the potential for covering less material. Because more classroom time is spent actively practicing decision making skills, fewer topics are completed. The benefits of increasing the opportunities for students to practice their decision making skills were deemed to outweigh the potential harm of not covering all relevant topics. Thus, the course was changed to utilize active learning techniques and written assignments to facilitate the desired ability outcomes.

COURSE ABILITY-OUTCOMES

The course has two ability outcomes that undergird the assignments and teaching strategies: (*i*) given a patient scenario, the student is able to determine if self care is appropriate and to develop a corresponding care plan that is rational and defensible; (*ii*) the student is able to develop and justify primary and secondary nonprescription medicine recommendations for specific patient conditions. Based upon these outcomes, the course seeks to develop in students a problem solving approach to patient care using the method proposed in the APhA Handbook of Nonprescription Drugs Casebook. This method: (*i*) fosters student's creative thinking to go beyond their first hunch or hypothesis and develop alternative hypotheses regarding patient complaints or concerns, and (*ii*) enables students to verify their hypotheses using a systematic format for questioning the patient to either rule-in or rule-out each hypothesis.

To accomplish the first ability outcome students are given assigned readings, study questions, and one or more cases prior to class discussion for each topic so that they can prepare a tentative care plan. One of the active learning techniques involves the instructor playing the role of a patient in front of the entire class and having individual students ask questions to determine if a nonprescription medicine is appropriate. In-class discussion of the cases also gives students the opportunity to practice decision making skills. Other teaching techniques used within the classroom to facilitate learning are breakout groups and one-minute summary papers(3).

To achieve the second desired ability, students are asked to develop a formulary. The formulary is the practice opportunity (the second component of the model) through which students acquire the ability. Students are given class time to assess both the pros and cons of individual ingredients within products and the products themselves, and to defend their formulary selections prior to completing the written formulary assignment. This formulary assignment and its utility in accomplishing the second course ability outcome will be the focus of the remainder of this paper.

FORMULARY ASSIGNMENT

The formulary assignment is explained to students as a hypothetical situation in which a third-party payer is interested in the concept of pharmaceutical care. The payer is willing to pay pharmacists for cognitive services and selected nonprescription medications if a justifiable formulary can be developed. The assignment is designed to develop the skill of providing an appropriate and defensible nonprescription medication recommendation. As stated above, an ability is the integration of knowledge, skills, and attitudes. In this assignment, the student needs a knowledge of disease states and differences in patient populations; "ideal" products versus available products; limitations for use; mechanism of action; adverse effects; drug, disease or food interactions; therapeutic end points; and monitoring parameters. The skills needed to accomplish the assignment are interpretation, evaluation, discrimination, logical thinking, and the capacity to determine the relative importance of information necessary to the decision. Being able to clearly justify a selection is another necessary skill. Attitudes are not assessed formally, but are addressed implicitly, through the understanding that recommendations to individual patients for nonprescription medicines should be therapeutically rational and defensible.

Developing a formulary of primary and secondary nonprescription medications for common self-treatable conditions provides the students with practice (the second component of ability-based education.) The formulary assignment is divided into three sections during the semester. Each section includes three or four topic areas such as allergy, cough, laxatives, and antacids assigned by the instructor. This keeps the assignment manageable for both the students to complete and the instructor to grade within the credit hours assigned to the course. All students are given the same assigned topics and are asked to work individually on the assignments. Students are encouraged to wait to begin writing until after the topic has been covered in class. The students generally have one month to complete each of the three sections and at least three or more days from the time the last topic is covered in class before the assignment is due. This enables students to utilize all available information prior to making their final medication decisions. Because the formulary assignment is also meant to be used as another method for reviewing course material, the assignments are required to be turned in prior to examinations. Additional practice is provided during class discussions. Mini debates using teams of students and case studies (4) are used to help students formulate decisions regarding proper product selection. Students are asked frequently during class to orally defend an answer as practice for their formulary selection defense. This enables the class to hear a variety of thought processes so that classmates can learn from each other.

After two years, the third section of the formulary was made optional. Virtually all students achieved competence in this ability after completing the first two formulary assignments, as evidenced by overall excellent grades. While there was a widespread distribution of grades on the first formulary assignment, student performance on the second was overwhelmingly excellent. Only a small handful of students who performed poorly on the first formulary assignment did not significantly improve their grade on the second. Those students needed the third section to assure fulfillment of the outcome.

The third component of an ability-based outcome, criteria, is critical for students to understand what the expectations are and how their performance will be assessed. The criteria for which students are graded include the knowledge and skills stated earlier such as knowledge of the product's adverse effects and interactions, and the skill of logical thinking. The assignment and an example of a hypothetical product recommendation are provided in Appendix A. The performance criteria have been translated into a scoring system and are provided in Appendix B. Both are handed out during the course orientation. The performance criteria are discussed in class and questions regarding the assignment are solicited by the instructor frequently in the first few weeks of the semester.

Feedback is the final component of the model. Feedback is given both informally by the instructor and peers during class discussions, and formally by the instructor through written comments on the assignment. Areas for improvement are suggested and students can set up

appointments to discuss the instructor's assessment. Clearly, grading must be completed and assignments handed back prior to the second section due date so that students can learn from the results of their first section. Self assessment is encouraged by having students reread the criteria and grading prior to handing in the assignment. Formal peer assessment has not been used for this assignment but may be incorporated in the future.

EVALUATION

The formulary assignment has been evaluated for its effectiveness as a learning tool by the students since it was first used in 1996. Questions to evaluate new teaching techniques or assignments were added to the college's formal, generic course evaluation form to provide the instructor with more specific feedback. A five-point Likert scale was used to grade the effectiveness of specified techniques or assignments (Appendix C). On average, a total of 120 (out of 130) optional course evaluations were completed each of the three semesters that this assignment was assessed. Although there were occasional negative comments written regarding the time involved with completing this assignment, no students rated the assignment below a "C" or as not being effective for their learning. The results of combining the assessments from 1996-98 yielded 56 percent of the students rating the formulary assignment "A" (very effective for myjeafning). Thirty-six percent rated the assignment a "B" and eight percent rated it "C". Students' written comments were also positive regarding the formulary as a tool for learning. Typical comments included: "The formulary was a lot of work but it really helped me learn the information." "I didn't do the optional third formulary and did poorly on the third exam. Please require it!" "I grumbled at the work, but I like the confidence I have now when recommending products to patients." Unsolicited reports from previous students indicated that they were still using their formularies a year later. Several clerkship faculty were informally asked to rate the students who had completed the revised nonprescription medicines course on their ability to recommend and defend nonprescription medications. Faculty reported seeing clerkship students using the formularies and were generally pleased with the students' knowledge and abilities relating to nonprescription medicines.

CONCLUSION

Applying the framework of ability-based outcomes to a course allows faculty to focus on abilities students should achieve upon completion of a course. Assignments can then be devised to enable students to have multiple opportunities to practice these desired abilities. When students are given the tools for success (practice, criteria, and feedback), they can achieve the desired outcomes. This approach allows faculty to confidently assess the accomplishment of those outcomes. Students in the nonprescription medicines course viewed the assigned formulary that was based upon an ability outcome as an effective learning tool.

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References

(1) Alverno College Faculty, *Student Assessment-as-Learning at Alverno College*. (edit. J.A. Schmitz), Alverno College Institute, Milwaukee WI (1994) p. 9.
(2) Zlatic, T.D. and Maddux, M.S., "Using Ability Outcomes to Transform Courses," Teaching Seminar Workshop, American Association of Colleges of Pharmacy, Alexandria VA (1996).
(3) McKeachie, W.J., *Teaching Tips, 9th ed*., D.C. Heath & Company, Lexington MA (1994) pp. 205-206.
(4) Bonwell, C.C. and Eison, J.A., *Active Learning: Creating Excitement in the Classroom*. ASHE-ERIC Higher Education Report No.l., Washington, D.C: The George Washington University (1991) pp. 38-46.

APPENDIX A. NONPRESCRIPTION MEDICINES FORMULARY ASSIGNMENT

Background

You have developed your practice into a comprehensive pharmaceutical care approach; assessing patient needs, designing drug therapy care plans and monitoring outcomes for your patients. The major insurers in the area are now reimbursing you for cognitive services related to prescription drug monitoring. They are investigating the value of including certain nonprescription medicines and products in the covered benefit. You have been asked to develop a formulary of nonprescription medicines and products along with the rationale for your selections and exclusions. This should be based on efficacy, product cost, and usefulness as a first-line treatment (or early detection/monitoring device) which will save in overall health care expenditures. If you are convincing, the insurers will reimburse you for cognitive services and product costs of these nonprescription medicines regardless of whether the patient obtains prescription drugs or not.

The topics for your formulary will be handed out separately in class. Refer to your syllabus for due dates.

The formulary must be generated with a laser printer using a 12 point font or greater. It should include a cover page with the course name and number, assignment title: "Non-Prescription Medicines Formulary" (Part 1, Part 2, or Part 3), your name and date. It should be stapled in the upper left-hand corner or placed in a 3-ring heavy paper folder. Note: Do not use acetate covers or large 3-ring vinyl binders. You are expected to do your own work on all assignments.

If assigned, your formulary will include the following information:

- Primary product selection
- Secondary product selection (back-up choice)
- Specialty selection (only if necessary for select cases such as sugar/alcohol free products for diabetics)

For each disease state indication, your Primary and Secondary selection must include the following information:

- Protocol for Product Recommendation
- Trade Name of Product
- Active Ingredient(s) Generic Name(s)
- Dosage Form and Strength
- Therapeutic Class
- Mechanism of Action
- Recommended Dosing (Include both adult and pediatric if available)
- Cost Per Day at Recommended Dosing
- Limitations for Use/Contraindications/Drug Interactions
- Adverse Affects/Cautions
- Therapeutic End Points/Referral to other Health Care Providers
- Other Patient Instructions (not covered above)
- Follow up recommendation

- Defense of Selection (A brief statement why you chose this product over other available ones)

*Note: all selections must be available from standard wholesalers or direct from the manufacturers. In other words independent proprietary brands such as Rexall, Osco, etc., brands are not to be used.

You may use the following example as a guideline but are NOT limited to its format. A chart would also be acceptable for providing most of the necessary information. Be complete but concise. Wordiness will not be rewarded. Each selection should fit onto a single page. If extensive patient instructions and your selection defense statement necessitate more space, a maximum of 2 pages is allowable.

Formulary Part 1 Exampl	**Primary Selection**
Disease State Indication	Allergic Rhinitis
Symptoms being treated	(Indicate whatever symptoms you determine would be appropriate for recommending the drug of choice in uncomplicated allergic rhinitis)
Trade Name	No-Run®
Active Ingredient(s)	xyzpheniramine
Dosage Form/Strength	scored tablet, 10 mg (also available in sustained release tablet, 40 mg)
Therapeutic Class	alkylamine antihistamine
Mechanism of Action	inhibits release of histamine from mast cells???
Dosing	Adult: 10 mg QID (q 4-6h) Pediatric: 6-12 yr. 5 mg QID not recommended under age 6
Cost/Day	$0.67 ($3.99 for 24 tablets)
Limitations/CI/DI	avoid alcohol and other CNS depressants; avoid in narrow angle glaucoma, others ?
ADR/Cautions	drowsiness, constipation, blurred vision, urinary retention, dry mouth and eyes, others?
Therapeutic End Point	may be used continually during allergy season; in patients with persistent wheezing; asthma; earache; pain above teeth and nose or around eyes refer to a physician
Other Patient Instructions	May develop tolerance; children may exhibit paradoxical reaction Do not increase dose beyond recommendation; Misc. non-drug measures (List these out) (Other patient counseling instructions should be included here)
Follow up recommendation	If relief is not seen within 48 hours call the pharmacy

Defense of Selection: Include your statement paragraph here defending why you chose this particular antihistamine and dosage form. Explain why other products that are available were not chosen. For example: least sedating of OTC antihistamines; scored tablet provides some dosage manipulation if adverse effects are bothersome; moderately priced and/or generic available; single entity product; FDA approved.

APPENDIX B. CRITERIA AND GRADING

The symptoms should be specific (match) for the condition being treated.

The product selected should match the symptoms. Don't add in extra symptoms that your product doesn't treat.

The factual information regarding the selection must be accurate and complete (i.e., therapeutic class, limitations for use, and therapeutic end points). All information must be present.

The justification should explain exactly why the particular product was chosen and why others that are available are not appropriate. It must be based on sound, defensible reasoning using all information available such as textbook, handouts, and class discussions. Wording should be clear and concise.

The justification must show evidence of your critical thinking skills: discrimination; interpretation; evaluation; logical thinking; and the capacity to determine relative importance of information.

Cost should be per day, not total cost of container (except for nasal sprays and ointments/creams which should be cost per ounce.) A 5 point deduction will be taken for incorrect calculations of cost per total assignment no matter if one or more costs are incorrect.

Misspellings and poor grammar will result in a possible deduction of 5-10 points per total assignment.

Minor errors will have a maximum of 5 points per recommendation deducted with maximum deduction of 25 per total assignment. Examples of minor errors are:

- missing or incorrect factual information regarding the selection, such as not including an important caution for use or an incorrect drug interaction.
- insufficient detail of symptoms for condition being treated.
- poorly explained justifications.

Major errors will have a maximum of 15 points deducted per error. Examples of major errors are:

- symptoms do not match the condition being treated.
- product selected does not match the symptoms.
- justification for selection is incomplete or incorrect and does not show evidence of clear critical thinking skills.

APENDIX C. SAMPLE EVALUATION OF TEACHING TECHNIQUES

The following are some of the educational techniques that were used to help you learn the material. Please rate their effective ness.

Very effective for my learning				Not effective for my learning
A	B	C	D	E

__34. Formulary
__35. Chapter study questions
__36. Patient cases
__37. Mrs. Magilicutty (role playing)
__38. mini lectures
__39. small group class discussion
__40. writing your ideas of the topic's "take home message" and potential test questions
__41. reviewing pros/cons of selected products on the overhead (such as listing the ingredients of several trade name antifungal products and discussing their merits)
__42. games
__43. review sessions (answer only if you were able to attend)
__44. e-mail questions (answer only if you used it to clarify questions)

What did you like best about this course?

What did you NOT like about this course?

Are there any subjects that were not covered that you would like to see included?

How could this course be improved?

Thank-you for taking the time to fill out and return this survey!

Additional comments:
