

Pharmacy Assessment of a Nonprescription Medicine Formulary Assignment for Student Pharmacists

Kelly P. Masters, PharmD, BCPS, Assistant Professor of Pharmacy Practice, Shenandoah University, Winchester, VA 22601

Erin N. Adams, PharmD, Assistant Professor of Pharmacy Practice, Shenandoah University, Winchester, VA 22601

Craig A.H. Richard, PhD, Associate Professor of Biopharmaceutical Sciences, Shenandoah University, Winchester, VA 22601

Abstract

Objectives: To assess student pharmacists' utilization, perceptions, and suggestions for improvement on the creation and use of a nonprescription medicines formulary.

Methods: Second-year student pharmacists created a nonprescription medicines formulary as part of a nonprescription medicine course. To assess the longitudinal value of the formulary assignment, data was collected from 4 pharmacy student classes at the completion of the assignment one year and then again two years later. The survey included multiple-choice questions and an open-ended question to gather suggestions.

Results: The majority (201 students, 71%) of the students completed the surveys, utilized their formulary, still possessed the formulary, believed the assignment increased their knowledge, believed the assignment should remain in the course, and were comfortable with nonprescription medicines for healthy adults. Only a minority of students were comfortable with nonprescription medicines for special populations.

Conclusions: The survey results indicate an overall positive perception of a nonprescription formulary assignment by pharmacy students as well as areas for improvement.

Keywords: formulary, monograph, nonprescription, over-the-counter, self-care, OTC

Introduction

In the United States, there are currently over one-hundred thousand different nonprescription medicines and products on the market and pharmacists are making millions of product recommendations for ailments on a daily basis.¹ Special challenges confront pharmacists in regard to nonprescription products, including a sharply rising trend of self-medication coupled with an increasing number of products; a tendency of patients to not read labels nor consult clinicians; and a wide input of health product misinformation from various electronic media.² The North American Pharmacist Licensure Examination (NAPLEX) has recently increased the number of competencies in regard to nonprescription medications and self-care to reflect these expanding challenges.³ Pharmacy schools, therefore, need to continually assess and improve education in nonprescription products to appropriately prepare students for the NAPLEX and to prepare students for the counseling, advising, and dispensing of nonprescription products to patients.⁴⁻⁵

There is not only a current need for increasing nonprescription medicine content in pharmacy schools, but there is a concurrent need for the development and documentation of innovative and effective approaches to teaching this content.^{2,4,6} The coupling of didactic education with actual application during practice experiences is extremely important as it demonstrates knowledge and builds confidence in student pharmacists.⁷ One specific method to assist student pharmacists in their education in nonprescription products is to research and summarize the important drug information necessary for proper patient use.⁸⁻¹¹ The final product is similar to the information in a drug monograph and is commonly referred to in the literature as a drug formulary assignment or project. However, the creation, utilization, long term value, and improvement of formulary assignments as an educational tool for student pharmacists are not well documented.

To address this need, we assigned student pharmacists in a nonprescription medicines course the development of a personal formulary of nonprescription medications they could use as a reference while on introductory or advanced pharmacy practice experiences. The objective of the assignment was to develop and implement a formulary system for nonprescription medicines by compiling and evaluating relevant scientific literature and drug use data for different patient populations. These educational objectives are in accordance with the Social and Administrative Sciences supplemental educational outcome 2.6.C, "Participate in the development and implementation of a formulary system" published in The American Association of Colleges of Pharmacy's Center for the Advancement of Pharmaceutical Education (CAPE) Educational Outcomes 2004.¹² An online survey was administered to 4 consecutive annual classes of student pharmacists that had completed the nonprescription formulary assignment over a 4-year period. The data was collected from the student pharmacists one year and two years after the completion of the assignment to assess the longitudinal value of the assignment. The survey collected data from the student pharmacists on the use, perceptions, and suggestions for improvement of the formulary assignment.

Methods

The formulary assignment was part of a nonprescription medicines course. The nonprescription medicines course for student pharmacists at Shenandoah University is a 2-credit-hour, one-semester, required class for students in their second professional year of pharmacy school. The completion of the formulary assignment accounted for 20% of the students' final course grade.

Textbox 1 summarizes the required information for the formulary assignment. Each student selected a patient population, selected 3 products for each of the specified therapeutic categories that are commonly treated with nonprescription products, and provided the specified drug information for each product. The students were limited to Category I active ingredients which are generally recognized as safe and effective. They were instructed to utilize the following references: *Handbook of Nonprescription Drugs*, *Micromedex*, *Drugs in Pregnancy and Lactation*, and the package labeling.¹³⁻¹⁵ A prior publication

Published in:

The International Journal of Pharmacy

Education and Practice

Vol 5, Issue 1, Summer 2009

reported that some of these specific resources were highly useful to student pharmacists working on a nonprescription medicine formulary.⁹

Text Box 1: Required Content Areas for Nonprescription Medicine Formulary Assignment

- I. Choose one patient population:
 - a. Healthy Adult
 - b. Pediatrics
 - c. Pregnant/Breast Feeding
- II. Select three products for each of the following therapeutic categories:
 - a. Acid-Peptic Disorders
 - b. Allergy
 - c. Constipation/Diarrhea
 - d. Cough/Cold
 - e. Fever/Headache/Pain
 - f. Fungal Products
 - g. Ophthalmic Products
 - h. Otic Products
 - i. Topical Products
 - j. Vaginal Products (if applicable)
- III. For each selected product, provide the following information:
 - a. Brand Name
 - b. Active Ingredients and Strengths
 - c. Therapeutic Class
 - d. Directions For Use
 - e. Adverse Effects
 - f. Warnings and Contraindications

If the selected population was not appropriate for a particular therapeutic category and product, the student was to indicate that a referral to a physician was needed. There were no limitations regarding minimum or maximum number of pages to be submitted. However, each formulary was required to be concise yet sufficient for appropriate counseling, and professionally organized. The assignment was assessed for accuracy and organization by licensed pharmacists. The required design of the formulary was a format that would be convenient and easy to use when the student was approached with questions in the community experience. The students were given approximately 2 months to complete the assignment. Students were instructed to complete the assignment as individuals and they were reminded that any group work would be a violation of the university's honor code.

Four nonprescription medicines courses throughout the years 2003 to 2006 were measured and completed by a total of 285 second-year student pharmacists. In 2 phases, all of these students received the same survey when they became third-year or fourth-year students. Phase I occurred in 2005 when the survey was provided to all the current third-year and fourth-year students. Phase II occurred in 2007 when the survey was again provided to all the current third-year and fourth-year students. The objective of the survey was to assess the students' use of the formulary, to obtain the students' perceptions of the utility of the formulary assignment, and to collect their feedback on how to improve the formulary assignment. Three faculty members and one student collaborated to create, review, and revise the survey. The survey was approved by the Shenandoah University Institutional Review Board (IRB) and was created via Survey Monkey™ and a link was sent to the participating students to an online survey via electronic mail.¹⁶ The questions in the survey were all multiple choice, with the exception of an open-ended question asking for their suggestions for improvement to the formulary assignment.

Results

In phase I (2005), 67% and 68% of the current third and fourth-year students, respectively, completed the survey. In phase II (2007), 87% and 60% of the current third and fourth-year students, respectively, completed the survey. The overall survey completion rate was 71% (201 students) for all students, with third-year students demonstrating a higher response rate (77%) than fourth-year students (64%).

Table 1 demonstrates that at the time of the survey, the majority of third-year students and fourth-year students had utilized their formulary, still had their formulary, reported a self-perceived increase in knowledge of nonprescription medicines due to the assignment, and felt that the assignment should remain in the course. Only a small minority of students were still utilizing their formularies at the time of the survey. Table 1 also demonstrates that the majority of third-year and fourth-year students at the time of the survey were comfortable with nonprescription products for healthy adults but were not comfortable with nonprescription products for pediatric patients, pregnant patients, or breastfeeding patients.

Written suggestions from the students on how to improve the assignment were summarized into general areas (Table 2). The majority of the written comments were positive and the most common suggestion was to require the inclusion of special populations in the assignment.

Table 1: Survey responses to closed-ended survey questions on experience and perceptions of formulary assignment

	Third Year (n=113)	Fourth Year (n=88)
Percent of third year vs. fourth year respondents that:		
• Ever referred to the formulary assignment, including for use as a pharmacy intern or during clerkship rotations	102 (90%)	69 (78%)
• Still have the formulary assignment	97 (86%)	52 (59%)
• Still refer to the formulary assignment	19 (17%)	11 (13%)
• Feel the assignment increased knowledge of nonprescription products	89 (79%)	63 (72%)
• Feel the assignment should remain in the course	87 (77%)	70 (80%)
• Feel comfortable with nonprescription products for healthy adults	84 (74%)	73 (83%)
• Feel comfortable with nonprescription products for pediatric patients	26 (23%)	24 (27%)
• Feel comfortable with nonprescription products for pregnant or breastfeeding patients	20 (18%)	17 (19%)

Table 2: Open-ended survey question on improving the formulary assignment

	All Respondents (n=201)
If you could improve the formulary assignment, what recommendations do you have?	
“No improvements necessary” or positive comment	44 (22%)
“Require all to do special populations” or similar comment	32 (16%)
“Limit information required in formulary” or similar comment	18 (9%)
“Have students create patient scenario” or similar comment	10 (5%)
“Have students present formulary to class” or similar comment	8 (4%)
Other input (wide spectrum of topics)	32 (16%)
Left field blank	56 (28%)

Discussion

Pharmacists are considered to be the experts in nonprescription drug therapy as well as drug information. The 2007 American Association of Colleges of Pharmacy Graduating Student Survey report indicated that more than 2,000 of the 2,845 respondents would be employed in the community setting upon graduation.¹⁷ It is imperative that student pharmacists be educated in the large number of nonprescription products and be competent in making nonprescription therapy recommendations to patients.⁴

The formulary assignment was incorporated into the nonprescription medicines course as an innovative means to assist the students in narrowing down the number of brand-name products and increasing their knowledge of several key active ingredients for different therapeutic categories. The assignment was designed to provide students with their own formulary for nonprescription products which they can subsequently use to help patients. Our data represents the largest and most comprehensive documentation to date on the utilization and perceived value of a nonprescription formulary assignment in a pharmacy school program.

Our study confirms that the majority of the students utilized the formulary outside the classroom and still possessed the formulary a year or two later (Table 1). In a publication regarding the use of a nonprescription formulary assignment in a pharmacy course, Krypzel stated that unsolicited comments from prior students indicated that some were still using their formularies a year later.⁸ Since the comments were unsolicited, it is unknown how many of the students in this prior research were still using their formularies. In our study, we found only a small minority were still utilizing their formularies a year or two later. A positive interpretation of this minimal use of the formularies after one or two years could be that the knowledge in the formulary is eventually absorbed by the pharmacy student over time to result in a diminished use of the hardcopy version. This potential interpretation requires data confirmation, but is supported by the decreasing trend of fourth-year students to still possess their formulary and still refer to their formulary compared to third-year students, although the fourth-year students equally and strongly support that the assignment should stay in the course (Table 2). An additional interpretation is that the decreased use over time could be due to the material being viewed as outdated.

Table 1 indicates that the majority of students (54% of all students who completed the project) reported a self-perceived increase in knowledge of nonprescription medicines due to the assignment and a majority also responded that the project should remain in the course. Likewise, the most common written comments submitted by students were positive (Table 2). Unlike our longitudinal collection of student feedback, other studies report feedback from student pharmacists that occurred in the same semester the formulary or formulary-like assignment was completed.^{8,10-11} Hunter reported that 6 third-year pharmacy students who created a nonprescription drug information monograph felt it was a useful learning tool in general, although no formal method of collecting their feedback was utilized.¹⁰ Krypzel also demonstrated that the majority of students reported the assignment to be effective to their learning, and that the majority of written feedback was positive.⁸ Nykamp et al documented that the majority of students thought the assignment should be included in the next year's course, that it increased their knowledge, reinforced the course content, and made them feel more comfortable making product recommendations.¹¹ The present findings are novel and important in that they demonstrate that students evaluated the assignment positively one year and two years after the assignment concluded, demonstrating and documenting the long-term perceived value of the assignment. The above studies support the short-and long-term perceived value of formulary assignments by student pharmacists. Future assessments of student knowledge gained from formulary assignments might be improved by including specific assessment measures or documenting frequency of use rather than relying only on students' self-perception regarding use.

The majority of students reported that they were more comfortable with healthy adults than special populations (Table 1). This is probably because 73% of students chose the healthy adult population for the focus of their formulary. Although the survey results indicate that the formulary assignment is useful, the survey results also indicate that more of an emphasis needs to be on increasing students' confidence

Published in:

The International Journal of Pharmacy

Education and Practice

Vol 5, Issue 1, Summer 2009

with recommending nonprescription products to special populations. Requiring all future formularies to focus on special populations was also a common suggestion in the written comments from the students (Table 2). Students also suggested presenting the formulary in class or using case-based scenarios that may also enhance learning. It would be useful for future studies to survey students at the beginning and the end of the semester to determine the change in their knowledge with nonprescription products and their confidence with patient populations. Additionally, the majority of the course work focused on healthy adult populations and the students probably have less frequent interactions with these special populations in the pharmacies. Angelo discussed the general discomfort that student pharmacists have with counseling on nonprescription recommendations to special populations.⁹ Another publication highlights the national need to increase pharmacy student training in nonprescription medicine counseling to special populations.⁴ Overall, our study and prior studies reflect the importance, the need, and a potential method for increasing and improving pharmacy education on nonprescription medicines for special populations.

Since the collection and review of the data and feedback from these surveys, several changes have been made to the current version of the formulary assignment. All lectures now include and emphasize special populations and a one-hour lecture is now dedicated solely to reviewing nonprescription therapies for special populations. To assist with limiting the information included, students are informed that they only need to include the 3 most common adverse effects, warnings, and contraindications. An additional change is that students were instructed that the length of the formulary should not be shorter than 10 pages or longer than 15 pages.

The content and utilization of a formulary assignment can be expanded beyond what we have presented in this study. Formulary assignments can be expanded into more complex treatment decision trees that incorporate economic, legal, genetic, and cultural considerations, as well as expected treatment outcomes for real or theoretical patients. Indeed, Nykamp et al reported the required inclusion of drug pharmacology, adverse reactions, cost, treatment recommendations, and counseling information as part of a nonprescription medicine assignment in the form of a patient case study.¹¹ The creation and utilization of these treatment decision assignments could also be useful for all areas of pharmacy besides nonprescription medicines. For example, the creation of a treatment decision analysis assignment by student pharmacists for a managed care setting has been reported as very favorable via student evaluations.¹⁸ These related ideas may assist in further course development.

Limitations

Our study had several limitations. Overall response rates to our survey could have been improved via additional email reminders to complete the survey and/or via use of a reward incentive. In addition, assessment of formulary-related knowledge before and after the project would have allowed for better assessment of knowledge acquisition due to the project. A third limitation is that improved wording and appropriate pre-testing of the survey could have resulted in a survey that included quantitative measurement of how often the students utilized their formularies in a clinical setting. Finally, subjective grouping of written feedback from students could have been avoided by providing pre-tested choices for the students. The overall interpretations of our data apply only to the specific course and associated instructors, and only a general interpretation can be applied to the incorporation of a formulary project into other pharmacy courses.

Conclusion

The majority of student respondents reported a self-perceived increase in knowledge of nonprescription medications due to the project. The students felt that the assignment should remain in the course and most of the students have either kept their formulary and/or referred back to it. The results of this study highlight the strengths and value as well as potential weaknesses of a formulary assignment as an educational tool for nonprescription medicine and the areas for improvement.

Acknowledgements

The authors wish to acknowledge the receipt of a Shenandoah University School of Pharmacy Research grant for this project. The authors also wish to acknowledge the assistance of Solmaz Sahraeyan, PharmD, for contributions to this research.

References

1. Consumer Healthcare Products Association. Nonprescription facts and figures Web site. <http://www.chpa-info.org/ChpaPortal/PressRoom/Statistics/nonprescriptionFactsandFigures.htm>. Accessed February 5, 2008.
2. Covington TR. Nonprescription drug therapy: issues and opportunities. *Am J Pharm Educ.* 2006;70(6):article137. <http://www.ajpe.org/view.asp?art=aj7006137&pdf=yes>. Accessed February 25, 2009.
3. Lee MA. Nonprescription medicines and the North American Pharmacist Licensure Examination. *Am J Pharm Educ.* 2006;70(6): article 138. <http://www.ajpe.org/view.asp?art=aj7006138&pdf=yes>. Accessed February 25, 2009.
4. Zierler-Brown SL, VanAmburgh JA, Casper KA, et al. Status and recommendations for self-care instruction in US colleges and schools of pharmacy, 2006. *Am J Pharm Educ.* 2006;70(6):article 139. <http://www.ajpe.org/view.asp?art=aj7006139&pdf=yes>. Accessed February 25, 2009.
5. Pray WS. The importance of self-care in pharmaceutical education. *Int J Pharm Educ Pract.* 2008;4(1). <http://www.samford.edu/schools/pharmacy/ijpe/108/pray.pdf>. Accessed February 25, 2009.
6. Sulli MM, Whetsel T. Teaching self-care as a junior faculty member: perspectives and lessons learned. *Am J Pharm Educ.* 2006(6);70:article142. <http://www.ajpe.org/view.asp?art=aj7006142&pdf=yes>. Accessed February 25, 2009.
7. Popovich NG. Nonprescription medication therapy and self-care instruction. *Am J Pharm Educ.* 2006;70(6):article 136. <http://www.ajpe.org/view.asp?art=aj7006136&pdf=yes>. Accessed February 25, 2009.
8. Krypel L. Use of a nonprescription medicine formulary assignment to help fulfill an ability-based outcome. *Am J Pharm Educ.* 1999;63:78-82. <http://www.ajpe.org/legacy/pdfs/aj630113.pdf>. Accessed February 25, 2009.
9. Angelo LB. Engaging students in self-care activities during an advanced community pharmacy practice experience. *Am J Pharm Educ.* 2006;70(6):article 143. <http://www.ajpe.org/view.asp?art=aj7006143&pdf=yes>. Accessed February 25, 2009.
10. Hunter KA. Learning opportunities for pharmacy students in our communities. *Am J Pharm Educ.* 1995;59:371-374. <http://www.ajpe.org/legacy/pdfs/aj5904371.pdf>. Accessed February 25, 2009.
11. Nykamp D, Marshall LL, Ashworth L. An active-learning assignment using nonprescription medicines. *Am J Pharm Educ.* 2008;72(1):article 20. <http://www.ajpe.org/view.asp?art=aj720120&pdf=yes>. Accessed February 25, 2009.
12. Center for Advancement of Pharmaceutical Education (CAPE) Educational Outcomes 2004 Web site. American Association of Colleges of Pharmacy. http://www.aacp.org/Docs/MainNavigation/Resources/6075_CAPE2004.pdf. Accessed January 16, 2009.

Published in:

*The International Journal of Pharmacy
Education and Practice*

Vol 5, Issue 1, Summer 2009

13. Beradri RR, ed in chief. *Handbook of Nonprescription Drugs; An Interactive Approach to Self-Care*. 15th ed. Washington, D.C., 2006:1-1201.
14. Klasco RK (Ed): DRUGDEX[®] System. Thomson Healthcare Web site. Available at: <http://csi.micromedex.com>. Accessed June 1, 2008.
15. Briggs GG, Freeman RK, Yaffe SJ. *Drugs in Pregnancy and Lactation*. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005:1-1858.
16. Finley R. Survey Monkey[™].Portland, OR. SurveyMonkey.com. <http://www.surveymonkey.com>. Accessed: December 2005, October 2007.
17. American Association of Colleges of Pharmacy Web site. Graduating Pharmacy Student Survey Report 2006. [http://www.aacp.org/site/page.asp? TRACKID=&VID=1&CID=104& DID=3111](http://www.aacp.org/site/page.asp?TRACKID=&VID=1&CID=104&DID=3111). Accessed June 1, 2008.
18. MacKinnon GE. Facilitating the understanding of the formulary decision making process using group projects. *Am J Pharm Educ*. 2000;64:54-58. <http://www.ajpe.org/legacy/pdfs/aj640110.pdf>. Accessed February 25, 2009.