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RESEARCH ARTICLES

Pharmacy Students' Attitudes Toward a Required Public Health Course and Developing a Public Health Program

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Objective. To determine pharmacy students' attitudes towards a required public health course and developing a public health program.

Method. Two hundred ten first-year pharmacy students enrolled in a public health course at a large private pharmacy school were surveyed. A 24-item adjective rating scale and a 10-item scale were used to measure students' attitudes towards the course and developing a public health program.

Results. Of 198 respondents, two-thirds found the course to be extremely or very appealing, of practical value, and only slightly demanding and difficult. The majority of the students indicated that establishing a public health program would be an opportunity to help the community and make a difference. Few students indicated that it would be a poor use of time or an example of busy work.

Conclusion. Pharmacy students had positive attitudes towards a required public health course and developing a public health program. Strategies to mold positive attitudes into actual behaviors of engaging in public health activities are needed.

Keywords: public health, attitudes, pharmacy curriculum

INTRODUCTION

With the increasing threat of epidemics such as swine flu (H1N1), and widespread chronic illnesses, such as those arising from obesity, the need for effective and efficient public health programs is apparent and urgent. Several reports on the challenges and future of public health have identified appropriate training and education for the public health workforce as a top priority along with the need for interdisciplinary participation in public health.[1] A prepared quality workforce is of paramount importance if the complex public health issues of the 21st century are to be addressed. Accordingly, educational academies and institutions engaged in training medical, nursing, pharmacy, and allied healthcare professionals are creating training programs and modifying their curriculums to improve professional competencies in assessing and monitoring public health problems and include disease prevention and health promotion activities.

Historically, pharmacy was considered the least active healthcare profession in terms of contributing toward public health service. Three decades ago, in a seminal article, authors Bush and Johnson noted that "not nearly enough pharmacists are now engaged in public health activities," and that "pharmacy education has failed to recognize the potential for pharmacists in public health."[2] The authors argued that while *micro-level* pharmacists (pharmacists who provide service at the individual patient level) were important for providing patient-specific interventions, *macro-level* pharmacists (pharmacists who focus on the health status of the community as a whole and play an active role in assessment, policy development, planning, and evaluation of needed services) were equally, if not more, fundamental to the establishment of effective pharmacist-provided public health activities. The authors emphasized the need to graduate pharmacists with abilities to participate in both macro- and micro-level public health service. Since their paper was published, the pharmacy profession has expended several efforts to develop competent pharmacists with capabilities to engage in public health-related services, such as smoking cessation, disease management, and prevention, such as immunizations.[3] Despite these efforts, few pharmacists have been directly involved in disease prevention and health promotion activities in the past decade. The majority of pharmacists are still focused on providing medication-related services. Common reasons for lack of pharmacist involvement in public health activities include lack of training and constraints, such as a heavy

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workload.[4] Also, many of the public health activities are considered as secondary activities that are provided only when resources (people, time, and money) allow since they do not produce revenue.

Given their relatively recent recognition as providers of preventative services,[5-7] pharmacists, like other healthcare professionals, will now be expected to play an active role in the public health arena. Accordingly, training pharmacists as public health providers will need to become a central part of their curriculum. Traditionally, little course work was devoted to public health. To address this gap and develop student competencies in the area of public health prevention services and health promotion, the American Association of College of Pharmacy (AACP) released the Social and Administrative Sciences (SAS) Supplemental Educational Outcomes in 2007.[8] These outcomes recognize the need for pharmacists to provide public health programs that take into account risk factors and pharmacoepidemiologic data and challenge practitioners to ''assure that all relevant members of a patient population receive needed services.'' Concepts related to public health have been integrated into the curriculum of some pharmacy colleges.[9] Such a curriculum should provide pharmacy students with the competencies required to integrate public health principles in their practice after graduation.

A central question while integrating public health-related concepts in the curriculum is whether public health concepts should be incorporated into an existing course, taught as an independent required course, or offered as an elective course. Much of the literature on public health in pharmacy has focused on students' attitudes toward and experiences in service-learning projects in a course that was offered either as an elective or a pharmacy practice experience. While pharmacy students have responded positively toward elective and experiential public health courses, their perceptions regarding a required public health course have not been reported/studied previously.

In order to successfully develop a curriculum that meets the goals outlined in the SAS Outcomes, the attitudes and values of pharmacy students regarding public health must be assessed. While there is abundant literature on nursing students' and medical students' attitudes towards public health and health promotion,[10-13] the literature on pharmacy students' attitudes towards public health is sparse. This study assessed pharmacy students' attitudes towards a *required* public health course, as well as their attitudes towards developing a public health program. The findings provide insight into student enthusiasm, in general, towards learning public health-related principles as an integral part of the curriculum.

The main objective of this study was to explore pharmacy students' attitudes toward a required public health course and assess their attitudes toward developing a public health program. A secondary objective was to test the psychometric properties of the scales used in the study.

METHODS

Public Health in Pharmacy is a required first-year course in the doctor of pharmacy (PharmD) program at the Arnold and Marie Schwartz College of Pharmacy The course was developed in 2006 by faculty members in the Social Administrative Sciences and Pharmacy Practice divisions at the college using public health-related concepts outlined in *Clinical Prevention and Population Health Framework for Health Professions*, a publication developed by the Healthy People Curriculum Task Force[14] and based on the endpoints outlined in the AACP Supplemental outcomes for SAS.[8] The course was consequently approved by the curriculum committee at the college in 2006. The content areas covered in the lecture portion of the course (3 hours each week) consisted of: (1) introduction to public health: what is public health, history of public health and pharmacist role in public health, definitions widely used in public health, healthy people 2010 goals; (2) evidence-based practice: epidemiology and biostatistics, methods for evaluating health research literature, outcome measures, determinants of health, and health surveillance; (3) health promotion: program development principles using the precede-proceed model with an emphasis on cultural competence and eliminating health disparities; (4) health systems and health policy: organization and financing of public health activities; and (5) community aspects of practice: pharmacist role in emergency preparedness such as bioterrorism, immunizations, chronic disease management and prevention services, environmental and occupational health, and international health issues.

During the recitation portion of the course (1 hour each week), students were assigned an ethnicity (non-Hispanic whites, African-Americans, Asians, and Hispanics) on which they worked individually and collaboratively in groups to (1) design a health promotion and disease prevention program, and (2) present and explain the program to the recitation section and faculty members. Students were provided with a series of community needs assessments forms designed by the authors based on the precede-proceed model,[15] which was taught in an earlier course (Behavior and Ethics in Pharmacy), and emphasized as an important model for developing public health programs. The needs assessment form was completed by each student as a homework assignment and used by each group to identify and explore the health

problems for the assigned ethnicity. Each group was required to write and submit a report identifying health problems that their group would target using health promotion and disease prevention principles. Upon identifying the target health program for intervention, students were asked to explore the different evidence-based public health programs published in the literature and identify the goals, methods, and evaluation plan utilized by those programs. A week after this exercise, groups were asked to develop goals, methods, and evaluation plans for their own programs. Students were challenged by the faculty member to be as realistic as possible in developing the program. In the final 3 weeks of the semester, each group presented the whole program (including the needs assessment, goals, methods, and evaluation plan) to the recitation class and submitted a final report that outlined the different components of the program in detail. Approximately 40% of the course grade was based on program development and presentation.

On the first day of the semester, students were provided with a syllabus and recitation manual and details about the course and were asked to complete a WebCT (Blackboard, Washington DC) survey during the first week, for which they would receive 1 point extra credit towards their final grade. Following recommendations from the university's institutional review board, students were asked to provide consent for faculty members to use their survey data for research purposes. Students were assured they would receive the extra credit regardless of their decision to provide consent to use the data.

Measures

Two main measures were used in the survey: the 24-item adjective rating scale and the 10-item Carter and Cochran measure of attitudes towards service-learning.[16] Five questions also queried students about their demographic information. The adjective rating scale utilizes 24 adjectives, such as interesting, boring, and difficult, to categorize students' attitudes towards a course into 1 of 3 factors: affective appeal and practical value; apathy; or difficulty. The adjectives in the affective appeal and practical value factor describe positive feeling towards the course and its practical value, whereas the adjectives in the apathy factor describe negative feeling and interest towards the course. The adjectives described in the difficulty factor capture the extent to which students find the course difficult and demanding. Students used a 4-point Likert-type scale ranging from extremely to not at all to gauge the adjective in each of the factors. Although the adjective rating scale had not been utilized in pharmacy prior to this study, it was selected because it had been validated using healthcare professionals (nurses) whose functions in the context of public health would be very similar to pharmacists and because it had good construct validity. A 10-item measure designed by Carter and Cochran to assess student perspectives on service-learning projects in a public health course was adapted to assess student attitudes towards public health program development.[16] Little was known about the psychometric properties of the Carter and Cochran measure, however, it was selected because it met the criteria for face and content validity.

Data obtained from the survey were de-identified and exported into SPSS, version 14.5. Although its construct validity already had been established by prior research, the reliability of the adjective rating scale was computed using Cronbach's alpha. Construct validity of the Carter and Cochran measure was conducted using a principal-components analysis with Varimax rotation using Eigenvalues over 1 as criteria for factor extraction. Descriptive and univariate analyses were conducted and presented.

RESULTS

One hundred ninety eight (response rate 94%) of the 210 students enrolled in the course provided consent to use their responses for research purposes. Two-thirds of the respondents were female. The majority of the respondents were single, had completed high school prior to entering pharmacy school, were less than 25 years old, came from diverse economic backgrounds, and identified their race as either non-Hispanic white or Asian (Table 1).

The reliability of the adjective rating scale was computed using Cronbach's alpha. The standardized alpha for the 24-item adjective rating scale was 0.72, indicating a moderate but acceptable degree of internal consistency.[17] Construct validity of the adapted Carter and Cochran measure was computed using principal components analysis, with Varimax rotation using Eigen values over 1 as criteria for factor extraction. In the analysis, student responses identified a single factor. The loadings (the correlations of each of the items in the scale with the factor), indicated that the majority of items in the scale had a moderate to high correlation (range from 0.60 to 0.81) with the factor (Table 2). The proportion of variance accounted by the items in the scale was 54.8%. In the reliability analysis using Cronbach's alpha, the standardized alpha for the 10-item scale of students' attitude toward a public health program was 0.84, indicating a high degree of internal consistency.[17]

On the 24-item adjective rating scale, 2 out of 3 students chose ''extremely'' or ''very'' scale anchors for the different adjectives in the affective appeal and practical value factor (eg, interesting, relevant, good, stimulating) of the adjective rating scale, indicating that the majority of students had positive feelings towards the course and

Table 1. Demographics of Pharmacy Students Taking a Required Course in Public Health

Demographic Factors	No. (%)
Gender, female (n=181)	115 (63.5)
Age (n=190)	
18 - less than 25	176 (92.6)
25 - less than 30	9 (4.7)
30 - less than 35	2 (1.1)
35 and more	3 (1.6)
Race (n = 193)	
Caucasian	99 (51.3)
African American	13 (6.7)
Asian/Pacific Islander	78 (40.4)
Hispanic	3 (1.6)
Marital Status (n =198)	
Single	182 (91.9)
Married	14 (7.1)
Divorced/separated	2 (1.0)
Average annual household income (n=198)	
Less than 25,000	68 (34.3)
25,000 - less than 50,000	41 (20.7)
50,000 - less than 75,000	35 (17.7)
50,000 - less than 75,000	31 (15.7)
More than 100,000	23 (11.6)
Level of education excluding pharmacy school (n = 198)	
Graduate education diploma	2 (1.0)
High school diploma	183 (92.4)
Bachelor's degree	13 (6.6)

thought the course had practical value (Table 3). Only one-third of students selected "extremely" or "very" scale anchors for the different adjectives in the apathy factor of the adjective rating scale, affirming the finding that few students had negative feelings towards the course. Approximately, two-thirds of the students chose the "slightly" scale anchor for the 2 adjectives (demanding and difficulty) in the difficulty factor of the adjective rating scale, indicating that students felt that the course was only slightly demanding and difficult.

Students' attitudes towards development of a public health program were positive. More than 80% agreed or strongly agreed that the program would be an opportunity to help the community, promote the practice of pharmacy, apply their knowledge, and make a difference. Few students indicated that it would be a poor use of time and an example of busy work, or be a bad experience of working in groups. Approximately 1 in 4 students disagreed that the public health program would be an overwhelming responsibility (Table 4). None of the demographic variables such as age, gender, marital status, average annual household income, and level of education achieved were associated with summative scores on students' attitudes toward the development of a public health program.

DISCUSSION

As the most accessible and trusted healthcare professionals, pharmacists are in an ideal position to play an important role in public health promotion and disease prevention activities.[18] From a pharmacy education perspective, the findings of this study that pharmacy students were positive towards a required public health course and developing a public health program are encouraging. The majority of the students indicated that the program would be an opportunity to help the community, promote the practice of pharmacy, apply their knowledge, and make a difference in society. Despite that the program development aspect of the course demanded that students complete a number of difficult and time-consuming tasks, only 1 in 4 students found the course to be difficult and demanding. Students appeared to be able to quickly adopt and apply the course skills and achieve efficacy. Their attitude may have been "This is not difficult to do." The lack of apathy toward the course among students could be attributed to the departure of this course from the highly clinical pharmacotherapy courses in the curriculum. Alternatively, it also could have been a reflection of the positive energy displayed by the faculty members in the course. Although not measured, faculty members who

Table 2. Validity and Reliability of Scale Measuring Pharmacy Students' Attitudes Toward Public Health Program Development

	Validity	Reliability Statistics		
Scale Item	**Factor Loading Using Varimax Rotation**	**Item-Scale Correlation**	**Squared Multiple Correlation**	**Cronbach's Alpha if Item Deleted**
The public health program will be an opportunity to help the community	0.62	0.50	0.39	0.82
The public health program will be a way to promote the practice of pharmacy	0.61	0.48	0.38	0.82
The public health program will be a good way to work with my classmates	0.75	0.63	0.46	0.81
The public health program will be a good use of my time	0.75	0.64	0.49	0.81
The public health program will be an opportunity to make a difference	0.81	0.69	0.61	0.80
The public health program will be an opportunity to apply my knowledge	0.8	0.67	0.62	0.81
The public health program will be a bad experience of working in a group.	0.4	0.33	0.21	0.84
The public health program will be a poor use of time.	0.69	0.61	0.47	0.81
The public health program will be an overwhelming responsibility.	0.25	0.41	0.24	0.84
The public health program will be an example of busy work.	0.66	0.57	0.42	0.81

taught the course displayed enthusiasm, positive energy, and commitment to public health activities, which may have influenced student assessment of the course. Given the similar results of earlier studies focusing on students' opinions of elective and experiential courses, pharmacy students seem to see a lot of value in taking public health-related courses. It could also be due to the high expectations or perceptions first-year pharmacy students may have about pharmacists' roles in the health care system. Finally, it could also be a function of the rating scale used to measure pharmacy student attitudes in this study.

From an academic pharmacy perspective there are several implications from the findings of the study. Pharmacy student enthusiasm about public health education is high. This provides an opportunity to not only make public health education a part of pharmacy education but also make curricular changes and interventions required to develop pharmacy student competencies and facilitate them in becoming public health care providers. Because this is the only public health course offered in their pharmacy education, students' positive attitudes for a public health course should be maintained and support given throughout their education so that they can implement health promotions programs in their future professional practice. This could be done through several mechanisms including collaborations between schools offering public health degrees and pharmacy schools, pharmacy schools and departments of public health, and student participation in research activities identified by the PharmD gateway to the National Institute of Health.[19] Finally, it is essential to create an environment where students realize that the burden of working together and creating common public health goals rests on the shoulders of all healthcare professionals. So far, the medical and nursing professions have taken an active lead in developing health promotion and disease management programs. This study shows that future pharmacists will be more receptive to active participation in health promotion and disease management programs. However, more work needs to be done to create public health program teams that include physicians, nurses, pharmacists, and allied healthcare professionals. Again, collaborations between medical, nursing, and pharmacy schools can serve as a forum through which pharmacy students can become an integral part of a public health care team.

Since the course is relatively new, the pedagogic exercise that required developing but *not* implementing a public health program was designed to get students to think about the issue and their future role as pharmacists in health promotion and disease prevention. While this was the first step, teaching students how to implement their public health programs will be vital to them realizing the impact they could have on the development and

Table 3. Pharmacy Students' Attitudes Toward a Public Health in Pharmacy Course, % (N=198)

Conceptual Factor and Expectation	Extremely	Very	Slightly	Not At All
Affective Appeal and Practical Value	11.0	45.9	38.6	4.5
Interesting	19.2	51.0	28.3	1.5
Relevant	15.9	67.2	16.9	0.0
Informative	1.5	14.1	73.7	10.6
Good	12.2	62.2	25.0	0.5
Stimulating	10.6	52.5	34.3	2.5
Worthwhile	14.9	64.4	20.1	0.5
Valuable	16.8	62.4	20.8	0.0
Challenging	3.0	26.4	62.9	7.6
Practical	14.5	59.1	25.4	1.0
Different	8.8	43.5	42.0	5.7
Enjoyable	12.3	49.2	36.4	2.1
Enlightening	11.6	56.6	30.8	1.0
Necessary	16.8	54.6	27.6	1.0
Exciting	10.3	41.5	44.1	4.1
Rewarding	18.4	37.2	43.4	1.0
Provocative	6.1	28.1	39.8	26.0
General	2.1	30.3	51.8	15.9
Useless	3.5	25.8	70.7	0.0
Apathy	1.8	25.7	37.8	34.7
Boring	1.0	47.2	51.8	0.0
Irrelevant	3.2	8.6	26.3	61.8
Dull	1.6	46.1	52.3	0.0
A waste	1.5	1.0	20.8	76.6
Difficulty	4.35	25.65	63.7	6.3
Difficult	1.0	14.1	74.2	10.6
Demanding	7.7	37.2	53.1	2.0

implementation of public health programs in the future. To that end, plans are being made to modify the course to allow for implementation of the programs developed by students. Currently, faculty members are exploring the possibility for developing a service-learning component for the course. The service-learning component would enable pharmacy students to develop and implement community-based health education and disease prevention programs in nursing homes, homeless shelters, and schools, and measure the outcomes from the programs. Given the large number of students (over 200) enrolled in the course, the task of assigning students to different sites will be challenging. Nonetheless, the potential benefit to pharmacy students, people in the targeted communities, and society overall will be tremendous and a step toward fulfilling the mission of pharmacy in public health.

Several limitations are associated with this study. First, this study was conducted in a single school of pharmacy at a private university that caters to a diverse ethnic group of students in a large metropolitan city. Thus, generalization of study findings is limited. Second, the course described in the study was developed using the public health-related concepts outlined in the Clinical Prevention and Population Health Framework for Health Professions developed by the Healthy People Curriculum Task Force[14] and based on the endpoints outlined in the AACP Supplemental outcomes for SAS.[8] Courses not based on these concepts may yield differential responses. Third, social desirability bias induced by the survey methods may be partially responsible for the overall positivity displayed in student responses. A non-personal forum (WebCT by Blackboard, Washington DC) was used to reduce this bias. Fourth, the data collected for the study was only quantitative in nature. Qualitative data would have provided more insights into areas of the course that could be improved. Finally, this is the first study to use the adjective rating scale in pharmacy. While it has been validated in nursing studies, future studies need to examine the validity of the adjective rating scale for assessing pharmacy students' attitudes.

CONCLUSION

Pharmacy students have a positive attitude towards public health-related concepts being taught in a required

Table 4. Pharmacy Students' Attitudes Toward Development of a Public Health Program, % (N=198)

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The public health program will be an opportunity to help the community	1.6	1.0	14.5	45.6	37.3
The public health program will be a way to promote the practice of pharmacy	2.0	0.5	14.9	46.2	36.4
The public health program will be a good way to work with the classmates.	1.0	1.0	19.3	51.3	27.4
The public health program will be a good use of time.	1.0	7.3	26.4	51.8	13.5
The public health program will be an opportunity to make a difference.	1.0	0.5	21.8	45.7	31.0
The public health program will be an opportunity to apply my knowledge.	0.5	1.5	12.2	57.4	28.4
The public health program will be a bad experience of working in a group.	26.0	49.5	15.8	3.6	5.1
The public health program will be a poor use of time.	25.4	51.3	16.8	2.5	4.0
The public health program will be an overwhelming responsibility.	3.0	27.4	47.7	17.3	4.6
The public health program will be an example of busy work.	10.7	53.6	24.0	5.1	6.6

public health course, and towards developing public health programs. Curricular changes and collaborations with public health departments, schools, and other health-care professional programs need to be made to mold these positive attitudes into actions as pharmacy students become future public health providers.

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