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Research

Assessing public health knowledge and perceptions of pharmacy students before and after completion of didactic and experiential public health coursework

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Abstract

Objectives: To characterize baseline public health knowledge and to evaluate changes in pharmacy student performance after participation in one semester of didactic and experiential public health coursework.

Methods: Third-year professional students were surveyed before and after fall semester 2013, a semester in which they completed two public health courses.

Results: Total public health knowledge score increased from 61.5% to 65.2% ($p = 0.006$). An increase in mean knowledge score was significant for the domains of social and behavioral science, and epidemiology, but not for the domains of biostatistics, environmental health, and health policy. Students initially perceived the pharmacy curriculum to do the best at preparing them in epidemiology, but this perception changed to social and behavioral science after taking the public health courses.

Conclusion: A semester of focused public health exposure increased knowledge scores in public health topics by 3.7%. Perceptions about public health education in the pharmacy curriculum were also changed.

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Introduction

The purpose of public health is to improve population health through disease prevention and health promotion. Improving population health outcomes will require better integration of clinical and population-based interventions and measures.¹ Achieving this mission depends on a multi-disciplinary approach, as has been observed in public health nursing and primary health care delivered in collaboration with public health services.^{2,3} Public health goals would be more completely and effectively achieved by increased

contributions from the discipline of pharmacy. However, it also depends on the work being consistent with the core competencies that define public health as established by the Association of Schools and Programs of Public Health.⁴

Pharmacy is increasingly involved in public health. However, a significant gap remains between the disciplines of pharmacy and public health, both professionally and historically. Understanding the extent and content of this gap is critical if pharmacy and public health are to partner in a way that achieves significantly improved population health outcomes.⁵ It is essential that the discipline that is trying to become involved in public health, in this case pharmacy, contribute to the realization of the essential services of public health, which require competency in the theory and practice of public health science.^{6,7}

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Table 1
The five core competencies of public health

Core competency	Definition	Pharmacy examples
Biostatistics	The development and application of statistical reasoning and methods in addressing public health problems.	Interpretation of data reported in the drug literature, using the correct statistical test in data analysis.
Environmental health sciences	The study of environmental factors that affect the health of a community.	Proper disposal of hazardous medication waste, importance of medication take-back programs.
Epidemiology	The study of patterns of disease and injury in human populations and the application of this study to the control of health problems.	Determining disease frequency in large populations, risks associated with medication use.
Health policy and management	Study of the delivery, quality, and costs of health care for individuals and populations.	How pharmacy policy is established, the history and role of the Centers for Medicare and Medicaid, and the Food and Drug Administration.
Social and behavioral sciences	Study of the behavioral, social, and cultural factors related to individual and population health over the life course.	Reasons for patient non-adherence to medications, the role of human behavior in disease risk.

In the recent decade, there has been a deepening involvement of pharmacy in public health and clarifying the relationship between these two health care disciplines.^{8–10} One of the issues remaining to be clarified is what public health skills pharmacy students need in order to contribute to the achievement of public health essential services.¹¹ Palombi et al.⁹ have suggested steps to involve pharmacy students in public health, including dialog with public health departments, expansion of public health in pharmacy curricula, hands-on public health learning, and other ways of developing pharmacists as public health professionals. But there is no indication of which public health principles serve as the framework for these objectives. This study aims to contribute to on-going discussion regarding the best way to educate pharmacy students in public health.

No data currently exist on pharmacist or pharmacy student understanding of the five core competencies of public health, so primary data was collected through the design and implementation of an assessment instrument using standard survey research criteria.¹² Determining baseline knowledge can serve as a compass for determining appropriate learning activities, and to modify implementation of public health education in the pharmacy curriculum.¹³ This study set out to determine pharmacy students' baseline knowledge of public health and the change in this knowledge as the role of public health in pharmacy is taught to them in the fall of their third professional year.

Methods

A 40-item instrument was created by investigators to assess public health knowledge (Appendix A). One of the investigators delivered the Public Health for Pharmacists course, and one of the investigators coordinated the introductory pharmacy practice experiences (IPPE) experience reported here. The design of the course and the IPPE-III experience preceded the design of the instrument. The five core public health competencies were used as the framework in the development

of this 40-item assessment instrument determined (Table 1). Other benchmarks used for assessing competency were consulted, including the Accreditation Council for Pharmacy Education (ACPE) standards and the North American Pharmacist Licensure Examination (NAPLEX) blueprint for public health competencies (Area 3).^{14,15}

Each of the five competencies contained questions assessing knowledge (biostatistics: seven items; environmental health sciences: four items; epidemiology: eight items; health policy management: eight items; and social and behavioral sciences: five items). Additionally, attitude was assessed through eight items. The knowledge areas were built on the definition of that core competency and practical application of that competency to pharmacy, focusing on the knowledge, understanding and application levels of learning (Appendix A). The instrument was built on the lower three domains of Bloom's taxonomy of learning: knowledge, comprehension, and application. Results from the attitude questions were not included in the present article.

Validity of the instrument was ensured in several ways. Construct validity was ensured by operationalizing the constructs through three iterations of discussion regarding the definition of each of the five categories. Face validity was accomplished by a focus group involving 10 pharmacy students to discuss and modify the assessment questions for clarity, completeness of response options, and level of difficulty. Content validity was ensured by the work of 11 public health and pharmacy experts who evaluated the instrument items for their essentiality in assessing that competency from which a content validity ratio (CVR) was calculated. Six items had a CVR below zero so they were eliminated and replaced with attitudinal questions. This explains the resulting disparate number of items for each competency, which did not affect the results obtained or discussed. Internal validity was ensured by having ten pharmacy students pilot test the assessment. Item discrimination analyses were performed on student responses to all knowledge questions. No questions had an item

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