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Experiences in Teaching and Learning

Design, implementation, and evaluation of educational workshop on management of Parkinson's and Alzheimer's disease patients for third-year pharmacy students

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ABSTRACT

Background and purpose: Increasing aging populations in the United States means an increasing number of persons with Parkinson's disease (PD) and Alzheimer's disease (AD) requiring competent pharmaceutical care. The workshop was designed and implemented to integrate pharmacology and therapeutics in management of PD and AD, and evaluate efficacy of students' high-cognitive thinking, and self-rated knowledge improvement, confidence, and interest in the subject.

Education activity and setting: Third-year pharmacy students participated in a three-hour workshop comprised of a foundational knowledge quiz from pathophysiology, pharmacology and therapeutics, performance on high-cognitive thinking in clinical scenarios, and hands-on activities in pharmacology and therapeutics related to PD and AD care. Pre- and post-education, Likert-style questions assessed students' self-rated confidence, interest and knowledge improvement. Descriptive statistics, paired *t*-test, and chi-square analyses were performed using Stata 10.1 statistical software (College Station, TX: Stata Corp LP).

Findings: Eighty-four of 93 students (90.3%) completed all workshop activities. Students' ability to apply knowledge in complex case mediation problems was not associated with performance on baseline quiz questions (Pearson *r*: 0.03–0.17). Completion of structured, hands-on active learning integrating clinical pharmacology and therapeutics had measurable immediate benefit solving high-cognitive order problems in clinical scenarios ($p < 0.05$). Hands-on activity also increased mean self-rated confidence ($p < 0.01$). Students (85.6%) reported knowledge improved "somewhat" or "very much" after the activity. Mean scores before and after hands-on activity were not associated with interest in the topic.

Summary: Structured, hands-on workshops can aid comprehension of taught/lectured material and its application to PD and AD, and is a way for instructors to close gaps between didactic lecture and clinical practice.

Background and purpose

With our growing aging population in the United States (US), the number of persons diagnosed with Parkinson's disease (PD) and Alzheimer's disease (AD) will continue to rise.^{1–3} Management of persons with PD and AD presents health care professionals with

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many challenges, such as dealing with the progressive nature of a chronic disease and complex medication regimens with increasing medical and therapeutic complications, as well as advanced age of individuals affected by these disorders.⁴⁻⁹ Clinically relevant drug-drug and drug-disease/condition interactions and adverse drug events are common problems in persons with PD and AD, and can significantly impact morbidity and mortality.¹⁰⁻¹⁷ These drug-related problems (DRPs) can usually be prevented with appropriate medication selection and administration, and proper patient medication education.^{5,10,12-14,18} Taking into consideration pharmacists' clinical expertise and practice, they are well-suited to play important roles in prevention, recognition, and resolution of DRPs in older adults with PD, AD, and other chronic conditions.¹⁹⁻²¹

Given our growing older adult population, Doctor of Pharmacy (PharmD) curricula across the US should strengthen/enhance education in geriatric care.²²⁻²⁴ To provide safe and effective care for PD and AD populations, it is important that pharmacy graduates possess a strong scientific and clinical knowledge base in PD- and AD-related pharmacology, disease pathophysiology, clinical presentation, assessment, diagnosis, and management. They should be able to not only recall or understand the information, but also to apply and integrate learned material to solve problems.²⁵⁻²⁷ To foster development of high-order thinking skills and abilities among pharmacy graduates, as well as to increase students' active participation and interest in taught subjects, a more student-centered teaching approach in healthcare education, active-learning, is being given increased emphasis compared to didactic lecture-based teaching.²⁸⁻³³ The Accreditation Council for Pharmacy Education (ACPE) endorses critical skills development through active-learning strategies.³⁴ In our PharmD curriculum, we developed an interactive workshop to provide an opportunity for third-year pharmacy students to discuss and practice integration and application of previously-learned information delivered using didactic lectures in pharmacology and therapeutics of PD and AD.

The overall goal of this pilot study was to develop, implement, and evaluate an interactive workshop integrating pharmacology and therapeutics in PD and AD. Specific objectives were to: (1) design and implement workshop activity, (2) enhance students' high-cognitive thinking, (3) increase student confidence in PD and AD management, (4) understand if active-learning exercises with discussion/clarification of material increases students' interest in PD and AD management, and (5) understand if pre-interventional (prior to hands-on) performance on three case scenarios on DRP and appropriate therapy recommendations was associated with high baseline interest or confidence in PD and AD management.

Educational activity and setting

Study participants and workshop integration into the curriculum

The study was approved by the University's Institutional Review Board. Participants ($n = 93$) were third-year PharmD students. This workshop was incorporated into a four-credit hour required core didactic course integrating clinical chemistry, disease pathophysiology, pharmacology, and therapeutics for primarily neurologic and psychiatric diseases/disorders.

The workshop was designed and delivered by a single full-time faculty member/licensed pharmacist with expertise in neuropsychiatry and geriatrics. The faculty served as course co-coordinator and was responsible for coverage of all previously taught therapeutic lectures on PD, cognitive impairment, and AD. This faculty member also worked closely with other faculty teaching pharmacology and pathophysiology to coordinate material to provide seamless coverage of PD- and AD-related information. Attendance was taken during prior therapeutic PD and AD lectures. The faculty was solely responsible for grading quizzes, scoring clinical scenarios, taking attendance, and assigning points for the workshop.

Workshop logistics

Total time dedicated for the workshop was 150 min. It was composed of sequenced graded and ungraded activities and assessments linked to different Bloom's taxonomy (BT) learning domains (Fig. 1). The baseline quiz and hands-on session were mandatory for students enrolled in this course and were included in the course grading structure. Participation was noted at the beginning and end of hands-on activity and students present for the entire 90-min session received five attendance points. Students could acquire two extra points for completion of three short case scenarios and two Likert-style questions assessing confidence and interest, as well as two extra points for completion of the same three case scenarios after completion of in-class hands-on activity and three additional Likert-type questions assessing confidence, interest, and knowledge. These four extra credit points were proportional to 0.5 % of the course point total.

Workshop activity structure

The workshop began with a short multiple-choice quiz taken individually (Fig. 1, Table A1). Questions were written at the low-cognitive level to assess students' foundational knowledge and understanding of disease pathophysiology, pharmacology, and therapeutics from prior didactic course lectures.

Immediately following the quiz, students were informed about the workshop and research being conducted, completion of the three short case scenarios and two Likert-type questions was voluntary, and completion of these would serve as consent to participate in the study. The handout included scenario instructions, detailed scenario information, and two Likert-type questions on: 1) confidence in providing PD/AD management, and 2) interest in PD/AD management (Fig. A1.A). The purpose of the scenarios was to assess students' baseline high-cognitive thinking/abilities after having completed only prior, primarily didactic lectures (Fig. 2). Scenarios were set in fictitious outpatient clinic/community pharmacy settings and considered actual practice experiences,

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