BACKGROUND

- The Accreditation Council for Pharmacy Education standards in the 2016 Standards that pharmacy calculations is required in the didactic PharmD curriculum in order to ensure pharmacy students are able to apply these skills and provide optimal patient care.
- Some students struggle with this portion of the pharmacy curriculum, which may lead to administering incorrect and harmful doses to future patients.
- Majority of pharmacy schools utilize classroom lectures, however a web-based pharmacy calculations course has demonstrated positive student feedback and significant reductions in remediation due to self-paced mastery of the material throughout the semester and required passing of each module.
- Due to the non-existent margin of error with pharmacy calculations, at Western University of Health Sciences College of Pharmacy (WesternU COP), we have implemented a high-stakes, 80% passing rate for calculations exams administered in the P1 year (after the course is originally taught) and again in the P2 and P3 years to test retention.

OBJECTIVES

- Evaluate students’ perceptions of educational and teaching methods in the 1st year pharmacy calculations curriculum.
- Identify if there is a difference in paper-based vs. computer-based assessments.
- Correlate objective performance to students’ perceptions of the methods, from the first goal, and with regards to predictors of success.
- Determine the preparation methods other colleges of pharmacy are utilizing to prepare their students for the NAPLEX examination, with regards to videos for calculations and computer-based exams.

METHODS

- IRB approved through WesternU COP.
- Inclusion: P1 students enrolled in PHRM 5302 at WesternU and other COP faculty for a separate online survey.
- Students were consented and participated in a 27-question survey on perceptions of the pharmacy calculations teaching methods and predictors for success, which utilized a 5-point Likert scale [1 = Strongly disagree; 5 = Strongly agree] and three free-response questions, and was administered after the computer-based final calculations exam.
- Students were given a random ID number, which was linked to survey responses. Random IDs were then linked to performance scores by a non-investigator.
- Professors from other COPs were consented through email to participate in a separate 8-question survey via SurveyMonkey to assess teaching methods.
- Statistical analysis:
  - Fisher’s exact for predictors of success (agree/strongly agree vs. other) with endpoint of pass vs. no pass.
  - Linear regression for correlation between survey responses and performance scores.
  - Student t-test for continuous endpoints of paper-based vs. computer-based assessments.
  - Descriptive statistics.

RESULTS

- **Student Perceptions of Teaching Strategies and Methods**

  - **Predictors of Passing the Calculations Exam**
    - 90% confidence interval
    - p-value
  - Mathematics classes have always come easy to me
  - For the final calculations exam, I felt prepared and less anxious with practice
  - Practicing calculation problems from the book prior to the calculations exam prepared me to perform better
  - Utilizing props or having pictures in the problems for visualization helped me to perform better on the quizzes and exam
  - I have a difficult time understanding what the calculation question is asking for to be able to set up the problem.
  - I read the test book prior to class and/or after class to help reinforce the concepts
  - The online practice quizzes on Blackboard helped to prepare me for the calculations preparation.

- **Correlation Between Perceptions and Performance**

  - I felt confident in pharmacy calculations at the beginning of the course

- **Paper vs. Computer-Based Assessments**

  - Comparison
    - Quiz 1 vs. Quiz 2
    - Quiz 1 vs. Quiz 2 & Exam
  - Paper vs. Exam: Computer

- **Responses from Other Colleges of Pharmacy**

  - The majority of Colleges of Pharmacy teach pharmacy calculations in the P1 year (89.6%)

- **Didactic Hours for Pharmacy Calculations**

  - Computer-Based vs. Paper-Based Assessments

  - Mathematics classes have always come easy to me

- **Linear regression for correlation between survey responses and performance scores**

- **Minimum passing percent for calculations comprehensive exam?**

  - 87.4
  - 32.6

- **Majority of assessment questions in multiple choice format?**

  - 45.8
  - 54.2

- **Online flipped classroom to any extent for pharmacy calculations?**

  - 35.4
  - 64.6

- **Revisor integrated comprehensive pharmacy calculations exams?**

  - 37.5
  - 42.5

REFERENCES