AACP REPORT

Trainee Poster Competition Abstracts Presented at the 122nd Virtual Annual Meeting of the American Association of Colleges of Pharmacy, July 19-22, 2021

"Alohomora!" Unlocking Student Engagement in an Elective Course Through Themed Competition

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Objective: To assess the impact of a semester-long, team-based, themed learning competition on student engagement and performance in a solid organ transplant elective course during the COVID-19 pandemic. Methods: Second- and third-year students were enrolled in the elective and “sorted” into four “Houses” for a Harry Potter themed competition. Points were earned by winning interactive games and answering audience response questions. The impact of the competition was assessed through pre- and post-class surveys, competition participation data, and overall academic performance. T-test, chi-square, and linear regression were employed for comparisons. Results: Due to the pandemic, the elective was the only traditional in-person course for 33 of 34 (97.1%) students. A total of 23 (69.7%) indicated prior interest in Harry Potter. Throughout the semester, 96.5% of students in attendance engaged in the optional in-class competitions, which was comparable to non-pandemic levels of participation (p=.78). By the end of the semester, 94.1% of students had earned “House Cup” points (median 23.75, range 0 to 210). Prior interest in Harry Potter did not have an impact on House Cup performance (p=.65). Students earning 20-35 or >35 House Cup points had higher final course grades (+4.2 [p=.012] and +6.6 [p<.001], respectively) than those with <20 points. In the post-class survey, 84.0% of respondents indicated in a free-text field that the competition was their favorite course component. Conclusions: Students responded well to the competition regardless of their interest in Harry Potter. Students performing well in the House Cup performed better in the course overall, and the majority considered it to be their favorite course component. These findings suggest that gamification and competition are valuable tools to sustain student engagement during a pandemic.

A Before-After Evaluation of the Impact of Remote Proctoring on Academic Performance

Madison B. Roberts, The University of Tennessee, Elizabeth A. Hall, The University of Tennessee, Dawn Havrda, The University of Tennessee.

Objective: To evaluate changes in student pharmacist exam scores after transitioning to remote proctoring, specifically when considering student grade point average (GPA) and level of testing anxiety. Methods: This is the second part of a retrospective, observational study that compared first-year (P1) and second-year (P2) student pharmacist composite exam scores administered in spring 2020 (n=384), which had four in-person exams and three remotely proctored exams. Students served as their own controls in a before-after analysis where the transition point was the implementation of remote proctoring. To assess for differences in exam scores amongst students with varying levels of testing anxiety, students were first classified into one of three groups (low, moderate, or high testing anxiety) based on Cognitive Test Anxiety Scale-Second Edition (CTAS-2) score. Kruskal-Wallis tests compared the difference in median scores amongst the CTAS-2 severity groups. Students were also stratified into one of two groups based on their cumulative GPA (ie, upper 50% or lower 50%); Mann Whitney tests compared the difference in median scores for these two groups. Results: When stratified by student CTAS-2 score, no significant difference in exam scores was found. When stratified by GPA, no significant difference in exam scores was found for P1 students, but a significant difference was noted for P2 students. Specifically, the lower 50th percentile GPA group had significant exam score improvements after transitioning to remote proctoring and testing. Conclusions: Remote proctoring and testing has a seemingly minimal impact on academic performance regardless of a student’s CTAS-2 score, yet may lead to improvements in score for students with a lower GPA.

A Qualitative Analysis of the COVID-19 Pandemic’s Impact on the US Pharmacy School Teaching

Reina Sanz, University of the Pacific, Rajkumar J. Sevak, University of the Pacific.

Objective: The COVID-19 pandemic has enforced substantial changes on educational institutions throughout the US. Many pharmacy schools shifted their academic programs...
An Analysis of First Professional Year Pharmacy Students’ Wellbeing Priorities and Perceptions

Michelle Rapier, East Tennessee State University, Nicholas Hagemeier, East Tennessee State University.

Objective: 1) To identify first professional year (P1) pharmacy students’ prioritization of wellbeing domains they most desired to improve; and 2) to summarize students’ wellbeing promoting action steps across all Gallup domains.

Methods: Students were introduced to Gallup’s wellbeing Assessment & Planning assignment in which they prioritized the Gallup wellbeing domain they most desired to improve. Two student cohorts also provided qualitative statements describing one action they would like to take to improve each wellbeing domain. Three researchers independently coded student responses and identified themes across wellbeing domains. Results: Physical wellbeing was the domain students most desired to improve in each cohort, ranging from 36% to 50% percent of students. Community wellbeing was the second most chosen wellbeing domain in two cohorts, while financial wellbeing was the least chosen domain to improve in three of the four cohorts.

A Scoping Review of Cumulative Exams as a Testing Modality


Objective: A cumulative exam is a testing modality that combines learning objectives and questions from different courses into a single exam. This differs from the traditional testing methods of deriving exam content from a solitary course, with each course conducting its own assessments. The integration of cumulative exams within academic programs requires increased coordination between courses and support from academic leadership. The effect of cumulative versus single course exams on student academic performance is not clear. A scoping review was conducted to examine how cumulative examinations compare to the traditional test taking approach with respect to student academic performance. Methods: Following the Preferred Reporting Items Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines, this scoping review included studies comparing cumulative exams to traditional examination processes. An electronic search was conducted using six databases: PubMed, ERIC, SCOPUS, cINAHL, PsychINFO, Academic Search Ultimate, and Education Full Text; additionally, an electronic search for grey literature was conducted within Pharmacy Education Certification websites (ie, ACPE, NABP) and Proquest (for dissertations & Theses). The search criteria were developed/validated by an academic librarian, and two academia pharmacists. Following an initial title search and removal of duplicates, abstracts were reviewed and full-text articles were assessed to confirm studies met inclusion criteria. From the studies that met eligibility for the scoping review, data were collected utilizing a standardized data extraction tool and data were then analyzed utilizing descriptive analysis techniques.

Results: Research in progress. Conclusions: The findings from this study will be presented in July 2021 during the AACP Virtual Annual Meeting.
budgeting money (financial) were the most commonly noted action steps students desired to take. **Conclusions:** Students identified physical wellbeing as the domain most desired to improve with exercise being the most common action to improve their physical wellbeing. Student perceptions should be considered by colleges and schools as they target wellbeing-promoting interventions.

**Assessing the Impact of a Pharmacogenomics Educational Intervention for Student Pharmacists in the PharmD Curriculum**


**Objective:** Pharmacogenomics is growing traction as precision medicine emerges within clinical practice. This area of practice may not be covered comprehensively within PharmD curricula. The objective of this study was to assess how incorporating a pharmacogenomics educational intervention with personal genotyping in a required course may change the perceptions and attitudes of student pharmacists. **Methods:** This study recruited University of North Carolina Eshelman School of Pharmacy second-year PharmD students from 2016 to 2019 who were enrolled in a 15-week required clinical pharmacology course. Surveys were provided pre- and post-educational intervention regarding perceptions and attitudes in student pharmacists. Pharmacogenotyping was performed using next-generation sequencing with molecular inversion probes. Pre- and post-intervention surveys were analyzed using descriptive statistics and the Wilcoxon-signed rank test. **Results:** A total of 549 second-year student pharmacists completed the pre-intervention survey with 370 of these student pharmacists (67%) also completing the post-intervention survey. There were statistically significant improvements in perceptions and attitudes from pre- to post-intervention, including familiarity with pharmacogenomics resources (eg, guidelines) for use in the clinical setting (*p* = .006), identifying therapeutic areas in which pharmacogenomics testing is required (*p* < .0001), interpreting the results of pharmacogenomic testing from patients (*p* < .0001), and recommending personal genotyping to patients (*p* < .0001). Student pharmacists reported having a better understanding of pharmacogenomics after personal genotyping (91%) and the educational intervention helped them understand the patient’s experience (88%). **Conclusions:** After the educational intervention, student pharmacists reported improvements in their understanding of pharmacogenomics and how it can be incorporated into clinical practice. This intervention including personal experience in genotyping can be transferred to additional pharmacy curricula.

**Assessment of a Virtual Interview Experience for Prospective College of Pharmacy Students**


**Objective:** Due to the COVID-19 pandemic, the University of Texas at Austin College of Pharmacy adapted the Prospective Student Interview process for cohorts projected to join the Class of 2025. The entire interview process was moved from in-person to a virtual format to allow a safe and accessible way to recruit students. This study will outline the process of transitioning to the virtual format and use a survey to assess the virtual interview experience for prospective college of pharmacy students. This data will be used to assess the utility of virtual interviews in the future. **Methods:** The virtual process included a pre-interview day and an interview day with four distinct sections: Multiple Mini Interviews, Interview Activity, Student Showcases, and Closing Remarks. A 15 item Qualtrics survey was developed and sent to applicants during the 2020-2021 interview cycle. Both quantitative and qualitative data will be collected using Likert scales regarding their experience. Following data collection, the data will be evaluated and used for implementing changes in the future process. **Results:** Work in progress. **Conclusions:** Contingent on the data collected, the virtual interview process is a viable method to continue interviewing applicants. Although the interview process will likely transition back to an in-person format, virtual interviews could be utilized post-COVID as an alternative interview process. This could be utilized to decrease barriers to access for students unable to attend in-person interviews due to financial or logistical difficulties. The described process of implementing virtual interviews as well as the data collected from the survey could be extrapolated to other schools of pharmacy hoping to implement flexibility in the interview process.

**Assessment of Clinical Knowledge in an Interprofessional Education Session Utilizing Team-Based Learning**

Kirsten A. Vyhmeister, Loma Linda University School of Pharmacy, Erin Richards, Loma Linda University School of Dentistry, Farnoosh Zough, Loma Linda University

Comparison of Virtual and In Person Learning in a Required Nonsterile Compounding Course

Laurie Hallegado, UNC Eshelman School of Pharmacy, Robert Shrewsbury, University of North Carolina at Chapel Hill.

Objective: The required nonsterile compounding course at the UNC Eshelman School of Pharmacy was adapted to accommodate virtual learning due to the COVID-19 pandemic. Various assessments were compared between the in person (Fall 2019, n=158) and virtual (Fall 2020, n=124) courses to determine if virtual learning had an impact in student learning. Methods: The assessment compared weekly quizzes, weekly clinical discussions, and overall course grades averaged into grade sets. Statistical differences between the grade sets were calculated using the Wald z-test (p<.05) because the averages were the total population data. Results: The comparison of the weekly quizzes in Fall 2019 and Fall 2020 was statistically different with the Fall 2019 (in person learning) having the higher average grade. There were no statistical differences between

Characterization of Student Pharmacists’ Experience with the Transition to Online Learning During the COVID-19 Pandemic

AnnMarie E. Baker, VCU School of Pharmacy, Lauren Pamulapati, Virginia Commonwealth University, Rachel Koenig, Virginia Commonwealth University, Rotana Radwan, VCU School of Pharmacy, Teresa M. Salgado, Virginia Commonwealth University, Lauren Caldas, Virginia Commonwealth University.

Objective: This study aims to assess individual student pharmacists’ experience with the transition to online learning during the COVID-19 pandemic nationally. Methods: This was a cross-sectional study utilizing anonymous Qualtrics surveys sent to ACPE accredited schools of pharmacy after the Spring 2020 semester. Likert-scale questions measured student’s individual experiences during the transition to online learning due to the COVID-19 pandemic. Descriptive statistics present characteristics and responses with means and standard deviations for continuous variables, and frequencies and percentages for categorical variables. Statistical analyses were conducted with JMP Pro 14 and SAS version 9.4. Results: A total of 471 students from 36 different schools of pharmacy across the nation responded to the survey, representing all of the eight APhA-ASP regions. The average age was 25.3 years old and a majority were female (74.2%). While 34.8% students said they preferred taking exams from home, 52.8% disagreed that learning virtually was preferred over face-to-face instruction. Students reported worse engagement in classes (55.8%), even with the highest percentage of responses indicating no change in their access to resources (45.7%), semester grades (51.9%), or overall grade point average (55.6%). Students felt most supported by their families and friends (70.6%), while engagement with peers was somewhat worse or much worse (64.5%). Additionally, 56.4% reported a worse pharmacy school experience compared to 10.8% reporting a better experience. Conclusions: While some elements such as exam taking were preferred during the transition, the majority of the students’ pharmacy school experience was worsened. As faculty continue to navigate virtual learning in higher education, the student perspective and experience is key in determining what portions of virtual learning are suitable for retention.

School of Pharmacy, Huyentrans Tran, Loma Linda University School of Pharmacy, Khaled Bahjri, Loma Linda University School of Pharmacy, Alireza Hayatshahi, Loma Linda University School of Pharmacy.

Objective: Demonstrate Team-Based Learning (TBL) as an effective pedagogy to assess dental and pharmacy students’ application of interprofessional clinical knowledge, utilizing Team Readiness Assurance Test (tRAT). Methods: All second-year dental and pharmacy students attended a virtual interprofessional case-based session as part of their required didactic curriculum. Their performance was counted toward their final course grades. Five clinical cases were given to the students and a corresponding tRAT assessment, testing their clinical knowledge on these cases, was completed by separate groups of pharmacy and dental students. Finally, all students were assigned to mixed dental-pharmacy groups to take an “interprofessional” tRAT which was, unknown to the students, the very same assessment. At the end of the session, the faculty members discussed the cases and corresponding tRAT assessments with the students. Results: A total of 104 dental and 74 pharmacy students participated in this study. There were five faculty members from the schools of dentistry and pharmacy to serve as moderators of the session. The aggregate data from the tRAT scores were analyzed and reported as 10.4 points, 12.0 points, and 12.2 points for pharmacy, dental, and interprofessional cohorts respectively. These scores were out of 15 points in each tRAT. The TRAT scores from the interprofessional groups were higher than that of the single-profession groups. Conclusions: This assessment demonstrates that an interprofessional approach to clinical cases and therapeutics discussions improves the quality of team-based applied clinical knowledge. It appears to be superior to the traditional single-profession pharmacy and dental team siloed method. This would be an efficient model for future clinical practice.

Characterization of Student Pharmacists’ Experience with the Transition to Online Learning During the COVID-19 Pandemic

AnnMarie E. Baker, VCU School of Pharmacy, Lauren Pamulapati, Virginia Commonwealth University, Rachel Koenig, Virginia Commonwealth University, Rotana Radwan, VCU School of Pharmacy, Teresa M. Salgado, Virginia Commonwealth University, Lauren Caldas, Virginia Commonwealth University.
the grade set averages of clinical discussions or overall course grades. **Conclusions:** Though the move to virtual learning was not voluntary but circumstantial, the new pedagogy appeared to have a modest impact on the students’ level of learning. A possible explanation for the smaller quiz grade average among virtual learning students is due to the technological challenges with quizzes given online versus on paper, as suggested by previous studies. However, the more likely explanation is that the in-person students had the advantage of additional hands-on laboratory experiences to add to their learning which was absent in the virtual learning group. The results suggested that “learning by doing” may have helped the students’ ability to comprehend and retain the information.

**Cost Analysis of Rivaroxaban versus Enoxaparin for Venous Thromboembolism Prophylaxis in Acute Medically Ill Patients**

Phoenix J. Riley, Campbell University; Charles Carter, Campbell University; Meredith Lilley, Campbell University.

**Objective:** Acute medically ill patients are at high risk for venous thromboembolism (VTE). Subcutaneous enoxaparin is the ‘gold’ standard therapy in these patients. Recently, one direct oral anticoagulant has been approved for this indication by the FDA; rivaroxaban (2019). The aim of this study was to perform a cost analysis of rivaroxaban versus enoxaparin for VTE prophylaxis. **Methods:** Cost estimates of rivaroxaban and enoxaparin were obtained from publicly available sources (CMMS, Drugs.com). Cost estimates for clinical outcomes were garnered from literature and public databases (CMMS). Data from a key trial (rivaroxaban: MAGELLAN) was utilized to determine probabilities of potential clinical outcomes. A decision tree model was constructed (TreeagePro) for analysis of the therapy relative to enoxaparin. Doses/regimens were consistent with approved labeling. Costs were reported in 2019 United States currency (USD) and the study was performed from a societal perspective. Discount rate was 5%. Monte Carlo (probabilistic sensitivity) analyses were performed. Results are expressed as expected value (EV) or the average cost for each treatment strategy. Two-way sensitivity analyses using 50% to 200% of the key VTE clinical outcomes was performed. **Results:** The EV for the comparison of enoxaparin to rivaroxaban favored enoxaparin ($1,271 versus $1,650; 22.3% difference). **Conclusions:** In acute medically ill hospitalized patients at risk for VTE, the EV of enoxaparin was more optimal than rivaroxaban based upon clinical trial results. These results are valuable in guiding effective clinical decision making and assessments for formulary inclusion. As further clinical outcome data becomes available, it is recommended that similar analyses be repeated to better model real-world settings.

**Cultural Intelligence Framework: Student Insights and Experiences**

Minshew M. Lana, University of North Carolina at Chapel Hill, Diana Lee, University of North Carolina at Chapel Hill, Carla Y. White, University of North Carolina at Chapel Hill, Mary McClurg, University of North Carolina at Chapel Hill, Jacqueline McLaughlin, University of North Carolina at Chapel Hill.

**Objective:** Pharmacists are well poised to address healthcare disparities; however, they are not adequately trained for cultural intelligence. In order to prepare culturally intelligent pharmacists, standards and curricula for cultural intelligence must be defined and implemented within pharmacy education. The objective was to create a Cultural Intelligence Framework (CIF) for pharmacy education and gain insight into its alignment with Doctor of Pharmacy (PharmD) student experiences. **Methods:** An extensive literature analysis on cultural intelligence education was used to construct a CIF, which integrates leading models of cultural intelligence in healthcare education with Bloom’s Taxonomy. Five student focus groups were conducted to explore and map their cultural experiences to the CIF. All focus groups were recorded, transcribed, de-identified, and deductively coded using the CIF. **Results:** All four CIF domains were observed, although the prevalence of each domain varied in student responses. Most students expressed Cultural Awareness, Knowledge, and Desire; however, few students discussed Cultural Practice. Participant comments suggest that culturally-relevant experiences differed by race and year in the curriculum. **Conclusions:** This study is a first step toward understanding cultural intelligence education and experiences in pharmacy. The lack of insight into Cultural Practice indicates a need to better prepare students to practice in a culturally responsive way. The differences in student experiences suggest that integration of cultural intelligence training into curriculum should reflect the needs of the student population. The CIF represents an evidence-based approach to cultural intelligence education that can help prepare our learners to be socially responsible health care practitioners.

**Departments of Pharmacy Practice Tenure-Track Scholarly Activity Abstract**

Ross Urry, The University of Utah, Mark A. Munger, The University of Utah.

**Objective:** The contribution of scholarly activity within Departments of Pharmacy Practice (DPP) of the American
Association of Colleges of Pharmacy (AACP) is currently limited. The purpose of this research study is to quantitatively determine how much DPP tenure-track faculty contribute to the academic discipline of pharmacy practice through the publication of scholarly data. Methods: A literature search through publicly available databases of PubMed and International Pharmaceutical Abstracts (IPA) is being performed of all DPP tenure-track faculty. DPP tenure-track faculty are determined through on-line published faculty rosters provided by AACP Colleges/Schools of Pharmacy (CSP). Tenure-track faculty listed under the titles of Department of Pharmacy Practice, Clinical Pharmacy and Pharmacotherapy (inclusive) are included. Each DPP tenure-track faculty member’s name is the primary search strategy while filtering results based on publication dates from 01/01/10-12/31/19. Scholarly publications from PubMed were confirmed in IPA, or vice-versa. An additional researcher, or objective third party, if necessary confirmed all data obtained. Each publication will be classified by publication scope (ie, clinical pharmacology, health economics and outcome research, biomedical informatics, review, editorial/letter, or case report), CSP geographical location, faculty demographics, and productivity index. Faculty productivity is defined as >3 publications/5 years for productive, 1-3 publications/5 years as moderately productive, and 0 publications/5 years for non-productive. Results: The number of CSPs being investigated is 144 with 2,000 tenure-track faculty. One-way ANOVA will be used to analyze qualitative data. One-way student’s t-test will be used to analyze and compare quantitative data. Conclusions: We expect the number of productive faculty will exceed the number of moderate and non-productive faculty. These results will confirm that DPP receives a net positive contribution of scholarly activity from tenure-track faculty.

Description and Evaluation of a Novel Advanced Pharmacy Practice Experience in Addiction Medicine

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Objective: Pharmacists are uniquely positioned to address societal harms related to substance use disorders (SUD), but must be adequately trained to do so effectively. A concerning shortage of advanced pharmacy practice experiences (APPEs) related to SUD was found in the 2019 AACP environmental scan of opioid-related activities. Addressing this deficiency should be a high priority for academic pharmacy. Beginning 7/1/2019, a college of pharmacy began offering a new elective APPE in addiction medicine allowing PharmD students 250 hours of training with responsibilities in direct patient care and clinical research. Methods: A 51 item survey was administered to 2020 P4 PharmD students before and after participation in the addiction medicine APPE, testing knowledge in 11 sections. Sections included: SUD and psychiatric pharmacology, neurobiology, co-occurring disorders, and harm reduction. Following each of the 11 knowledge sections, students ranked their self-reported confidence in providing care for that respective section. Post-APPE, students were allowed a free text space to provide feedback on the APPE experience. Descriptive statistics and paired t-tests were used to analyze the data. Results: Responses from three P4 PharmD students were included for analyses. The mean APPE knowledge score increased from 43.8% to 79.1% (p=.007169). A substantial majority reported an increase in confidence. The mean self-reported confidence of the 11 sections improved from 28.28% to 73.74% (p=.006958). Free text responses garnered positive feedback from students stating the APPE allowed them to immerse themselves in all stages of the recovery process, increase confidence in presentation skills with patients, and solidified their passion for addiction medicine. Conclusions: A novel APPE in addiction medicine addressed a current gap in pharmacy education, earned positive evaluations from student pharmacists, and increased SUD related knowledge.

Does One Size Fit All? Preceptor Experiences and Perceptions of Remote Rotations

Bonnie Lam, University of Toronto, Gajan Sivakumaran, University of Toronto, Aleksandra Mejia, University of Toronto, Debbie Kwan, University of Toronto.

Objective: Due to the global pandemic, non-direct patient care experiential rotations rapidly transitioned from traditional in-person to remote rotations. We sought to understand preceptors’ experiences and perceptions of this novel mode of precepting. Methods: Preceptors who led at least one rotation remotely were invited to complete an online questionnaire. The questionnaire was informed by a literature review on remote supervision of healthcare students. The questionnaire was divided into five domains: 1) preceptor/student relationship, 2) preceptor support and continuing professional development opportunities, 3) technology, 4) preceptor perceptions and 5) workload and the working environment. The survey consisted of a mix of Likert-scale, multiple choice and open-ended questions. Descriptive statistics were used to characterize the quantitative data. Written responses were coded and analyzed for emerging themes. Results: Forty-seven of 157 preceptors (30%) responded to the questionnaire. Project and research
rotations were the most prevalent types of remote rotations. The majority of preceptors were willing to precept remotely again (85%). Student responsiveness (87%) and enjoyment of teaching (83%) were among the greatest motivators. Major themes reflected the preceptors’ struggles in building rapport and facilitating in the moment learning opportunities. Preceptors identified guidance and on-going support as key factors to ensure preceptor and student readiness and to manage expectations. The recipe for a successful rotation included careful consideration of appropriate pedagogy and technology. **Conclusions**: Although this was a novel mode of teaching, preceptors reflected a positive experience in leading remote rotations. Traditional precepting approaches employed during in-person rotations need to be adapted and individualized for the context of remote rotations, highlighting that there is no ‘one-size-fits-all’ approach. Transitioning to a remote environment generates new opportunities and drives innovation.

**Efficacy of Combination Treatment versus Monotherapy in Obesity: A Meta-analysis of Randomized Controlled Trials**

Peter Haydaw, Loma Linda University, Shant Krikorian, Loma Linda University, Khaled Bahjri, Loma Linda University School of Pharmacy, Ike De La Pena, Loma Linda University.

**Objective**: Combination therapy has emerged as a promising therapeutic intervention for obesity in light of the multifactorial etiology of the disease. Data on the comparative efficacy of combination pharmacotherapies versus monotherapy for obesity are currently lacking. We conducted a meta-analysis to evaluate whether combination treatment was associated with greater weight loss compared with monotherapy in obese individuals. **Methods**: EMBASE, MEDLINE, Clinicaltrials.gov and Cochrane Controlled Trials Register were searched from study inception until November 2020 for randomized controlled trials (RCTs) of pharmacological combination therapy versus monotherapy in adults with obesity (Body Mass Index \( \geq 27 \) kg/m2), follow up of \( \geq 3 \) months, and available required data. A systematic approach was used to screen, critically appraise and subsequently extract data from the studies that were included in the meta-analysis. The meta-analysis was performed using random effects model to provide a summary of weight change before and after exposure to treatments. **Results**: Fourteen studies were eligible for inclusion in the meta-analysis (n = 1119 subjects) from a total of 964 unique and relevant articles. These RCTs included 25 comparisons of combination versus monotherapy anti-obesity drugs. The meta-analysis revealed a 2.04 kg (95% confidence interval 1.67-2.42) additional weight loss in obese individuals who received the combination treatments compared to those exposed to monotherapy. Fenofibrate plus orlistat treatment produced the most profound weight reduction compared to fenofibrate monotherapy. **Conclusions**: The results of this study indicate that combination treatment is superior to monotherapy in producing short-term weight loss in obese individuals. Future studies should determine whether the combinatorial approach mitigates or increases the adverse effects of pharmacological obesity treatments.

**Enhancing Student Confidence in the Pharmacists’ Patient Care Process (PPCP) Using Calibrated Peer Review (CPR)**

Sara B. Leidy, Purdue University, Alex Isaacs, Purdue University, Monica L. Miller, Purdue University, Zachary A. Weber, Purdue University.

**Objective**: The objective of this study was to assess the impact of CPR-based assessments on students’ confidence in implementation and evaluation of the PPCP. **Methods**: Students completed three case-based assignments utilizing a CPR system, which incorporates practice and calibration designed to prepare students for self and peer evaluation. Following these assignments, a pre- and post-survey was administered across two academic years to the same cohort of students in their first and second professional years. Student confidence was evaluated using a 5-point Likert scale. Implementation was assessed by ability to rank a problem list, provide patient specific recommendations, provide supporting evidence for a recommendation, and develop written communication. For evaluation items, students were asked confidence on their ability to assess a peer’s work, one’s own work, provide constructive feedback, and recognition of answer correctness and quality. Student confidence was analyzed with a Mann-Whitney U test using the pooled data from pre- and post-surveys. **Results**: Of the 314 eligible participants, 309 (98%) completed the pre-survey, while 233 (74%) completed the post-survey. There was no significant change in confidence of assessment skills. Confidence increased significantly in ability to perform all patient case activities \((p<.01)\), except developing written clinical documentation \((p=.07)\). Confidence increased significantly in ability to evaluate self and peers for all patient case activities \((p<.01)\), except evaluation of written clinical documentation \((p=.07)\) and a subjective, objective, assessment, and plan note \((p=.12)\). **Conclusions**: This study highlights the role of CPR in a pharmacy curriculum. With a significant increase in student’s confidence in completion and evaluation of patient case activities, use of CPR can be an additional tool for learning the PPCP and preparing students for clinical education.
Evaluation of a Simulation to Communicate about At-Risk Opioid Behaviors in a Community Pharmacy

Shelby Go, The University of Kansas, Ashley Crowl, The University of Kansas, Amy Robertson, The University of Kansas, Sarah Shrader, The University of Kansas.

Objective: To evaluate the effectiveness of an objective structured learning experience simulation (OSLE) focused on identifying and communicating about at-risk opioid behaviors in a community pharmacy setting through student perceptions and performance. Methods: A lack of educational activities regarding communicating about at-risk behaviors and refusing to fill opioid prescriptions was noted in the literature. The learning objectives for a new OSLE developed for third-year pharmacy students were (1) refuse to fill an opioid prescription and (2) counsel a patient demonstrating at-risk behaviors on an opioid prescription. Unmatched pre-/post-responses from a voluntary and anonymous student satisfaction/confidence survey were analyzed with independent t-tests. Standardized rubrics assessed student performance and scores were analyzed with descriptive statistics. An inductive content analysis identified the impact on students’ perceptions and future behaviors from post-OSLE reflections. This was approved by the institutional review board. Results: Pre-/post-surveys, completed by 143 and 111 students respectively, demonstrated students’ confidence in their ability to assess at-risk opioid behaviors, counsel a patient demonstrating these behaviors, refuse to fill an opioid prescription, and respond to a patient’s nonverbal responses significantly improved following the simulation (p<.01) and 81% of students felt the OSLE was beneficial. Students’ mean OSLE score of 34.2/45 (76%) demonstrated average competency. The following strategies to address the challenge of patients with at-risk opioid behaviors were identified from student reflections: importance of patient-centered care and the role of the pharmacist, recognition of judgement against these patients, and empathetic communication. Conclusions: A simulation focused on communication regarding at-risk opioid behaviors was an effective educational method. Students improved their self-confidence, demonstrated communication skills, and identified strategies to improve communication and mitigate judgement toward patients using opioids.

Evaluation of Opioid Education and Prevention Programs Targeted to K-12 Students

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Objective: The opioid epidemic continues to be a national public health crisis. Although school-aged children (K-12) may not be heavy opioid users, many experience spillover effects from use by family members or community-wide problems, making education and prevention in this group of high importance. The objective of this study was to identify and characterize substance abuse education programs aimed at school-aged children, focusing on programs which integrate opioid education. Methods: An in-depth literature review was conducted using various combinations of the keywords: substance abuse, opioid abuse, education, program, prevention, children, school, and community. Google was utilized for a broad program search, while MEDLINE was used to ensure search comprehensiveness and determine if program outcome data was published. Inclusion criteria was publicly-available programs targeted to school-aged children. For each program the following data was abstracted: name, website, setting (community-based vs. school-based), length, format, credential(s) of instructor(s), cost, and any published outcomes. Results: Ninety-four substance abuse education programs were identified, 11 (11.7%) of which included information on opioid education. Of the programs including opioid education, five (45%) exclusively addressed opioid education. Nine (82%) focused on personal behaviors and peer pressure surrounding opioids, while two (18%) included science-based resources about opioids and education on the use of Narcan. None of the programs incorporated involvement of a health care professional. Conclusions: While many substance abuse education programs are available for school-aged children, relatively few focus on or incorporate opioid education. Health care professionals such as pharmacists could help address current education gaps by providing practical opioid information including Narcan administration. Pharmacy educators have an opportunity to partner with local community organizations and schools to support more comprehensive opioid education.

Evaluation of the Student Educational Assistance Program Before and During the COVID-19 Pandemic


Objective: The main objective is to analyze the effect of the pandemic on our SEA Program services in two areas: if using SEA materials helped boost their confidence (yes/no), and if using SEA materials helped decrease their stress.
(yes/no). **Methods:** Surveys created by SEA members in Fall 2019, Spring 2020, and Fall 2020 on SEA material feedback were emailed to the University of Connecticut Doctor of Pharmacy Class of 2023 students. No email or demographic information were collected. The Fall 2019 survey only asked if SEA services improved their performance on their exams; considered a surrogate measure for increased confidence and lowered stress. Descriptive and bivariate statistics were conducted. **Results:** Statistical analysis was done via SPSS 27. There were 111 responses collected from the survey in Fall 2019, 45 responses from the post-lockdown survey conducted in Spring 2020, and 42 responses in Fall 2020 (n=198). Across all surveys, most students reported increased confidence and lowered stress due to SEA services. Compared with the Fall 2019 data, there was significantly fewer individuals in Spring 2020 that responded “yes” to increased confidence and lowered stress from SEA services (p-value < .05). **Conclusions:** Our survey responses show that SEA Program resources has maintained the confidence boosting and stress lowering effect during the pandemic. Based on the consistency of responses in Fall 2020 compared to Fall 2019, it is thought that the fewer positive responses in Spring 2020 were likely due to the change in curriculum from in-person to virtual and subsequent accommodation in Fall 2020. Future research is needed to explore how to sustain student confidence and reduced stress given changes in learning experiences (virtual).

**Examining Social Determinants of Health in Patient Cases – An Insufficiency or Missed Opportunity?**

Olile Okoro, University of Minnesota, Lea Edwards, University of Minnesota, Ashley Baker, University of Minnesota, Akua Appiah-Num, University of Minnesota.

**Objective:** The objectives of the study were to - (i.) assess the extent of the integration of Social Determinants of Health (SDOH) in patient cases used in the core PharmD curriculum in the 2019/2020 academic year, and (ii.) identify opportunities for further integration and discussion of SDOH in patient cases used in pharmacy education. **Methods:** Patient cases used in years 1-3 of the Doctor of Pharmacy program (PharmD) during the 2019/2020 academic year were extracted and reviewed. A content analysis of the cases was conducted to determine inclusion of SDOH, based on criteria outlined in the PRAPARE tool. Frequencies, proportions, and measures of central tendency were used to describe the data extracted. **Results:** Forty-two percent (n=227) of the 541 cases analyzed mentioned one or more SDOH. The proportion of patient cases with mention of one or more SDOH (78.8%, 37.8%, 31.9%), and the median number of SDOH mentioned per case (2, 1, 0), declined with increasing year of study, ie, from Yr1 to Yr3. The most frequently mentioned SDOH were social integration (26.1%), race/ethnicity (17.2%), stress (14.2%), employment (9.4%), and housing (8.7%). Discussion questions for most of the patient cases focused solely on medication therapy even when SDOH were included in the case. **Conclusions:** SDOH even when integrated into patient cases were not given the necessary attention in the contemplation of treatment. Pharmacy educators need to be more intentional about the inclusion and discussion of SDOH in patient cases alongside clinical parameters. To address persisting health disparities and achieve the universal goal of health equity, SDOH must be considered as an integral part of patient-centered care, and should therefore be adequately reflected in pharmacy education.

**Exploring the Relationship Between Standardized Patient Comments on Empathy and Student Pharmacist Communication Assessments**

Logan T. Murry, The University of Iowa, Laura Knockel, The University of Iowa, Jeffrey Reist, The University of Iowa, Michelle Fravel, The University of Iowa, Matthew Witry, The University of Iowa.

**Objective:** The objectives of this study were to 1) quantify students’ communication ability using SP communication rubric scores, 2) describe SP comments of student empathy, and 3) test the relationship between quantitative rubric scores and empathy categorization using an integrated analysis of transformed qualitative comments. **Methods:** A concurrent mixed methods research design was used to assess graded Performance Based Assessments (PBAs) of student pharmacists at a college of pharmacy in the Midwest US. PBA rubrics (n=218) completed by SPs contained 20 assessment items with space for open-ended comments to the students. Descriptive statistics were calculated for numeric rubric scores. Open-ended SP feedback to students were coded interpretively to describe SP perceptions of empathy within the encounter. Qualitative SP feedback was transformed into quantitative categorical data by categorizing assessments into high-empathy, mixed-empathy, and low-empathy encounters. The association between quantitative rubric scores and transformed empathy categories was tested using Kruskal-Wallis ANOVA. **Results:** SPs provided feedback on 141 of 218 rubrics (64.7%). The mean communication score was 38.96 ± 1.64. Comments from SPs reflected considerable variation in student empathetic communication ability. The totals for the low, mixed, and high-empathy category transformations were 6 (4.3%), 95 (67.4%), and 40 (28.4%), respectively. There was a statistically significant (p<.05) difference in median communication score between empathy categories, with a mean
rank scores of 12.08 for the low-empathy group, 67.26 for the mixed-empathy group, and 88.73 for the high-empathy group. **Conclusions:** Scores on communication rubrics and SP open-ended comments on student empathy appear to be related. SPs place high value on empathy when assessing student communication ability. Pharmacy educators should consider additional ways to assess students for clinical empathy and communication abilities during PBAs.

**Global to Local: An Opportunity to Create Global Experiences in Local Communities**

Lauren Blum, *University of North Carolina at Chapel Hill*, David R. Steeb, *University of North Carolina at Chapel Hill*.

**Objective:** To provide opportunities for students and faculty to engage with rural, underserved local communities and to deepen their understanding of the global impact that can be made through local public health efforts. **Methods:** To develop the Global to Local initiative, a deliberate, stepwise approach was taken to ensure program success and sustainability, including: (1) identifying rural, underserved local communities facing significant health challenges, (2) cultivating collaborative relationships with community stakeholders, (3) developing and implementing programs to improve health locally, and (4) helping faculty, students, and other stakeholders understand the connection between global and local health issues. **Results:** Currently, the Global to Local program is concentrating on two rural communities in North Carolina and is in the process of bringing together various community stakeholders to identify priorities and develop initiatives that utilize student pharmacists to address those priorities. Additionally, seven final year student pharmacists have been selected to participate in Global to Local experiential rotations during the 2021-2022 academic year. **Conclusions:** There is a clear connectivity and alignment between global and local health priorities and many opportunities for academic institutions to increase their local and international impact through a Global to Local framework. While Global to Local is still in development, the approach used to create this program has successfully led to collaborative relationships with many local community partners and could be replicated by others looking to create a similar initiative. Universities throughout the country are well-positioned to tackle the most pressing health issues in their state, and with increasing student interest in global experiences, a Global to Local framework would offer an ideal opportunity to both provide students with a global experience and improve health for local communities.

**Headache Prevalence, Characteristics, Symptoms, Triggers, Impact, and Management Strategies Among Student Pharmacists**


**Objective:** Headache is a prevalent and debilitating condition that affects approximately half of all adults globally and leads to considerable disability. However, the burden of headache has not been well-investigated among student pharmacists. Therefore, this study aimed to describe the prevalence, characteristics, symptoms, triggers, impact, and management strategies of headache among student pharmacists. **Methods:** A questionnaire will be administered via email over a three-week period in March-April 2021 to all student pharmacists at one college of pharmacy in the United States. An email will be sent to eligible students with information and a link to the questionnaire inviting them to participate in the study. Reminder emails will be sent each week during the data collection period. The questionnaire consists of five questions capturing headache characteristics (location, quality, intensity, frequency, and duration), seven questions regarding associated symptoms (change in appetite, food cravings, mood/personality changes, neck/shoulder pain, nausea/vertigo, and vision changes), 14 numeric scale questions covering headache triggers (foods, odors, sleep quantity, sleep quality, screen time, schoolwork hours, work hours, exercise, medications, caffeine, alcohol, bright lights, loud sounds, and personal problems), nine numeric scale questions covering headache impact (sleep quality, sleep quantity, ability to work, perform daily tasks, grades, mood, personal relationships, leisure activities, and quality of life), 16 numeric scale questions about pharmacological management strategies, 13 numeric scale questions about non-pharmacological management strategies, and six demographic/descriptive items (age, gender, race/ethnicity, body mass index, perceived health status, and graduation year). Data will be analyzed using descriptive statistics. **Results:** Data collection will conclude by April 2021 and results will be presented at conference. **Conclusions:** Appropriate conclusions will be made according to the study findings.

**Identifying Predictors of Generalized Anxiety Symptoms among Pharmacy Students in Response to the COVID-19 Pandemic**

Rania H. El-Desoky, *University of Houston College of Pharmacy*, Divya Varkey, *University of Houston College of Pharmacy*, Matthew Wanat, *University of Houston College of Pharmacy*, James Douglas Thornton, *University of...
Objective: To explore the prevalence of generalized anxiety (GA) symptoms among Doctor of Pharmacy (PharmD) students at an academic institution during the COVID-19 pandemic. We used Alderfer’s theory of needs including existence, relatedness, and growth (ERG) to elucidate which unsatisfied needs are predictive of higher levels of GA symptoms. The goal is to design a program or initiative to address unmet needs triggering increased levels of GA symptoms. Methods: A cross-sectional, single site survey was administered to first through fourth year PharmD students from October 2020 to January 2021. The survey included demographics, the Counseling Center Assessment of Psychological Symptoms-62 validated tool, and nine questions to assess Alderfer’s ERG theory of needs. Predictors of GA symptoms were evaluated using descriptive statistics and multiple linear regressions. A correlation analysis was used to assess if ERG categories correlated with GA symptoms. Results: A total of 257 of 513 students responded, 214 responses contained usable data. The mean GA symptom score was 1.28 out of a maximum average of 4, with 1 indicating no symptoms and 4 indicating the highest symptoms of GA. The relatedness needs, which included feeling disliked, socially disconnected, and misunderstood had the strongest correlation (65%) to GA symptoms. Each of the ERG needs were predictive of GA symptoms (p < .001). The relatedness need was most predictive of GA symptoms (β = 0.56). Conclusions: Interventions aimed at fulfilling relatedness needs may be beneficial in decreasing GA symptoms among PharmD students. Future steps will aim to create a program that increases social connectedness and psychosocial support in virtual settings through establishing virtual community meeting chats, games, and group counseling sessions dedicated to building and maintaining peer to peer interactions.

Impact of a Skills-Based Laboratory on Pharmacy Student Comfort Level and Ability to Counsel

Rachel L. Rogers, Purdue University College of Pharmacy, Margaret Tharp, Purdue University College of Pharmacy, Jamie Woodyard, Purdue University College of Pharmacy, Jamie Woodyard, Purdue University College of Pharmacy, Jamie Woodyard, Purdue University College of Pharmacy, Jamie Woodyard, Purdue University College of Pharmacy, Jamie Woodyard. Objective: To determine the impact of a skills-based laboratory focused on men’s and women’s health products on pharmacy students’ perceived comfort level and ability to counsel patients. Methods: Pharmacy students participated in a laboratory focused on men’s and women’s health products. The laboratory included two small group discussions and a 10-minute counseling session with a mock patient on a specific product. Students (N = 133) completed pre and post surveys to assess their perceived comfort level and ability to counsel on products. The 45-item survey was based on the theory of planned behavior. Items focused on students’ perceived comfort level and ability to counsel: 1) cis- or transgender patients and 2) on 11 health product types. Their intent to counsel patients and prescribe products in the future were also assessed. A 7-point Likert scale (strongly disagree to strongly agree) was utilized. Wilcoxon Signed Rank tests were conducted to determine statistical significance (p < .05) for the primary objective. Results: Statistically significant positive changes were identified for all survey items (p < .000) assessing perceived comfort level and ability to counsel, though only 5 products (doxylamine succinate/pyridoxine hydrochloride, ulipristal acetate, estrified estrogens, finasteride, and vardenafil) were incorporated into mock counseling scenarios. Students also indicated they intended to provide counseling (p < .015) and prescribe products in the future (p < .010) after completing the laboratory. Conclusions: Pharmacy students’ perceived comfort level and ability to counsel improved regardless of whether students had the opportunity to practice counseling with a mock patient on that specified product. These results may support small group discussion as an effective method to increase students’ confidence in counseling on men’s and women’s products.

Impact of a Virtual Roundtable on Pharmacy Student Perceptions of Postgraduate Residency Training

Kristine P. Nguyen, The University of Georgia, Blake Terrrell, The University of Georgia, Andrew Darley, The University of Georgia. Objective: To evaluate the impact of a virtual residency roundtable on student perceived knowledge of postgraduate pharmacy residency training. Methods: During the COVID-19 pandemic, many in-person events have been limited; residency preparation continues to be a pertinent topic for pharmacy students planning to pursue postgraduate training. A student organization hosted a virtual residency roundtable through a video conferencing platform with residency program representatives and students in attendance. The roundtable consisted of rotating through four breakout sessions. This allowed an opportunity for students to discuss various components of residency training with different program representatives. A retrospective pre-post survey was sent to students to ascertain their perceived understanding of postgraduate training at baseline and after attending the roundtable, as well as overall event perceptions. Results: Approximately 40% (n = 36) of attendees completed the
Impact of Limiting Short-Acting Opioids on Chronic Pain Management in Veterans at VA Loma Linda

Shannon Nguyen, Ngoc-Linh Nguyen, Pain Management in Veterans at VA Loma Linda

Impact of Limiting Short-Acting Opioids on Chronic Pain Management in Veterans at VA Loma Linda

Ngoc-Linh Nguyen, Western University of Health Sciences, Shannon Nguyen, Western University of Health Sciences, Hyma Gogineni, Western University of Health Sciences, Howard Nguyen, Western University of Health Sciences.

Objective: To compare the effects of short-acting (SA) opioid dose reductions on patient-reported pain level. Secondary objectives assessed SA opioid restrictions on reduction of total morphine milligram equivalents (MME) and additional referrals to addiction or other services. Methods: This is an IRB-approved retrospective observational study. Inclusion criteria: patients receiving 90 consecutive days of SA opioid prescriptions from 02/01/15 to 05/31/16. Exclusion criteria: cancer/chemotherapy, hospice/palliative care, liquid opioid formulations, tramadol, and combination buprenorphine and naloxone. Descriptive statistics were used to analyze demographics, pain level, and psychiatric comorbidities. Paired t-tests were used to compare pre- and post-MME with statistical significance defined as p-value < 0.05. Linear regression analysis was used to characterize the relationship between patient-reported pain level and MME. Results: A total of 535 patient charts were included. Patients had a mean age of 60.4 +/- 11.01 years, with chronic lower back pain (61.3%) being most common. When comparing SA opioid dose reductions with pain levels, 64.3% of veterans did not experience a change in pain level from the baseline. The difference of the total MME between the start and end of the study period was statistically significant (p < .001). The average percent reduction of opioid doses from the beginning to the end of the study was 11.5%. At the start of the study, 17% of patients were prescribed concurrent long-acting (LA) opioids, and by the end, this amount increased to 26%. Additional opioid-related referrals to other services were less than 5%. Conclusions: SA opioid and MME dose reductions had no change in patient-reported pain level. Quantity restrictions of SA opioids resulted in either increased strengths of current SA opioid prescriptions and/or additional LA opioids.

Implementation of the Purdue University College of Pharmacy Spanish Language Track

Moises Martinez, Purdue University, Jasmine Gonzalvo, Purdue University.

Objective: Spanish is the second most common language spoken in the United States. It is well known that language barriers between health care professionals and patients is a common contributor to health disparities. Thus, the Center for Health Equity and Innovation out of the College of Pharmacy at Purdue University has created a Spanish Language Track for pharmacy students with the objectives of graduating pharmacists who are proficient in the Spanish language and creating a model Spanish language track framework for implementation at other academic institutions. Methods: A syllabus was created that outlined the requirements of successful completion of the Spanish language track program. A partnership with the College of Liberal Arts was included which would allow Doctor of Pharmacy students to obtain a Spanish for the Professions Minor. Collaboration with the experiential learning office provided expanded IPPE/APPE Spanish-speaking opportunities. Service-learning engagement opportunities were also included that would allow the students to apply Spanish language skills through cultural immersion activities. A partnership with Universidad de Antioquia in Medellin, Colombia was also established to connect Colombian students with Purdue students to create a virtual, active learning experience. Results: The Spanish Language Track has been reviewed by the Office of Student Services, the Department of Spanish, and the College of Pharmacy Curriculum Committee. The initial cohort of Spanish language track students will be recruited in the Fall semester of 2021. Conclusions: The Spanish Language Track will provide the opportunity for pharmacy students to complete a Spanish minor and to graduate with a high level of Spanish language proficiency. Feedback from the first student cohort will allow for refinement of the initial proposed Spanish language track model.

Incorporating Cultural Considerations to Care During an Interprofessional Simulation Activity

Jennifer T. Garson, Purdue University, Zachary A. Weber, Purdue University, Monica L. Miller, Purdue University.
Incorporation of a Student Resilience Program into First-Year eOrientation to Improve Stress, Self-care, and Resilience

Alaa K. Abdelhakiem, University of Houston, David Wallace, University of Houston, Kimberly Nguyen, University of Houston, Austin De La Cruz, University of Houston.

Objective: To implement a resilience program for first-year pharmacy students to build stress management, resilience, and self-care strategies that can be used as a part of their daily routine throughout their pharmacy career. Methods: First-year PharmD students were included in the study and provided access to complete five units of the Student Curriculum on Resilience Education program (SCoRE) over a four-week period. Students voluntarily completed the Perceived Stress Scale (PSS-10) pre- and post-program surveys to measure the resilience programs’ impact on students’ stress levels. Results were analyzed using paired t-tests. Throughout the program, students were administered touchpoint surveys evaluating their level of resilience and self-care strategies following completion of respective units within the program. Results: First-year students (n=111) completed anonymous pre- and post-PSS-10 surveys as well as four touch point surveys while completing the SCoRE Program. There was no statistically significant difference in PSS-10-survey results after completion of the program, suggesting it did not impact students’ perceived stress levels. After completion of the program, 72.6% of students reported a high level of resilience compared to 27.3% of students who reported a moderate level. Furthermore, 88.8% of students reported a better understanding of resilience strategies. High levels of self-care strategies were reported by 33.3% of students compared to 63.9% with moderate levels and 2.8% with low levels. Conclusions: Implementing the SCoRE program to first-year pharmacy students aided in the development of resilience and self-care strategies that may have an impact on their long-term pharmacy career. The program did not see a difference in PSS-10 scores. A total of 79.6% of students would recommend this program to another student and 87.6% preferred administering the program prior to starting the PharmD curriculum.

Innovative Teaching Methods During COVID-19: Pre-Recorded Video Lectures Vs. Virtual Case-Based Learning

Reem Aljanabi, Western University of Health Sciences, Keana Mendoza, Western University of Health Sciences, Sylvia Uong, Western University of Health Sciences, Hyma Gogineni, Western University of Health Sciences.

Objective: To compare performance, perceptions, and preferences between pre-recorded video lectures and virtual case-based learning in liver pharmacotherapy. Methods: This is an IRB-approved prospective observational study. Inclusion criteria second-year Doctor of Pharmacy Students enrolled in the liver pharmacotherapy course in Spring 2021. The two teaching methods utilized were pre-recorded video lectures (AUD=Alcoholic Use Disorder and DILI=Drug-Induced Liver Injury) and virtual case-based learning (ALF=Acute Liver Failure and CLF=Chronic Liver Failure). Prior to class participation students were required to complete the designated activity. The class began with an iRAT (Individual Readiness Assurance Test), followed by post-topic surveys, team-based case discussions, and Kahoot quizzes. The course ended with a post-survey. Data was analyzed using descriptive statistics.
and t-tests. **Results:** Student performances were measured by comparing the Kahoot quizzes and the final examination scores per topic. Kahoot scores for ALF = 60.8% vs AUD = 66.7% ($p = .089$); Kahoot scores for CLF = 45.4% vs DILI = 55.8% ($p < .00001$). Final exam scores for ALF = 74.6% vs AUD = 83.5% ($p < .00001$); final exam scores for CLF = 79.0% vs DILI = 84.5% ($p < .00001$). The average time to complete the pre-course activity for ALF, CLF, AUD, & DILI was 79, 130, 128 & 106 minutes, respectively. Students' perceptions of usefulness, understanding, time/flexibility, self-directed learning, ease of use, and clarity of instructions ranked on an average ALF (3.7/5), AUD (3.6/5), CLF (3.0/5) & DILI (3.8/5). Students preferred a combination of pre-recorded video, virtual case-based learning, and in-class lecture (46%) over individualized methods. **Conclusions:** Students' performance significantly differs between pre-recorded video lectures and virtual case-based learning depending on the difficulty of liver pharmacotherapy topics, such as CLF vs. DILI. A combination of different modes of teaching is preferred over a single method.

**Instructional Redesign of an Interprofessional Education Course**

William M. Hammonds, *The Ohio State University*, Alexa Valentino, *The Ohio State University*.

**Objective:** Interprofessional Education 1-4 (IPE1-4) are a series of 0.5 credit hour courses designed to teach students how to advance collaboration and quality of care through interprofessional (IP) health care teams. It consists of 2-3 IP activities per semester. Student learning outcomes were previously limited to student-reported achievement of the learning objectives and were not mapped to Interprofessional Education Collaborative (IPEC) competencies. Given the limited number of meeting times, it was difficult for faculty to keep students engaged. For Fall 2020, IPE1 was re-designed to implement formal assessment tools related to IP competencies and to incorporate intentional strategies to connect with students. The objective of this project is to evaluate student performance and satisfaction as a result of this instructional redesign. **Methods:** Using a modified backwards design process, the course coordinators identified target IPEC competencies and mapped course activities. Each IP teaching team ensured objective alignment and created a new case-based assignment to directly assess student performance. The teaching teams also recorded videos to introduce the course and each activity, and to provide feedback on each assignment. Student satisfaction with the videos was assessed through a Qualtrics survey. **Results:** Two case-based assignments were completed by 135 pharmacy students with average scores of 97% and 98%, respectively. Of 129 pharmacy student survey responses, 74% agreed or strongly agreed that the feedback videos made them feel more connected and no students disagreed. Students also supported continued use of course introduction videos. **Conclusions:** The instructional redesign of IPE1 was effective as demonstrated by student performance and survey responses. Based on our findings, we plan to continue formal assessment cases and course videos in the future.

**Lutein Loaded Biotinylated Polymeric Nanoparticles for the Treatment of Age-related Macular Degeneration**


**Objective:** The goal of this study is to enhance the delivery of lutein into retinal cells using PLGA-PEG-Biotin nanoparticles to treat Age related macular degeneration (AMD). **Methods:** Lutein loaded polymeric nanoparticles were prepared using O/W solvent-evaporation method. Particle size and zeta potential (ZP) were determined using Malvern Zetasizer. Other characterizations included differential scanning calorimetry, FTIR, and in-vitro release studies. In-vitro uptake and cytotoxicity studies were conducted in ARPE-19 cells using flow cytometry and confocal microscopy. **Results:** Lutein was successfully encapsulated into PLGA and PLGA–PEG–biotin nanoparticles. Sizes of lutein-loaded PLGA and PLGA–PEG–biotin nanoparticles were 196.4 ± 20.04 nm and 208.0 ± 3.38 nm, respectively. The entrapment efficiency of lutein was 56% and 75% for lutein-loaded PLGA and PLGA–PEG–biotin nanoparticles, respectively. FTIR and DSC confirmed encapsulation of lutein into nanoparticles. Cellular uptake studies in ARPE-19 cells using flow cytometry (FACS) and confocal microscopy confirmed a higher uptake of lutein with PLGA–PEG–biotin nanoparticles compared to PLGA nanoparticles and lutein alone. In vitro cytotoxicity results confirmed that the nanoparticles were safe, effective, and non-toxic. **Conclusions:** We have successfully developed and characterized lutein-loaded, biotin-decorated polymeric nanoparticles. Results from this study suggest that biotin-conjugated nanoparticles may be an appropriate formulation for targeted drug delivery in the treatment of AMD and other retinal diseases.
Microneedle-Mediated Transdermal Delivery of Naloxone Hydrochloride for Treatment of Opioid Addiction

Dorcas Frempong, East Tennessee State University, Dhruv Mishra, Northern Arizona University, Ashana Puri, East Tennessee State University, Prashant Dogra, Houston Methodist Research Institute.

Objective: Naloxone is administered as an intravenous, intramuscular, subcutaneous injection and intranasal spray for treating opioid overdose. The short duration of action of naloxone results in requirement of frequent re-dosing which may be eliminated by development of a transdermal system. Our study aimed to assess the effect of microneedles on the skin permeation of naloxone. Methods: In vitro permeation of naloxone across intact (passive) and microneedle-treated (Dr. Pen Ultima A6) porcine skin was evaluated. Microporation conditions with drug solution of 10 mg/mL were investigated: needle lengths (500 μm and 250 μm) for 1 minute and 500 μm length for 1 and 2 minutes. The effect of different naloxone concentrations (10 and 20 mg/mL) on skin treated with 500 μm microneedles for 2 minutes was also tested. Through pharmacokinetic modeling, the in vitro results were extrapolated to predict the plasma concentration kinetics of naloxone in patients. Results: Passive permeation for naloxone after 6 hours was observed to be 8.25 ± 1.06 μg/cm². A 5-fold enhancement was observed with 500 μm needles-1-minute treatment. However, 250 μm-1-minute treatment showed less permeation than 500 μm treatment (p<.05). Microporation with 500 μm-2 minutes did not enhance the permeation as compared to the 1-minute application (p>.05). Increasing the donor concentration from 10 to 20 mg/mL doubled the drug permeation across skin treated with 500 μm microneedles for 2 minutes. Shortest lag time of ~8 minutes was observed with 500 μm, 2-minute treatment. With this test condition, the modeling simulations demonstrated the attainment of pharmacokinetic profile of naloxone comparable to those obtained with the FDA-approved intramuscular and intranasal devices. Conclusions: Microneedle-mediated transdermal delivery holds potential to deliver therapeutically relevant amounts of naloxone for opioid overdose treatment.

Near-Peer Teaching Impact on the Student Pharmacist Teachers

Cassandra M. Tomiko, VCU School of Pharmacy, Lauren Pamulapati, Virginia Commonwealth University, Rachel Koenig, Virginia Commonwealth University, Lauren Caldas, Virginia Commonwealth University.

Objective: This study aims to assess the perception of near-peer teaching from the perspective of the student pharmacist teachers in their third-year who taught first-year pharmacy students in a semester-long foundations course. Methods: This is a cross-sectional study utilizing a Qualtrics survey that was sent to current and former students who completed the PHAR 691: Academic Pharmacy elective, since its first class in 2018. This study is IRB approved. The survey consists of eight Likert-scale perceived benefits of near-peer teaching, thirteen confidence questions with a scale of 0-100, three free-response questions, and demographic questions. The quantitative data will be analyzed using descriptive statistics and frequencies. Qualitative data will be coded by the trainee and mentor and assessed with an interrater reliability test. Results: Data collection is currently in progress with goal completion by March 30, 2021. Of the 22 potential participants, seven completed the survey (32% response rate) to date. The participants are 71.4% female and the majority from the Fall 2020 class (57.1%). Of the participants, 85.7% reported positively to a plan to pursue a career in academia with a reported confidence average of 76.6 (SD 13.8) on the 100-point scale. Confidence was highest for pursuit of a residency with an average of 93.7 (SD 9.4) and lowest for creating objective-based assignments average of 70.4 (SD 24). Perceived benefit was highest for “developed professionally and personally” with all positive responses. Conclusions: Conclusions will be determined at data collection completion. This information will add to the literature of near-peer teaching and assist institutions interested in starting programs for near-peer teaching.

Perspectives from West Virginia University Pharmacy Graduates and Students Surrounding Pharmacogenomic Use, Barriers, and Implementations

Ryan E. Archer, West Virginia University, Marina Galvez Peralta, West Virginia University, Marina Suzuki, Pacific University Oregon.

Objective: The objective of this project was to investigate whether the implementation of pharmacogenomics (PGx) in didactic curriculum has been mirrored with PGx applications during APPE and practice after graduation, particularly in West Virginia University pharmacy graduates and students, and to identify any barriers of PGx implementation. Methods: An online IRB-approved survey on current experiences with PGx was offered to all current third- and fourth-year students, along with alumni pharmacists from the WV School of Pharmacy. The survey with both
Pharmaceutical Performance of L-carnitine Tablet Supplements

Shadi Zamanipour, South College.

Objective: L-carnitine (levocarnitine) tablets are available as a prescription product indicated for treatment of primary systemic carnitine deficiency, and as a dietary supplement (DS) available from numerous manufacturers in various strengths and L-carnitine salt forms. As a DS, L-carnitine is used to enhance endurance, muscle recovery, weight loss, and cognitive brain function. Regulatory requirements for DS are less rigorous than those for prescription or OTC drug products and, thus, may fall short of the pharmaceutical quality that would assure delivery of the form and quantity of the DS claimed on the labeling. We tested the L-carnitine content and dissolution rates of several L-carnitine tablet DS products and compared those results with three lots of prescription levocarnitine USP tablets. Methods: Dissolution testing and determination of levocarnitine content (potency) of both prescription and DS products was performed according to the current USP monograph for levocarnitine tablets. L-carnitine concentrations in dissolution and potency samples was determined by HPLC. Results demonstrated that all lots of prescription levocarnitine tablets complied with USP specifications. Results: Of the nine DS product lots tested, two failed USP specifications for potency, one failed for dissolution, and two more failed both specifications. The dissolution/time profiles of only three of the four DS products meeting both tested USP requirements were found to be statistically similar ([as determined by the Similarity Factor (f2)] to the dissolution profiles of the prescription products. Conclusions: The variability in performance vs USP specifications and between different L-carnitine DS products is illustrative of unreliability of DS products to deliver their labeled content. This work demonstrates the need for caution in the use of L-carnitine DS tablets; particularly for treatment of serious L-carnitine deficiencies.
intentional structured approach to interprofessional experimental education will have a positive impact on students' self-perceived interprofessional collaboration behaviors after completing the required inter-professional experiences.

**Pharmacy Students’ Response to the Addition of a Synchronous Discussion Within an APPE Seminar**

Brianna R. Groen, University of Wisconsin-Madison School of Pharmacy, Amanda Margolis, University of Wisconsin-Madison School of Pharmacy, Denise Walbrandt Pigarelli, University of Wisconsin-Madison, Catherine Lea, Mayo Clinic Health System, Claire Lee, Aspirus, Mara Kieser, University of Wisconsin-Madison School of Pharmacy.

**Objective**: Doctor of Pharmacy students at the University of Wisconsin-Madison School of Pharmacy participate in a year-long Advanced Pharmacy Practice Experience (APPE) seminar, which moved to a virtual format in 2020 due to the COVID-19 pandemic. Seminar delivery model for blocks 1-3 was asynchronous and included a pre-assignment, a 50-to-60-minute pre-recorded presentation, and a post-assessment. The delivery model for block 4 included an asynchronous 30-to-40-minute presentation with post-assessment and a 30-minute synchronous discussion. There were two seminars each block. The objective of this evaluation was to determine students’ perceptions regarding APPE seminar delivery. **Methods**: APPE students completed a baseline survey at the end of block 3 which included questions focused on understanding of content, seminar engagement and seminar delivery preference. Using a 4-point Likert scale, students responded to statements ranging from 1 = not at all agree to 4 = completely agree. Students completed a similar survey at the end of block 4 after seminar was altered to include synchronous discussion. **Results**: The proportion of students completing both surveys was 87% (125/144). Students’ perception of their understanding of content did not change with the addition of a discussion (mean pre = 3.32, post = 3.34, p = .532). Students rated “the time spent completing seminar assignments reasonable” higher after block 4 (mean pre = 3.43, post = 3.61, p = .019). Students felt more engaged in APPE seminar after the inclusion of a synchronous discussion (mean pre = 3.02, post = 3.29, p = .005). Students’ responses increased toward agreeing that APPE seminar facilitated discussion (mean pre = 2.76, post = 3.23, p < .001) but reported preference for asynchronous presentation without discussion (62%). **Conclusions**: The synchronous discussion created a more engaging experience and facilitated discussion. However, it did not impact student reported understanding of seminar content and students preferred asynchronous seminar.

**Qualitative Analysis of Perspectives Regarding Quality Assurance in Three-Dimensional Printing (3DP) of Pharmaceuticals**

Anes Karic, Purdue University, Amy H. Sheehan, Purdue University, Brandon L. Barrett, United States Pharmacopeia, Eric J. Munson, Purdue University.

**Objective**: To explore perspectives of academic stakeholders regarding the essential criteria required to assure quality in pharmaceutical three-dimensional printing (3DP). **Methods**: An exploratory qualitative study design was used to conduct semi-structured interviews with four expert 3DP stakeholders from global academic institutions. An interview guide was developed that included open-ended questions designed to identify criteria for quality assurance of finished dosage forms as well as ascertaining the role of process analytical technology (PAT) in 3DP workstreams. All interviews were audio recorded and transcribed by a third party. Data were analyzed in an iterative process using NVivo Version 12 to categorize responses and identify themes. Using an inductive coding process, two researchers independently read all transcripts and developed conceptual codes. **Results**: Identified themes for quality and PAT include finished dosage forms, measurements, and techniques. Fused deposition modeling (FDM) and extrusion-based systems were recognized as the easiest methods to assure quality in solid dosage form 3DP. Porosity, compression strength, dissolution rate, viscosity, and shape are critical measurements. Visually monitoring each layer during printing was advised for extrusion-based technologies. Recommended safety testing included microbial and heavy metal analysis. Raman and infrared spectroscopy were identified as important tools to integrate into 3DP workstreams. In-process PAT measurements such as printing pressure, temperature, color, weight uniformity, dimension (density and structure) were also identified as valuable quality assurance measures. **Conclusions**: Academic stakeholders reported quality measures and spectroscopic techniques in 3DP solid dosage forms may be incorporated in extrusion-based technologies. This data provides a direction to advance pharmaceutical 3DP.

**QuEST - Prep: Question Evaluation of Standardized Test Preparation Material for NAPLEX Examination**

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Objective: To evaluate the item writing construction quality of multiple-choice questions (MCQ) in a commonly used North American Pharmacist Licensure Examination (NAPLEX) online preparatory test bank. Methods: A group of 6 students and 2 pharmacist faculty evaluated 350 randomly selected MCQs from each of the 41 categories within the Access Pharmacy APhA NAPLEX Online Test Bank. The MCQs were evaluated for adherence to 15 best practices for item writing, and violations were coded by the group members. The evaluators were trained and individually coded each question before a discussion with the group was held to ensure consensus of best practice violations for each question. Results: The average number of violated best practices per question was 2.24. The number of questions that adhered to all best practices was 56 (16%). The most frequently violated best practices for item writing were non-parallel answer choices (49%), excess information included in question stem (33%), the presence of logical cues (25%), and grammatical or spelling errors (21%). Only one best practice (answers contain 3-5 options) was adhered to in all questions examined. Conclusions: This review examined approximately 17% of a NAPLEX preparatory test bank. Eighty-four percent of questions examined contained at least one violation of best practices for item writing. As the first review of online pharmacy test banks, these results align with published literature both in and outside of pharmacy for textbook question banks. These results support a previous review of the RxPrep 2018 Course Book for NAPLEX preparatory material. Implications of utilizing flawed MCQ for NAPLEX preparation has not been determined but may impact student confidence with material, thereby impacting utility for study purposes.

Remediation Policies for Pharmacy Programs

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Objective: To explore PharmD programmatic remediation strategies to determine feasibility for integration, academic sustainability for students, and maintain the professionalism, legitimacy, and integrity of programmatic outcomes. Methods: A literature review was conducted as well as a review of top ranked pharmacy programs’ websites and student handbooks for remediation policies. Additionally, assistant/associate deans for student and/or academic affairs were emailed for additional information about their remediation processes. Results: Remediation data was collected for all programs, with 77% responding to an email request for additional information. The definition of remediation varied among programs, where some require students to repeat a course if failed and some do not. The remediation strategies varied, including oral (15%), written (46%), or case-based reassessments (15%), early warning systems (54%), student-directed remediation (8%), and summer restudy (15%). However, the most common remediation process is instructor and course specific. The timing and duration vary between schools (during the course term (23%), intersession (8%), next term (15%), or unspecified (54%)). One school diverges from traditional grading systems, resulting in its remediation being built into a different framework, in which passing is not based on combined percentages of coursework and exams, but rather the rating of students’ competency in Summative Assessments only. Conclusions: Numerous remediation strategies were identified that may be valuable to any program beginning a major curriculum revision. The effectiveness of the specified strategies will require more empirical data and may be further solidified with evaluation from an AACP committee to guide the inclusion of remediation strategies into pharmacy programs.

Social Determinants of Health: Interacting within an Interprofessional, Online, Asynchronous Workshop

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Objective: Social Determinants of Health (SDoH) knowledge is vital for all healthcare professionals; although, various professions discuss SDoH from different perspectives. Quality interprofessional education (IPE) involves students from two (or more) professions interacting to learn with, about, and from one another. Our objective was to describe an SDoH workshop that included four health-professions (social-work, public-health, nursing, and pharmacy). Methods: Workshop learning objectives were to observe and identify neighborhood-level SDoH factors, and then examine their impact and application to clinical cases. Before the workshop, students were intentionally divided into interprofessional teams of 6 students (1-2 social-work, 0-1 public-health, 2 nursing, 2 pharmacy). Next, each team was assigned a neighborhood block in the city. Over 1-week, workshop activities included: completing a pre-workshop quiz, watching a SDoH primer video, posting a video self-introduction to their team, responding to two teammate’s self-videos, completing a windshield survey (for SDoH-related observations of neighborhood), responding to the impact of observed SDoH on two clinical cases, post reply
Student Pharmacists’ Perception towards Online Learning Activities in Social Determinants of Health Course

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Objective: Social Determinants of Health (SDoH) stand-alone course was incorporated into PharmD curriculum at University of Michigan College of Pharmacy in Fall 2020, and it was remotely delivered to P1 student pharmacists. The study aimed to (1) assess how student pharmacists’ rated learning activities in the course, and (2) compare their pre- and post- scores of SDoH basic knowledge and deep approach to learning (DAL)- the approach students take for learning with their intrinsic motivation.

Methods: Two self-administered, electronic questionnaires were distributed to students at the first week and the end of the course. We calculated the total score of each activity based on weighted values (1-7), for times it was ranked. Paired t-test was used to compare the students’ mean scores of basic knowledge and DAL at the beginning and at the end of the course. Results: Among seven learning activities, 24 student pharmacists who provided post-survey responses rated “Videos interviewing clinical pharmacists or teams” as the most valuable number one, followed by “All other videos,” and “Small group LEPE partner community resource guide” whereas “The song playlists” as the least valuable. The overall course satisfaction score was 4.54 out of 5. Data from 13 matched students were used to performed analyses for the mean scores of knowledge and DAL. Paired t-tests showed no statistically significant differences in the both scores (p>.05). Conclusions: Student pharmacists enjoyed the videos and the small group project, which both related to cases where SDoH were illustrated by clinical pharmacists. Although there were no significant changes in their basic knowledge and DAL scores, students’ overall course satisfaction was very high. This study highlighted the effectiveness of some online learning activities.

Student Stressors: In Their Own Words

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Objective: Student pharmacists experience high levels of stress, and if left unaddressed, may impact their academic performance and wellness. In order for schools to assist students in their stress management, stressors need to be identified. The study objective is to determine student-identified stressors for programing development. Methods: Third year professional student pharmacists (N = 146) completed a Wellness Action Plan (WAP) as a part of a skills laboratory. For this assignment, students were provided stress-related categories and descriptions (time management, career development, exams, grades, performance, financial, expectations, stress management, relationships, and feedback on performance) to assist in stressor identification. Students created five SMART goals based on self-identified stressors. A qualitative review of the WAP was completed to characterize student stressors. Stressors were coded based on the provided categories with additional codes created for stressors not represented within the defined framework. Descriptive statistics were performed. The most frequently identified stressors were determined by calculating the number of students documenting a stressor one or more times as a part of their WAP. Results: The most frequently identified stressors were time management (79%), career development (56%), exams (40%), financial concerns (31%), and grades (29%). A subgroup analysis further delineated commonly held stressors within the cohort: 1) difficulty in getting recommended sleep (14%), 2) balance between academic expectations and extracurricular activities (14%), 3) ability to obtain a post-graduate training position (30%), and 4) exam preparation (12%). Conclusions: Results will inform the creation of wellness focused programming in the College aimed at building students’ stress management skills. This approach will support student pharmacists in the management of their stress throughout their academic and professional careers.
Student-Led Diversity Book Clubs to Promote Student Understanding and Awareness of Structural Racism

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Objective: The objective of this study is to describe the utility of student-led book clubs as an educational tool to enhance pharmacy students’ understanding and awareness of structural racism. Methods: In light of recent events, a heightened sense of awareness regarding racial issues provoked student leadership at a College of Pharmacy to develop a diversity book club in response to a perceived urgent need for opportunities for students to engage in such conversations. The initiative was virtually conducted during Fall 2020 by a student organization that promotes global health awareness. So You Want to Talk About Race by Ijeoma Oluo, a book that explores racial issues in the US was selected by the student leadership and the format was similar to traditional book clubs with small group discussions using the provided facilitator guide. An anonymous online 32-item survey was developed by student leadership and faculty advisors to assess perceived benefits of the book club. All students on campus were eligible to attend. A second book Born a Crime by Trevor Noah, a light-hearted approach to understanding racism under the South African apartheid was selected for the Spring. Descriptive statistics were used to analyze results. Results: Currently, 14 out of 18 participants completed the survey. Ethnicities of participants included African-American, Caucasian, Middle Eastern, Asian, and Hispanic. All students participated due to interest in the topic and would recommend the book club to others. On a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), students rated 3.4 mean on items assessing understanding of structural racism before the book club compared to 4.2 after. Conclusions: Student-led book clubs provide opportunities to promote a better understanding of racial issues among students.

Students’ Self-Assessment of Patient Counseling OSCE Communication and Perceptions of Communication Skill Importance

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Objective: The primary objective is to compare students’ self-assessment with standardized patient assessment of communication skills in a patient counseling objective structured clinical exam (OSCE). The secondary objective is to evaluate student perceptions of the importance of communication skills in the practice of pharmacy, as well as the impact of a virtual OSCE format. We hypothesize that student self-assessment will differ from standardized patient assessment. Methods: Several studies have evaluated student’s self-assessment compared to a faculty observer or standardized patient on the application of “soft-skills”, however, there are conflicting conclusions. This study will further illuminate how student’s self-assessment compares to that of an observer, and will also enhance understanding of student perceptions of communication skill importance. A patient counseling OSCE in the first year of the pharmacy curriculum was used for the self-assessment. The evaluation is graded by a standardized patient using a rubric covering both verbal and non-verbal communication. Students’ self-assessment of their performance, as well as their perceptions of the importance of communication skills, was collected through completion of an optional survey after the evaluation. The survey includes 15 questions and was developed by the study investigators. Results: Sixty-nine students completed the optional survey and results will be analyzed in April 2021. Conclusions: With the knowledge that one’s aptitude for self-assessment can impact the trajectory of their career, having a working knowledge of the accuracy of students’ self-assessment is crucial. Enhanced understanding of students’ perceptions of communication skill importance will allow for tailored educational efforts on this topic. Lastly, understanding students’ perceptions related to OSCE completion in a virtual format is important for designing future communication OSCEs in pharmacy curricula.

Substance Use and Non-use Among Student Pharmacists Before and During a Doctor of Pharmacy Program

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Objective: Challenging curricula, competition, and high expectations for patient care, are all potential stressors that could lead to increased substance use during pharmacy school. The primary objective of this study was to compare student pharmacist substance use before (BP) versus during (DP) a PharmD program. Methods: An anonymous survey, using Qualtrics software, was sent to student pharmacists in their first through third professional years at a four-year PharmD program. Questions included use of prescription and non-prescription substances BP and DP as well as reasons for use and/or non-use. Chi square and z-tests were
used to analyze the data. **Results:** A total of 332 students participated in the study, resulting in a 57% response rate. Overall substance use significantly decreased by 24.6% DP compared to BP (p<.001). A statistically significant shift to decreasing frequency of use was seen for all individual substance categories with the exception of alcohol and prescription stimulants. Reasons for initial use and use DP varied depending on the substance. Participants ranked personal health as the most important factor in never using or stopping use of substances (50.6%). Notably, 75.6% of participants were unable to identify resources to address substance use. **Conclusions:** Enrollment in a PharmD program may result in overall decreased substance use, suggesting that pharmacy education may positively influence students’ decisions regarding substance use. Since personal health was the most important reason for non-use, health benefits of non-use should continue to be stressed in curricula. Since less than 25% of respondents were able to identify a substance use resource, this represents an opportunity to include these resources into existing curricula.

**The Effect of Wellness and Resilience Programming on Pharmacy Students’ Perceived Wellness**

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**Objective:** Describe the effect of a wellness and resilience program on perceived stress among graduate pharmacy students. Evaluate which aspects of the campaign are most effective for improving student wellness. **Methods:** Students at a small, private institution were invited to participate in various wellness initiatives throughout the Spring 2021 semester. Online modalities included virtual encouragements and media campaigns. In-person modalities included food insecurity resources, an encouraging note wall, and wellness-focused professional events. Additionally, a week-long “Spring Break” intervention included activities (ie, art therapy, rock climbing, community outreach, therapy dog sessions, etc.). Programming was available to pre-APPE graduate pharmacy students. Students were invited to complete a survey based on the Perceived Stress Scale (PSS) at the beginning and end of the spring semester. The PSS is a 40-point survey analyzing perceived levels of stress. Scores ranging from 14-26 indicate moderate stress, and scores >26 indicate high stress. Descriptive statistics were run through SPSS 27. **Results:** Of the 130 surveyed students, 65 (50%) responded with an average score of 20. Based on professional year, third-year students averaged highest at 22.2. Ten students (15%) were rated at high-stress above 26. Female students averaged 3.5 points higher than male students (21.1 and 17.6, respectively). A post-survey and focus groups, including open-ended program-specific questions, will be conducted at the end of the spring semester and analyzed accordingly. **Conclusions:** Pre-test data indicates that pharmacy students are moderately stressed, with a portion (15%) of students being classified as high stress. Upon final data collection, the overall effect of the campaign will be analyzed.

**The Future of Academia: Does Burnout Affect PharmD Students’ Attitudes Towards Pursuing an Academic Career?**

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**Objective:** Rates of burnout in pharmacy practice faculty are increasing. When faculty suffer from burnout, it can negatively impact how students perceive academia. The objective of this study was to identify if students are aware of burnout in academia and whether it impacts their decision to pursue an academic career. **Methods:** A cross-sectional survey was distributed to students at the three PharmD programs in the state of Michigan via Qualtrics. A combination of 4-point Likert scale, scaling and free-response questions were used to gather information on students’ attitudes towards academic pharmacy. Descriptive statistics and qualitative content analysis were used to examine responses. **Results:** Responses from two hundred eighty-eight students were analyzed (response rate: 27.4%, 288/1052). Only 4.2% (12/284) ranked academia as their anticipated practice setting post-graduation. The majority did not believe academic pharmacists are likely to be burned out (60.8%, 174/286) and are not avoiding a career in academia because of burnout (89.8%, 257/286). Responses to an open-ended question asking students about their perceived level of success as an academic pharmacist encompassed six themes including willingness to teach, confidence in teaching ability, perceived communication skills needed, interest in research, perceived skills needed, and experience in academia. **Conclusions:** Student perceptions of burnout in academia do not align with reality. It does not appear burnout is a factor preventing students from pursuing academia, but it is evident other factors deter students from pursuing a career in this field. Increasing exposure to academia through shadowing and mentorship opportunities may provide students with experiences that challenge their misconceptions and/or instill confidence in pursuit of this career path.
The Impact of the COVID-19 Pandemic on Pharmacy Student Stress Utilizing Cohen’s Perceived Stress Scale

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Objective: Doctor of Pharmacy (PharmD) students consistently experience higher perceived stress levels than the standard population. Increased stress levels have been linked to lower mental health-related quality of life (HRQOL), as well as increased use of unhealthy coping mechanisms. The effects of the ongoing coronavirus disease (COVID-19) pandemic has led to an unprecedented increase in perceived stress worldwide. This study aims to assess the impact of COVID-19 on pharmacy student stress by comparing the perceived stress of pharmacy students in a pandemic classroom environment versus a normal classroom environment based on previously published data.

Methods: The Cohen’s Perceived Stress Scale (PSS-10) was administered to P1-P3 students as part of a larger perceived stress study. Demographic questions, including age, anticipated graduation year, gender, and race/ethnicity, were also incorporated in the survey. Paired-sample t-tests, multiple linear regression models, and a classification tree model will be conducted.

Results: Of the 445 P1-P3 students enrolled, 375 (84.2%) completed the voluntary perceived stress survey. Response rate varied by class: 141 P1 (95.3%), 89 P2 (61%) and 144 P3 (95.4%) responses were captured. Preliminary data analysis suggests higher perceived stress levels amongst female students. The mean perceived stress scale score amongst all students was 20.3, signifying “high stress.”

Conclusions: Perceived stress levels amongst Doctor of Pharmacy (PharmD) students during the COVID-19 pandemic are considered high compared to previous studies prior to the pandemic. Future research should examine ways to address pharmacy student stress during the Doctor of Pharmacy curriculum as well as the mental health effects of the COVID-19 pandemic.

Undergraduate Student Perceptions, Confidence, and Knowledge of Self-Care Concepts

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Objective: To assess undergraduate student perceptions, confidence, and knowledge of self-care concepts before and after participation in a self-care course. Methods: Undergraduate students enrolled in an elective self-care course participated in lectures reviewing common medical conditions for which self-treatment is appropriate and strategies to prevent disease or treat minor illnesses. To determine baseline student perceptions, confidence, and knowledge and later the course’s impact on these attributes, students completed a pre/post online survey. Students received participation points for survey completion toward their final course grade. Confidence was measured on an 11-point scale (0=no confidence; 10=complete confidence). Level of agreement was measured on a Likert scale, ranging from strongly agree to strongly disagree. Survey questions explored confidence in recognizing common medical conditions and selecting appropriate self-treatment strategies and perceptions on the role and safety of over-the-counter medications. Wilcoxon Signed-Rank Test was used to determine statistical significance of change in confidence and level of agreement. Results: In Fall 2020, 43 students enrolled in the course completed both the pre- and post-surveys (98%). Of these students, 40 (91%) were pursuing a pre-health sciences degree and 36 (82%) specifically expressed interest in Doctor of Pharmacy programs. Confidence improved within all questions from pre- to post-survey. The greatest change in confidence was observed for skills in which students lacked previous experience with, such as describing cause(s) of minor illness, selecting appropriate over-the-counter medications, and identifying when medical referral is needed. Changes in students’ level of agreement with questions correlated with topics discussed in the course. Conclusions: After participation in a self-care course, undergraduate students gained confidence and knowledge of self-care concepts.

Why Should I Care? Characterizing Relevance for Learning and Teaching Medicinal Chemistry

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Objective: Medicinal chemistry is core to Doctor of Pharmacy (PharmD) training and while important, student perceptions of its relevance can heavily influence learning and engagement in the subject matter. The purpose of this study was to explore how PharmD students perceived relevance of Medicinal Chemistry to their professional education. Methods: First-year PharmD students at a single institution (n=223 respondents) were surveyed at 5 time-points over one academic year regarding their experiences, thoughts, and perspectives of learning medicinal chemistry (n=698 total comments). Using thematic analysis researchers identified 9 codes related to the relevance construct. Coding consensus was reached by 2 independent coders initially, using 10% of the data followed by reanalysis of the full data set. An audit was performed, and interrater
reliability calculated \( \kappa = 0.755 \), Percent agreement = 70.9%.) **Results:** While most codes \((n=8\) of 9 codes) were identified in comments across all 5 time-points, they varied in frequency. This demonstrates that perceived relevance may be temporal. For example, “Appreciation,” defined as valuing the subject, and its sub-codes changed over time. The sub-code “Positive Appreciation” was found in most comments (77-93%), and increased from time 1 to time 5. The frequency of “Negative Appreciation” stayed consistent across the first three time-points (at 2%). The number of comments coded with “Unconvinced/Unsure Appreciation” and “Both Positive and Negative Appreciation” declined over time. **Conclusions:** This study provides evidence that may be useful for defining and characterizing relevance. Future directions for this research should include creating and validating tools, inventories, or checklists for promoting relevance and improving teaching practice.