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CENTRAL MICHIGAN
UNIVERSITY

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Abstract Booklet

Welcome!

You are cordially invited to the 7th Annual Herbert H. and Grace A. Dow College of Health Professions Research Symposium. Our heartfelt thanks go out to Gary Russell and Barb Anderson Russell for their generous sponsorship of this event. We encourage you to engage in discussions with our presenters and explore the healthcare research being pursued by our esteemed scientists, clinicians, educators, and emerging researchers!

Kind regards,

Ksenia I. Ustinova Ph.D.
Chair, The Herbert H. & Grace A. College of Health Professions Research Committee

Thomas J. Masterson Ph.D.
Dean, The Herbert H. & Grace A. College of Health Professions Research Committee

Our Sponsors!

Gary and Barb met on their first day of attending CMU where between them they have earned four degrees and obtained a lifetime of Chippewa pride. They taught for several years in the Alma Public Schools until Gary was called to Washington by another Central alum, U.S. Senator Bob Griffin, to work in the Senate. Gary later served as Chief of Staff for two other senators and as a Senior Policy Advisor at the U.S. Department of State. Barb was a Kindergarten teacher in Alma, as well as at schools in the Fairfax County (Virginia) Public Schools, where for the second half of her career she was an elementary school librarian. They reside near Mt. Vernon within two miles of their four grandchildren and their parents. Gary and Barb are excited to support the Health Professions Research Symposium, which they see as "providing an educational trifecta – learning by doing, producing information, products, and procedures in a vital area, and providing an effective avenue to get them to those who can put them to use."

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DOCTOR IN PHYSICAL THERAPY PROGRAM

Inpatient Physical Therapy For a 78-Year-Old Female Following a Cerebral Vascular Accident and Fall: A Retrospective Case Report

Logan Reder, Rochelle Kopka*. (*primary presenter)

Objective. After suffering a cerebrovascular accident (CVA), a patient may experience a phenomenon known as pusher behavior, described as a decreased awareness of true postural vertical and greatly impairs a patient's postural stability. Physical therapy plays an important role in the recovery a patient following a CVA, and can help them return to performing activities of daily living independently. The purpose of this case study is to describe the physical therapy interventions and outcomes associated with the treatment of an adult female following a stroke with pusher behavior and sustaining a subsequent fall with pelvic fracture.

Methods. A 78 year old female who was admitted to an IPR unit, following a CVA and fall resulting in a pelvic fracture. The patient presented with hemiparesis of the left upper and lower extremities, as well as spasticity of the left lower extremity upon weight bearing. Physical therapy interventions included neuromuscular re-education, therapeutic activity, therapeutic exercise, and gait training to work towards increasing the patient's functional status and level of independence.

Results. Upon discharge the patient had reached 3 out of 4 of the goals set upon initial evaluation. She was able to complete all transfers with the use of a small base quad cane and contact guard assist. She was also able to ambulate up to 50 feet using a small base quad cane and minimum assistance. She also negotiated 4 stairs with minimum assistance and use of a railing on the right side.

Conclusion. This case mirrored results to other studies when focusing on somatosensory deficits in this population. However, this case had a unique aspect with the patient's pain and spasticity, as a result of her pelvic fracture. This patient benefited from a high motivation to improve, but was hindered by complications during discharge planning. Future research should be conducted to further evaluate the prevalence and underlying causes of pusher behavior.

A 54-year-old Female with Right Shoulder Pain and Right Hand Paresthesia Secondary to a Lifting Incident with a History of Cervical Disc Herniations

Dylan Tasson, Rochelle Kopka* (*primary presenter)

Purpose. Cervical disc herniations, although common in adults, can range in severity. Acute cases tend to be the more life threatening, as they primarily happen with trauma. The prevalence of cervical spine disc herniations increase in both men and women as they age. The purpose of this retrospective case report is to describe the outcome of conservative management of acute shoulder injury accompanied by radiculopathy into the right upper extremity secondary to cervical spine disc herniations.

Methods. The patient was a 52 year-old female being treated for cervical disc herniations, radiculopathy in her right upper extremity, and acute shoulder pain after a lifting incident. The patient was treated in an outpatient orthopedic setting, seen two times per week for four weeks. Treatments included therapeutic exercise, therapeutic activity, manual therapy, modalities, and neuromuscular re-education.

Results. The patient's improvement was measured with manual muscle testing and perceived improvement with symptoms during the day. The patient improved in both right shoulder abduction and external rotation 4/5 with no pain while in therapy. The patient had an overall, 70% improvement in right hand paresthesia compared to day one. The patient's overall pain rating did not change from a subjective 6/10 in her right shoulder from the beginning of treatment to the end. The patient received an orthopedic specialist's second opinion during her time in therapy, which ultimately lead to the finding of a right long head of the bicep’s tendon tear. The patient was put on hold with therapy for further orthopedic surgical intervention.

Conclusion. Treatment was able to diminish most of the radicular symptoms in the patient’s right hand, while also improving the patient's shoulder strength with abduction and external rotation. It is possible that the patient had disc herniations already present in her cervical spine that may have been exacerbated by the mechanism of injury. The patient verbally confirmed compliance to her home exercise program while denying any setbacks. The patient received an injection into her right long head of the biceps to help with her pain. The patient's course of therapy was complicated by an underlying bicep tendon tear which, could further explain her continued pain and limitations.

Simulated Escape Room Influence on Student Physical Therapists' Perceptions of Clinical Reasoning

Jessica L. Sullivan*, Karen E. H. Grossnickle, Elisabeth S. Moore, Briyana Morrell. (*primary presenter)

Background: Clinical reasoning is a complex skill that requires clinicians to apply foundational knowledge and practical skills in unique patient encounters to provide comprehensive care in a dynamic healthcare setting. Healthcare educators must facilitate the development of clinical reasoning early and consistently across the educational curriculum to aid in developing this critical skill. Utilizing a simulated environment to create a realistic healthcare setting may assist in developing clinical reasoning by creating a meaningful and engaging learning experience.

Purpose: This basic interpretive qualitative research study aimed to understand physical therapy students' perceptions of clinical reasoning and its development, including the impact of a simulated escape room experience.

Method: The transcribed data from semi-structured interviews was analyzed using open and axial coding to interpret the educational experiences from the students' perspectives. Study results can inform healthcare educators of the influence of a simulated escape room experience on student perception of clinical reasoning development.

Results: The main themes that influenced the development of clinical reasoning in physical therapy students were understanding the why, the graduate learning experience, the application of knowledge in practice, and growth.

Conclusion: Meaningful, realistic, and engaging learning activities are crucial in developing clinical reasoning. Integrating a simulated escape room learning activity can facilitate clinical reasoning development through the real-world application of knowledge and practice of skills in a safe and engaging environment, emphasizing adaptability and collaboration.

Keywords: simulation-based learning, simulated educational escape room, clinical reasoning

Doctoral physical therapy students' perception and confidence following multimodal approach to acute care curriculum

Emma Polski*, McKenze Thompson*. (*primary presenter)

Background. A multimodal approach to education has shown to be an effective way to prepare students for their future as an essential healthcare professional. Research has shown that incorporating a multimodal approach to education as a part of physical therapy curriculum has increased student confidence levels. Although research is strong for simulation, there is lack of evidence on utilizing community partners or other curriculum experiences on student preparation and confidence levels.

Purpose. The purpose of this study was to evaluate the perceptions, experiences, and confidence of doctoral physical therapy (DPT) students in their acute care clinical rotations following the multimodal approach to the acute care curriculum at Central Michigan University (CMU).

Methods. Qualitative analysis was completed following participant interviews, structured by open-ended questions, encouraging reflection on self-confidence, experiences, and perceptions before and after their acute care clinical rotation following their exposure to a multimodal educational approach including lecture, laboratory, simulation, and community partnerships. The targeted population was physical therapy students who received a satisfactory grade for their acute care clinical experience and PTH 736 (Exam and Diagnosis IV) from a CAPTE approved DPT program.

Results. Results show that students report increased confidence following the exposure to a multimodal approach to physical therapy curriculum, including but not limited to: lecture activities, laboratory activities, community partnerships, as well as IPE simulation.

Discussion. The qualitative data collected from this study provides evidence to guide physical therapy programs and further benefit the future of healthcare through improved acute care curriculum for physical therapy students.

Key words: acute care, physical therapy curriculum, multimodal education, confidence

Guided Motor Imagery Intervention for a Professional Flutist with Embouchure Dystonia: Riding a Backwards Bicycle

Karen E.H. Grossnickle*. (*primary presenter)

Background and Purpose: Embouchure dystonia results in tremors and perioral muscle spasms which may result in loss of or disabling musical performance for woodwind or brass musicians. It is theorized to be the result of multiple factors and characterized by sensorimotor dysfunction exhibited as increased cortical excitability, inhibitory loss, and deviant plasticity. 1-2% of professional musician's experience task-specific focal dystonia; however, actual incidence may be underreported. Interventions aimed at full recovery have not been identified. Graded motor imagery (GMI) has been shown to modify cortical excitability and sensorimotor function positively in persons with complex regional pain syndrome, phantom limb pain, and chronic pain conditions. The purpose of this case report is to examine the use of GMI tailored for a professional flutist diagnosed with embouchure dystonia. Clinical decision-making for tailoring the GMI will be presented as a part of an integrated care plan.

Case Description: A 54-year-old professional flutist with a 3-year history of embouchure dystonia manifesting in perioral and finger tremors when playing and a sensation that the instrument was "foreign" is presented. Using a biopsychosocial approach, an evaluation was conducted. Previous intervention, including exercise and manual therapy, had been unsuccessful. Examination revealed deficits: reduced accuracy and speed of hand and face left/right lateral discrimination; tremors of face, lips and fingers while playing; and reduction in tone richness noted on tone spectrum analysis. GMI as a sequential, 3 stage progression (right/left laterality, explicit motor imagery, mirror therapy) was tailored with a goal of the subject returning to play without restrictions as a professional flutist.

Outcomes: 21 sessions over 12 months were conducted. The flutist returned to professional musical commitments without dysfunction following integration of GMI into her rehabilitation. Outcomes included: Patient Specific Functional Scale increase from 3 to 8.7 points (minimal detectable change is 2 points); improved accuracy of left- and right-hand discrimination (range pre-GMI 54-70%, post-GMI 80-100%); improved speed of left- and right-hand discrimination (range pre-GMI 1.4-2.5 seconds, post-GMI 1.2-1.7 seconds); and achievement of greater tone richness. Tremors or spasms were non-existent.

Discussion: Using critical thinking, a GMI intervention, which uses the brain's adaptive abilities to recover function, was developed for a flutist with embouchure dystonia. While GMI has been explored in persons with chronic pain or non-progressive neurological conditions, this case demonstrates the potential for use in musicians with dystonia. Activities that work on accuracy and speed of lateral hand and facial/hand discrimination; explicit motor imagery for activating mirror neurons under ideal conditions of movement, and mirror therapy to enhance neuroplasticity are believed to facilitate recovery of sensorimotor function.

Underrepresented Minority Physical Therapy Occupation Interest and Academic Success

Naya Haynes*, Emily Schubbe. (*primary presenter)

As the United States (U.S.) becomes more diverse, professionals in healthcare fields remain predominantly Caucasian. To improve patients' trust and reduce mortality rates, it is imperative the diversity of healthcare providers reflects the diversity of the U.S. population. The purpose of this study was to analyze the perceived influence of demographics like race, gender, and socioeconomic status (SES) on interest in pursuing a career in physical therapy and how these perceptions influenced academic success while in school or as a practicing physical therapist (PT). Participants of this study consisted of undergraduate students, Doctor of Physical Therapy (DPT) students, and practicing PTs from the U.S. Semi-structured interviews conducted via WebEx allowed participants to share personal experiences about facing discrimination due to the color of their skin, disadvantages they faced in their education due to their SES, and other experiences that impacted their journey to becoming a PT. Data were transcribed, coded, and analyzed with a constant comparative approach. Themes identified during data analysis were: 1) The overall impact of demographics on the educational experience: Gender, Race, and SES; 2) Lack of exposure to the physical therapy occupation; 3) Importance in representation within the physical therapy field; and 4) Improving Diversity, Equity, and Inclusion (DEI) in physical therapy. These themes suggest the efforts from academic institutions and physical therapy organizations have made minimal progress in diversifying the physical therapy profession, with minimal impact on the underrepresented minority (URM) students most vulnerable to discrimination, microaggressions, and added academic challenges. To better enable and support URM students' academic pursuits, DPT programs may consider more effective ways to enhance exposure to the PT profession and provide adequate support to those who need it. This would allow more people from diverse backgrounds and lower SES to pursue a DPT degree and increase diversity within the physical therapy profession.

Keywords: physical therapy, underrepresented minorities, diversity

Effects of wearing the NewGait rehabilitative device on walking gait in individuals with Parkinson's Disease

Brooke N. Ray*, Joseph E. Langenderfer, Ksenia I. Ustinova. (*primary presenter)

Quality and speed of gait is a significant contributing factor to quality of life. Individuals affected by Parkinson's disease often experience drastic deficits in both parameters. The NewGait rehabilitative device was designed to provide support during walking for individuals with gait deficits. The present study has been designed to test the effectiveness of the NewGait device's ability to improve gait quality and speed in individuals with Parkinson's disease. Twenty participants with varying degrees of walking impairment secondary to Parkinson's disease in the Mid-Michigan area were recruited. For the intervention participants were monitored by Vicon T160 Motion Capture system to analyze their gait while walking under 3 separate conditions. Participants walked 50 ft independently; participants were allowed to walk with or without their assistive device. The three conditions included a control trial of walking without the NewGait, walking while wearing the NewGait, and walking after the NewGait was removed. Three trials were conducted with each condition. For the second condition, the NewGait was configured using the NewGait 3D hip + dorsiflexion configuration. 3 different degrees of elastic bands (mild, moderate, strong) were used to provide kinematic and somatosensory cueing. A skilled physical therapist fit each individual to the system. Spatiotemporal gait parameters measured were step length, step width, foot clearance, gait velocity, stance time, and double support time. Kinematic parameters included maximal angular displacements of ankle, knee, and hip motion in the sagittal plane. Friedman ANOVA was used for data analysis with the factor condition. All statistical analyses were calculated using alpha levels of 0.05. Participants improved stride length and step width while wearing the NewGait. These improvements suggest that implementing the NewGait system during walking, whether at therapy or at home, shows potential to provide benefit to individuals with gait impairments due to Parkinson's disease who struggle with walking.

Key words: Gait, Parkinson's disease, Somatosensory cueing, NewGait

Improving Self-Efficacy in Managing Parkinson's Disease: The Parkinson’s Disease Health Marker Report Card

Brooke Alexander*, LaChane' Ballard, Megan Ready, Alexandra Vasile, Chin-I Cheng Jamie Haines. (*primary presenter)

Purpose: Parkinson's Disease (PD) is a neurodegenerative condition that is characterized by dead or dying neurons in the substantia nigra and manifests clinically with rigidity, bradykinesia, impaired sensory integration, incoordination, postural instability, and a variety of non-motor symptoms. To address the challenges faced by individuals with PD in obtaining specialized healthcare, particularly in rural areas where the availability of specialists and vital resources is restricted, the PD Health Marker Report Card (PD-HMRC) program was introduced in three rural communities in Michigan (Mount Pleasant, Houghton, and Alpena). The program provides participants with a comprehensive report card with measures of self-efficacy in disease management, balance confidence, non-motor symptoms, gait speed, anticipatory/reactive balance, fall risk, and strength over one year. This study aims to evaluate the impact of the PD-HMRC program on promoting behavioral and lifestyle changes for PD management and enhancing self-efficacy among individuals with PD residing in rural communities.

Methods: Thirty-one people with PD were recruited to participate in the PD-HMRC for one year. At the time of this abstract, subjects completed objective measures at Visit 1 (intake) and Visit 2 (6 months). Outcome measures included: the Brief BESTest, 10-meter walk test - at a self-selected and fast pace (10 MWT), 3-meter backward walk test (3 MBWT), 30 second sit to stand (30 sec STS), Activities Balance Confidence Scale (ABC), 33-item Chronic Disease Self-Efficacy Scale (CDSES), and Non-Motor Symptoms Questionnaire (NMSQ). Each subject received a report card summarizing their performance on each test, and on Visit 2, comparisons were made to previous scores. Individualized recommendations were provided at both visits to address identified areas of concern, including available community resources. A paired two-sample t-test was completed to compare scores between Visit 1 and Visit 2.

Results: Significant improvements ($p < 0.05$) were found in the self-selected paced 10 MWT, 3 MBWT, and the 30-second STS. Although 18/31 subjects had either maintained or improved CDSES scores, no statically significant changes were found. Five participants increased their CDSES score by over 10%.

Discussion: Strength and gait speed improvements were significant, suggesting a reduction in fall risk for the group and the potential for more engagement in the community, which in turn may positively impact quality of life. CDSES scores were not significant between Visit 1 and 2, which may indicate subjects faced obstacles with integrating the report card findings and carrying out recommendations given by the team.

Conclusion: While performance measures linked to fall risk are improved with the report card program in the 6-month period, more support may be needed to see positive significant changes in self-efficacy for managing symptoms of PD in rural communities.

Comparing the effectiveness of manual and self-applied inferior glenohumeral joint mobilizations using ultrasound imaging

Raegan Hickok, Catherine Stump, Sydney Wynne*, John M Andraka. (*primary presenter)

Objective: Shoulder pathologies such as adhesive capsulitis and subacromial impingement syndrome have increasing prevalence. One common intervention for addressing glenohumeral (GH) joint hypomobility associated with these diagnoses is joint mobilization. We hypothesized that manual inferior GH joint mobilizations would be significantly more effective when compared to commonly prescribed self-mobilizations. Moreover, since inferior GH joint self-mobilizations require gripping leading to involuntary rotator cuff muscle activation, we suspected that minimal to no inferior GH accessory gliding would be detected. The purpose of this study was to compare the effectiveness of two commonly prescribed joint mobilization techniques by measuring acromiohumeral distance (AHD) using ultrasound imaging.

Methods: Nineteen healthy adults (12 females, 7 males; 22.9 ± 1.2 years) volunteered to participate. Inferior GH self-mobilizations and clinician-applied manual mobilizations were performed twice in a randomized order with a consistent traction force of 15% body weight monitored by dynamometry. AHD was measured using ultrasound imaging at rest (baseline) and during the two test conditions. The transducer was placed at the anterolateral border of the acromion and the subacromial space was clearly visualized. All ultrasound images were saved, and AHD was later measured by one blinded assessor. AHD was measured by identifying the most superior point on the lateral acromion, then extending a line 30º from vertical to the superior aspect of the humeral head.

Results: The intraclass correlation coefficient (ICC) for test-retest reliability of AHD measurements at baseline and during both mobilization test conditions was excellent ranging from 0.876-0.963. Differences in AHD (mobilization-baseline) were compared using paired t-tests and reported as mean ± SEM. Indeed, differences in AHD during clinician-applied mobilizations (3.90 ± 0.51 mm) were significantly greater ($p < 0.0001$) than self-mobilizations (1.68 ± 0.49 mm). No significant differences were observed when comparing clinician-applied mobilizations between genders (female: 3.16 ± 0.58 mm; male: 5.15 ± 0.90 mm, $p = 0.060$). However, significant differences were noted when comparing female and male self-mobilizations (female: 0.88 ± 0.51 mm; male: 3.05 ± 0.90 mm, $p < 0.05$).

Conclusion: First, our AHD measurement methodology was found to have excellent reliability. In addition, clinician-applied manual GH joint mobilization was a significantly more effective method of creating inferior humeral accessory translation when compared to a commonly prescribed self-mobilization technique. In fact, AHD was unchanged or less than resting baseline measurements in almost 1/3 of participants. Although EMG data was not collected, this is likely due to the involuntary rotator cuff activation that occurs with gripping during self-mobilizations. Although commonly described in physical therapy educational and clinical resources, our findings question the usefulness of prescribing inferior GH joint self-mobilizations.

EXERCISE SCIENCE PROGRAM

The Effects of Acute Caffeine Supplementation on Pitching Accuracy and Velocity.

Garrett Navarra*, Daniel Platt, Paul O'Connor. (*primary presenter)

Introduction. Caffeine is one of the most used ergogenic aids in the world. Caffeine has been reported to act as a CNS stimulant to aid in enhancing muscle fiber contractions, reducing fatigue, and improving focus and alertness. However, its direct effects on specific sports performance measures are not well understood.

Objective. This study aimed to investigate the acute effects of different doses of caffeine supplementation on pitching velocity and accuracy in collegiate baseball players.

Methods. Six NCAA Division I collegiate baseball pitchers (20.3 ± 1.0 years, 87.2kg ± 6.3 kg) volunteered to participate in a randomized double-blind crossover study. Before the caffeine doses were administrated, participants provided informed consent, as well as medical history, and details surrounding habitual caffeine consumption. Caffeine was administered in the form of caffeine powder mixed with water and an artificial sweetener and delivered in three different doses; a placebo (P), moderate dose - 2.5 mg/kg (M), and high dose - 5 mg/kg (H). Following caffeine consumption, participants performed their standard warm up before the start of each trial. 1 hour following caffeine supplementation, subjects completed a pitching velocity and accuracy test that consisted of delivering 16 fastballs from the mound to a catcher behind home plate. These pitches were delivered into the same chosen quadrant of the strike zone. All six subjects completed 3 trials of this test on separate occasions, each trial with a different dose of caffeine. Each trial mimicked one inning with the pitcher throwing 16 pitches with a 20 second pitch clock. Speed and accuracy were measured with a Trackman portable B1 unit. Speed was measured in miles per hour and a strike was accurate if it was in the intended quadrant of the strike zone.

Results. An ANOVA with repeated measures was performed indicating no significant difference in mean velocity times across the three groups (P: 86.3 ± 2.83 mph, M: 86.6 ± 3.31 mph, H: 86.48 ± 4.16 mph, $F = 0.015$, $p = 0.906$) Similarly, for accuracy, there was no significant difference within subjects (P: 5.2 ± 2.3 hits, M: 7.0 ± 2.3 hits, H: 6.2 ± 4.1 hits, $F= 0.211$, $p = 0.665$).

Conclusion. Data collection is ongoing, but despite the lack of significance the results may be of interest to coaches and athletes. Research suggests that caffeine's effect on individuals varies immensely, and it might be best to look at individual results when comparing caffeine effects on pitching velocity and accuracy.

The Effect of Plyometric Exercise on Change of Direction Performance

Andrea Willsey*, Jessica Hill, Nolan Coon, Nicole Dunham, Naveen Sharma, Paul O'Connor. (*primary presenter)

Introduction. Post activation potentiation (PAP) has been shown to bring about improvements in explosive movements such as sprinting, bounding, change of direction performance, and jumping; exhibiting the enhancement of a muscle's rate of force production (RFD). Typically, moderate to heavy resistance training has been used to elicit the improvements. However, this is not practical in many field-based sports and there is some evidence that plyometric exercises may elicit a similar performance enhancement.

Objective. This study assessed the effects of unilateral and bilateral plyometric exercise to improve change of direction performance in collegiate team sport athletes.

Methods. 11 female members from CMU's Division I field sports teams (Lacrosse, Field Hockey, Soccer) participated in a randomized crossover study design to compare the effects of two types of plyometric exercise on 505 change of direction performance. On three separate occasions, following a standardized warm up, subjects performed bilateral (BI) plyometrics involving broad jumps, unilateral (UNI) plyometrics involving alternate leg bounds, or a control condition (C) of walking, on separate days in random order. A 505 change of direction drill was completed immediately following the plyometric condition and at 2, 4, and 8 minutes after the plyometric condition. Subjects were encouraged to refrain from heavy exercise in the 24 hours before their trials and trials were performed at the same time of day.

Results. A two-way repeated measure ANOVA was performed indicating no significant difference between or within any of the conditions or time points (Table 1).

Table 1. Change-of-direction performance times (seconds) by condition and time after intervention.

Condition	Immediately	2 minutes	4 minutes	8 minutes
Control	2.56 ± 0.18	2.54 ± 0.19	2.55 ± 0.18	2.53 ± 0.20
Bilateral	2.53 ± 0.18	2.53 ± 0.17	2.49 ± 0.19	2.51 ± 0.18
Unilateral	2.59 ± 0.18	2.51 ± 0.17	2.51 ± 0.18	2.51 ± 0.19

Conclusion. The plyometric interventions had no impact on the subsequent performance of a change of direction test. The plyometric interventions may not have had sufficient potentiation to change performance.

The Effect of Caffeine on Reaction Time In Collegiate Sprinters out of Starting Blocks

Olivia Hankey*, Anya Turner, Grace Williamson, Paul O'Connor (*primary presenter)

Introduction. Short sprinters rely on fast reaction times to the starter's pistol to gain a competitive edge. While factors such as hip trajectory and block setup have been studied for improving starting block performance, some athletes struggle to enhance their time. Caffeine, known for its ergogenic effects, may offer a solution. Extensive research has determined that caffeine is able to increase calcium release, provide an anti-inflammatory response, preserve muscle glycogen, and act as a CNS stimulant to aid in enhancing muscle fiber contractions, reducing fatigue, and improving focus and alertness. Studies have shown caffeine's ability to improve reaction time in response to a visual stimulus. However, its impact on reaction time (RT) to auditory stimuli, such as the starting gun in track and field, is less understood.

Objective. The present study investigates the impact of caffeine on RT and time to distance, 30m, (TTD) out of starting blocks in collegiate track and field athletes.

Methods. Five female members (age; 19.5 ± 1.5 years, height: 164.0 ± 4.6 cm, body mass: 63.3 ± 3.2 kg) of the Central Michigan Varsity Track and Field Team participated in a randomized crossover double-blind study, assigned to placebo (P), moderate - 3mg/kg caffeine (M), and high – 6mg/kg (H) caffeine groups. They performed three, 30-meter sprints reacting to a three-start command, with RT recorded using the Reactime: Training System (Lynx System Developers, MA, USA) with a 5-minute break between each sprint. An average of the three trials was recorded. All participants completed a standardized warm-up before each trial and had previous experience with block starts. Participants were asked to record their dietary intake for 3 days before their first trial and then asked to repeat this prior to the next two trials. Habitual caffeine intake was recorded, and participants were instructed to refrain from engaging in other training activities and caffeine intake 24 hours prior to their scheduled session.

Results. An ANOVA with repeated measures was performed indicating no significant difference in mean RT times across the three groups (P: 0.203 ± 0.036 sec, M: 0.196 ± 0.043 sec, H: 0.188 ± 0.020 sec, $F = 1.309$, $p = 0.316$) Similarly, for TTD, there was no significant difference within subjects (P: 4.805 ± 0.103 sec, M: 4.787 ± 0.127 sec, H: 4.742 ± 0.122 sec, $F= 3.079$, $p = 0.154$).

Conclusion. Data collection is ongoing, but despite the lack of significance the results may be of interest to coaches and athletes. For both RT and TTD times trended faster with the increasing doses of caffeine and at the elite level races are won and lost by 1/100th of a second.

An analysis of exercise advice and habits during pregnancy: What do women hear and do?

Alexus L. Houk*, Hannah E. Ewing, William A. Saltarelli, Rachael K. Nelson. (*primary presenter)

Introduction: Pregnancy can result in serious health complications for the mother and child, and the risk of such complications increases with excessive maternal weight gain and obesity. However, few pregnant women achieve the recommended amount of exercise. Although OB/GYNs report recommending exercise to their patients, it's unclear whether pregnant women are receiving or understanding this information, which may be why so few meet current exercise guidelines.

Purpose: To examine what advice women receive from their OB/GYNs regarding exercise during pregnancy and their exercise/physical activity habits before, during, and after pregnancy.

Methods: Participants were recruited via social media platforms, word of mouth, the snowballing method, and from flyers sent to 200 pediatric clinics across the U.S. The survey consisted of 27 questions concerning participant demographics, clinician exercise advice, attitude toward exercise during pregnancy, and exercise behavior before, during, and after pregnancy. Of the 114 responses received, 14 were excluded due to incomplete surveys. Therefore, 100 responses were included in the final analysis.

Results: 65% of respondents reported that their OB/GYN encouraged them to perform regular exercise during their pregnancy, and 62% reported that they felt supported by their OB/GYN to exercise during pregnancy. Additionally, 58% of respondents indicated that they discussed at least one aspect of the FITT Principal (frequency, intensity, time, and type) with their OB/GYN or medical staff. However, only 29% of respondents reported that they were given advice on modifications to make exercise easier/safer, 27% reported receiving pregnancy and exercise educational materials, and 2% reported they had a personalized exercise plan prescribed by their OB/GYN.

Conclusion: While most women appear to be receiving encouragement from OB/GYNs to exercise during pregnancy, pregnant women may need further guidance concerning physical activity in order to increase exercise engagement.

Influence of incremental increases in accumulated steps/day on prevalence of metabolic syndrome in overweight vs obese individuals.

Zachary Houslander*, Allyson O'Grady, William Saltarelli, Rachael Nelson. (*primary presenter)

Introduction: Metabolic syndrome (MetS) is a cluster of risk factors that increase risk of developing cardiometabolic diseases. Over 1/3 of U.S. adults have MetS, including ~25% and 50% of overweight and obese adults, respectively. Components of MetS are treatable through regular exercise, however <30% of U.S. adults meet aerobic exercise guidelines. Alternatively, a sufficient amount of daily living steps may be able to reduce MetS. Purpose: To determine number of steps/day associated with reduced prevalence of MetS in overweight vs. obese individuals.

Methods: A cross-section study design was used to evaluate prevalence of MetS in overweight vs. obese individuals. 62 overweight (BMI: ≥25 kg/m2; n=22) or obese (BMI: ≥30 kg/m2; n=40) adult (age: 40.5 ± 14.0 years), non-exercisers participated. Each participant wore an accelerometer to determine average steps/day over three days. Average steps/day were stratified into categories of <2,000 steps/day, up to >10,000 steps/day. MetS was determined by presence of ≥3 components.

Results: 4.5% of overweight individuals and 47.5% of obese individuals had MetS. Minimal prevalence of MetS was seen in overweight individuals, while obese individuals showed reduced prevalence of MetS at >10,000 steps/day.

Conclusion: Accumulating ≥10,000 steps/day is associated with reduce prevalence of MetS in obese, non-exercising adults. Weight maintenance should be encouraged to reduce prevalence of MetS in overweight, non-exercising adults.

Body temperature responses to exertional heat stress and active cooling

Christiana Donkor*, Rowan Fitzpatrick, Sarah Daniel, Marian Avila, Michaell Platt, Micah Zuhl. (*primary presenter)

Introduction. Individuals working in physically demanding professions such construction, agriculture, firefighting (both structure and wildland), manufacturing, and warehousing are at heightened risk for heat injury. Workers are 4 times more likely to experience heat strain after a single shift under hot conditions, and 15% of individuals who consistently work in the heat are susceptible to heat-related injuries. Recommendations for work/ rest cycles exist for workers in hot environments, however, limited research has explored temperature changes and metabolism during consecutive work/rest cycling in a hot environment. This study aimed to explore temperature changes and metabolism during three hours of physical work in a hot environment. The work was separated into cycles that included 45 minutes of exercise followed by 15 minutes of rest (repeated three times).

Methods. Five (3 male, 2 female) participants exercised in an environmental chamber (29 C WBGT, 36 C, 40% RH) for three hours separated into 45 mins of exercise and 15 mins of rest (three cycles). In one trial, participants completed the rest interval in the heat (HT) and in the other trial, recovery was completed in an air cooled space (CT, 16 WBGT). Body temperature, hemodynamics, subjective fatigue, and metabolic rate were recorded every 5-10 minutes.

Results. A total of four trials were completed at time of submission. Peak core temperature during exercise was 38.11 C vs. 38.01 C in the HT vs. CT, respectively. Cooling rate during recovery was -0.012 C per minute vs. -0.017 C per minute in HT vs. CT, respectively.

Conclusions. Preliminary results suggest that peak core temperature is lower when rest was completed in the cool environment. The explanation is likely due to the greater rate of cooling.

Osmolarity of commercially available hydration drink mixes.

Kaleigh Hendricks*, Christiana Donkor, Micah Zuhl. (*primary presenter)

Introduction. Hydration beverages play a pivotal role in maintaining fluid balance, replenishing fluids and electrolytes depleted during physical activity and dehydration. Commercially available powdered hydration beverages specifically have gained increasing popularity over the last few years for their convenience and portability. Each product claims elevated hydration capabilities, however, these exact hydration measures are not required to be stated on a standard nutrition label. The purpose of this study was to investigate the osmolarity of commercially powdered hydrating drinks currently sold on the market.

Methods. A total of 9 different brands were selected for analysis. Sample preparation was standardized across all products. Powders were mixed according to manufacturer specifications and stirred constantly for two minutes on magnetic stir plate. Osmolarity was measured in triplicate using an osmometer (Advanced Instruments), and recorded.

Results. One commercially available product (DripDrop) has been tested. The mean osmolarity was 232 +- 3 mOsm. The remaining products will be tested and reported.

Conclusions. In addition to emphasizing the significance of taking osmolarity into account when selecting powdered hydration beverages for rehydration, this study could help shape future guidelines for beverage formulation.

The effect of physical activity prior to group therapy for substance use disorders on mood and mental health.

Katherine Sunday*, Valerie Maestas, Micah Zuhl. (*primary presenter)

Introduction. Acute sessions of exercise have been shown to have mood enhancing and cognitive (e.g., memory and inhibitory control) benefits among both healthy and clinical populations. In theory, mood and cognitive improvements after brief exercise may support an individual's ability to retain information learned in behavioral therapy. Mindfulness-based relapse prevention therapy (MBRP) integrates evidence-based practices to decrease the probability and severity of relapse for patients in substance use disorder aftercare. Ancillary exercise performed just prior to MBRP may improve the ability of patients to engage in the practices of MBRP and retain the skills that are taught in therapy. The aims of this study were to examine mood changes among individuals enrolled in a 10-week group MBRP program, who performed 15-20 minutes of physical activity prior to engaging in therapeutic tasks (MBRP+Ex). Secondary aim was to compare mental health changes with a treatment as usual (TAU) control who did not perform exercise.

Methods. Eight participants (3 males, 5 female) aged 37 +/- 4 enrolled in the MRBP+Ex group and completed 10 weeks (1 session per week) of therapy. Exercise was performed for 15-20 minutes prior to therapy and included: resistance bands, walking, yoga stretching, or breathing exercises. Mood state was recorded before and after each session. Mental health was screened before and after 10 weeks. Eight individuals (4 males, 4 females) aged 41 +/- 6 enrolled in the TAU group. Mental health was screened before and after 10 weeks.

Results. The overall change in levels of anxiety, liveliness, and happiness significantly improved in the MBRP+Ex group. When examining each day individually, the improvement in anxiety was significant on days 1 and 2. Liveliness was significant on days 1 and 2. Happiness was significant on days 1, 2, 5, and 6. Changes in mental health were not significant in either group and no difference between groups.

Conclusion. Single bouts of exercise prior to group therapy improve mood state, but the effect may wear off over time.

Effect of Breaking up Prolonged Sitting with Intermittent Stretching on Endothelial Function.

Isabella Andreski*, Matthew Weber, Haley Smith, Nicholas Kruse. (*primary presenter)

Sedentary behavior is associated with an increased incidence of cardiovascular disease (CVD). Prolonged sitting, a common form of sedentary behavior, is often reported to impair endothelial function via flow-mediated dilation (FMD) test. Decreased FMD is a well-established endpoint of endothelial dysfunction, linked with numerous cardiovascular risk factors, including CVD. Thus, finding low cost, feasible strategies to mitigate sitting induced endothelial dysfunction are imperative.

Objectives: The main objective of this study was to examine whether prolonged sitting broken up periodically with static stretching exercise can mitigate the sitting induced impairment in endothelial function.

Methods: In a randomized, crossover design six young adults (age: 21±3 yr, body mass index = 23.2 kg/m2) were allocated to two intervention groups (SIT vs STRETCH). The SIT group involved uninterrupted sitting for 3-h. The STRETCH group involved intermittent stretching of the lower extremities every 45 minutes during 3-h sitting. FMD compared endothelial (dependent dilation) function of the popliteal artery before and after each intervention. The FMD test involved a blood pressure cuff wrapped distal to the site of measurement and inflated to 240mmHg for 5 minutes, followed by a 2-minute observation of the vasodilation of the popliteal artery via ultrasound. Doppler ultrasound measured popliteal artery diameter and associated hemodynamics (blood flow/shear rate) immediately before and after each intervention. The percent change in popliteal FMD was calculated using the following equation: %FMD (peak diameter/baseline diameter)/baseline diameter x 100. The level of leg congestion (venous) immediately prior to and after each condition was measured via calf circumference measurement using Gulick tape and total blood volume ([Hbtot]) using near infrared spectroscopy (NIRS). Blood pressure and heart rate were measured before and after 3-h sitting. Primary outcome variables were analyzed using analysis of variance to assess group (SIT vs. STRETCH) and time (pre vs. post). Statistical significance was set a priori at $P \leq 0.05$.

Results: In the SIT condition, there was a significant impairment in popliteal artery FMD (pre: 6.5% ± 1.9%, post: 4.0% ± 1.3%; $P<0.05$). In the STRETCH condition there was no change in pre vs. post FMD measurements (pre: 6.2% ± 2.3%, post: 6.1% ± 1.8%; $P=0.90$). Leg circumference and [Hbtot] were increased after SIT (both $P<0.05$), but did not change (pre vs. post) with the STRETCH trial ($P=0.47$ and $P=0.61$). No changes in blood pressure and heart rate were observed in either group.

Conclusions: Prolonged sitting–induced leg endothelial dysfunction may be prevented by brief intermittent bouts of stretching in young, healthy adults. The mechanism(s) responsible for this may be related to venous congestion brought on by increased sympathetic overactivation.

Influence of Passive Stretching on Vasoconstrictor Responsiveness in Human Contracting Muscle

Carolina Dancu*, Haley Smith, Isabella Andreski, Matthew Weber, Nicholas Kruse. (*primary presenter)

Objective/Purpose. The aim of this study was to provide a more thorough understanding of the relationship between passive skeletal muscle stretching before exercise and macro and microvascular regulation. We hypothesized that a prior bout of passive stretching would improve functional sympatholysis, thereby improving local control of blood flow and oxygenation during moderate intensity exercise.

Methods. Seven healthy, young adults (age: 21±2 yr; body mass index: 22.9±3 kg/m2) completed one preliminary session followed by two experimental testing sessions in a randomized, crossover fashion. During each experimental group subjects first completed passive stretching (PS) of the wrist flexor muscle for two minutes, or no stretching (NS). Following PS (or NS), participants engaged in a single handed 5-minute bout of rhythmic isometric sub-maximal (20% of maximum) handgrip exercise at 33% duty cycle. The last two minutes of exercise involved lower body negative pressure (LBNP) at -30mmHg to unload the cardiopulmonary baroreceptors and reflexively increase sympathetic vasoconstriction. Brachial artery diameter and blood velocities (via Doppler ultrasound) determined arm blood flow (FBF). Forearm, muscle tissue oxygenation during stead-state (SS)-exercise and SS-exercise with LBNP was determined with near infrared spectroscopy (NIRS). Brachial artery forearm vascular conductance (FVC) was calculated from FBF and mean arterial pressure (MAP). From this, vasoconstrictor responsiveness (i.e. functional sympatholysis) was determined as the %change(Δ) in FVC during LBNP. Arterial blood pressure during the rest and exercise conditions was measured, beat-by-beat, using finger plethysmography applied around the middle phalanx of the third finger on the non-exercising hand. Skeletal muscle motor unit recruitment patterns were measured using electromyography. Variables were analyzed using analysis of variance to assess group (PS vs. NS) and condition (rest vs. 20%).

Results: During exercise LBNP reduced FBF and FVC compared with SS-exercise ($P<0.05$). There was a greater ($P<0.05$) decrease in %ΔFVC during the rest trial compared with the exercise trial for both conditions. No differences in %ΔFVC were evident between groups during rest with LBNP (-43.2±4.0% vs. -42.7±4.4%; $P=0.79$). During exercise the %ΔFVC was greater in PS versus NS (-5.4±1.8% vs. -8.7±2.2%; $P<0.05$). NIRS oxygenation ([O2Hb]) was higher in PS vs. NS ($P<0.05$). MAP tended to be lower in PS vs. NS ($P=0.12$). No changes in EMG patterns were evident between groups ($P=0.47$) during exercise.

Conclusions: This study has identified that a prior bout of passive stretching of wrist flexors enhances skeletal muscle blood flow and oxygenation by improving functional sympatholysis. No change in motor unit recruitment (EMG) patterns were evident suggesting that muscle efficiency is not compromised with stretching. The decrease (non-significant) in MAP may be be the driving force for improved FVC and functional sympatholysis with stretching. More research is needed to confirm this hypothesis.

Effect of Prolonged Sitting on Skeletal Muscle Blood Flow and Functional Sympatholysis

Matthew Weber*, Isabella Andreski, Haley Smith, Nicholas Kruse. (*primary presenter)

Prolonged sitting is well established to induce vascular dysfunction at rest. No information exists on this response during exercise.

Objectives: The primary objective of this study was to examine whether prolonged sitting impairs skeletal muscle blood flow and vasoconstrictor responsiveness (functional sympatholysis) during exercise. The secondary objective (if evident) was to determine whether breaking up prolonged sitting with intermittent stretching could ameliorate this detrimental response.

Methods: Six young, recreationally fit subjects (age, 21±3 yr; body mass index, 23.2±2 kg/m2) participated in two testing sessions in a randomized order: 1) 3-h of uninterrupted sitting, or 2) 3-h of sitting interrupted with an 8-min bout of static stretching every 45 minutes. Plantar flexion exercise in the prone position occurred pre- vs. post-conditions. Exercise consisted of five minutes of steady-state exercise at 20% maximum, with the final two minutes involving a cold-pressor test (CPT) to induce sympathetic vasoconstriction. Popliteal artery diameter and blood velocities (Doppler ultrasound) determined leg blood flow (LBF). Leg (gastrocnemius) muscle tissue oxygenation was determined via near infrared spectroscopy (NIRS). Leg vascular conductance (LVC) was calculated from LBF and mean arterial pressure (MAP). Arterial blood pressure was measured, beat-by-beat, using finger plethysmography. The degree of vasoconstriction [% change in LVC; (%ΔLVC)] that occurred during CPT relative to rest or exercise was calculated as [%ΔLVC=LVC*(CPT)−LVC/LVC]×100. Leg circumference (Gulick tape) and total blood volume ([Hbtot]) using near infrared spectroscopy (NIRS) measured levels of venous congestion. Variables were analyzed using analysis of variance to assess group (SIT vs. STRETCH) and condition (rest vs. 20%). Statistical significance was set at $P \leq 0.05$.

Results: Prolonged sitting resulted in decreased LBF during exercise (pre vs. post; $P<0.05$). This was accompanied by a decrease in NIRS-derived oxygenation ([O2Hb]) during exercise (pre vs. post; $P<0.05$). There was a greater decrease in %ΔLVC during rest (CPT) trial versus exercise trial ($P<0.05$). The SIT condition had a tendency for a greater decrease in %ΔFVC than STRETCH condition (−15.6±3.2 vs. −12.7±2.5%; $P=0.13$). Similarly, LBF tended to be greater with stretching compared to control ($P = 0.08$). Likewise, LVC tended to be greater with stretching ($P=0.1$). NIRS-derived oxygenation ([O2Hb]) during exercise was greater in STRETCH vs. SIT ($P<0.05$). Leg circumference and [Hbtot] were increased after SIT (both $P<0.05$), but did not change (pre vs. post) with the STRETCH trial ($P=0.47$ and $P=0.61$). No changes in central hemodynamic variables (blood pressure and heart rate) were observed during exercise between groups.

Conclusions: This is the first study to identify that prolonged sitting induces macro and microvascular dysfunction during exercise in young participants. Intermittent stretching to break up prolonged sitting may ameliorate this; however, more research is needed to verify this supposition.

Early Physical Therapy Intervention in Left Hemiplegic Cerebral Palsy: A Case Study

Karli Gasta*, Alexa Michels, Julie Jacoby, Roop Jayaraman. (*primary presenter)

Introduction: Cerebral Palsy (CP) comprises a spectrum of disorders arising from impaired brain development, commonly diagnosed within the first two years of life, resulting in motor disabilities and potential developmental delays. This case study aims to assess the impact of early Physical Therapy (PT) intervention on children with Cerebral Palsy, focusing on resolving existing and preventing future developmental delays.

Objective: This case study examines the influence of early PT intervention on a male patient diagnosed with Left Hemiplegic Cerebral Palsy at seven months old, exploring the effectiveness of therapeutic interventions in addressing developmental delays.

Case Description: The subject, born prematurely, received seven months of PT intervention. Initial assessments revealed developmental delays in locomotion, range of motion, and posture, with specific goals established for achieving developmental milestones. Therapeutic interventions included manual stretching, reciprocal crawling, static standing, assisted step-taking, and floor-to-stands, facilitating progress toward established goals. Post-discharge, the patient continued home interventions, demonstrating significant progress by achieving initial goals, walking independently, and receiving continued Speech Therapy for swallowing and verbal communication.

Discussion: The family has been educated on recognizing signs requiring further therapy, and the patient is scheduled to return to PT if future developmental delays arise. This case underscores the positive impact of early diagnosis and intervention on patient outcomes, emphasizing the importance of a multidisciplinary approach in managing Cerebral Palsy.

NUTRITION AND DIETETICS PROGRAM

Examining the Impact of Social Media Usage on Body Image Perception among College Students at Central Michigan University

Najat Yahia, Julie Jacoby*, Chin-I Cheng, Lixin Li. (*primary presenter)

Objective: The widespread and rapidly growing use of social media among students raises concerns about its potential impact on various aspects of their lives, particularly their body image and self-esteem. This study aims to explore how social media usage influences students' perceptions of their body weight. In addition, it will examine relationships between social media usage (duration, content type, preferred platform) and concerns about body shape and motivation to exercise.

Methods: A cross-sectional study will be conducted among 200 Central Michigan University students during Spring 2024. Participants aged 18-30 will be recruited to complete an online survey including questions about students' demographic characteristics such as age, gender, year- in- school, body image, physical activity, and social media usage to provide a comprehensive overview of the student's variables. Body image concerns will be collected from the 34 BSQ Body Screening Questionnaire questions. The International Physical Activity Questionnaire (short form) will be used to assess students' physical activity. Social media use questions will include questions about the duration of usage per day, content type, and preferred social media platforms.

Results: The findings of this pilot study will help shed light on the relationship between body image and social media use among students to foster positive experiences within the student community. We aim to compare differences in gender, how comparison contributes to body image dissatisfaction, extent of specific platforms' effects. In addition, we will examine the role that physical activity plays in mediating the relationship between social media and body image in college students. We are looking to examine if there is a connection between the amount of time spent editing photos for social media and body shape concern in college students. Moreover, we will explore how portrayals of idealized bodies on social media relate to body image dissatisfaction. Results will be analyzed and shared once the research is completed in spring 2024.

Conclusion: As social media has become integral to students' daily routines, understanding its role in shaping students' perceptions of their body image is crucial to addressing potential negative impacts on their body image and body weight concerns. The results of this study will provide insight into various aspects of social media usage that may influence body image perceptions and delve into the correlation between the frequency and nature of social media engagement among college students and their perceptions of body image.

PHYSICIAN ASSISSTANT PROGRAM

Experience and Perception of Chat Generative Pre-Trained Transformer (ChatGPT) as an assistant learning tool among First year Physician Assistant Students

Audrey Shaw*, Najat Yahia, Lixin Li. (*primary presenter)

Introduction: With the recent development of artificial intelligence (AI) language models, such as OpenAI's Chat Generative Pre-Trained Transformer (ChatGPT), ChatGPT has emerged as a valuable tool to assist health care professionals. ChatGPT may also be used as an assistance tool in medical education. Nevertheless, there is limited research on the perception and experience of ChatGPT as a learning tool, particularly among medical students or Physician Assistant students.

Objective: This study aimed to explore the experience and perspectives of ChatGPT as a learning tool among first-year physician assistant students at Central Michigan University.
Methods: A cross-sectional study was conducted among PA students enrolled in a Physician Assistant (PA) class in year 2023. Thirty-three Students completed an online survey administered through Qualtrics.

Results: Results of the study indicated that 95.4% of the students have never used Chat GPT compared to other study resources during their didactic year. There were diverse opinions on using Chat GPT as a learning resource and perceived helpfulness. Fifty percent of students found it "Definitely not" helpful, and 19% found it either "Probably yes" or "Definitely yes." Among those who used Chat GPT, 85.7% reported using it to review material and explore new concepts. Around 71% of students reported not using Chat GPT for exam preparation. In addition, the survey indicates that Chat GPT is not commonly used for collaboration among students or for asking questions deemed uncomfortable in a class setting. Interestingly, the opinion on the tool's effectiveness varies among students, with 59% feeling that Chat GPT is "Definitely not" considered to improve their overall understanding of the material, and a smaller percentage reported positive impacts. A majority (76.47%) of students reported not recommending Chat GPT to other physician assistant students.

Conclusion: Chat GPT was not found to be a preferred resource for studying or prepare for their exams by first-year PA students. The survey indicates a gap in the widespread adoption and positive perception of ChatGPT among PA students. Future studies with larger samples are needed to understand the tool's role in various aspects of medical education.

Identify Opportunities to Improve Physician Assistant (PA) Curriculum to Enhance Research within the PA Profession

Erica Parks, Lixin Li*. (*primary presenter)

Introduction: The Physician Assistant (PA) profession has a 59 years history and has become an important clinical part of the U.S. healthcare system. The mission and goals of most PA programs are to train clinically competent health care providers. PA-focused research has not been integrated into PA education in most programs. As a results, success in research is a challenge for practicing PAs.

Aims: This study aims to explore the research background and the perception of research among PA students. This study also aims to identify barriers and explore opportunities for improving research in PA curriculum.

Methods: Survey questions were delivered through Qualtrics to Central Michigan University Physician Assistant students of class of 2024 and class of 2025 before their Evidence-Based Medicine course. Ninety-six students participated the survey.

Results: Students had low confidence in their ability to identify and search relevant databases (only 6.25% of students reported being "Very confident"). Fifty six percent of students had never critically appraised a research article (44.34% in "Might or might not," "Probably not," and "Definitely not" categories), none of the participants reporting being "Very confident" in their ability to evaluate research articles. The study also reveals that confidence in data analysis and interpretation was notably low. Interestingly, participants showed a moderate to high level of familiarity with various types of research study designs. However, 43% of students had not engaged in designing a research study. Furthermore, participants showed varying levels of familiarity with case report, the structure of research articles and components of research presentations. Confidence in presenting research findings was reported in only 28% of students.

Conclusions: PA students lack essential skills such as research designing, analyzing data, and interpreting research findings. This is the major barrier for their future PA-focused research. This finding emphasize the necessity for integrating specific research skills and competencies into the PA curriculum in order to enhance research within the PA Profession.

Evaluating the Impact of an Evidence-Base-Medicine Course on Enhancing Student Research Skills, Confidence and Shaping Future Research in the Physician Assistant Profession.

Erica Park, Lixin Li*. (*primary presenter)

Introduction: Both experienced and newly graduated Physician Assistants (PAs) often lack training and experience in research. As a result, research productivity remains a challenge for PAs. Few studies have explored the importance of addressing these gaps in research training and experience among PAs.

Aims: This study aims to evaluate the impact of Evidence-Based-Medicine course (EBM) on enhancing student research skills and to assess changes in their knowledge, abilities, and confidence levels across various research-related domains.
Methods: Data was collected through a survey administered before and after the EBM course. A total of 96 students that enrolled in Central Michigan University physician assistant program in the years 2022 and 2023 participated in the survey.

Results: This study indicated the confidence in identifying and utilizing relevant databases for evidence-based research, critically appraising research articles, and conducting literature reviews have been significantly increased after EBM course, particularly in the "Very confident" category. Furthermore, there was a significant enhancement in familiarity with research study designs, ethical considerations, and engagement in research projects involving human subjects. Additionally, participants showed improved confidence in developing research hypotheses, writing research articles and case reports, and presenting research findings.

Conclusions: Integrating research training into the PA curriculum is crucial to ensure that PAs possess the necessary research skills for evidence-based practice. Further study is needed to explore the impact of research training on students' research engagement and professional growth in their respective fields.

Oral Ulceration induced by Anti-psychotic drug: A rare side-effect of Aripiprazole.

Angelyn Danowski*, Lixin Li. (*primary presenter)

Introduction: Antipsychotic drugs including Olanzapine, Quetiapine, and Haloperidol have been associated with elevated incidence of oral ulcerations. In contrast, Aripiprazole, a third-generation atypical antipsychotic approved by the FDA in treating schizophrenia, bipolar I, and treatment resistant depression exhibits a lower risk of oral ulceration in newly initiated anti-psychotic therapy. Aripiprazole has been reported to cause oral ulceration in only 4.98% of patients per year.

Case Presentation: A 17-year-old female with a 4-year self-reported history of anxiety and depression failed multiple different selective serotonin re-uptake inhibitors (SSRIs) due to intolerable side effects. Subsequently, 2mg Aripiprazole was initiated. At her one month follow up, the patient reported insomnia that resolved after two weeks, but showed improvement of anxiety, depression, and appetite. However, she developed a 4.5cm x 1.5cm erythematous, geographical ulceration with well-demarcated borders on the right dorsal surface of her tongue. Unaware that Aripiprazole was the cause of the ulcer, the patient continued the Aripiprazole an additional two months. Despite persistence of the ulcer, her depression symptoms significantly improved from a Patient Health Questionnaire (PHQ) of 26 to 15. Upon discontinuation of the Aripiprazole due to the suspicion of its association with her ulceration, the ulcer rapidly resolved within 3 days.

Conclusion: Although rare, monitoring for oral ulcerations is crucial in patients taking aripirazole, as early discontinuation may prevent pain, discomfort, and result in complete resolution of such ulcerations.

A Complex Presentation of L1 cell adhesion molecule (L1CAM) Gene Mutation in a 9-Month-Old Male.

Abigail Meesseman*, Lixin Li. (*primary presenter)

Background/Introduction. The L1 cell adhesion molecule (L1CAM) plays key role in the central nervous system development. L1CAM gene mutation is a rare X-linked genetic disorder affecting about 1 in 30,000 males. Its mutation results in L1 syndrome that is associated with brain malformation and nervous developmental. L1 syndrome manifests with a spectrum of clinical features including hydrocephalus, spasticity of the lower limbs, cortical thumbs, aphasia, and intellectual disability. Severely affected individuals often survive only a short time after birth and there is no known therapy to treat or delay the disease process.

Objectives. We report a 9-month-old male with L1CAM gene mutation present with a constellation of clinical manifestations including developmental delay, dysphagia, macrocephaly, and plagiocephaly.

Case presentation. L1 syndrome was suspected prenatally during the 20-week gestation period following the detection of ventriculomegaly on prenatal ultrasound. Subsequent prenatal MRI detected the ventriculomegaly and aqueduct stenosis in the neonatal . Genetic testing detected the mutation of L1CAM gene, confirmed the diagnosis of L1 syndrome in the neonatal . Following delivery, the newborn received CPAP due to transient tachypnea. The patient further presented with unilateral sensorineural hearing loss and difficulty feeding. His numerous complications necessitated the involvement of a wide variety of specialists. A malformation of the aqueduct duct of Sylvius was identified. Additionally, G-tube insertion was deemed necessary for feeding. The patient underwent G-tube placement and has since exhibited positive outcomes with this intervention.

Conclusions. This study emphasized the importance of comprehensive prenatal and postnatal evaluation in infants with L1CAM genetic disorders. Multidisciplinary management focusing on associated complications and developmental support is essential for establishing the best outcome for the patient.

AUDIOLOGY PROGRAM

Comparison of Hearing Devices: OTCs, PSAPs and Prescription Hearing aids.

Yunfang Zheng, Elyse Kady*. (*primary presenter)

Over-the-counter (OTC) hearing aids (HAs) and personal sound amplification products (PSAPs) are advertised as alternatives to prescription HAs, and have grown in popularity due to relatively cheaper prices. Since FDA approval in 2022, more OTCs and PSAPs with advanced technology have entered the market. Little is known about these current OTCs and PSAPs, especially how they apply amplification to individual ears. This research study aims to compare the acoustic fit and personal perceptions of Jabra Enhance OTC HAs, Sony CRE-E10 OTC HAs, and AirPod Pro earbuds programmed to function as both OTC HAs (Airpod OTCs) and PSAPs (Airpod PSAPs) by assessing the output of each device across different frequencies using real-ear measurements and speechmapping, and having each participant fill out a personal perceptions questionnaire.

Participants included adults with bilateral mild-to-moderate sensorineural hearing loss. A hearing evaluation was completed to determine candidacy. Each participant self-fitted pairs of Jabra Enhance, AirPod OTCs, Airpod PSAPs, and Sony CRE-E10, and was fitted with Oticon More HAs by an audiology professional in a randomized sequence. Information obtained from each fitting included real-ear aided gain and output for three input levels and maximum power output (MPO), pre-and post-fit Client Oriented Scale of Improvement (COSI) questionnaire in four simulated environments (playground, street, home, and restaurant), and a personal perception questionnaire regarding own and others' voices, device operation, and physical fit. Data collected was analyzed using Matlab and JMP pro.

Results revealed significant sound level difference in the ear canal among the devices for all input levels ($p < .0001$). The prescription HAs had the highest MPO and outputs (for all inputs), which were the closest to the verifit NAL-NL2 targets. Sony outputs were similar to those from prescription aids, and the outputs decreased in the sequence of Jabra, Airpod OTC, and Airpod PSAP with the output-difference-to-prescription HA as 5-11/8.5-12.5/10.7-23dB at 2-8kHz for 55dB input, respectively. Overall, there was a significant impact of device on the device operation, sound perception, and self-perceived aided benefit ($p=0.0033$). Although the self-fit devices were set up within a reasonable time frame, everyone needed professional assistance, except one participant that needed no assistance with Airpod PSAP. Sony and Jabra HAs were perceived louder but poorer sound quality and comfort compared to prescription HAs. Airpods were rated the lowest, although Airpod OTCs were rated louder but with less sound quality and comfort than Airpod PSAPs. For all simulated listening environments, participants perceived much better, better, slightly better aided benefit from prescription HAs, Sony/Jabra, AirpodOTCs/PSAPs, respectively. Both Airpod forms were perceived to have no aided benefit for home and restaurant environments. The results will help professionals better understand modern OTC and PSAP devices and how they compare to prescription HAs.

Combined effects of high-frequency hearing loss, fitting formula, and venting on real ear sound level and patient perception.

Amanda Brown*, Yunfang Zheng, Paige Hunter. (*primary presenter)

This study investigated how acoustic options and fitting formulae affect hearing aid fitting for high-frequency hearing losses (HFHLs). Real ear measures were completed on Kemar (25 HFHL configurations per HL) and adults with three groups of HFHLs, with 14 eartip options for three fitting formulae. Subjective responses were obtained for nine HL combinations. Results revealed significant impacts of the HL, eartip/venting, and fitting formula on sound level in the ear canal and perception. Participants with HL did not perceive sound the same as those with normal hearing. Further effects of multiple aspects were reported for a better fitting with HFHLs.

High-frequency hearing losses (HFHL), common and impacting life quality (Furman et al., 2013), pose speech clarity issues aided by hearing aids but may cause occlusion or undesired feedback (Dillon, 2012; Hengen et al., 2020). Our preliminary study revealed effects of HFHL degree, configuration, fitting parameters, potentially impacting speech intelligibility for moderate-severe and greater HLs. The combined effects on HL listeners remain unclear. Clinically, specific fitting guidelines for HFHL lack. This study assessed acoustic and perceptual effects on hearing aid fitting for moderately-severe to severe HFHLs.

Real ear measures (REMs) were conducted on Kemar and adults with normal hearing, moderately-severe, severe HF-SNHLs. Simulated HLs for Kemar involved five low frequency (LF) thresholds and five HFHL configurations for each severity. Recorded metrics included real ear occluded gain, aided gain for 20dB insertion, aided gain/output for each HL, and maximum gain before feedback for various fitting options. Subjective responses were obtained for the individual's perceptions of their own and other's voices with different domes/earmolds and fitting formulae for a total of nine HL combinations, including the participant's HL and simulated HLs with the above five LF thresholds and five HFHL configurations when fixing H/LF thresholds, respectively.

Results highlighted effects of HL, eartip/venting, fitting formula on sound levels and perception ($p < .0001$). LFHL increase boosted output across frequencies, while higher HF cutoffs decreased output at 1500-8000Hz. Different acoustics were noted for domes/earmolds. Participants associated louder sounds with lower quality, less comfort, and increased occlusion. HL individuals perceived differences compared to normal hearing, preferring NAL-NL2 and more open ear tips, with DSL causing more perceived occlusion ($p < .0001$). Preferences varied among participants. Further information forthcoming for improved fitting with HFHLs.

Fitting Formula Effects on Hearing Aid Fitting for Different Degrees and Configurations of Hearing Losses.

Yunfang, Zheng, Yara Ayoub*. (*primary presenter)

Hearing aid fitting formula (FF) plays a critical role in tailoring the amplification to the specific needs of individuals with hearing loss (HL) to optimize fitting outcome. Previous studies have focused on the accuracy of hitting prescriptive targets with different FF for different HLs and demonstrated positive fitting outcomes (e.g., Baker, 2017). The degrees and configurations of HLs are important for FF choices, which is however not systematically investigated. Clinically, there are no guidelines regarding selecting specific FF to reach the best fitting outcome for different HLs. This study investigated the acoustical and perceptual effects of fitting formulae on hearing aid fitting.

Software simulations and real ear measures (REMs) on Kemar were completed using four groups of rising, sloping, and flat HL configurations: mild, moderate, moderately-severe, and severe. Each group of the rising/sloping HL included five high/low frequency (H/LF) thresholds (0,10,20,30,35 dB) and four/five configurations of L/HFHL (LFHL ranges at 250,250-500,250-750,250-1000Hz; HFHL ranges at 2-8,3-8,4-8,6-8,8kHz) for each H/LF threshold, with a total of 20/25 combinations of rising/sloping HLs each group. Gain and compression ratio (CR) for different inputs and maximum gain before feedback (MGBF) were recorded from the software for NAL-NL1, NAL-NL2, and DSL-pediatric FF. Real ear aided gain and output for different HLs, and MGBF were recorded on Kemar and one normal hearing listener (simulated mild HLs) for the three formulae. Perceptual responses regarding own and other's voices from the listener were also obtained. Data were analyzed using JMP Pro 17 for multiple aspects.

Results revealed that the FF significantly affected insertion gain, compression ratio (CR), and MGBF ($p<.0001$). The DSL formula provided 10dB more gain than NAL formulas across most frequencies and all HLs. DSL maintained consistent gain across the frequencies for flat and rising losses, with more gain at mid-high frequencies for sloping losses. NAL-NL1 yielded the most gain at mid frequencies, while NAL-NL-2 was most gain at mid-high frequencies for all HLs. Flat losses had the highest CRs, led by NAL-NL2, whereas DSL had the lowest CRs. The proposed MGBF introduced varying gain restrictions across HLs, particularly for DSL and more at high frequencies, potentially affecting speech intelligibility. Insertion gain increased significantly with the degree and number of frequencies of HLs. Perceptually, DSL was perceived as the loudest with more occlusion, lower sound quality, and comfort. The degree and configuration of HL had a significant impact on perception ($p<.0001$). More information will be discussed/reported for formula selection for desired outcomes.

Comparison of over-the-counter hearing aid fitting between self-fit and professional-fit.

Yunfang Zheng*, Jennifer Gozdor. (*primary presenter)

To reduce the cost and increase the accessibility of hearing aids (HAs), over-the-counter (OTC) HAs have been approved to be fit to adults with a mild to moderate hearing loss (HL) without the presence of a healthcare professional. Studies have been focused on the validation of self-fitting and found comparable aided benefit between self- and professional-fit on sound quality, preference, and speech intelligibility (e.g., De Sousa et al., 2023), although self-fit showed less effective (e.g., Humes et al., 2017). Studies also examined the hearing threshold accuracy from the OTC app and audiometer with inconsistent findings (e.g., Chen, et al., 2021; Keidser & Convery, 2016). No study has considered all fitting essentials in the comparison. This study followed audiology best practice fitting process including comparisons on audiometric results and verification of HA operation, physical fit, real ear measures, in addition to the validation of aided benefits between self- and professional-fit of OTC aids.

84 adults with a mild to moderate sensorineural HL completed this study. 20 participated in the human factor study from unboxing and fitting aids to turn off the aids, to verify the feasibility of self-fitting. The whole procedure was timed for further data analysis. Each participant also completed a self-identification questionnaire. 64 participated in the clinical study, randomly assigned into self-fit or professional-fit group (32 each). All underwent three stages: fitting, wearing aids for one month, and outcome validation. Quick Speech in Noise (QuickSIN), the Abbreviated Profile of Hearing Aid Benefit (APHAB) and the Speech, Spatial and Qualities of Hearing Scale (SSQ12) questionnaires were used to validate aided benefit. Real ear aided gain and output, hearing test results from OTC app and audiometer, and participant operation performance were also recorded for further comparison. Data collected were analyzed using Matlab and JMP pro.

Results revealed that OTC HAs were operated within a reasonable time frame, but age had a negative impact on the device operation, real ear responses, and self-perceived aided benefit. Also, not all participants possessed the knowledge regarding the correct procedure to address their hearing issues. The real ear aided gain/outputs were significantly higher at 2000Hz and 4000Hz for the professional-fit and for those with higher technology level and HA history. Both groups had aided benefit for QuickSIN. The professional-fit indicated relatively higher self-perceived aided benefit for APHAB and SSQ12 than the self-fit group. The average threshold differences (OTC app vs. audiometer) were all within 10dB. The thresholds from the app were higher at 500Hz, with some exceptions showing differences of 15-35dB.

Information obtained from this study provides valuable insights for OTC fitting, which will help both audiology professionals and patients achieve better rehabilitation outcomes.

Hearing Loss and Sickle Cell Disease in the Middle East: A Closer Look at Beta Thalassemia.

Jana Al Jurdi*, M. Dawn Nelson. (*primary presenter)

Purpose: Beta Thalassemia, also known as Sickle Beta Thalassemia or Mediterranean anemia, is a type of Sickle Cell Disease that is mostly prevalent in Middle Eastern and Mediterranean populations. Unfortunately, in today's literature, not only is there an unclear differentiation between Middle Eastern and Mediterranean populations, but also an underrepresentation of the audiologic effects of Beta Thalassemia in the Middle East. Auditory cortex hypoperfusion, ototoxic effects of the treatment methods, and anemia support the increased likelihood of hearing disorders in these populations. The results of this research will hopefully help highlight the state of audiologic healthcare that underserved Middle Eastern populations receive, and propose some solutions to be used to better serve such populations.

Methods: A literature review encompassing articles about Beta Thalassemia and audiologic effects will be conducted to determine the underlying mechanism of destruction of auditory function in Beta Thalassemia as well as the state of audiologic intervention these patients receive in Middle Eastern countries.

Results: Results indicated that there is a high prevalence of hearing and vestibular disorders in Beta Thalassemia patients which highlights the importance of implementing routine audiologic testing in the plan of care for Beta Thalassemia patients. This high prevalence is linked to the ototoxic effects of chelation therapy Beta thalassemia patients receive, auditory cortex hypoperfusion documented in such patients, as well as canal paresis. Moreover, further research is needed to assess the state of audiologic care Beta Thalassemia patients receive in the Middle East. The findings support the correlation of hearing loss and vestibular disorders and beta thalassemia. More research is needed to highlight the importance of this issue in Middle Eastern countries.

SPEECH-LANGUAGE PATHOLOGY PROGRAM

What's in a Written Word?

Katie Squires* (*primary presenter)

Purpose: Randomly ask 100 people what they think about spelling, and the most common response will be "It doesn't make sense. English spelling is crazy." The reality is that English spelling does make sense when it's taught in the correct way. English is a morphophonemic language, and it favors the consistent spelling of morphemes over the consistent spelling of phonemes. Moreover, spelling preserves the history of a word, so if a word looks "irregular", it is likely because of a historical influence.

Methods: A brief history of English orthography (spelling) will be presented along with tools used to implement scientific investigation of why a word is spelled a particular way.

Results: Students use resources such as etymonline.com to find the root and history of a word, word sums to build the morphemic elements of a word, and word matrices to show the relationships between words in a family. They also choose graphemes to represent phonemes or other markers within a word to accurately spell it. Following this instructional approach, students can explain why there is a <w> in the word "two", the connection between pterodactyl and helicopter, and why "please" cannot be spelled *please.

Conclusions: When students are taught to inquire about a word's orthography and have the tools to conduct scientific analysis, they learn that spelling isn't crazy or something to be memorized. English spellings do make sense. Moreover, students are excited to become word detectives because nothing motivates like understanding.

HEALTH ADMINISTRATION PROGRAM

Social Media and Health: Unveiling the Interdisciplinary Research Landscape.

Hannah Johnston*, Rodina Bizri-Baryak, Elina Erzikova, Lana Ivanitskaya. (*primary presenter)

Background: Health researchers have been using social media as a data source since 2008 and the volume of research continues to rise annually. Social media platforms offer access to longitudinal data on health policy, health attitudes, and behaviors. Researchers from multiple disciplines have recognized social media as a cost-effective, rich source of health-related data on worldwide populations. AIM: We focus on the interdisciplinary nature of the above-mentioned research and ask: What interrelated disciplines contribute ideas to health-related research that builds on social media data?

Methods: Complex queries in the Web of Science database yielded 13,080 relevant studies. We selected a subset of 5,000 articles from journals with the highest impact factors. To maintain diversity in our collection of studies, we limited the number of articles contributed by any single journal to a maximum of 100, preventing any one journal from overshadowing the others. If a journal had more than 100 articles, we picked the 100 most cited articles. The most cited article selection task was performed by two researchers independently. They achieved perfect agreement in their final selections. We analyzed sources, mostly journal titles, from articles' references by building a co-citation map in VOSviewer, a bibliometric software designed by Leiden University researchers. The map clusters sources based on their tendency to be cited together. The clusters provided insights into the multidisciplinary nature of health studies that utilized social media data.

Results: The authors of 5,000 health-related articles in our corpus cited 54,478 sources (mostly journals) in their reference lists. We mapped 1,000 journals with the greatest total link strength; each was cited at least 20 times. The co-citation map of these journals revealed multiple contributing fields of science. Specifically, the journals were grouped into 7 clusters based on their tendency to be cited together: mental health, behavior, and adolescence; medicine; information/business; communication; public health; addictive substances; and psychology/sociology. The node size indicates citation volume. Journal of Medical Internet Research, Computers in Human Behavior, and PLOS One emerged as the top three most frequently cited journals.

Conclusions: The growing health literature that builds on social media data draws upon contributions from many scientific disciplines. The co-citation map displayed 7 clusters, with a salient group of journals related to mental health, behavioral health, and adolescence. Our study highlights opportunities for collaborative research among social media researchers and health experts, as well as scholars from other related fields. Their research is likely to produce insights that inform evidence-based policies and interventions that address pressing issues such as mental health promotion, behavioral interventions, and adolescent health education, among others.

Electronic Health Records: the Wonders and the Worries.

Mark Cwiek*, George Kikano, José Brown, Vincent Maher, Brenden Roth, Ferdousi Zaman. (*primary presenter)

The advancement of technology in the medical field within the United States and around the world has been the story of a remarkable achievement in advancing diagnostic and treatment capabilities, but concomitantly also greatly increased the cost of providing care and the risks of legal liability. A critical component of technological advancement in the healthcare field is electronic health records (EHRs). EHRs have provided a great many opportunities for improving how medical records are maintained, stored, and shared. EHRs unfortunately also have increased physician frustration and burnout rate, increased risks of data security breaches and privacy violations, and provided a general lack of interoperability between EHR systems. The “wonder and worries” of EHRs are discussed in this paper, along with ideas for EHR systems improvement. The authors recommend that hospitals and healthcare organizations strive to achieve certification from the Office of the National Coordinator – Authorized Testing and Certification Body, develop effective encryption of data, utilize best-practice password protection, and maximize the use of audit logs. Further, the human connection aspects of the clinical experience need to be kept at the forefront, and physicians should be helped in this goal using medical scribes and software programs that help physicians avoid burnout related to EHR demands. There are reasons for cautious optimism that the myriad promised benefits of electronic health records can yet be realized for physicians and other clinicians, their patients, and society as a whole.

When Surgeons Are “Too Old” to Practice Surgery: Recommendations to Balance the Imperatives of Public Safety and Practical Necessity.

Mark Cwiek*, Dan J. Vick, Krista Osterhout & Vincent Maher. (*primary presenter)

Few countries have legally set a maximum age for practicing surgery. This is difficult to sustain as surgeon shortages in many localities require hospitals to grant surgical privileges based on internal peer review systems. This approach is not without problems. Some hospitals and medical societies have developed competency assessment programs. Based on the literature and the experience of various jurisdictions, the authors recommend a policy approach that does not mandate a retirement age for surgeons, but rather a mandatory age of 65 at which surgeons shall be legally subject to periodic assessment of physical dexterity, eye/hand coordination, and cognitive skills.

An Interactive Interface for Age-Adjusted Stroke Risk Estimation.

Dimitrios Zikos, Shravan Kumar*. (*primary presenter)

Introduction: The incidence of stroke has been increasingly high in the US and worldwide. There are several demographic factors, but most importantly clinical factors that increase the risk for stroke in one's life, such as diabetes, hypertension, heart disease, obesity, and more. The present study has been designed to provide insights into the likelihood of stroke based on one's medical history and demographics. The study aims to develop a statistical model for the estimation of the odds of stroke and thereafter incorporate the model into an application that can be used as a stroke risk scenario builder.

Methods: This is a cross-sectional study that used a dataset with 5,111 patient cases from kaggle.com stroke data repository. The dataset includes information about patient comorbidities, including risk factors for stroke, demographic, and lifestyle factors. A logistic regression model was created to examine how each of the studied variables is associated with stroke. This model served as the backend of an interface where the user enters their demographic information and sees the likelihood of stroke for their age, as well as a plot projecting how the risk would change in the future as they age. Using the interface, the user can also create what-if scenarios, where they can add or remove risk factors and see updated projections and comparisons of the risk for stroke.

Results: According to the logistic regression model each year of age increases the likelihood for stroke by 7.8%, the presence of hypertension increases the likelihood by 71.3%, heart disease by 52.9%, and diabetes mellitus by 71.9%. In addition, smoking was found to increase the likelihood of stroke by 41.1%. BMI, gender, marriage status and residence type were not found to be associated with stroke in a statistically significant way. The integration of the model into an interactive web interface allows comparative trends to be presented to users for better visualization of the positive effect that a lifestyle change would have.

Conclusion: The present study attempted to provide a practical application by delivering critical insights into the dynamics of stroke occurrence and risk factors. The development of the user-friendly interface provides a visual understanding of risk trends according to user input. The application is expected to provide insights to a patient and motivate them to improve lifestyle factors in a convincing way. Future research plans involve new likelihood estimations by incorporating more clinical and lifestyle factors into the system backend.

PUBLIC HEALTH PROGRAM

Public Health in the Shadows: Tracing Darknet Drug Trends.

Sergey Soshnikov* (*primary presenter)

Background: Our study delves into the dynamics of online drug markets, mainly focusing on Hydra, a prominent Darknet marketplace, to understand their public health impact, with a particular emphasis on underserved communities and vulnerable groups. It examines the digital transition of the drug trade and its challenges for health policy development.

Methods: We applied advanced web scraping using Python software to collect detailed data on drug types, quantities, and their distribution by region, adjusting for population differences. Our methodology included statistical analysis and geographical mapping to draw connections between Darknet market drugs available for sale and health outcomes such as overdose rates and disease incidence.

Results: The study uncovered that cannabis, amphetamines, and cocaine were the most available drugs, with proportions of 35%, 22%, and 18% of total listings, respectively. Opiates, though less common at 8%, had a pronounced presence in specific regions like Krasnodar, making up 15% of local offerings. There was a significant correlation identified between drug availability on Hydra and public health issues, showing a 40% increase in overdose cases and a 25% hike in HIV rates in areas with high drug availability. Notably, during the COVID-19 pandemic lockdowns, there was a 30% reduction in drug listings.

Conclusions: Our findings indicate an urgent need for drug policies that are sensitive to the nuances of regional and community-specific needs, especially underserved ones. The data demonstrates a direct correlation between Darknet drug trade and significant public health challenges, advocating for policies that are informed by real-time data and tailored to the distinct needs of various communities. The research supports the implementation of targeted interventions to mitigate health risks associated with drug trade on digital platforms.

Alcohol Use and Depression in Sexually Minoritized College Students.

Marlowe Huff*, Morgan Chatterson, Kacie Allen, Rebecca Terpening, Abriel Allen, Hurlette Reed. (*primary presenter)

Objectives: Identify the relationship between alcohol use and depression in undergraduate U.S. sexually minoritized college students.

Methods: Six electronic databases (i.e., EBSCO, MEDLINE ultimate, CINAHL Plus with Full Text, PubMed, ProQuest, and Grey Literature) were used to conduct our search for the most relevant articles associated with our population and research question. Boolean operators (and, or) were used to manipulate all search terms identified by the authors. Studies published between January 2014 and November 2023 were included in this review. Inclusion criteria also included participants being enrolled in a two- or four-year college or university in the United States and the studies written in English.

Results: This study highlights that there was a relationship between U.S. sexually minoritized college students who exhibited depressive symptoms and those who also practiced alcohol use. The relationship is greater in sexually minoritized college students than their heterosexual peers. After assessing ten cross-sectional studies (N=10), rates of depression and alcohol use were shown to be higher amongst sexually minoritized college students when compared to their heterosexual peers. Of the 6 studies that examined this relationship, 5 showed that there was a significant relationship between alcohol use and depression.

Conclusion: A relationship was identified between alcohol use and depression in undergraduate U.S. sexually minoritized college students. This study also highlighted that this relationship is widely understudied for undergraduate U.S. sexually minoritized college students. Hence, it is important to continue to conduct research on this understudied public health issue in order to develop prevention efforts for alcohol misuse/abuse and depression.

Study Limitations: This study was limited by the selection criteria of articles written in English and published between January 2014 and November 2023. These specificities could have potentially excluded pertinent research, introducing bias. Furthermore, different sexually minoritized groups showed different results for the relationship being examined, hence future studies can focus on studying each group individually. By our study using a single categorization for sexually minoritized youth, this can introduce the possibility for distorted results or wrong conclusions.

Risk Factors Related to Childhood Obesity in the USA.

Soumitra Palit*, Tahia Sufyani*, Joseph Inungu, Chin-I Cheng, Emmanuel Naatei. (*primary presenter)

Introduction. Childhood obesity is a complex and multi-factorial phenomenon. Understanding these factors is crucial in developing effective interventions to prevent and treat childhood obesity. The purpose of this study is to provide an update on factors related to childhood obesity in the United States.

Methods. This cross-sectional study analyzed data from the 2021 Youth Risk Behavior Surveillance System (YRBSS) survey to assess factors associated with childhood obesity among US children aged (12 to 17 years). Logistic regression analysis was used to identify the socio-demographic factors associated with overweight and obesity. Data were analyzed using R.

Results. A total of 12,836 respondents were enrolled in the study. Among them, the prevalence of overweight, obesity, and morbid obesity was found to be 17.66%, 11.21%, and 1.76%, respectively. Respondents with a BMI over 25 were mostly male (17.63%) and of white race (32.77%). The main socio-demographic factors associated with overweight, and obesity were being 14 or 15 years old, male, non-white, having a history of alcohol or marijuana consumption, and not practicing physical activity. These findings can inform targeted interventions for prevention and management.

Conclusion. Behavioral change strategies targeting youth are needed to address these factors. These strategies must be multi-level combining individual, community, and policy-level interventions.

The Changing Landscape of Higher Education: Different Types of Learners, Their Expectations, and Strategies to Increase Engagement.

Marcia Mackey* (*primary presenter)

Yesterday's students are todays' adult learners in the ever-changing world of higher education. Generational trends along with the Covid-19 pandemic caused considerable shifts in individual perspectives on work and learning. All learners come with a suitcase of experiences that impact educational readiness and engagement. We must add to this mix the sudden access to artificial intelligence (AI) and its impact on student expectations.

The traditional undergraduate student still exists, but the type of institution which they select has shifted. Furthermore, data demonstrates why some potential students choose to not enroll in college and why some choose to drop out. Higher education learners from 16 to 65 know what they want from the institution. Research clearly shows a difference in expectations in terms of the education path as well as what learners need and expect from faculty. Education needs to be inclusive of all learners across all identities, rather than linear and limited in scope. This presentation explores the six categories of learners, the importance of serving all individuals, and ways to meet everyone where they are in terms of self-identity and readiness to learn. To create an ideal experience, the gap between instructor and student expectations must be addressed.

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