THE HERBERT H. &
GRACE A. DOW COLLEGE OF
HEALTH PROFESSIONS
CENTRAL MICHIGAN UNIVERSITY

5th Annual Research Symposium

April 6th, 2022

Health Professions Building Atrium

Free Communication Abstract Presentations

Welcome!

On behalf of the Research Committee, we would like to welcome you to the 5th Annual Herbert H. and Grace A. Dow College of Health Professions Research Symposium. This event has been generously sponsored by Gary Russell and Barb Anderson Russell. Through this symposium we encourage you to interact with our presenters and learn about the health care research, conducted by our internationally known scientists, clinicians, academicians, and young researchers!

Sincerely,

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."

Gary Russell, BA, MA
Barb Russell, BS in Ed, MA

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PHYSICAL THERAPY

Physical Therapy Interventions in an Inpatient Setting for a 69-year-old Male with Acute Respiratory Failure Secondary to COVID-19 Infection: A Case Report

Ayache MR, Bourassa R

Background and Purpose: Coronavirus disease (COVID-19) is a newly discovered virus with undetermined long-term side effects. Research is rapidly growing to determine medical management for patients following the COVID-19 diagnosis. There is a wide range of signs and symptoms experienced by these patients. Some may have cold and flu-like symptoms and return to previous activity levels quickly and without intervention while others experience more severe symptoms, such as shortness of breath or irregular heartbeat and rhythm. Patients with more severe presentations require rehabilitation in order to return to their prior level of function. The purpose of this case report is to determine how inpatient physical therapy rehabilitation consisting of endurance training, therapeutic exercise, and gait training effects the recovery of a 69-year-old male patient with acute respiratory failure (ARF) caused by COVID-19 diagnosis.

Case Description: The patient is a 69-year-old male who was diagnosed with ARF secondary to COVID-19 diagnosis. The patient was in the hospital for 51 days, in which he was intubated for 8 days. The patient was then sent to inpatient rehabilitation hospital for 14 days. The patient was completely independent prior to his injury. The examination during the initial evaluation of the patient included a gross strength screen of his legs, pain levels, vital signs, and functional mobility. Additional measures that were included later on were the 6MWT, 10MWT, and the 5STS. The patient was treated every day for 90 minutes for 2 weeks in an inpatient rehabilitation hospital.

Outcomes: Upon discharge, the patient demonstrated improvement in his outcome measures of pain and strength. The patient met 10 out of 10 of his long-term goals. The patient was able to demonstrate improvement on the 6MWT by improving his score from not being able to take more than 8 steps during initial evaluation to 187.3 m (614ft) by session 13. He also demonstrated improvements on the 10MWT, 5STS, and functional mobility.

Discussion: The results indicated that inpatient rehabilitation physical therapy was useful at improving the patient's endurance, oxygen rate recovery time, increasing strength, improving functional mobility, transfers, and distance ambulated. Future research should include a larger sample size and patients of different age ranges with ARF secondary to COVID-19 in order to be able to better generalize results to larger populations.

Physical Therapy Management of a 6-Year-Old with Pre-existing Tuberous Sclerosis and Left-Sided Hemiparesis following Right Hemispherectomy for Intractable Epilepsy

Millisor J, Bourassa R

Background and Purpose: Intractable epilepsy is a common clinical manifestation seen in children with tuberous sclerosis, a rare genetic condition causing benign tumor growth throughout the body. Hemispherectomy surgery is a viable treatment route for these children when antiseizure medications prove to no longer be effective. Children with a history of intractable epilepsy who undergo a hemispherectomy are left with significant functional weakness, severely impaired mobility, and hemiparesis or hemiplegia. Guidelines for physical therapy management of these children in an outpatient setting is scarce. The purpose of this case report is to document the effectiveness of possible treatment interventions to guide physical therapy management of low-level functioning pediatric patients in the outpatient setting following a hemispherectomy.

Case Description: A 6-year-old Caucasian female presented to a specialized outpatient pediatric clinic with a referral for left-sided hemiparesis following a right hemispherectomy for management of intractable epilepsy. The child was dependent in all ADL's, wheelchair-bound, non-verbal, and all functional mobility tasks prior to receiving surgery. The child was seen twice weekly for treatment sessions lasting 45 minutes to 1 hour in duration. Interventions focused on strength and mobility through the primary use of therapeutic exercise, therapeutic activity, transfer training, balance training, gait training, and manual therapy.

Outcomes: The duration of this case report documented the child's progress over 16 weeks; however, she was still receiving therapy after completion of this case report. At week 16, the child required decreased assistance with transfers, could ambulate 426 feet in a Rifton© pacer gait trainer in 6 minutes and was able to sit unsupported on static and dynamic surfaces with contact-guard assist only indefinitely. The child's mother subjectively reported improvements in participation and alertness.

Discussion: Children who undergo a hemispherectomy for management of intractable epilepsy may benefit from receiving skilled physical therapy intervention in the outpatient setting to address functional mobility, strength, balance, and gait efficiency. Future research should be conducted to evaluate the ideal frequency and intensity of physical therapy interventions, as well as on specific evidence-based intervention protocols to guide management to improve the effectiveness of rehabilitation in the pediatric population.

Perspectives of People with Parkinson Disease Managing Exercise During the COVID-19 Pandemic: A Qualitative Study

Haines J, Yorke A, Harvey K, Duley A, Baase J, K Langen

Background and purpose: Parkinson's disease affects more than ten million people worldwide. Exercise has been shown to help those with Parkinson's disease manage symptoms. With the initial onset of COVID-19, those who engaged in regular community-based exercise classes were unable to exercise in person or rely on social support systems. This study is a one year follow up investigating how 20 people with PD managed exercise in the year following state mandated shutdowns and social distancing.
Participants: Twenty people with Parkinson's Disease ages ranging from 48 to 84 years old who attended community exercise programs prior to COVID-19 mandated stay-at-home orders in Michigan beginning March 2020.
Methods: Subjects participated in a virtual interview (Zoom) approximately 1 year after COVID-19 mandated stay-at-home orders. Audio recordings were transcribed, and the constant comparative method was used for theme identification.
Results: Eighteen of the original 20 subjects completed the 1-year follow up interview. Only seven of eighteen subjects had returned to their pre-COVID exercise frequencies. Three major themes were identified: (1) subjects reported continued fear and confusion of how to navigate their lives during the pandemic, (2) realization that exercise is essential in managing disease symptoms, (3) finding alternatives to exercise in a post-pandemic environment.
Discussion: Overall, subjects still struggled to get back to pre-COVID exercise levels. Barriers included difficulties using technology for online exercise classes, fear of returning to in person classes, loss of social connection and lack of accountability. Free access to online classes, strong social support systems, and desire to better manage disease symptoms were all factors that drove subjects to seek out exercise options.
Conclusion: Maintaining safe, regular exercise routines to manage symptoms of Parkinson's Disease in a post-COVID world is multi-factorial. Providing support to facilitate return to previous level exercise frequency should be a consideration for health care providers.

Physical Therapists' Perceptions of Preparedness to Engage in Culturally Competent Practice Upon Graduation: A Qualitative Study

Schubbe E

Introduction. Graduates of entry-level Doctor of Physical Therapy (DPT) programs are not demographically diverse when compared to the population of the United States. Entry level DPT programs must provide depth, breadth, and opportunity within the curriculum to develop culturally competent providers. The purpose of this qualitative study was to examine perceptions of novice/advanced beginner and experienced physical therapists (PTs) as to whether they felt prepared by their physical therapy education to act as culturally competent providers and compare methods of cultural competence education received. Findings can inform whether cultural competence curriculum standards in physical therapist education are viewed as effective or if changes to curriculum may be needed.
Review of Literature. Research has highlighted measured or perceived changes in perceptions, attitudes, and behaviors of cultural competence with clinical exposure and experience for PT students. However, studies which examine or compare practicing PT perceptions of the effectiveness of entry-level cultural competence education are limited, as is evidence supporting specific cultural competence curriculum methodology.
Subjects. Thirteen licensed PTs participated in the study.
Methods. In this phenomenological qualitative study, subjects participated in semi-structured interviews. Data were coded and analyzed using a constant comparative approach.
Results. Three themes emerged: 1) clinical and life experiences had greater influence on perceptions of preparedness, 2) experiential learning was valued and contributed to culturally competent practice, and 3) suggestions to improve cultural competence curriculum.
Discussion and Conclusion. Entry-level DPT programs may consider exposing students to diverse patient populations through community outreach and interactive opportunities early in the curriculum. Incorporating student experiences with different social, cultural, or ethnic groups may promote a greater perceived value of cultural competence curriculum and improve PTs' perceptions of preparedness to practice culturally competent care.

Pain Education Delivered Virtually Is As Effective As in-Person for Persons with Low Back Pain

Grossnickle KEH, Brady A, Wejroski A, Thornock A

Purpose/Hypothesis: Low back pain (LBP) is a prevalent global health problem and leads all diseases in lived years with disability. Evidence exists for the use of a biopsychosocial interventional approach for LBP including therapeutic pain education (TPE). Emerging evidence for virtual delivery (VD) modes for a variety of health care interventions has led to exploration of effectiveness using this modality for TPE. The aim of this study was to determine if an abbreviated TPE session delivered virtually was as effective as in-person delivery (ID) for persons with chronic LBP. The hypothesis was that there would be no difference between the VD and ID for cognition, attitudes and beliefs, pain, and physical performance measures. Curiosity about differences in visual attention (VA) and influence on outcome measures between the 2 groups was explored.
Number of Subjects: Twenty-eight subjects with chronic LBP: ID (N=13; mean age, 42.7 ± 19.6 years; average pain onset, 12.03 years ± 10.3) or VD (N=15; mean age, 45.3 ± 18.6; average pain onset, 11.7 years ± 11.6).
Materials and Methods: Participants were randomly assigned to a 1-hour TPE session delivered either ID or VD. The ID participants were seated in a room with the presenter who utilized a Prezi presentation projected on a monitor. The same scripted curriculum with Prezi presentation was presented to the VD group via videoconferencing technology. Outcomes measured were the Revised Neurophysiology of Pain Questionnaire (RNPQ), the Survey of Pain Attitudes-Brief (SOPA-B); Visual Analog Scale (VAS); straight leg raise (SLR) and forward flexion test (FFT). VA to presenter face, Prezi presentation, or other was assessed using PS Live Capture Hardware and Yarbus Eye-Tracking software (Positive Science, Rochester, NY) to capture eye gaze.
Results: There were no pre/post differences ($p<0.05$) between the groups for the RNPQ, SOPA-B, VAS, SLR and FFT. There were differences ($p<0.05$) between the groups for eye gaze time devoted to face (ID=41.7%, VD=17.2%), Prezi (ID=48.1%, VD=71.1%), and other (ID=10.2%, VD=4.6%). All subjects demonstrated improvements ($p<0.05$) for RNPQ, SOPA-B, and VAS post intervention.
Conclusions: This research study indicates delivery mode did not alter the outcome for persons with chronic LBP. Visual attention measured by eye gaze was different between the groups. Those receiving ID attended more equally to the presenter face and Prezi while the VD group attended more to the Prezi. While VA was different, outcomes were not different and all participants improved in their cognition (RNPQ), attitudes and beliefs (SOPA-B) and pain (VAS) regarding their LBP after the 1-hour TPE.
Clinical Relevance: These findings suggest that VD is an effective means of delivering TPE to persons with LBP. VD of TPE may offer increased treatment access and reduce costs associated with LBP.

Education Altered Emotionality, Harm, Control, and Medication Domains for People with Chronic Low Back Pain

Grossnickle KEH, Brady A, Wejroski A, Thornock A

Purpose/Hypothesis: The purpose of the current study was to investigate the impact of an abbreviated therapeutic neuroscience education (TNE) session on seven domains of pain attitudes and beliefs: solicitude, emotionality, medical cure, control, harm, disability and medication for persons with chronic low back pain (CLBP).
Number of Subjects: 28 subjects with CLBP.
Materials and Methods: Participants received a 1-hour TNE session. A Prezi presentation projected on a monitor along with a scripted TNE curriculum was delivered by the physical therapist to each participant. Participants' attitudes and beliefs about their CLBP were assessed using the 30-item Survey of Pain Attitudes-Brief (SOPA-B). The SOPA-B was administered prior to and following the 1-hour TNE session. The TNE session included curricular content described in *Pain Neuroscience Education: Teaching People About Pain* (Louw et al, 2nd edition).
Results: Total SOPA-B scores are difficult to analyze due to the operational definitions of the scaled scores for each item (true versus untrue). Further item and domain analysis were warranted. Descriptive analysis for mean, variance, minimum, maximum, standard deviation, and median were analyzed for each item. A significant p value of < 0.05 was established for all items analyzed. It was identified that statistically significant changes occurred to the following number of items within the domains for all participants: solicitude 2/5 ($p < 0.012$-0.022), emotionality 4/4 ($p < 0.000$-0.005), medical cure 0/5, control 5/5 ($p < 0.000$-0.013), harm 3/5 ($p < 0.001$-0.015), disability 1/3 ($p < 0.005$), and medication 3/3 ($p < 0.003$-0.025). All participants improved in their attitudes and beliefs (SOPA-B) regarding their CLBP after the 1-hour TNE. It was identified that the pain attitude and belief domains of emotionality, control, harm, and medication were impacted by TNE the most, while minimal to no significant changes were observed for the pain attitude and belief domains of solicitude, medical cure, and disability.
Conclusions: TNE content had greater impact on the specific domains of emotionality, control, harm, and medication for participants with CLBP. Future studies should seek to clarify which curricular content impacted the specific domains and further exploration for content that might impact the domains of solicitude, medical cure, and disability should be conducted. Knowledge about which content impacts which domains could lend to further prescriptive focus of TNE interventions for persons with CLBP lending to potentially greater outcomes.
Clinical Relevance:
Critical attention to curriculum design and educational delivery of TNE by physical therapists may be vital to outcomes and impact on pain for persons with CLBP.

PHYSICIAN ASSISTANT

Mixed Hallucinogen Intake Induces Psychotic Disorder in Patient with History of Depression: A Case Report

Hirschenberger PM, Li L

Background: N, N-dimethyltryptamine (DMT) intake associated with psychotic episodes is a rare phenomenon and appears to present in individuals with premorbid conditions and concurrent or prior substance use.
Case presentation: A 42-year-old Hispanic male presents with a past medical history of depression, was brought into the office by the patient's wife who stated the patient is "not the same" since mixed hallucinogen intake. The patient exhibits elevated affect, restlessness, verbose and loud speech, flights of ideas, and impairment of concentration. The patient who has long-term cannabis use reports recent concurrent intake of DMT, psilocybin, and lysergic acid diethylamide (LSD). Patient was admitted for inpatient psychiatric care in which the patient was started on a medication regimen consisting of Zyprexa zydis, clonazepam, Benadryl, Cozaar, Effexor XR, Fluphenazine Decanoate, and Trileptal. The patient responds well to the treatment, his mood was stabilized after one week of treatment regimen and was discharged from inpatient psychiatric care. The patient developed akathisia one-week later discharge due to the side effects of fluphenazine and started on benztropine. The patient was tapered off other medications in within two weeks of post-psychiatric discharge. Patient lost follow-up.
Conclusion: The mechanisms about the pharmacologic properties of hallucinogenic substances such as DMT, LSD, psilocybin, and marijuana are not clear. However, it appears that individuals with a personal or family psychiatric history and history of current or prior substance abuse have increased risk of developing psychosis and mania. These patients should avoid DMT, in particularly mixed intake of these substances.

Hydroxyurea Induced Livedo Vasculitis: A Case Report

Heeter SA, Li L

Introduction: Livedo vasculitis, a vaso-occlusive condition that causes numerous skin changes and ulcers, have an occurrence rate of 1 in 1,000,000. It is associated with coagulopathies and usually occurred on the lower extremities. The diagnose of livedo vasculitis was delayed in majority of patients. The pathogenesis is not well understood. Hydroxyurea which is used to treat myeloproliferative disorders has been reported to associated with livedo vasculitis. Hydroxyurea induced livedo vasculitis is rare but severe once developed.

Case presentation: A 78-year-old female presented to the office at the request of her hematologist due to an irritation and symptomatic rash on her back for several months. The rash appeared dry with mild excoriations but did not appear to be infected. She also complained of pain on her thighs although there was no rash appreciated. Patient has the history of thrombocytosis and is treated with hydroxyurea for almost two years. Livedo vasculitis was suspected in this patient and a biopsy of the rash on the back was performed. Biopsy results confirmed the diagnosis. The similar rash on her thigh also developed two weeks later and biopsy confirmed the diagnosis of livedo vasculitis. The cause of the livedo vasculitis in this patient was unknown. The rash completely resolved after discontinuing the hydroxyurea, but reappeared when the patient re-started the hydroxyurea, therefore confirming hydroxyurea induced livedo vasculitis in this patient. The rash was improved after topical Sarna but did not response to topical Triamcinolone. Hydroxyurea was discontinued in this patient but was prescribed with steroid bursts, and NSAIDs.

Conclusion: Patients with coagulopathies, in particular who take Hydroxyurea, have increased risk of developing livedo vasculitis. Early diagnosis and early intervention are extremely important for this patient population

Achondroplasia Contributes to the Development of Multiple Comorbidities in Adulthood

Priyanka V, Li L

Background: Achondroplasia, a form of short-limbed dwarfism, is a rare genetic disorder. Although achondroplasia has an autosomal dominant inheritance in some cases, 80-90% of cases result from spontaneous genetic mutation of fibroblast growth factor receptor 3 (FGFR3) and present with spinal and joint pathologies into adulthood. Skeletal dysplasia in achondroplasia is characterized by intrinsic abnormalities in the growth or remodeling of cartilage and bone. Abnormal endochondral ossification was another characteristic finding.
Case presentation: We report a case of a 65-year-old Caucasian female patient with achondroplasia at birth. The patient states she has had muscle and joint pain and underwent multiple musculoskeletal and spinal surgeries since childhood. These surgeries include laminectomy of the thoracic and cervical spine at the age of 13. B/L hip replacement, and revision at the age of 13 and 23, left elbow replacement and revision at the age of 51 and B/L knee fusion surgery due to repeated dislocations caused by joint laxity and arthritis at the age of 56. She also had triceps tendon rupture repair and thoracolumbar spinal stenosis at the age of 51 and 54. Patient developed multiple comorbidities related to this condition, which includes degenerative joint disease (DJD), obstructive sleep apnea (OSA), hearing impairment, pseudo claudication, and spinal stenosis. She is on chronic pain management on Norco and muscle relaxer along with physical therapy (PT). The main affected bones in this patient are long bones, skull, and spine which is the characteristic finding of achondroplasia. She is regular in her follow up with specialists and her primary care physician (PCP). Her parents were born normal. Her disease most likely due to spontaneous genetic mutation. Her son (43 yr. old) was also born with achondroplasia, which reflects autosomal dominant inheritance in him. Her granddaughter (7 yr. old) also has a similar condition.
Conclusions: Multiple musculoskeletal pathologies are related to physeal (growth plate) dysplasia in achondroplasia patient. Early intervention is required to improve the patient's quality of life and to prevent the adverse long-term outcome. From prenatal period to old age patient needs continuous multidisciplinary follow-up to improve patients' quality of life.

ATHLETIC TRAINING

Rectal Temperature Cooling Rates in the Polar Life Pod are Excellent and Consistent with Stationary Tubs

Miller KC, Amaria NY

Context: Rapid recognition via rectal temperature (T_{REC}) and treatment with cold-water immersion (CWI) is essential to reduce mortality and morbidity from exertional heatstroke (EHS). Several tools exist to perform CWI in the field. Stationary tubs (TUB) are common and effectively treat EHS but may be heavy and impractical in some situations. Other techniques for CWI (e.g., tarps) are gaining popularity due to their cooling effectiveness and other benefits (e.g., less water needed, portability). One commercial product, the Polar Life Pod® (PLP), may be another way to reduce body temperature but little research has compared its effectiveness to TUB or examined patients' perceptions of its effectiveness.

Methods: Thirteen men and women completed this crossover study (8 men, 5 women; age:21±2y; mass:73.9±11.2kg; height:176.2±11.1cm). On two days, participants were weighed nude. They dressed and exercised in the heat (38.5±0.5°C, 45±2% relative humidity) until T_{REC} was 39.5°C. Then they either immersed themselves up to the neck in TUB (567.8 L; 15°C) or lay in the PLP while we poured 151.4 L to 227.1 L of water (3.2±0.6°C) into the unit. Participants cooled until T_{REC} was 38°C. Participants recovered for 10 minutes, were weighed nude again, and then excused. Exercise duration, water volumes and temperatures, environmental conditions, and hydration were monitored on both days for consistency. Thermal sensation (0=unbearably cold; 8=unbearably hot) was recorded before and after exercise, half-way through cooling, and immediately post-cooling. Environmental symptom questionnaire responses (0=not at all; 5=extreme) were recorded before and after exercise and immediately post-cooling. We calculated means and standard deviations. Dependent t-tests compared T_{REC} cooling rates and exercise durations. Repeated measures analyses of variance identified potential differences in thermal sensation and ESQ scores between conditions (Number Cruncher Statistical Software v.2007, α=0.05).

Results: Participants had similar exercise durations (PLP=41.6±6.9min, TUB=42.2±9.3min, t_{12}=0.5, P=0.31), thermal sensation scores (PLP=7.0±0.5, TUB=7.0±0.5, $P > 0.05$), and ESQ scores immediately post-exercise each day (PLP=25±13, TUB=29±14, $P > 0.05$). While T_{REC} cooling rates were excellent in both conditions, the PLP cooled participants faster than TUB (PLP=0.28±0.09°C/min; TUB=0.20±0.09°C/min, t_{12}=2.5, P=0.01). Thermal sensation ($F_{3,36}$=5.9, P=0.002) and ESQ scores ($F_{2,24,}$=15.4, P<0.001) differed at some times between conditions. PLP thermal sensation was lower half-way (PLP=1±1, TUB=2±1, P<0.05) and immediately post-cooling (PLP=2±1, TUB=3±1, $P < 0.05$). PLP ESQ scores were higher than TUB post-cooling (PLP=25±14, TUB=12±9, $P < 0.05$).

Conclusions: The PLP and TUB cooled hyperthermic individuals at "ideal" rates for EHS victims (i.e., >0.16°C/min). Despite using 250-375% less water, the PLP cooled faster than TUB due to the colder water temperatures utilized. The PLP may be an effective tool for treating EHS when portability and limited water volumes are concerns. Clinicians should have re-warming tools/strategies (e.g., heating blankets) available to help patients feel better post-immersion.

EXERCISE SCIENCE

The Effect of Self-selected Exercise Workloads on Perceived Enjoyment and Self-efficacy in Sedentary Adults

Waaso P, Gofton N, Zuhl M

Introduction: Almost half of U.S. adults are sedentary, which is associated with a 20-30% increased risk of mortality and an increased risk for cardiovascular and metabolic diseases. Aerobic exercise training is a cost-efficient, effective means of reducing the negative impacts of sedentary behaviors, but 50% of adults drop out of exercise programs within the first 6 months citing issues such as lack of time and enjoyment. High intensity interval training (HIIT) has shown to be more or as enjoyable as continuous aerobic exercise training but is associated with higher dropout rates, and poor adherence. Moderate intensity interval training (MIIT) could be used in place of HIIT not only to achieve greater feelings of enjoyment and confidence among individuals, but to improve adherence rates. Self-selected workloads have also shown to be more enjoyable than researcher-selected workloads. Therefore, the primary purpose of this study was to determine the effects of two acute bouts (interval vs. continuous) of self-selected moderate-intensity treadmill exercise on perceived enjoyment and self-efficacy towards exercise in a sedentary cohort. The secondary purpose of this study is to determine if sedentary humans self-select appropriate workloads on a treadmill when workload is blinded.

Methods: Fifteen sedentary adults were randomized to a single-blinded cross-over study design. Each person completed two 30-minute bouts of moderate-intensity treadmill activity, one interval and one continuous. Participants were instructed to select their own intensity on the treadmill with guidance from the Borg RPE 6-20 scale. Workload and heart rate during exercise were blinded to the participant. The continuous protocol followed a guided RPE of 13 (somewhat hard). The interval protocol followed a guided RPE of 15 (hard) for 1-minute and 11 (light) for 2-minute recovery periods for an average RPE of 13 (somewhat hard) to match the continuous trial. Post-exercise self-efficacy and perceived enjoyment were assessed using the Self-Efficacy of Exercise scale and the Physical Activity Enjoyment Scale, respectively. Exercise workload using treadmill speed and grade and exercise heart rate were compared between trials.

Results: No significant differences were found between conditions for self-selected workloads ($p=0.351$), self-efficacy ($p=0.513$), perceived enjoyment ($p=0.713$), and heart rate ($p=0.112$).

Discussion: Sedentary individuals reported no difference in self-efficacy or perceived exercise enjoyment after performing either moderate intensity continuous or interval exercise. Participants were, however, adequate in self-selecting their own intensities with RPE guidance as there were no differences in workloads across conditions. These results suggest that when able to self-select moderate intensity exercise workloads, sedentary individuals equally enjoy both interval and continuous exercise.

Impact of Yoga Exercise Training on Exercise Enjoyment and Compliance among Previously Sedentary, Overweight Adults

Macks KL, Meehan MM, Stockhert MC, Kruse NT, Nelson RK

Introduction: Nearly two-thirds of U.S. adults are classified as overweight or obese predisposing them to health problems including cardiovascular disease, type 2 diabetes, and certain types of cancer. Although exercise improves many factors for chronic disease, most U.S. adults do not meet current exercise guidelines. Low compliance with current exercise guidelines demonstrates a need for further methods of exercise to draw individuals to a physically active lifestyle. One method is yoga, a non-traditional form of exercise performed in hot or thermoneutral environments that has been shown to improve health markers and reduce chronic disease risk, yet compliance and enjoyment of these different forms of yoga exercise have not been examined.
Purpose: To evaluate the impact of hot and thermo-neutral yoga on exercise enjoyment and compliance.
Methods: Using a randomized, crossover design, males (n=3) and females (n=11) completed an 8-week yoga training program (60 min/day, 3 days/week) in a thermo-neutral (22.1 ± 0.2 °C; humidity: 27.8% ± 1.6%) or hot environment (35.3 ± 0.8 °C; humidity: 20.5% ± 1.4%). Exercise compliance was recorded as an objective measure ([# of completed exercise sessions/24] x 100) and exercise enjoyment was assessed through the Physical Activity Enjoyment Scale (PACES).
Results: Initial enrollment included 25 participants. However, 11 participants dropped out of the study including 7 from the hot group and 4 from the thermoneutral group. Compliance was similar between hot (83% ± 8%) and thermoneutral (84% ± 14%) groups. Participants reported a similar level of enjoyment between the hot vs. thermo-neutral yoga exercise sessions (80.2 ± 10.8 vs. 77.0 ± 4.7 PACES score, p=0.60)
Conclusion: Both hot and thermoneutral yoga are equally effective at inducing compliance and enjoyment to exercise.

Identifying and Removing Barriers from Black Women in Cardiac Rehabilitation Settings

Murrell K, Jayaraman R, Iheduru-Anderson K

Background: Cardiac rehabilitation is an individualized outpatient program that includes exercise, education, and support to improve cardiovascular health following a cardiovascular event. Individuals qualify for and can benefit from cardiac rehabilitation following certain cardiovascular events regardless of age, sex, and race. Cardiac rehabilitation has been found to decrease the risk for all-cause mortality by 32% and the chance of rehospitalization after an acute myocardial infarction by 25%. Despite the benefits of cardiac rehabilitation, it remains an underutilized resource by Black women who qualify for it with only 11.9% of this sub-population participating in the intervention.
Objective: The purpose of this literature review is to identify barriers contributing to poor participation in cardiac rehabilitation programs by Black women in the United States. A secondary aim is to offer recommendations from literature that could increase Black women's participation in and improve adherence to cardiac rehabilitation. Methods: Integrative review was chosen to conduct this literature review because this method can be applied to all research studies. Whittemore and Knafl's (2005) approach to conducting an integrated review was used to design this study and dissect chosen articles. First, the problem, purpose, and variables of interest were identified to form a research question. Second, a literature search was conducted using multiple databases and specific terminology. Third, selected articles were reviewed for inclusion and exclusion criteria. Lastly, 32 articles were entered into an Excel file and analyzed to identify common themes.
Results: Several themes emerged after analyzing the potential barriers Black women face before and during cardiac rehabilitation: lack of physician referral, financial costs, lack of knowledge, and lack of representation. Several themes were also identified after analyzing the recommendations to improve adherence: changing the approach for physician referral, policy changes, improving accessibility, and providing culturally appropriate care.
Conclusion: Research shows that cardiac rehabilitation can improve a patient's functional capacity by 17-30% following a cardiovascular disease event. However, disparities in healthcare prevent some populations, specifically Black women, from taking advantage of cardiac rehabilitation interventions. Clinicians and Black women can work together to overcome the barriers that prevent them from seeking and adhering to cardiac rehabilitation programs. Cardiac rehabilitation programs and practices must be evidence based to see favorable outcomes and increases in Black women's attendance. Future research should investigate the effectiveness of removing individual barriers to cardiac rehabilitation on Black women's participation in and adherence to the intervention

Keywords: Black Women, Cardiac Rehabilitation, Adherence, Barriers, CVD

What Exercise Guidance are Pregnant Women Receiving from their OB/GYN?

Ray BN, Raczak KE, Saltarelli W, Nelson RK

Introduction: Despite the known benefits of regular exercise during pregnancy, engagement in exercise throughout pregnancy remains low. As the primary source of information and care during pregnancy, OB/GYNs may influence exercise behavior of their patients during pregnancy. However, it remains unclear what information women receive from their OB/GYN regarding exercise during pregnancy.
Purpose: To examine the information women report receiving from their OB/GYN regarding exercise during pregnancy. Methods: Participants were recruited via social media platforms (e.g., Facebook, Reddit, Twitter, etc.) and the snowballing method to complete our anonymous survey. The survey consisted of thirty questions, regarding respondent demographics, clinician advice, and exercise behavior. Of the 144 responses received, 6 were excluded because they did not meet inclusion criteria (i.e., ≤6 months postpartum) and 21 were excluded for completing only demographic questions. Therefore, 120 responses were included in the final analysis.
Results: 66% of respondents indicated that they were encouraged to exercise during pregnancy by their OB/GYN or their OB/GYN's medical staff. Furthermore, 60% of respondents indicated that they were given advice related to frequency, intensity, time, and/or type of exercise to engage in during pregnancy. However, only 13% of respondents were provided with educational materials regarding exercise during pregnancy, only 21% were provided guidance on how to modify exercise during pregnancy to make it easier and/or safer, and only 1% reported developing an individualize exercise prescription plan with their OB/GYN.
Conclusion: Most women are receiving encouragement to exercise and report they are participating in exercise across pregnancy, but there is still room for improvement regarding specific exercise prescription and the proportion of exercising women.

The Effect of Acute Interval Exercise on Mood

Nelson E, Waaso P, Flemming I, Zuhl M

Introduction: In 2017, nearly 20 million American adults were diagnosed with substance use disorder (SUD). SUDs are associated with psychiatric comorbidities such as anxiety, depression, and increased risk of suicide, but participation in regular physical activity has been found to significantly improve those symptoms. Self-reported mood, anxiety, and depressive symptoms were positively impacted with increased physical activity. With this knowledge, exercise is incorporated in outpatient treatment for SUDs. Mood fluctuations are also characteristic of SUDs. Feelings of anxiousness, sadness, anger, and uneasiness can be additional obstacles to treatment, during an already challenging time. To both reduce adverse mood states and boost more positive moods such as happiness, cheerfulness, and liveliness, exercise may be a beneficial treatment modality. Therefore, the purpose of this study was to determine the impact of acute self-selected interval exercise on measures of mood such as anxiousness, liveliness, sadness, happiness, and cheerfulness among patients in outpatient treatment for SUDs.

Methods: Participants were recruited from an outpatient treatment center in Midland, MI. Individuals performed exercise either before or after their therapy treatment. Participants performed cycling interval exercise once per week for eight weeks. Exercise intensity was self-selected, which allowed participants to choose their own cycling workload and were guided by using a rating of perceived exertion (RPE) scale. The target was to achieve a RPE range of 12-15 ("moderate" to "hard" on scale) A mood questionnaire was administered before and after each exercise session that asked participants to rank their level of anxiety, sadness, cheerfulness, uneasiness, happiness, and liveliness.

Results: Fourteen individuals enrolled in the study and combined completed a total of 39 exercise sessions. Anxiousness (3.15 ± 2.30 vs. 2.15 ± 2.08, $p<0.001$), sadness (1.15 ± 2.03 vs. 0.64 ± 1.22, $p=0.02$), cheerfulness (5.12 ± 1.73 vs. 5.59 ± 1.49, $p=0.03$), and uneasiness (2.17 ± 2.38 vs. 1.25 ± 1.74, $p<0.001$) significantly improved after acute interval exercise.

Discussion: Single sessions of self-selected interval exercise improved measures of mood state among individuals in outpatient treatment for SUDs. Namely, anxiety, sadness, and uneasiness all decreased; and, cheerfulness improved. The mood enhancing effects of interval exercise may put one at ease during their outpatient therapy sessions and thus allow them to learn and retain the information presented in treatment.

The Effect of a Commercially Available Pre-workout Supplement on Self-selected Running Performance

Flemming I, Kotas S, O'Connor PL

Background: Nutritional supplementation with the intention of improving athletic performance has become increasingly prevalent. Supplements have become more commercially available, providing any individual with the opportunity to experience the potential effects. Pre-workout, specifically, is a readily available supplement that has become progressively more popular among competitive athletes and recreationally active individuals. Some research suggests nearly 25% of young active adults consume pre-workout supplements at least 4 days per week of training. Pre-workout supplementation has been shown to enhance strength and power performance among those who resistance train; however, there is minimal evidence regarding how it effects ratings of perceived exertion and performance during endurance exercise.

Purpose: The purpose of this study was to evaluate participant performance, rating of perceived exertion, and subjective feelings of energy, fatigue, alertness, and focus in response to 30 minutes of running at a self-selected speed following consumption of a common, commercially available pre-workout supplement.

Methods: Five active adults (males: n=4, females: n=1, Age: 22.2 ± 1.3 years, Height: 173.8 ± 3.5 cm, weight: 75.1 ± 14.1 kgs, VO2max: 46.3 ± 2.9 ml/k/min) participated in a randomized, double-blinded cross over study. The participants completed one maximal exercise test and two 30-minutes continuous exercise tests on a motorless treadmill. Either a pre-workout supplement or a placebo mixed with water was consumed 25 minutes prior to the continuous exercise tests. The supplement was blinded to the participants and the researchers. For the second continuous exercise appointment, the participant was asked to consume the opposite product (supplement or placebo). During the treadmill tests, the participants were instructed to run on a motorless treadmill at a self-selected pace for 30 minutes. Speed and distance were blinded to the participants. Rating of perceived exertion, heart rate, and distance were recorded every 5 minutes. Energy level, fatigue level, alertness, and focus for the task were assessed using a 5-point Likert scale from 1 (very low) to 5 (very high) before the participant consumed the supplement, immediately before exercise, and immediately post-exercise.

Results: No significant differences were found between conditions for distance, average speed, heart rate, or rating of perceived exertion at any time point. Additionally, no significant interactions were found between condition and time for energy, fatigue, alertness or focus for the task.

Conclusion: Our results do not support the consumption of pre-workout supplements for improving running performance, perceived exertion, or subjective feelings of energy, fatigue, alertness, and focus among recreationally active adults. Additional participants and more research are needed.

Concurrent Training Programming Recommendations for Elite Athletes: An Integrative Review

Richardson A, Jayaraman RC

Background: Concurrent training combines resistance and aerobic exercises in a single session, allowing participants to maximize their training time. The majority of the studies suggest that concurrent training is an effective method for the healthy general population to improve overall fitness. Access, limited time, and convenience need to be considered when designing strength and conditioning programs for elite athletes, making concurrent training an attractive option. However, a review of the exercise science literature suggests that training gains following a concurrent training program are moderate compared to traditional strength and conditioning. The exercise science researchers have coined the term interference effect to describe the modest improvements often reported in aerobic fitness and overall strength following concurrent training in elite athletes. In addition, there is limited research and guidance on designing concurrent training programs for elite athletes to minimize the interference effect.

Purpose: Develop a practical guide for the Strength and Conditioning Coach interested in implementing concurrent training for elite athletes. The main focus of our recommendations will be on exercise programming that focuses on exercise order, training volume, training intensity, rest between modalities, and ratio of RT:AT

Methods: Integrative review was used to analyze the literature on concurrent training. The integrative review allows for diverse methodologies, including experimental and non-experimental studies, to fully understand the concurrent training model and the interference effect reported in the literature. The following keywords were used to find research articles using the PubMed database, 'concurrent training,' 'performance,' 'interference,' and 'exercise.' Studies included in the integrative review were conducted in the last ten years and had sedentary and athletic participants. Rodent models were also included to understand better the potential mechanisms of the interference effect.

Findings: Resistance and aerobic training can impact overall training quality and volume via residual fatigue and substrate depletion. Rodent studies suggest that the interference effect involves crosstalk between AMPK-mediated inhibition of the mTORC1 signaling pathway. Interference between these mechanisms can minimize training gains. Human training studies suggest that the interference effect is often significantly reduced by manipulating exercise order, intensity, recovery, and the ratio of resistance training (RT) to aerobic training (AT). Human training studies consistently report that the critical factors in minimizing the interference effect are the order of RT and AT within a session, intensity of AT, and the recovery period between training modalities.

Conclusion: A well-constructed concurrent training program can increase overall strength and aerobic fitness in elite athletes as long the program correctly sequences the order of RT and AT and monitors the intensity and total workload. More guidelines for designing concurrent training programs are needed, and more human training studies are vital to better understand the interference effect.

Acute vs. Chronic Responses to Exercise Training in Type-2 vs. Pre-diabetic Adults

Muench JP, Pierce SE, Naugle EP, O'Neil S, Zuhl MN, Nelson RK

Exercise is recommended for improving glycemic control yet it remains unclear whether exercise training produces similar acute and chronic adaptations in T2DM vs. pre-diabetic individuals given their varying states of insulin resistance.
Purpose: to compare acute and chronic exercise training adaptations in response to the same exercise training program in T2DM vs. pre-diabetic individuals.
Methods: 22 male (n=8) and female (n=14), previously inactive (no planned physical activity), adults with T2DM (n=11) or pre-diabetes (n=11) completed the same exercise training program (3 days/wk, 8 wks). Before and exactly 72-hr after participants' last exercise session, chronic adaptations in body fat percentage ([BF%] assessed via dual x-ray absorptiometry), fitness determined by a 6-minute walk test (6MWT), resting systolic (SBP) and diastolic (DBP) blood pressure, fasting blood glucose (BG), and self-efficacy using the Self-Efficacy for Exercise Scale (SEE) were measured. Participants' SBP, DBP, and BG were also monitored immediately before and 5-min after each exercise session to determine acute responses to exercise.
Results: A significant improvement in 6MWT was observed for T2DM (1529 ± 76 vs. 1749 ± 72 ft., $p<0.001$) participants. No significant chronic or acute changes were observed in SBP for either group. A trend for an improvement in resting DBP was observed in T2DM (79 ± 2 vs. 75 ± 3 mmHg, $p=0.06$) but not pre-diabetic (76 ± 2 vs. 78 ± 2 mmHg, $p=0.25$). Similarly, there was a trend for acute improvements in DBP from pre to post exercise among T2DM (79 ± 3 to 78 ± 3 mmHg, $p=0.08$) but not pre-diabetic (76 ± 2 to 75 ± 5 mmHg, $p=0.64$). No significant changes were observed in fasting BG in either group. Acutely exercise resulted in significantly lower BG from pre to post exercise in T2DM (171 ± 11 to 144 ± 10 mg/dL, $p<0.01$) and pre-diabetic (107 ± 4 vs. 96 ± 2 mg/dL, $p<0.01$) participants. A significant improvement in SEE was observed in T2DM (40.5 ± 8.3 vs. 68.7 ± 5.5, $p=0.04$) and pre-diabetic (46.2 ± 8.1 vs. 69.0 ± 6.1, $p=0.01$) participants.
Conclusion: Despite varying states of insulin resistance, exercise training resulted in similar improvements in fitness, acute improvements in blood glucose, and exercise self-efficacy in both T2DM and pre-diabetic adults. However, unlike pre-diabetics, T2DM participants experienced additional benefits in resting and acute changes in diastolic blood pressure.

AUDIOLOGY

The Effect of Hearing Aids on the Perception of Speech in Noise and Reverberation in Older Adults with Mild to Severe Sensorineural Hearing Loss

Latus-Kennedy C, Zheng YF

The aim of this study was to supplement current literature on speech understanding in difficult listening environments through hearing aids with a focus on older adults with hearing loss.

Subjects included twenty participants, aged 60 years or older, from the mid-Michigan area. Based on their degree of hearing loss they were separated into four groups from mild, to severe. Inclusion criteria also included good to excellent word recognition scores. All groups received a hearing evaluation and tympanometry testing to confirm thresholds and normal middle ear function. Participants were then fit with Phonak Marvel 90-R receiver-in-the-canal (RIC) hearing aids binaurally and verified through a real-ear measurement with the Audioscan Verifit Two.

The stimuli for testing came from a reduced word list from Egan's 1948 phonetically balanced word lists. Words were selected at random and presented a single time to each participant within each run of the test. There were six different noise conditions, including quiet, +12 SNR (Signal to Noise Ratio) to –4 SNR, and five different reverberation times including anechoic, 0.2s reverberation to 0.9s reverberation. Each condition included 20 words, presented at the participant's most comfortable listening level (MCL) through hearing aids and circumaural headphones in a sound treated booth. Participants repeated stimulus words and scored as correct, incorrect, or partially correct, providing scores for words and phonemes. Each condition was tested twice, and a third time if the difference between runs was greater than 10%. The sores were statistically analyzed in a multi-factorial ANOVA.

Word recognition scores decreased as SNR decreased and as reverberation time increased for all groups. Results were compared to a previous study completed with normal hearing (NH) subjects. NH and aided mild hearing loss (HL) groups had significantly higher WRS compared to more severe HL groups. There was no significant difference in WRS for NH and mild aided groups and among the other aided groups.

Phoneme recognition scores were higher than word recognition scores, but both had similar trend in noise and reverberation. NH and aided mild HL groups had significantly higher phoneme recognition compared to moderate and more severe HL groups. There is no significant difference on phoneme scores for NH and mild aided groups and among the other aided groups.

There was a significant interaction between noise and reverberation in both recognitions. Word and phoneme recognition were poorer in some combined conditions than either noise or reverberant condition and at more reverberant and noisy conditions.

When comparing the WRS results, WRSs are significantly higher for with HAs than without HAs. Results for mild HL with HAs indicated WRSs were similar to those with NH, confirming benefit of using hearing aids in noise and reverberation, especially for listeners with a mild HL.

Venting and Fitting Formula Effects on Hearing Aid Fitting in Listeners with Sloping Hearing Loss

Zheng YF, Rusinowski R

Objective: This study aims to look at how different vent sizes will affect the gain and output acoustically, to aid audiologists in determining the best vent size for different degrees of a sloping high frequency sensorineural hearing loss, while also taking into consideration different fitting formulae and feedback curve values.
Methods: In this study, different degrees of high-frequency sensorineural hearing loss were simulated to see how different vent sizes affect the gain and output acoustically. Simulations were conducted using Phonak Target software. A Phonak Audéo M90-RT hearing aid was used in Target software with domes and earmolds with varying vent sizes to analyze the gain and output. Vent sizes ranged from an open fit to a completely closed fit, and were simulated using different dome pieces as well as a custom earmold. Dome pieces included open, power, cap, and vented. Degrees of hearing losses included mild, moderate, moderately-severe, severe, and upper limit of severe (90dB). Mild hearing loss ranges included 0-40, 10-40, 20-40, 30-40, and 35-40dB. Moderate hearing loss ranges included 0-55, 10-55, 20-55, 30-55, and 35-55dB. Moderately-severe hearing loss ranges included 0-70, 10-70, 20-70, 30-70, and 35-70dB. Severe hearing loss ranges included 0-80, 10-80, 20-80, 30-80, and 35-80dB. Upper limit of severe hearing loss ranges included 0-90, 10-90, 20-90, 30-90, and 35-90dB. Analysis of the data outcomes was performed to indicate at what frequency output and gain will start to change for different vent sizes for different degrees of hearing loss. NAL-NL2, NAL-NL1, and DSL Pediatric fitting formulae were used.
Results: Results showed that as vent size increases, the gain of different input sounds and the maximum gain before feedback decreases, especially for the lower frequencies and more effect for NAL fitting formulae than DSL formula. DSL and NAL-NL2 provide more gain for mid-high frequencies, while NAL-NL1 provides more gain for mid-frequencies. Results also showed there was essentially no gain limitation for a mild HL across fitting formulae and acoustic parameters. For HL's moderate and above, gain limitation increased.
Conclusion: This study demonstrated the clear effects of vent sizes and fitting formulae on gain for different high frequency sensorineural hearing losses. Information obtained provides a good acoustic insight for audiologists regarding correct fitting options for an individual's hearing loss leading to a better patient fitting outcome.

SPEECH-LANGUAGE PATHOLOGY

Supporting Friendship in People Living with Aphasia: A Research Agenda

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Background: Social isolation has been linked to several negative health outcomes including quality of life and mortality. Older adults with chronic health conditions are at high risk for experiencing social isolation. Aphasia is a chronic neurologic language disorder most commonly caused by stroke that impacts a person's ability to talk, listen, read, and write. Communication skills are essential to developing and maintain friendships. People with aphasia, especially those who are older, are at high risk for social isolation due in large part to their communication disability. People with aphasia have identified friendship as a key priority for intervention, prompting the need for clinical research and practice.
Aims: This poster will outline beginning steps to address this priority for people with aphasia. First, the process of developing and using a multi-stakeholder advisory board will be described. Then, results of a scoping review to map the landscape of friendship interventions for older adults and adults with neurogenic communication disorders will be presented. Finally, preliminary data highlighting key themes from interviews of people with aphasia and their friends will be presented. The long-term goal of this work is twofold: 1) to increase access to evidence-informed interventions and programming to support friendship for people with aphasia; and 2) for clinicians to deliver said interventions/programming in real-world clinical settings.
Method: An advisory board consisting of clinicians, researchers, people with aphasia, and family members was developed to validate and guide the process. Advisory board members were known advocates who had an interest in friendships and aphasia. Then, a scoping review was conducted per PRISMA guidelines to map the literature about current friendship interventions for older adults. Finally, interviews were conducted with people with aphasia and their friends and analyzed qualitatively for themes.
Results: Advisory board resulted in affirmation of the research agenda and guiding feedback along each step of the process. A total of 43 articles were included in the scoping review. The articles included represent a wide variety of theoretical frameworks, interventionists, participants, quality, formats, measures, and reported effects from a number of countries. Qualitative interviews are being analyzed and preliminary key themes will be presented.

Funding for this project provided by a grant from the Tavistock Trust for Aphasia.

Picture This: Using Photovoice to Explore Life with Cognitive-Communication Disability due to Traumatic Brain Injury

Inch G, Ilacqua C, Blaisdell B, Strong K

Purpose: A picture is worth a thousand words and can be a form of capturing self-expression. For individuals with communication disorders, the ability to take pictures to represent their feelings and experiences can be a new way for them to share their perspective. This project used a technique called PhotoVoice to show what life is like living with a cognitive-communication disability due to traumatic brain injury.
Methods: Four participant-photographers with cognitive communication disorders due to traumatic brain injury partnered with student coaches from the speech-language pathology program to photograph and caption moments representing their life. Photographers and coaches met twice a week for seven weeks. During individual coaching sessions, photographers worked with their coaches to select photos and discuss meanings. During these sessions, photographers and coaches often explored emotional impact, goals of the photos, and how the photos connected with the rest of the group's photos. Additionally, the entire team of photographers and coaches, met once a week as a group to facilitate connections, reflect on shared experiences, group pictures into themes, construct captions, and to select photos for the final display. VoiceThread platform was used for the display.
Results: The result of these efforts was an online display of photographers' captioned photos organized into photographer-selected themes. Photos were grouped into common themes at the end of the group sessions. These photos showed feelings, hardships, and experiences that the participants have gone through as a result of their traumatic brain injury. Many of these photos explore both positive and negative aspects of living with a traumatic brain injury. Five final photographer-selected themes were included: Isolated and Overwhelmed, Inconsistent and Erratic Emotions, Support, Neurofatigue, and The Path Ahead. The display was shared with participants' friends, family, and other invited guests, where they were able to leave comments via text, audio, or video on the photos in the display.
Discussion: Photovoice can be a method used to show stories and increase awareness of what life is like living with a cognitive-communication disorder due to traumatic brain injury.

Finding Oneself Through Stories: Using Guided Autobiography to Explore Life with Dysarthria Post Stroke

Tembreull C, Strong K

Storytelling can be a way for people to examine loss and cultivate hope for the future. Story and identity are related to one another because stories shape the way we are as an individual and are part of who we are. Personal stories extend beyond the telling of a simple sequence of events. As the chronology of a past event is recounted, it can be shaped and can be further explored to help with self-discovery and identity. Writing can help individuals explain the nature or origin of their illness, which in this case is stroke, and their changed relationship with their world, how they live with uncertainty and fear, and how their identity is changed and strengthened in relation to the illness. Guided autobiography (GAB) is a method of life review that incorporates individual and group experiences through autobiographical writing. Traditionally, GAB has been used with older adults as a way to reflect on their life. More recently, GAB has been modified to explore identity post-stroke. Stroke survivors can sometimes feel a disconnect with who they are post stroke. Rediscovering who they are is an important part of the recovery process. Communication is an essential tool in the changes caused by stroke. In addition to physical disabilities, many stroke survivors can have communication disabilities such as aphasia and dysarthria. Dysarthria is defined as a communication disorder impacting muscles in the face, lips, tongue, and throat, as well as muscles for breathing are weak. People with dysarthria often have difficulty being understood. This change in communication may negatively impact a person's identity and quality of life. This poster will describe a five-week online GAB workshop for stroke survivors with dysarthria with a focus on six themes. Themes centered around life before stroke, the stroke event, the recovery journey, and hopes for the future. Examining these experiences may provide insight to speech-language pathologists and other health professionals who might be interested in using this technique with their clients.

NURSING

Effective Communication Between Care Givers and Families of Patients with Traumatic Brain Injuries

Tickner A

Introduction Communicating effectively with patients after a traumatic brain injury (TBIs) can pose significant challenges between patients, care givers, and their families. Patients with TBIs present with a wide range of symptoms from mild to severe side effects. These patients often develop aphasia which creates barriers to verbal communication and quality of care. Recognizing and understanding expressive and receptive language complications is crucial for nursing staff to identify in order to give proper family education. This will aid in the recovery process.

Purpose The purpose of this literature review is to identify evidence based and effective communication techniques and tools that will promote quality of care. This will aid in family and care giver education for better communication with patients who present aphasias with their TBI diagnosis.

Method Previous clinical observation on acute and rehabilitation brain injury units, along with evidence based research will be utilized in developing an educational program for families of patients suffering from aphasias related to TBI diagnosis. Utilizing data bases such as CINAHL and the Central Michigan University library are essential for this research.

Findings The end result is for nursing staff to quickly assess for aphasias in TBI patients, then providing educational resources for families. Types of educational resources found in the literature review would include a take-home pamphlet, one on one education with nursing staff, and posters on the walls of brain injuries units. Tools such as closed ended questions and the use of index cards are useful to decrease communication frustrations between TBI patients and their families and improve the quality of care for these patients.

Implication for practice Implication for practice is for nurses to provide family and care giver education for patients with TBI's. This will be done by incorporating evidence-based research communication techniques specifically for expressive and receptive aphasias in this patient population.

Conclusion With proper nursing education given to TBI patients' families and other care givers, frustrations for verbal communication will be decreased and overall quality of care and recovery is improved.

PUBLIC HEALTH

Assessment of Risk Factors of Childhood Obesity in Dhaka City

Nayeem J, Ahmed B, Inungu JN

Background/Objective: Childhood Obesity is one of the most prevalent forms of malnutrition in Bangladesh. The purpose of this study was to assess the risk factors of childhood obesity among school-going children in Dhaka.
Methods: A cross-sectional study was conducted among school-going children in selective areas of Dhaka city from September 2014 to January 2016. A convenient sampling approach was used to select participants and a pretested questionnaire was used to collect information on demographic variables and different physical activities.
Results: Among the 1075 children selected, 712 (66.23%) were boys and 363 (33.77%) were girls. Their age was between 8-16 years, with a mean age of 12.95 years. 642 (56.5%) of them were first-born among their siblings. They belonged to middle-class families and their body built was satisfactory. Among them, 656 participants (61.02%) were concerned about obesity. About 622 children (57.86%) did not know about the health effects of obesity. However, 233(21.67%) knew about the cardiovascular effect of obesity, 164 (15.26%) knew about the diabetic complications arising from obesity whereas 56 (5.21%) knew about the respiratory complications. Among the 1075 children, 675 (62.78%) were aware of nutritious food and 394(36.65%) had an obese person in their family. About 56% of these children (n=602) did not get proper information about obesity from their school or institutions. In terms of activities, 601 children (55.9%) spent 1- 2 hours wtaching TV daily, whereas 345 (32.1%) spent 3-4 hours and 129 (11.9%) spent more than 5 hours watching TV. The study also found that 670 (62.33%) of them were involved in other types of physical activity such as cricket for boys and “bouchi” for girls. Finally, 266 participants (24.74%) reported consuming more food during emotionally distressing conditions.
Conclusion: Lack of awareness, health education, ignorance by the guardians, and lack of nutritious food are the main causes of childhood obesity in Dhaka. The Health Ministry of the Bangladesh Government should take proper measures to raise awareness among the guardians, teachers, and social authority and encourage Non-Governmental Organizations to get involved to solve this issue.

Mapping Health Equity within the Landscape of PPP Research, 1969-2022: A Bibliometric Analysis

Smallwood A, Lana Ivanitskaya L

A multi-dimensional construct of public-private partnerships (PPP) is examined using a bibliometric analysis of 7,953 health-related articles from the Web of Science database published between 1969 and 2022. We aim to visualize and position existing equity research within the broader literature on PPP in health settings or contexts. It is a global research effort by authors from 158 countries, 70% of whom are non-U.S. scholars. With VOSviewer, a bibliometric analysis software, we map 1) keyword clusters and 2) terms data-mined from the actual text of 7,953 abstracts and titles. Available online, with control panels to zoom in/out or search for a term, the maps reveal the scientific landscape and common research topics. First, the keyword co-occurrence map with 998 most used keywords shows prominent nodes related to developing countries and somewhat small nodes related to equity. We proceed to review highly cited research indexed with the following keywords: equity (34 articles), inequality (13), disparities (11), and neglected (tropical) diseases (29). Do their authors document measurable impacts of equity goals? Unlike a keyword map, our second map of terms, defined as noun phrases extracted from abstracts and titles by mining data, contains a relevant cluster defined by democracy (59), justice (55), and human rights (32) nodes. These terms are closely related to equity research; therefore, we expand our review to well-cited studies in this cluster. We identify directions for potential research collaborations among PPP researchers with areas of study that co-occur, or overlap, with health equity. Although few PPP articles are indexed with equity-related controlled vocabulary, health equity research is a distinct domain within the broader PPP literature. Future systematic reviews on health equity and PPP should expand their search queries to include democracy, justice, and human rights terms we derived from the terms map. They represent the actual language used by the PPP article authors in their abstracts and titles.

Maps: 1) keywords https://tinyurl.com/y7dagx9f and 2) terms data-mined from abstracts and titles https://tinyurl.com/y89cook5.

Key words: Bibliometric analysis, health equity, PPP, public-private partnerships

The relationship between regulatory activities and chronic pain in patients with adverse life experiences: A Quality Improvement Study

Ablao M

Background and Purpose: Globally, chronic pain (CP) is an enormous issue. It is estimated that 1 in 10 adults are diagnosed with CP each year. Pain has multiple consequences like anxiety, suicidal thoughts, inability to work, and disrupted social relationships. The purpose of this Quality Improvement Study (QIS) is to create solutions for public health and medical professionals to understand the interconnectedness of pain, life experience, and regulatory activities (RA).

Review of the Literature: Evidence suggests that toxic stress and early childhood trauma act–as a root to lifelong impairments in physical and mental health. Current pain theories explain that CP does not occur in the single body part, rather is a result of brain dysregulation. Studies show that Tai-Chi and Yoga alleviate pain and improve function in patients with CP. These activities improve brain regulation and decrease CP.

Subjects: Twenty-five patients with a CP diagnosis attended RA classes through a Federally Qualified Health Center (FQHC). The mean age of patients is 50.9; sex is 8% Male, 92% Female. Patients vary in racial/ethnic backgrounds: Non-Hispanic White (NHW), White-Hispanic (WH), Non-Hispanic Black (NHB), and some who chose not to disclose.

Materials and Methods: Patients with CP were referred to the classes by their physician or their licensed clinical social worker (LCSW). The class includes 8-weeks of three sessions/week. Activities include meeting and discussion in a group setting, health education, Tai-Chi and Yoga, and meditation. In addition to collecting demographics, the Study Assessment Instruments included the Brief Pain Inventory (BPI): a short series of questions including severity of the person's pain and interference with daily activities; and the Adverse Childhood Experience (ACE) Questionnaire: a series of 10 yes-or-no questions to measure history of physical, emotional, or sexual abuse. Research indicates that persons with an ACE score of 4 or more-have increased risk of illness.

Results: Majority (92%) of patients came to RA for CP. Pain-related diagnoses were fibromyalgia (28%), back pain (24%), and complex regional pain syndrome (8%) with co-occurring diagnoses. 45% of patients had an ACE score of 4 or more. Several participants noted that the most severe traumas of their life (racism, foster care) were not included in the original ACE Questionnaire. On average, pain scores were 5.2 on a scale of 1-10. Pain interference scores were 34 on a scale of 70. 20% of patients who attended regularly reported a decrease in CP following the class.

Conclusion: This QIS demonstrated that RA improves CP for patients with adverse life experiences. Incorporating RA as an integrative experience at health centers improves patient health. Future studies may consider use of research tools like the Philadelphia Expanded ACE (PACEs) Questionnaire to analyze community-level adversity to understand the scope of patient trauma.

Characteristics of COVID 19 Cases among Refugees Identified during First Wave Outbreaks Affecting Ingham County, Michigan

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Objectives: There is an increased risk of coronavirus (COVID-19) exposure amongst the refugee population mostly because they face challenges that prevent them from following public health guidelines. Factors that increase risk of exposure in this community include but not limited to overcrowded living situations, employment in less protected service sector jobs, language barriers, low health literacy high rates of comorbidities, inadequate access to transportation and healthcare facilities, limited social support and family separations. Although there is lack of sufficient data on the impact of COVID-19 in this population, there is a growing body of literature that highlights the bureaucracy, poverty, and discrimination that has affected the well-being of refugees during the pandemic. The purpose of this study is to examine the risk factors that may affect health outcomes in the refugee community by investigating a first wave outbreak in COVID-19 cases among the refugee population served by the Ingham County Health Department, Michigan.

Methods: Data were collected from the Michigan Disease Surveillance System (MDSS). The study population consisted of refugees of all ages between March and May 2020. The case investigators conducted phone interviews with positive cases that were sent to the health department for investigation. Data were collected and descriptive analysis was conducted on gender, age, number of people living in a home, language barrier, hospitalization, secondary COVID-19 cases, and the refugee country of origin.

Results: There were 482 cases, 367 refugee cases and 114 non-refugee cases and 1 death. Among the 367 refugee cases the majority were between ages 41-60 (40.6% n= 149). 15.5% (n= 57) of cases had greater than 5 household members and 47.1% (n= 173) of cases had a language barrier and required a translator.

Conclusion: We identified language barrier as the most prevalent factors among this population of refugees and newcomers. Overcrowding was another risk factor. Proper isolating in such household setting is almost impossible and is not a viable infection control measure. As we assess the societal implications of the pandemic, it is important that we do not exclude the refugee populations and the barriers to accessing healthcare. This study highlights the need to assess and better understand risk factors and barriers to health care that this refugee population faces and formulate plans and policies that would improve overall health outcomes.

HEALTH ADMINISTRATION

A Descriptive Study of Chief Complaint Patterns and In-Patient Mortality of Covid-19 Patients

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Objective: The chief complaints of hospitalized COVID-19 patients can provide useful information about severity and the risk for mortality. This descriptive study (i) utilized *Apriori*, an association mining algorithm to find the most frequent rules of co-occurring chief complaints for hospitalized Covid-19 patients, and (ii) estimated the most frequent chief complaint constructs for patients and the mortality rates for each construct.
Methods: The study was conducted with clinical data collected in 2021 from a regional hospital in Michigan. The dataset includes 1,093 in-patient cases with a primary diagnosis of COVID-19. Upon admission, chief complaints were identified. A manual classification of the self-reported symptoms resulted in the following chief complaint categories which were represented in the dataset as new variables: (i) dyspnea, (ii) cough, (iii) fatigue, (iv) fever, (v) chest pain, (vi) altered mental state (AMS), (vii) hypoxia, (ix) syncope, (x) abdominal pain, and (xi) lower extremity pain/swelling. Following this, the chief complaint constructs were created for each patient and the mortality rate was estimated, for all constructs which had a frequency N>10.
Results: The association mining rules with confidence *[Probability (Symptom1 | Symptom2)]* of at least 50% were calculated. The top rule was found to be {cough, headache}→{fever}. All six patients who had cough and headache as chief complaints, also had fever. The second-best rule (Confidence = 86%) was the rule {fatigue, diarrhea}→{dyspnea}, followed by {fever, headache}→{cough}.
We then calculated the chief complaint constructs with at least ten cases, for all patients, and for those above 60 years of age; For all patients, the most frequent construct was that of dyspnea alone (N=259), with a mortality rate of 24.71%. Constructs that include AMS [{AMS}, {dyspnea, AMS} & {fever-chills, AMS}] showed high mortality rates (30%, 50%, and 60% respectively). The non-respiratory construct {abdominal pain} (N=17) was found to have the lowest mortality rate (5.88%). Every construct is associated with a higher mortality rate for patients above 60 years of age. The Relative Risk (R.R) for death for >60-year-old patients was the highest for the single-symptom constructs of {fever/chills} (R.R = 1.73), and {abdominal pain} (R.R = 1.70) followed by the {cough, fever-chills} construct (R.R = 1.63).
Conclusion: Covid-19 patients admitted with AMS are already at very high risk, especially when AMS is doubled with dyspnea of fever. The authors believe that understanding what chief complaints coexist on Covid-19 patients upon hospital admission, as well as how chief complaints are associated with the risk for mortality, can contribute to a better understanding and prioritization of the appropriate clinical care for Covid-19 patients.

Trinity Health IT Cost Benchmarking

Collins E, DeLellis N

In support of Trinity Health's commitment to financial stewardship, annual information technology cost benchmarking is conducted to assess performance across a sample data set of external organizations. The goal of this research is to perform a comparative analysis of the Trinity Health IT costs in comparison to organizations in the provided dataset. Trinity Health posed this research question to the students of the Health Administration Capstone course HSC 545 (Fall 2021): How does variation in organization size influence IT cost benchmark performance? The students analyzed the dataset provided by Trinity Health which contained 71 healthcare organizations of various sizes and specializations, collected by a third party. The dataset contained eight different fields: organizational information, IT cost, IT operating metrics, Items in IT, Functions supported by IT, Reporting relationship; Core Software Vendors, and detailed IT staffing by type. The dataset information was collected during the fiscal years of 2017-2020. The Health Administration Capstone course performed an approach to divide the data set into sections and had groups of students analyze each section. Each group of students compared the average across the 71 healthcare organizations and Trinity Health's average. The students were able to conclude from the comparison where Trinity Health's performance level was at compared to the average of other external organizations in the industry. Students created visual graphs, charts, and tables to present the findings discovered in this data set. The students organized their results of the IT cost benchmarks into a PowerPoint. A presentation of the results to the Director of the Office of the Chief Information Officer (OCIO), Michael Prokic. Michael Prokic took the findings the students organized and presented them to the Trinity Health Information Services Leadership Team (ISLT). These findings were recognized and considered by organization leadership resulting in the Health Administration Capstone course research work being successful to the organization and the students.

HSC 545 Trinity Health Productivity Study

Kelley J, DeLellis N

Background. Undergraduate students within the CMU Health Administration program were assigned a data set from Trinity Health, a not-for-profit health system operating 92 hospitals in 22 states, to examine productivity measures of their IT departments. Traditional IT performance metrics include comparison of actual and planned spending, average cost and revenue per employee, number of projects, or customer satisfaction scores, however, the Trinity Health dataset has a limited number of variables and required a modified approach to productivity analysis.

Methodology. This exploratory study is focused on the comparison among ten IT sites to assess productivity measures by work units, production rates, and productivity within each work unit. The data included each employee's workload by week for the August 2021-January 2022 period. Variables included total work hours, hours of work by assignment type, number of tickets assigned to the individual employee, ticket types, opening and closure dates for each ticket.

The analysis will use descriptive statistics (frequency and measures of central location), group comparison, and charts to determine any trends and significant findings of productivity measures within Trinity Health IT.

Preliminary results. Due to the limited nature of data, the study selected hours per ticket and days to ticket closure as major metrics used for productivity analysis; the number of tickets per employee week was used to reflect workload by site. Workload ranges from 1 to 319 tickets, with an average of 19 per employee week. There is a significant difference between sites, with the lowest average tickets per employee week as 13.3 and the highest as 33.9 tickets. Hours per ticket ranged from 2.4 to 6.4 hours and were negatively correlated with the workload ($r=-0.4$, $p<0.01$). The average time in days to close a ticket was 14.9 (sd 35.76), ranging from 8.7 to 25.7 days among sites. The closure time may be affected by the number of tickets closed the same day (26.8%), which ranged from 22% to 33% among sites. Additional analysis will be performed to identify potential predictors for individual productivity.

Practical implications. This applied research project will help Trinity Health to assess the productivity of its IT workforce, which is foundational to Trinity Health's stewardship principles.

Emergency Room Pediatric Utilization: an Association between Patient's Age and ED Visit Urgency Level

Delellis N, Zikos D

Background: Overutilization of costly Emergency Department (ED) services had been a healthcare concern for several decades, including utilization of pediatric ED visits (age 0 to 17 years), which are often initiated by parents. While parent decision making in non-urgent situations seems to be poorly identified (Kirby, Wooten, Spanier, 2021), the estimated proportion of non-urgent visits vary from 20 to 40% (Alele et al., 2021; Biagioli et al., 2021). National Hospital Ambulatory Medical Care Survey reported 46% of pediatric ED patients of 5-14 years old as semi- or non-urgent, compared to 25% for all ages combined (CDC.gov, 2022). The pediatric group also include adolescents who are likely to participate in the decision making related to ED visits; therefore, the study hypothesized a decrease in non-urgent ED visits as patient age approaches adulthood.
Data: The study used de-identified data from Hospital Electronic Medical Records of a suburban mid-size hospital ED (2009 to 2016). After removal of non-pediatric patients and records with no assigned urgency level, final sample was 61114 visits.
Methodology: Mantel-Haenszel test of trend (linear-by-linear association) was performed to determine the presence of a linear trend between assigned level of ED visit urgency and patient's age.
Results: A Mantel-Haenszel test of trend was conducted to determine a linear association between the pediatric ED patient age in years and the level of visit urgency. The age pediatric age was defined as 0-14 (CDC.gov) and visit urgency was recoded from EMR visit level (immediate, emergent, urgent, less urgent, non-urgent) into 5-point ordinal scale. The Mantel-Haenszel test of trend showed a statistically significant linear association between age in years and urgency level, $\chi^2(1) = 281.28$, $p < .0005$, $r = -0.097$, indicating increase in age being associated with higher level of ED visit urgency and vice-versa. Additional analysis is focused on demographic and socioeconomic factors associated with urgency level of ED pediatric patients.

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