

POSTER PRESENTATIONS 1 1D: INTERDISCIPLINARY RESEARCH IN HEALTH EDUCATION

Presenter's Name: Anderson, Ronan

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Abstract Title: Early hip osteoarthritis and associated clinical outcomes, cost-effectiveness, and pathophysiology following total hip replacement versus hip arthroscopy

Abstract:

Introduction: Intra-articular hip pathology is a prevalent source of pain and disability. Among these pathologies is osteoarthritis (OA), which commonly affects working adults between age 40-60. Younger patients are often managed non-operatively with physical therapy, anti-inflammatories, and injections. Despite its effectiveness, total hip arthroplasty (THA) has been avoided in younger patients with OA due to concerns over recovery time and prosthetic longevity which impact healthcare costs. As a result, younger patients can experience a decrease in physical and emotional quality of life as their condition progresses. Furthermore, pathophysiology of OA is poorly understood and often not detected until progression is visible radiographically. Advancement of minimally-invasive surgeries such as arthroscopy, improved THA prostheses, and sensitive biomolecular detection methods offers the opportunity of improved clinical and cost-effective treatment decisions. The present study will compare clinical outcomes and consider costs of THA versus arthroscopy. Additionally, synovium will be analyzed for biomarkers associated with early OA to improve diagnostic sensitivity and capabilities.

Methods: Individuals (aged 40-60) with radiographic evidence of mild-moderate hip OA will be randomized to undergo THA or arthroscopy. Throughout the first year post-operatively, participants will complete functional testing, quality of life measures, and cost questionnaires to evaluate clinical outcomes and cost-effectiveness between groups. During surgery and one year post-operatively, samples of synovium will be collected for molecular analysis of biomarkers associated with early hip OA.

Results: We expect THA to yield better clinical outcomes compared to hip arthroscopy. We expect to find evidence supporting THA as a cost-effective treatment option. Additionally, we expect to identify the presence of common biomarkers indicative of early hip OA.

Discussion: Historically, middle-aged patients with hip OA have been declined surgery due to costs and concerns over longevity of surgical treatment options. With recent improvements in hip arthroplasty and arthroscopy, it is important to evaluate effectiveness of these surgeries in younger OA patients, before their condition progresses. Furthermore, analysis of biomarkers implicated in the onset and progression of hip OA is an important step to earlier detection and improved, financially informed treatment decisions.

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Presenter's Name: Halari, Moheem

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Abstract Title: A Postmortem Study of Injury Patterns in Pedestrian and Cyclist Fatalities as a Predictor of Motor Vehicle Collision Dynamics and Pedestrian/Cyclist Kinematics

Abstract:

Introduction: The United Nations reports that annually 1.35 million fatalities occur worldwide due to motor vehicle collisions (MVCs), more than half of which involve pedestrians, cyclists, and motorcyclists. In Ontario, coroners' investigations of pedestrian and cyclist fatalities from MVCs include post-mortem examinations by pathologists who document injuries to determine a cause of death and mechanisms of injury. The purpose of this study is to understand these mechanisms by correlation of trauma patterns sustained by fatally injured pedestrians and cyclists with MVC findings.

Methods: An Injury Data Collection Form (IDCF) was used to extract motor vehicle, MVC, pedestrian demographic and injury information from the Office of the Chief Coroner for Ontario database using autopsy data from cases done between 2013 – 2019. Injuries were coded using the Abbreviated Injury Scale (AIS) 2015 revision and classified by body region. Because AIS 1 (minor) and 2 (moderate) injuries are least likely to cause death, the study focused on serious (AIS \geq 3) injuries.

Results: The literature described injuries in both fatal and non-fatal cases and showed varying injury patterns between children, youth, adults, and the elderly. The most frequent vehicle type and impact zone described in the literature were cars and frontal impacts, respectively. The IDCF was used to extract data from 760 post-mortems. Children were the first group to be analyzed. From 2013 – 2018, there were 25 (14 males and 11 females) MVC-pedestrian (0 – 14 years) collision deaths. The following overall injury patterns emerged based on AIS \geq 3 - craniocerebral injury: 24 (96%), AIS 6 = 8 (33%) brainstem laceration; neck injury: 16 (64%), AIS 3 = 8 (50%) atlanto-occipital dislocation; thorax injury: 23 (92%), AIS 3 = 13 (56.5%), pulmonary (12) or cardiac (1) trauma, and abdomen/retroperitoneum injury: 20 (80%), AIS 4 = 4 (20%) hepatic, spleen, or renal injury. Most of the pedestrians (n=16) were struck and run over. Majority (n=22) of the vehicles were broad front (pickups, SUVs etc.). There was a higher incidence of atlanto-occipital dislocations (8/16; 50%) and eleven children (46%) sustained brainstem injuries (3 contusions and 8 laceration/transections).

Discussion: The injury patterns emerging from the literature review differed from the present study. This could arise from the differences between older vehicles and the current more diverse motor vehicle fleet.

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Presenter's Name: Orlando, Jordyn

Additional Author(s): McKinley, G

Abstract Title: Examining the link between non-suicidal self-injury and suicide attempt in adolescents: An extensive review of the factors associated with suicidal behavior.

Abstract:

Non-suicidal self-injury (NSSI) refers to the deliberate self-inflicted destruction of body tissue without suicidal intent and for purposes not socially sanctioned. NSSI is especially prevalent among adolescents, with rates estimated to be approximately 15-20%. Despite the co-occurrence of NSSI and suicide, little research has been conducted with regards to how NSSI leads to suicide attempts in adolescent populations. To address the gaps in the current research, an extensive literature review was conducted on NSSI and suicide among adolescents, with a specific focus on the events and mechanisms that move an adolescent from simply engaging in NSSI to attempting suicide. In this article I summarize several population-based studies on the factors associated with NSSI and suicide. I further describe several proposed theories explaining possible mechanisms behind NSSI and suicide, and utilize these theories to examine the relationship between NSSI, suicide and the associated factors previously outlined. I conclude with a summary of the findings and include potential considerations for further research.

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Presenter's Name: Raval, Keval

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Abstract Title: Automated mapping of an expertise network in a research group: application to Western Pathology

Abstract:

Any academic department is an ensemble of expertise in research areas; for example, the department of Pathology at Western University itself contains sub-departments of research such as medical health Informatics, lung pathology, cardio pathology and more. The conventional approach to mapping an expertise network is to manually find the papers of faculty members in the academic department of interest, subjectively determine their overall topic of research, and then compare them to the others. This method is disadvantageous because it is time-consuming, there is an overwhelming amount of data to sift through, and it is a highly subjective process. Creating an expertise network greatly benefits researchers as it allows them to attract potential students interested in their research, external funding partners, and collaborators who work in a related research area. Streamlining the process of generating this network and producing it objectively by using text mining and clustering analysis is the novel method in this project, aiming to resolve the two main issues of the conventional approach. The inquiry can be summarized into four main steps. First, text mining of abstracts of the research papers from the researchers of the Pathology Department of Western University was performed to create unique sets of key terms per researcher. To perform this, the abstracts were pulled from the PubMed Application Programming Interface (API), and they were text mined using SpaCy, a Natural Language Processing (NLP) module in python. The key terms extracted were nouns, pronouns, verbs and adjectives as they are the parts of speech that most often characterize a body of text. Next, similarity scores between researchers' sets based on the cosine similarity metric were calculated to produce a matrix of results. Dimensionality reduction using Principal Component Analysis and clustering using various algorithms, such as Agglomerative and K-means, was performed on this resulting matrix. Finally, an optimal end goal is to build a website that has an interactive network that is intuitive to use, where users can easily search and find areas of interest to them. This inquiry proposed a novel method to streamline the tedious process of categorizing the research department of any faculty into areas of expertise. The applications of this method can allow researchers to effectively communicate their area of research, enabling an efficient and objectively accurate information exchange.

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Presenter's Name: Wang, Eric

Additional Author(s): Tian R, Cecchini MJ

Abstract Title: Online Activity Changes in the Pathology Community on Twitter Throughout the COVID-19 Pandemic

Abstract:

Introduction: Pathology Twitter is an active online community that discusses, educates, and shares pathology related content. With the recent COVID-19 pandemic, there has been a shift to work-from-home and social media has experienced a surge in usage. We have analyzed data from the pathology community on Twitter. We aim to see how social media usage has changed during the pandemic.

Methods: The Python package snsrape was utilized to gather Twitter data from pathology hashtags. The daily number of Tweets from each hashtag were graphed daily from October 1st, 2018 to February 16th, 2022, along with a 21 day rolling average. Keyword occurrences from each Tweet such as "COVID" were also graphed in the same manner. A composite graph combined the total number of Tweets from all hashtags covered ($n=175196$). Pre-pandemic tweets were considered as those that occurred prior to February 3, 2020 (the date the US declared a public health emergency for COVID-19). Daily COVID cases and deaths in the US were plotted alongside the graphs.

Results: Our composite graph showed that pathology tweeting peaked and sustained through the summer months of 2020. This level of activity was not seen in the previous year where pathology tweets peaked around international conferences or in subsequent waves of the pandemic. One hashtag of interest #PathTwitter appeared to predict the three major waves of the COVID-19 pandemic in the US. COVID keyword sentiment was highest in the first wave of the pandemic. In the following winter of 2020, total tweeting hit a local minimum while US COVID deaths were at all time highs and this inverse correlation continues. In general, both online activity and COVID related tweeting have begun to level off. However, current tweeting levels still remain higher than pre-pandemic.

Discussion: In 2020, there was a global shift to work from home. The increase in the housebound pathology community may have caused an influx of work and educational related tweets. An inverse correlation between pathology Twitter volume and US COVID deaths may be driven by a potential increased workload and/or health policy changes that occur in response to increasing COVID deaths. #PathTwitter tweets often peaked a few weeks before corresponding spikes in COVID cases, future and ongoing work will explore the geolocation and other data associated with these tweets to better understand the relationship between these spikes and subsequent waves of COVID-19.

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Presenter's Name: Wang, Teng Qing

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Abstract Title: COVID-19: Managing Parent Attitudes and School Stress (COMPASS)

Abstract:

Introduction: The COVID-19 pandemic has left millions of children unable to access in-person learning, and brought about drastic changes to their home environment and learning delivery. These changes have increased stress for both parents and their children, which can negatively impact children's learning and cognitive development. In a previous study, we have found that screen time in children as well as parental stress have increased during the pandemic, and that parents experiencing more stress were significantly associated with increased screen time in children. This longitudinal study examines changes in children's cognition, home and school learning environments, and parental stress. We now hypothesize that changing school conditions (i.e. asynchronous lecture hours) are associated with cognitive and behavioural changes in children as well as parental stress, and that parental stress is associated with cognitive and learning outcomes.

Methods: Parents of children from 6-12 years old were recruited to complete 5 online surveys on a rolling basis. Major stressful life events in parents were measured using the Holmes-Rahe Life Stress Inventory and parenting stress was measured using the Parenting Stress Scale (PSS). Behavioural changes in the children were measured using the Strengths and Difficulties Questionnaire (SDQ). Parental involvement was assessed using the Alabama Parenting Questionnaire. Cognitive games created by Centivizer were completed by the children on a rolling basis and assessed common metrics of cognitive health, such as reaction time and working memory.

Results: As of the first round of data collection, we have found that increased processing speed in children was significantly associated with a child's age ($p < 0.001$), increased time spent reading every day ($p = 0.011$), and increased physical activity ($p = 0.011$). Furthermore, increased screen time in non-school contexts also significantly improved processing speed ($p < 0.011$).

Discussion: These results may show that increased screen time in children from ages 6-12 as a result of the COVID-19 pandemic may provide some benefits to their cognitive development. However, the negative changes induced by the pandemic on both parents and their children, such as reduced access to physical activities, could negatively impact the cognitive development of children.