

The Nineteenth Annual
Ranger Research Day

Friday, November 22, 2024
Student Center Ballroom



**LIST OF
ABSTRACTS**

The Nineteenth Annual
Ranger Research Day

Northwestern Oklahoma State University
 Alva, Oklahoma ~ Friday, November 22, 2024
 Student Center Ballroom

A B S T R A C T S

Business

2.07 Management

2.07.01, “Teaching Leadership: Developing Character Strengths in the Classroom” [Paper]

Dr. Theresa McBride (Faculty)

The present paper is composed of early-stage insights from four military and civilian faculty members in the United States who have collaborated across the borders of distinct institutions of higher education—a public military academy, a private military academy, a private Methodist college, and more recently, a public university—to share, adopt, develop, and innovate approaches to curriculum development and instruction in the field(s) of leadership and organizational behavior. This work describes the sharing of course materials for use in the classroom with the intention of teaching cadets and students to reflect on, and to lead from, values-based foundations.

Education

3.06 Psychology

3.06.01, “Client Loyalty in Beauty Salons” [Poster]

Chellsie Quinn (Dr. Taylor Randolph, Sponsor)

The researcher explored factors behind client loyalty in beauty salons to determine if clients choose to remain with the same hairstylist based on the price of service, consistent results of the service, location of the salon, or the relationship with the stylist. The independent variables are clients of beauty salons. The dependent variable is client loyalty, which has been measured through the frequency of client visits or the duration of the client-stylist relationship based on surveys from salon patrons. Other measurements include client satisfaction ratings or willingness to recommend the stylist to others. Valid measurements have been achieved by collecting data on the frequency of client visits or the client's

response to loyalty-oriented questions in surveys sent via e-mail. It has been determined that clients with rank relationship and consistent results as the most important reasons they remain loyal. Since those two factors are most important to them, the client is willing to pay more in price and to travel to a farther location to remain loyal to their hairstylist.

3.06.02, “ACT Scores and College Success” [Poster]

Ashley Ailey (Dr. Taylor Randolph, Sponsor)

This researcher investigated the relationship between ACT scores, high school GPA, time spent studying, and class attendance with college success being measured by first-year GPA. A sample of 64 college students from NWOSU and participants of different ages through social media, were asked to participate in a survey that collects data on said variables. Correlation analysis and regression modeling will be used to examine the independent and combined effects of these factors on academic performance in the first year of college. This researcher identified the relative weight of each variable in predicting college success to determine if ACT scores remain a significant predictor when other factors are considered. Understanding the correlation of these variables can inform college admission practices and student support initiatives to promote academic success.

3.06.03, “Social Media Use and Academic Achievement: A Comparative Study of Traditional and Non-Traditional College Students’ Grade Point Averages” [Poster]

Rhonda Hobbs (Dr. Taylor Randolph, Sponsor)

This study investigates the relationship between social media use and academic performance, as measured by grade point average (GPA), among traditional students (TS) and non-traditional students (NTS) at Northwestern Oklahoma State University (NWOSU). Utilizing a survey-based, correlational design, data was collected focusing on the impact of time spent on platforms such as Facebook, Twitter, Instagram, and TikTok. The hypotheses posit that increased social media use correlates with lower GPA for TS, potentially due to ongoing brain development and higher engagement in multitasking. In contrast, NTS are expected to experience a lesser or neutral impact due to more mature cognitive capacities. Sixty-four (64) participants were recruited, categorized by student type, and measured for (GPA) alongside reported social media use.

Data analysis included descriptive statistics and Pearson’s correlation to explore relationships between social media habits and GPA. Results revealed no significant overall correlation between social media use and GPA; however, TS exhibited higher usage rates compared to NTS. The findings suggest that while social media use varies by student type, it does not uniformly predict academic outcomes. Limitations include sample size, reliance on self-reported data, and cross-sectional design. The study emphasizes the need for future research to better understand the impact of social media, particularly regarding how different usage patterns and multitasking behaviors affect academic success. Educators and policymakers should consider these insights to guide students toward more effective social media use, integrating digital literacy and time management strategies into educational frameworks to support student achievement in the digital era.

3.06.04, “The Impact of Active and Passive Music on Anxiety” [Poster] Patricia Boeckman (Dr. Taylor Randolph, Sponsor)

Anxiety disorders have become increasingly prevalent in today's society, affecting approximately 40 million adults in the United States. This paper explored the therapeutic potential of music in alleviating anxiety, distinguishing between two forms of music engagement: active and passive. It examined the effects of active music practices—such as playing an instrument, singing, and songwriting—on anxiety relief compared to passive engagement, which primarily involved listening to music. The paper highlighted the significant psychological and physiological benefits of engaging with music by reviewing existing literature and studies, including research conducted by Karakelle and Akın (2019) and Thomas et al. (2012). Findings indicated that active music engagement reduced physiological stress indicators, such as cortisol levels, while enhancing mood and fostering emotional well-being. Furthermore, music served as a medium for self-expression and self-discovery, promoting resilience and coping skills among participants. The study emphasized the importance of incorporating music-related activities into mental health initiatives, especially within educational settings, to build supportive communities and to improve overall psychological health. By recognizing and utilizing the therapeutic qualities of music, individuals struggling with anxiety received better support, fostering emotional health across diverse populations.

3.06.05, “Depression and Coping Methods Used by College Students” [Poster]

Beatriz Penaflor (Dr. Taylor Randolph, Sponsor)

From the pressures of being a college student to the impact of the COVID-19 pandemic on college campuses across the globe, depression has become a daily part of college life and has been reported to negatively impact the lives of college students. While the use of coping styles is a comparatively newer concept than depression, research on coping methods has been found to be beneficial to those dealing with depression. The objectives of the study were to (1) find the most prevalent coping styles used among Northwestern Oklahoma State University (NWOSU) students and (2) find what differences (if any) exist between the three coping styles (Problem-Focused Coping, Emotion-Focused Coping, and Avoidant Coping) used and levels of depression concerning the demographic of NWOSU students. The study conducted an online data survey via Google Forms with a modified version of the PHQ-9 Survey for depression and the Brief COPE Inventory for the three coping styles. The data was collected and completed throughout October 2024, and a total of 51 participants participated in the analysis. The study used both SPSS and Jamovi to analyze the data obtained, and the results showed that Problem-Focused and Emotion-Focused were the most prominent coping styles used by NWOSU college students to help with their depression. Suggestions from the data have shown that using specific coping styles or a combination of coping styles can help benefit college students going through depression.

3.06.06, “Responsibility versus Blame: What Role Do Success and Failure Play in the Ability to Accept Responsibility or Attribute Liability”

[Poster]

Nick Bocanegra (Dr. Taylor Randolph, Sponsor)

How often do people take personal responsibility for their circumstances? How often do people place blame on others for their circumstances? More specifically, which choice do people make more often when it relates to success and failure? This study further explores the already-established Attribution Theory, which explains how a person’s perceived reasoning for past successes and failures can contribute to their current and future motivation and success (Weiner, 1974). However, this study looks at if people attribute their failures and successes to themselves or to somebody else. This study predicts that people will take credit for their personal successes while placing blame on others for their personal failures. The researcher will use an attributional style questionnaire (ASQ) as the instrument of measurement. The questionnaire consists of participants being presented with different hypothetical scenarios that deal with success and failures. The answers to the survey work on a Likert scale that indicates to whom or what they attribute their hypothetical success or failure. The participants of this study are NWOSU students and people solicited via social media. Based on the answers the participants give, the researcher determines who people attribute their successes and failures to while also seeing if that attribution varies in different areas of life. The independent variable is the questions in the questionnaire and the dependent variable is the measurement of how often people take responsibility versus how often they blame others.

3.06.07, “Parenthood & Academic Success” [Poster]

Abriana Braley (Dr. Taylor Randolph, Sponsor)

The researcher aimed to compare the significance of joint versus single parenthood regarding academic success within the confines of Northwestern Oklahoma State University and Northern Oklahoma College students who are parents. The researcher grouped participants by single and joint parenthood families, which were then categorized by average income, child age range, and academic performance. The independent variables in this instance were whether the participant is a single or coupled parent, the average annual income of their household, and the average age of the children within the household. Determining factors that were also measured were gender of the participant, age, and number of children. The dependent variable in this study was the average academic success of each participant. This was specifically measured using the grade point system, or letter grade system, of the academic institution. The instrument used was a general survey that provided an intake of statistics for academic percentages and income levels. The prediction was that single parents would show a moderately lower academic performance rate than parents with a spouse. However, results of the study showed that the factors of marriage and parenthood were much more likely to be correlated with income than the participant’s letter grade average. There was no statistically significant correlation between parenthood, or marriage, and letter grade average.

3.06.08, “Does Competition Affect Performance?” [Poster]

Isabella Mcmillan (Dr. Taylor Randolph, Sponsor)

Throughout this study, the researcher will be looking at how competition affects work ethic. The researcher will set up an online spot-the-difference puzzle. A website the researcher made will randomize which page of instruction each participant will see. Group A will receive instructions that they are to complete the puzzle to the best of their ability and as fast as they can. Group B will receive instructions that they are competing against other people for the fastest time. The researcher's dependent variable will be the times recorded. The independent variable will be the different instructions given. The researcher's hypothesis is that the participants will be highly motivated with competition, and they will work more efficiently and solve the puzzles faster. Throughout this poster, the researcher will discuss how competition affects individuals' effort. This can be applied in everyday life, when people think that there is a reward there is almost always a positive outcome of higher productivity. The researcher will be discussing competition and effort and the connection between the two.

3.06.09, “Selfies to Scholarships: The Grand Inquiry into Social Media's Intellectual Feast (or Famine)?” [Poster]

Damian Doerr & Angela Horner (Dr. Taylor Randolph, Sponsor)

This study investigates the relationship between social media use and academic performance, as measured by grade point average (GPA), among traditional students (TS) and non-traditional students (NTS) at Northwestern Oklahoma State University (NWOSU). Utilizing a survey-based, correlational design, data were collected focusing on the impact of time spent on platforms such as Facebook, Twitter, Instagram, and TikTok. The hypotheses posit that increased social media use correlates with lower GPA for TS, potentially due to ongoing brain development and higher engagement in multitasking. In contrast, NTS are expected to experience a lesser or neutral impact due to more mature cognitive capacities. A total of 64 participants were recruited, categorized by student type, and measured for GPA alongside reported social media use. Data analysis included descriptive statistics and Pearson's correlation to explore relationships between social media habits and GPA. Results revealed no significant overall correlation between social media use and GPA; however, TS exhibited higher usage rates compared to NTS. The findings suggest that while social media use varies by student type, it does not uniformly predict academic outcomes. Limitations include sample size, reliance on self-reported data, and cross-sectional design. The study highlights the need for future research to better understand the nuanced impacts of social media, particularly regarding how different usage patterns and multitasking behaviors affect academic success. Educators and policymakers should consider these insights to guide students toward more effective social media use, integrating digital literacy and time management strategies into educational frameworks to support student achievement in the digital era.

3.06.10, “Music Education and its Relationship to Academic Performance” [Poster]

Maegan Holson (Dr. Taylor Randolph, Sponsor)

The inclusion of music education has been a battle in schools for several years. Many have fought for and against music education. Reasons being some school systems find music

education to be extremely expensive for instruments, music, competitions, uniforms, teachers, etc. These expenses can add up and end up being quite a bit of money. Schools also find it difficult to keep teachers for their music program as well because of how uncertain the music education programs are and how much work and time goes into a music education degree with little reward. However, another reason schools want music education out of their schools is because they do not see music education as important as say academics or even athletics. In this research, the researcher worked to prove this wrong by conducting an experiment involving participants' experiences with music education. This will include any experience whether it is instrumental or vocal and explore possible relationships with their GPA, literacy skills, and math skills.

3.06.11, “Relations Between Stress & Intimacy” [Poster]

Isaac Joseph (Dr. Taylor Randolph, Sponsor)

This study seeks to unravel the intricate relationship between stress levels and the inclination toward risky sexual behaviors with the hope of shedding light on this critical connection through targeted interventions. The central hypothesis is that if high levels of stress occur, then there will be higher chances of risky sexual practices being carried out. This paper reviews comprehensive literature, which therefore attempts to synthesize insights from prior research, particularly concerning young adults and adolescents so that the latter should have a firm basis for its investigation. In operationalization, stress operates as an independent variable and protection operates as a dependent. In this regard, self-administered questionnaires are issued to a sample of 1600 college students from Northwestern Oklahoma State University, and it is from such questionnaires that the levels of perceived stress are obtained. This paper intends to provide valuable insights into building interventions tailored to college students in detail and gain insights into how stress interplays with risky sexual behaviors.

3.06.12, “The Impact of Sleep Duration and Quality on Athletic and Academic Performance Among College Athletes Across Different Sports” [Poster]

Carla Briscoe (Dr. Leigh Kirby, Sponsor)

Sleep is essential for optimal athletic and cognitive performance, yet college athletes often struggle to maintain healthy sleep patterns. This study examined the relationship between sleep duration and quality on athletic and academic performance among college athletes (N=104) across different sports at Northwestern Oklahoma State University. Using the Pittsburgh Sleep Quality Index (PSQI) and performance measures, data revealed that 56.8% of athletes reported poor sleep quality (PSQI >5). Statistical analyses showed significant differences between good and poor sleepers in athletic performance measures, with good sleepers demonstrating higher scores in mental focus (M=4.22 vs M=3.43, $p<.001$), physical endurance (M=3.95 vs M=3.40, $p=.006$), and overall athletic performance (M=3.97 vs M=3.35, $p<.001$). While academic performance showed similar trends, differences were not statistically significant. Analysis across sports (soccer, baseball, and golf) indicated comparable sleep quality patterns but varying impacts on performance metrics. These findings suggest that sleep quality significantly influences athletic performance, though effects vary by sport type. Results emphasize the importance of implementing sleep

education and optimization strategies in collegiate athletic programs to enhance athlete performance and well-being.

Liberal Arts

4.11 American Studies

4.11.01, “The Heart of the Problem, An Art Piece” [Poster]

**Paige Swatek, Alyssa Overpeck, & Jaden Brunnermer
(Dr. Steven Mackie, Sponsor)**

Oklahoma has a beautiful and diverse landscape that is rich with natural resources. Throughout the years, capitalistic procedures have leached these precious resources from the earth, leaving devastation in the wake. From plowing natural grasslands until they are arid deserts for commercial grain production for humans and animals to mining for precious metals until creeks run red, Oklahoma has been the home of many human-made disasters. The most egregious come from the oil and natural gas industry, who have effectively destroyed local water tables with their catastrophic practices. Capitalism tells the *masses* that they need more from the earth; however, our goal is to get the masses to realize that the *earth* needs more from us. There are simple choices that people can make every day that can help slow or even stop this destruction. We just need to start talking honestly about it.

4.11.02, “Giving a Voice to the Voiceless, An Art Piece” [Poster]

Lisa Turner (Dr. Steven Mackie, Sponsor)

We live in a delicate ecosystem of humans, plants, and non-human animals. The problem of poor recycling habits and facilities in Oklahoma leads to trash, materials that can be both recycled and not recycled that end up in Oklahoma’s rivers and lakes. By recycling material that can be recycled and by repurposing items that cannot be recycled, Oklahoma can do its part to save the non-human animals in Oklahoma and the people who live here. We can also save the ocean sea life if we help do our part in Oklahoma. Not all items must go to the landfill forever because they cannot break down naturally. Humans can repurpose the items to serve a new use, like turning them into an art project or something new to use in the house. I will create an animal, a spiny soft-shell turtle, from material that can and cannot be recycled. Soft-shell turtles are one of the animals affected by poor recycling habits and facilities in Oklahoma. I want to bring a voice to the animals. I want to give a voice to the voiceless. Giving a voice to the voiceless can help bring awareness to humans about non-human animals that cannot speak or fight for themselves.

4.11.03, “Food and Consumption Practices in *McTeague: A Story of San Francisco*” [Paper]

Jillian Anderson (Dr. Shawn Holliday, Sponsor)

The novel *McTeague: A Story of San Francisco* was written by Frank Norris in the late 19th century. Throughout the book Norris uses the traditions and consumption of food to highlight major events between the main characters, McTeague and Trina, as well as other supporting characters. Food and how it is consumed can be seen as a comparison between class, wealth, and happiness. The metaphor that people are what they eat rings true. When

McTeague courts Trina through the beginning of their marriage, they experience new and wealthier pleasures, which included better and more expensive food. As their marriage and happiness disintegrate, the food choices and practices they use also deteriorate. Thus, this paper will look at the rise and fall of McTeague from his dinner table.

4.11.04, “Friends Until This Bottle Ends: Champagne, Real Pain, and Frank Norris's *McTeague*” [Paper]

Paige Swatek (Dr. Shawn Holliday, Sponsor)

Champagne, the delightful sparkling French wine, plays a minor role with major implications in Frank Norris's naturalist novel, *McTeague* (1899). Although the novel only concerns itself with the beverage for a few short paragraphs, champagne is an important indicator of McTeague and Trina's rising social class, and their subsequent blunders foreshadow how they will fumble their burgeoning future together. This paper explores the history of champagne and the official method for making the product before tying that background information into literary interpretations of *McTeague*. Together we will explore the mythos and the reality behind champagne, the delightful nectar that brings the Sieppes, their loved ones, their friends, and McTeague to the wedding table to celebrate, before analyzing what Norris intended for champagne and this gathering to represent.

4.11.05, “Frank Norris's Numbing Pain: What Dental Anesthesia Depicts About Human Desire” [Paper]

M'Cheila Rader (Dr. Shawn Holliday, Sponsor)

In the late nineteenth century, advancements in dental anesthesia allowed for a revolution in patient care, allowing patients to experience the most critical surgeries with minimized pain. Frank Norris's novel *McTeague* (1899), written around the same time as these developments, demonstrates Norris's access to resources to ensure he promotes the products and practices authentically. Through discovering and revealing some historical discrepancies within the novel, this essay explores how Norris uses dental anesthetics as a tool of manipulation, facilitating sexual violence. Through the character of McTeague, a dentist who exploits anesthesia to fulfill his innate, brute desires, the narrative highlights a troubling power dynamic. This duality of anesthetics being designed for relief yet utilized as a tool for manipulation underscores a deeper ethical dilemma within the novel and between patient-doctor relationships. By examining the role of dental anesthetics, Norris critiques the illusion of autonomy in an industrious America steeped in individualism. Norris's portrayal serves as a cautionary tale, urging readers to question authority and the state of vulnerability that comes from surrendering one's agency.

4.11.06, “The Last Note: The Loss of McTeague's Concertina and the End of His Marriage” [Paper]

Lisa Turner (Dr. Shawn Holliday, Sponsor)

This thick description about the novel *McTeague* by Frank Norris looks at the importance of McTeague's concertina, focusing on a short history of the concertina instrument, its effects on the people that played them, and how the instrument is played. The loss of his concertina is what makes McTeague snap in the final moments of his marriage to his wife Trina, killing her. This loss triggers his spousal abuse and shows what happens when a partner loses something he cares about more than his partner's safety.

4.11.07, “Comedic Representation of American Resentments in Frank Norris’s *McTeague*” [Paper]

Bo Pearson (Dr. Shawn Holliday, Sponsor)

The transition between the 19th and 20th centuries prompted several changes for Americans, including the type of entertainment presented and the audiences that consumed it. Vaudeville represent American culture through its problematic treatment of certain groups, the merging of different social classes, and the commentary of the resentments and struggles of the audience it entertained, as seen and represented in Frank Norris’s 1899 novel *McTeague*. American vaudeville created one of the first spaces in the nation’s history where members of different social classes were blended to create a diverse but connected audience. In the early 1900s, San Francisco’s population consisted of many immigrant groups, as shown through Norris’s characters, which showcase examples of both the elements of literary naturalism and early 20th-century American culture. Vaudeville consisted of comedians, farce sketches, singers, dancers, musicians, ventriloquists, and other talented acts. The performances provided an escape to its audiences while directly reflecting the daily struggles of the average working-class American.

4.11.08, “Molded Below: The History of Gilding and its Implications in *McTeague*” [Paper]

Shayna Miller (Dr. Shawn Holliday, Sponsor)

In *McTeague*, Frank Norris explores the deep-rooted effect of gold through almost every character the reader encounters. Being a major motif in the novel, gold becomes one of the central ways that Norris shows the decay of morality and humanity specifically in Trina, McTeague, Maria, and Zerkow as they each descend into madness and/or death as a result of their obsession with wealth. The novel is set during the American Gilded Age just before the Industrial Revolution, both of which had major impacts on materialism and social status. Gilding, the process of covering items in thin layers of gold, became popular during this era as a symbol of wealth in America. Gilding was not exclusive to the USA, but was also popular in many countries across Asia, Africa, and Europe, which all developed their own methods of practice for gilding. Eventually, most American middle- and upper-class homes were decorated with gilded items. *McTeague* is no exception to this, and the other characters’ obsession with gold as a means of visible financial stability bleeds into their downfalls.

Math & Science

6.01 Biology

6.01.01, “Halo Bacterium in Gypsum Crystals” [Poster]

Kenzie Doane (Dr. Piper Robida, Sponsor)

Microbes are found living nearly everywhere on Earth. Alabaster Caverns State Park, in Northwest Oklahoma, is home to one of the world’s largest public gypsum caves. Formed following the evaporation of a large inland sea that existed during the Permian Age, the Alabaster Caverns contains an abundance of selenite gypsum crystals. Recently, scientists uncovered ancient microbes trapped within large selenite crystals found in Mexico’s Cave of

Crystals. It was estimated that these microbes had been laying dormant within the crystals for over half a million years and researchers found that they are very different from known bacterial species alive today. Extremophiles are microbes that can withstand living in harsh environments, such as those that would be encountered in these subterranean ecosystems. Understanding how life has survived and evolved in extreme environments on this planet can help astrobiologists explore the possibility of life existing elsewhere in our galaxy. In this study we sought to investigate whether similar, ancient microbial species exist in selenite crystals collected from Alabaster Caverns State Park. Crystals were collected from the cave walls, sterilized, crushed and cultured in a salt-containing media. Cultures were plated and individual colonies were isolated. Gram-staining was performed, and DNA was extracted. Polymerase chain reaction (PCR) was used to amplify the 16S- ribosomal ribonucleic acid (rRNA) gene. We identified a gram-positive bacterium that is spherically shaped and arranged into chains. Our PCR product was around 1500 base pairs and will be further evaluated by gene sequencing to identify the specific species.

6.01.02, “Effect of Stress and Traumatic Brain Injury on Neuronal and Glial Cells in Rats” [Poster]

Johnathan Ylitalo (Dr. Standifer, University of Oklahoma Health Sciences Center, Sponsor)

This study investigates how PTSD, modeled by single prolonged stress (SPS), in the presence and absence of TBI can affect the expression of neurons, astrocytes, and microglia in male Wistar rats. Neurons, astrocytes, and microglia were analyzed to test the hypothesis that microglia and astrocytes would increase at the injury site of rats exposed to TBI and PTSD more than in non-TBI (sham/control) rats. We studied this by performing mild TBI using the controlled cortical impact (CCI) model that directly impacts the brain after rats receive a craniotomy. Using an immunofluorescence (IF) microscopy technique, microglia were labeled with an antibody targeting IBA-1; antibodies targeting GFAP and NeuN were utilized to identify astrocytes and neurons, respectively. NeuN and IBA-1 immunoreactivity decreased at the impact site on the cortex, but IBA-1 and GFAP increased in the area surrounding the impact site of SPS+TBI group. No obvious changes were seen with PTSD exposure alone. However, apparent hippocampal neuron loss was noted in sections of brain from rats in the SPS+TBI group. SPS and TBI affect the expression of IBA-1 and GFAP differently at the site of impact and in the surrounding area; NeuN and IBA-1 immunoreactivity decrease at the impact site, while GFAP and IBA-1 immunoreactivity is denser in the area immediately below the impact site (glial scar).

6.02 Chemistry

6.02.01, “Study of Iodine Distribution and Concentrations in Western Oklahoma Brine Waters and Recycling of Used Chloroform” [Poster]

Amanda Lane & Alaina Pierce (Dr. Jason Wickham, Sponsor)

In the late 1970s, it was discovered that the brine waters of NW OK contain significant amounts of Iodine (above 60 ppm). However, the exact amounts and distributions of Iodine throughout this region were unknown. Currently, the majority of the world's supply of Iodine comes from mining Iodate minerals in Chile ($\approx 65\%$), brine water aquifers in NW Oklahoma ($\approx 5\%$) and Japan ($\approx 25\%$), and seaweed extraction. With the growing need for Iodine compounds in various fields the demand for Iodine is higher than ever. Thus, Iofina

and NWOSU created a partnership to quantify the Iodine concentrations and distribution throughout the brine aquifer as well as to determine the longevity of these iodine concentrations. So far, this study has led to the discovery of new sites within the aquifer that may be of commercial interest and has taken an in-depth look at several possible new plant sites, which has led to the construction of six new plants. Fluctuations in iodine concentrations of up to 100 ppm have been observed throughout this study which is a much larger fluctuation than the expected 10 ppm. We are currently investigating whether these fluctuations are due to the change from vertical to horizontal wells as a function of the inhomogeneity within the brine aquifer. Iofina currently uses chloroform during routing testing procedures during plant operations. In order to reduce the financial and environmental impact of this chloroform waste, we have generated a distillation process to recycle this chloroform with up to a 93% recovery.

6.06 *Nursing*

6.06.01, “Comparing Chlorhexidine vs. Povidone-Iodine to Prevent Surgical Site Infections” [Poster]

**Lyzeth Salcedo Vega, Liliana Labra, & Leslie Hernandez
(Prof. Heidi Ritchie, Sponsor)**

This evidence-based study investigates the comparative effectiveness of chlorhexidine gluconate (CHG) and povidone-iodine (PVI) as antiseptics for preventing surgical site infections (SSIs). Surgical site infections (SSIs) represent a significant and common complication in postoperative care, often impacting patient outcomes and recovery. SSIs are leading to prolonged hospital stays, increased healthcare costs, and higher rates of morbidity and mortality. According to the Centers of Disease Control in 2024, SSIs cost up to 3.3 billion dollars a year and an average of \$20,000 for an individual. Evidence from various reviews suggest that CHG offers superior, longer-lasting protection demonstrating lower SSI rates when compared to povidone-iodine. While both antiseptics PVI and CHG reduce infection risk, CHG consistently shows better outcomes across a range of surgeries. Limitations affecting the results include patient adherence to preoperative protocols, age-related factors, and differences in antiseptic application techniques. Based on these findings, the research study recommends CHG as a standard preoperative antiseptic that can enhance patient recovery, reduce the risk of infections, and reduce healthcare costs.

6.06.02, “Nursing Bedside Handoff Report Compared to at the Nursing Station” [Poster]

**Maegan Rexrode, Maria Cornwell, & Megan Kegin
(Prof. Heidi Ritchie, Sponsor)**

Shift report is an essential part of nursing as the oncoming nurse takes over plan of care. Usually, this is completed at the nurses' station, but studies show that switching to a bedside shift report increases patient safety and satisfaction and improves communication between nurses. The goal is to involve specific patient outcomes such as improving patient-centered care, improving treatment and communication, and decreasing medication errors. The aim of our study is to compare nursing bedside handoff reports verses at the nursing station in adult patients to improve patient outcomes during hospital stays. A variety of hospitals are changing to bedside handoff reports and our research is

to gain a better understanding of these changes. Our information was pulled by eight articles that investigated nurses and clients' feelings related to bedside report being implemented in facilities. In conclusion, the use of bedside nursing reports during shift changes leads to increased safety of the patient, higher patient satisfaction, and increased level of communication between nurses and patients. Results showed a 24% decrease in patient falls, increased efficiency, increased nursing accountability, improved patient satisfaction scores, a reduction of medication errors, and the clients felt engaged in their plan of care.

6.06.03, “Negative Pressure Wound Therapy Compared to Traditional Wound Therapy” [Poster]

**Morgan Poust, Bridget Wilhite, & Talia Wright
(Prof. Heidi Ritchie, Sponsor)**

To date, there is limited evidence on the effects of Negative Pressure Wound Therapy (NPWT) on fracture-related injuries. Much of the evidence that has been done shows conflicting results. The purpose of this project was to gather evidence to show the effectiveness of NPWT in the management of fracture-related injuries, specifically in regard to infection rates. We gathered information to support our study from seven academic journals. These articles were collected from CINAHL, Cochrane Database of Systematic Reviews, and PubMed Central databases. The research suggests that there is a small advantage to using NPWT in fracture related injury management as evidenced by a slight decrease in infection rates. However, more research needs to be done with bigger sample groups to say that NPWT is better than traditional methods of wound therapy.

6.06.04, “Enhancing Pediatric Comfort: The Role of Virtual Reality During Medical Procedures” [Poster]

**Cason Matthews, Tiffany Baugh, & Brittan Crabtree
(Prof. Heidi Ritchie, Sponsor)**

The pediatric population is a vulnerable group, especially when it comes to pain and anxiety during medical procedures. Our group decided to research if virtual reality (VR) would be an effective distraction tool for patients ages 0-21. Virtual reality is an interactive simulation of our world. Our research of evidence revealed that multiple studies have been completed on this topic. We found that using VR during medical procedures can reduce procedure time, decrease pain, and decrease anxiety for the pediatric population. It was found that VR is more effective than traditional distraction tools like music and videos. Virtual reality was used in the emergency room, operating room, at the bedside, and in dental offices. We found that immersive VR is better than passive, but the brand of the headset did not make a difference. The simulation can be customized to the patient's preferences, their age, and their ability to interact with the game. Most of the parents of the pediatric patients stated they would want their child to use VR again. Overall, virtual reality is effective in decreasing pain and anxiety in the pediatric population undergoing medical procedures.

6.06.05, “The Critical Impact of Parental Education on Childhood Vaccination” [Poster]

**Adrianna Gutierrez, Brook Hess, & Jazlyn Norwood
(Prof. Heidi Ritchie, Sponsor)**

This study aims to investigate if parents of pediatric patients who receive additional education about vaccines are more likely to vaccinate their children. Vaccine hesitancy is an ongoing concern, with factors such as side effects and misinformation that influence parental decision-making. The results may help healthcare multidisciplinary teams identify the need to continuously educate and prevent further disease through vaccination. Our findings revealed among the parents who participated that those who had no education regarding vaccines were less likely to vaccinate in comparison to those who receive excess education and therefore proceed with childhood vaccinations. Factors such as lower education and lower income correlated to increased vaccine hesitancy. In conclusion, the importance of childhood healthcare is vital and the need for education on vaccines is critical for parents to facilitate pediatric vaccinations.

6.06.06, “The Impact of Interruptions on Nurses During Medication Administration and Patient Outcomes” [Poster]

Catherine Vaverka & Katherine White (Prof. Heidi Ritchie, Sponsor)

Medication errors can occur at any step of the medication process. A nurse may be interrupted during the preparation, administration, and documentation of administering medication. Our poster focused on answering the question: in hospitalized patients, do distracted or interrupted nurses make more medication errors than nurses who are not distracted or interrupted? Addressing this issue was important to us because medication administration errors not only cost hospitals additional money but can also harm or kill patients while in the nurse’s care.

After reviewing eight articles, our research found that nurses are consistently distracted while administering medications, which contributes greatly to errors in the medication administration process. We also found that the most common medication errors include wrong dosages and polypharmacy. After finding research to support our question validity, we found that effective interventions exist to prevent these errors. Although there was research on individual interventions, combined interventions proved to be the most effective in reducing medication administration errors.

6.06.07, “Effects of Video Games” [Poster]

**Jillian Burton, Kayleigh Rausch, & Jadin Wilkinson
(Prof. Heidi Ritchie, Sponsor)**

Do violent video games cause aggression among adolescents? Video and internet games are greatly increasing in popularity, causing effects to behaviors and overall mental health. This internet gaming is increasing world-wide. Our objective was to find out the effects of video games on the behaviors of adolescents ages 12-18 who frequently play violent games. We gathered information for our project by searching through research articles, finding nine articles that pertained to our research. We then narrowed down that research to three articles providing useful information for our poster. Our results have concluded that excessive gaming addictions can lead to impulsive behaviors and aggression in adolescents. Although

more research is needed to gain more information, it is shown that better encouragement from parents, teachers, and other role models who set clear boundaries can form better habits and improve these aggressive behaviors and impulsive control of adolescents.

6.06.08, “Effects of Chlorhexidine Products on Central Line Associated Bloodstream Infections” [Poster]

**Jaydon Mills, Malik Wilson, & Brianna Brantley
(Prof. Heidi Ritchie, Sponsor)**

The increased use of central lines has contributed to growing statistics of infections in adult critically ill patients which have agitated ideas to implement new interventions such as the chlorhexidine gluconate (CHG) bath to battle the rates of these infections specifically relating to central line associated bloodstream infection (CLABSI), which in turn challenges patient safety, cost aid, and staff compliance. Research studies have relied on observational studies, process compliance audits, and multicentered randomized trials in order to gather data to determine how effective the use of CHG is against CLABSI, while also taking into account compliance limitations. We utilized articles from Northwestern Oklahoma State University’s Library to assess the effect of chlorhexidine products on decreasing the incidence of CLABSI between 2018 and 2024, which included stepped wedge clustered randomized trial, data analysis methods, qualitative data collection, direct observation, and surveys. We found significant evidence that showed the reduction of the incidence of CLABSI cases with the implementation of chlorhexidine products for critical ill clients.

6.06.09, “Vaccine Hesitancy and Refusal Among Parents for Their Children” [Poster]

Aubrey Runyon & Eli Runyan (Prof. Heidi Ritchie, Sponsor)

The topic of vaccinating children is controversial to some parents. The purpose of this study was to determine the factors that contribute to vaccine hesitancy and the interventions that can be implemented to increase vaccine acceptance. Vaccination is important to decrease the spread of preventable diseases. The World Health Organization defines vaccine hesitancy as “the delay of acceptance or refusal of safe vaccines despite availability of vaccination services” (WHO, 2015). Vaccines teach the body to defend itself by stimulating immune response without the dangers of the full-blown infection (CDC, 2024, p.1). Vaccine hesitancy can be caused by misinformation, mistrust in providers, and decreased knowledge about vaccines in general (6). Interventions that have shown success in vaccine hesitancy include the following: patient reminder systems, training for healthcare workers to promote trust and confidence in providers, and educational videos and handouts (1) (2). The results concluded that implementing these interventions increases the willingness of parents to vaccinate their children and decreases vaccine hesitancy. The impact of using interventions to increase vaccine acceptance is pertinent to society because of the recent COVID-19 pandemic that was experienced. Vaccine hesitancy has increased after the global pandemic making intervention necessary to decrease preventable diseases around the world (5).

6.06.10, “LGBT Mental Health” [Poster]

Karen Rust, Madeline Pack & Adele Callaway

(Prof. Heidi Ritchie, Sponsor)

The LGBT (lesbian, gay, bisexual, and transgender) population have reported discriminatory as well as often inappropriate actions, interactions, and treatments. The aim of this evidence-based project was to find if there is a correlation between inclusive education for healthcare workers and mental health disparities in LGBT populations. Nine studies were examined with a goal to determine what disparities were faced by LGBT community members in mental health care settings, and what can be done to improve those adverse situations. The studies were accessed through various scholarly resources and had an inclusion criteria of LGBT populations, mental health disparities, education interventions, and societal stigma impacts. Several studies found that culturally competent training improved health care worker skills in working with the LGBT population. The results of the studies found that advocating for LGBT health issues is important for creating new discoveries and research as a gateway to seek better outcomes for mental health within the community.

6.06.11, “Effects of Early Hospice and Palliative Care Admissions”

[Poster]

Kara Blackwelder & Heather Gritz (Prof. Heidi Ritchie, Sponsor)

Effects of early hospice and palliative care admissions was researched through Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane systematic reviews, PubMed, and various nursing journals. Search terms included hospice, palliative care, terminal illness, quality versus quantity of life improvements with early admissions. Hospice and palliative care are different but these terms are often used interchangeably. Hospice focuses on quality versus quantity of life. Treatments are focused on the patient’s signs and symptoms rather than the diagnosis, comfort measures for the patient, and support of the entire family. Palliative care also focuses on keeping the patient comfortable while allowing the option for curative treatments to continue. When determining the quality-of-life improvement that early hospice/palliative care admissions have versus late admissions, a better understanding of “early” is needed. Results showed defining early as greater than 90 days prior to death or upon diagnosis of terminal illness gave patients and families the opportunity to utilize hospice or palliative care options fully. Researching this question revealed a need for standardizing education of all health care professionals in the growing field of hospice and palliative care. Along with improved satisfaction of care, reduced health care costs, lower acute care admissions, and lower hospital deaths, a reduction of stress on patients and families; early referrals to hospice and palliative care are seen as beneficial.

6.06.12, “Effects of Ketogenic Dietary Therapy on Pediatric Epilepsy”

[Poster]

Shay Collins, Maggie Swann, & Rebekah Skoda

(Prof. Heidi Ritchie, Sponsor)

Pediatric epilepsy is common among children worldwide, and it can lead to many negative physical and mental symptoms. Although there are a variety of treatment options available to manage epilepsy, these treatments may not be effective or the best choice for some pediatric clients struggling with epilepsy. Our research has found that several versions of the ketogenic diet are effective in reducing seizure activity in these clients as well as increasing

overall quality of life. As effective as this dietary therapy option is, some adverse effects may occur. Our research will help clarify and promote understanding of ketogenic diet therapy and its different versions, correlations between versions, and seizure reduction. These adverse effects may occur due to the diet and recommended interventions for the medical community. We hope to educate and inspire more research on the topic of ketogenic dietary therapy in pediatric epilepsy.