The Use of Complementary Therapies for the Reduction of Prescribed Opiate Morphine Milligram Equivalents in Patients Receiving Treatment for Chronic Pain with Comorbid Mood Disorders: A Retrospective Study

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Objective

- The objective of this study was to show that the use of psychotropic medications, behavioral health therapy, osteopathic manipulative therapy, or the combinations thereof, would lower the required total morphine milligram equivalents (MMEs) in patients with chronic pain and a comorbid mood disorder.

Background

- In a 2019 National Health Interview Survey, 50.2 million adults (20.5%) reported that they experienced chronic pain.
- About 20% of people who have chronic pain have a comorbid mood disorder.
- Studies have shown longer-term opioid use in adults with mood disorders.
- Generalized anxiety disorder affects 6.8 million adults or 3.1% of the U.S. population, yet only 43.2% are receiving treatment. There often exists a co-occurrence of major depressive disorder.
- Despite this strong co-occurrence, limited research exists on the best approach to managing chronic pain that is comorbid with a mood disorder.
- Many psychotropic medication classes have been shown to be effective in reduction of inflammation, treatment of nerve pain, and the treatment of osteoarthritis.
- Additional therapies such, osteopathic manipulative therapy (OMT) has been shown to be safe and effective for the management of chronic pain.
- There are inadequate studies to explore the efficacy of individual and combination non-opiate therapies for chronic pain.

Methods

- This is a retrospective study of patients within a rural outpatient primary care setting who had an active diagnosis of chronic pain between the dates of January 01, 2021 and July 31, 2021.
- Patients were further assessed for a comorbid mood disorder defined as depressive disorders (MDD) (ICD 10 codes: F33.0-F33.9) and anxiety disorders (GAD) (ICD 10 codes: F41.0-F41.9).
- 211 patients were included. 57 had a comorbid mood disorder.
- Additional treatment modalities were controlled for including psychotropic medication commonly prescribed for MDD and GAD; behavioral health therapy (BHT) as defined as an appointment with a licensed professional counselor, licensed clinical social worker, or psychiatric physician; and osteopathic manipulative therapies (OMT).
- BHT and psychotropic medications were not controlled for separately due to the BHT only group being significantly underpowered.
- The primary outcome was the average MMEs prescribed per month in those with and without a comorbid mood disorder.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Average MMEs when controlling for different treatment modalities</th>
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</thead>
<tbody>
<tr>
<td><strong>n</strong></td>
<td><strong>MME, mean</strong></td>
</tr>
<tr>
<td>-treated</td>
<td>57</td>
</tr>
<tr>
<td>treatment**</td>
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<tr>
<td>All Patients</td>
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<tr>
<td>Treatment**</td>
<td>131</td>
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One Factor ANOVA
***Treatment represents psychotropic medications and/or behavioral health

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Average prescribed MMEs when controlling for different psychotropic medications</th>
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<tr>
<td><strong>n</strong></td>
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<td>-treated</td>
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<td>All Patients</td>
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<td>Psychotropic Medications</td>
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<td>SSRI</td>
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<td>SNRI</td>
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<td>TCA</td>
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<td>Antidepressant</td>
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<td>Benzodiazepine</td>
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<td>Patients With a Comorbid Mood Disorder</td>
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<td>Psychotropic Medications</td>
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<tr>
<td>Benzodiazepine</td>
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</table>

One Factor ANOVA

Conclusions

- Patients with a comorbid mood disorder required significantly more MMEs to control their chronic pain.
- Contrary to expected outcome, augmenting with any complementary treatment modality did not result in significant reduction in total MMEs among patients with a comorbid mood disorder; although, the groups could be underpowered.
- Additionally, when assessing all patients, patients receiving BHT and/or psychotropic medications required significantly higher total MMEs whereas, the addition of SNRI medications resulted in significantly lower MMEs among patients without a comorbid mood disorder.
- Importantly, the addition of OMT to both patients with and without a comorbid mood disorder is associated with a significantly or near significant reduction in required MMEs.

Discussion

- The association of higher MMEs and the addition of psychotropic medications and/or BHT likely is not a causal relationship but a display that chronic pain patients with comorbid mood disorders tend to experience pain that is more difficult to control.
- This is likely demonstrated when controlling for the use of benzodiazepines and its association with significantly higher MMEs.
- SNRIs are an important augmenting medication among patients without a comorbid disorder.
- OMT could be used as a viable treatment both for chronic pain and mood disorders. In fact, research on therapeutic touch and its association with improvement in depressive symptoms has been demonstrated.
- A multimodal and multidisciplinary approach to pain and mood disorders should be pursued and could be a viable option in helping combat the opiate epidemic.

Limitations

- Because this is a retrospective study, ongoing prospective study is warranted.
- It is unknown what targeted behavioral health therapies were implemented when being treated by LPCs, LCSWs, or psychiatrists.
- To date, there still exists limited published data on the efficacy of OMT for chronic pain and the use of therapeutic touch for mood disorders. Further research could show important and cost effective ways to manage both.

Sources

We performed a cross-sectional analysis of the 2020 National Immunization Survey (NIS) data. We constructed logistic regression models to determine any associations, via relative risk ratios (RRR), between child vaccination status and maternal characteristics and then intent to vaccinate a child within the next 12 months. We then conducted a sub-group analysis among Hispanic mothers by language (English or Spanish).

CONCLUSION

Vaccination against HPV has been shown to be safe and confer excellent protection against high risk oncogenic phenotypes.

Understanding maternal characteristics associated with HPV vaccine hesitancy is necessary for creating targeted approaches to improve vaccine uptake in their children.

SIGNIFICANCE OF FINDINGS

- Vaccination rates being lowest among children of less-educated mothers suggest potential socioeconomic barriers that are affecting uptake rather than attitudes or beliefs about the vaccine.
- Younger mothers might have lower perceived benefit from vaccination compared to older mothers because of lack of personal exposure to once devastating illnesses.
- Proper counseling to mothers through the use of evidence-based information and shared-decision making could potentially increase vaccine uptake in children.
- Public health promotion efforts and increased accessibility to vaccination could serve to alleviate some of the socioeconomic barriers and increase vaccine uptake.

REFERENCES

Surgical Diagnosis of Bilateral Ectopic Pregnancies: A Case Report

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Abstract

Bilateral ectopic pregnancies, a rare type of heterotopic pregnancy, occur in about 1 in 200,000 pregnancies and 1 in 725 to 1,580 ectopic pregnancies (1). Given the increased number of women undergoing assisted reproductive technology (ART) to achieve fertility, there is a growing number of bilateral ectopic pregnancies being diagnosed. Surgical treatment of bilateral ectopic pregnancies may include linear salpingostomy versus bilateral salpingectomy. A less utilized treatment includes direct methotrexate injection into the bilateral fallopian tubes. This case report will detail a bilateral ectopic pregnancy that was diagnosed surgically and confirmed by pathology. The patient desired future fertility, requiring a two-separate laparoscopic salpingectomy for the most conservative treatment option. This led to the diagnosis of the contralateral ectopic pregnancy several days following the initial ectopic pregnancy, which has occurred in multiple other case reports, even delaying diagnosis up to several weeks (5).

Introductions

• Ectopic pregnancies are a rare occurrence, with an incidence of approximately 1-2% of all pregnancies (6).
• The most common treatment for ectopic pregnancies is to occur in the fallopian tube, more specifically in the ampulla.
• There are approximately 250 literature cases of bilateral ectopic pregnancies (2).
• Bilateral ectopic pregnancies can further be divided into primary, meaning they are spontaneous in nature, or secondary, meaning they were achieved during the process of assisted reproductive technology (ART).
• Bilateral ectopic pregnancies are most commonly diagnosed at time of laparoscopy or laparotomy.
• Transvaginal ultrasound in conjunction with serum beta-HCG are rarely diagnostic of bilateral ectopic pregnancy. However, they are useful for treatment monitoring and ruling out intrauterine pregnancies or heterotopic pregnancies.
• Surgical treatment may involve bilateral salpingectomy, however treatment should be tailored for each patient’s desire for future fertility.

Case Report

• Patient is a 34 year old G2P0020 Caucasian female who presented to the emergency department with intermittent abdominal pain for one week. She reported her first day of her last menstrual period was on 4/26/21 and had a positive home pregnancy test on 5/28/21. Had visited the ED one week prior to presentation with abdomen pain and abdominal distention. Abdominal exam was remarkable for mild guarding and right lower quadrant tenderness to palpation. Her beta HCG on admission was 22,054 mIU/mL. Transvaginal ultrasound revealed no intrauterine pregnancy with a left adnexal complex structure measuring 1.9 x 1.5 x 1.8 cm with an echogenic structure possibly representing a chorionic villi in left fallopian tube.
• She was taken to the operating room for diagnostic laparoscopy for suspected left ectopic pregnancy. Intraoperative findings included a hemorrhagic appearing left fallopian tube that was more edematous and hemorrhagic in appearance compared to prior laparoscopic findings (see Figure 1). She underwent a left salpingectomy without difficulty and was discharged to home on postoperative day zero. Pathology confirmed chorionic villi in left fallopian tube.
• With regards to this case report, the patient did desire fertility, thus when the ectopic was visualized on the right fallopian tube, a decision was made to perform a right salpingectomy. However, the physician should carefully inspect the fallopian tube, as it may be too damaged to even benefit from salpingostomy. There are also risks with salpingectomy, including incomplete evacuation of ectopic pregnancy, increased risk of recurrent ectopic pregnancy, or the persistence of gestational tissue post procedure.

Discussion

Bilateral ectopic pregnancies, a rare type of heterotopic pregnancy, occur in about 1 in 200,000 pregnancies and 1 in 725 to 1,580 ectopic pregnancies (1). Given the increased number of women undergoing assisted reproductive technology (ART) to achieve fertility, there is a growing number of bilateral ectopic pregnancies being diagnosed. Surgical treatment of bilateral ectopic pregnancies may include linear salpingostomy versus bilateral salpingectomy. A less utilized treatment includes direct methotrexate injection into the bilateral fallopian tubes. This case report will detail a bilateral ectopic pregnancy that was diagnosed surgically and confirmed by pathology. The patient desired future fertility, requiring a two-separate laparoscopic salpingectomy for the most conservative treatment option. This led to the diagnosis of the contralateral ectopic pregnancy several days following the initial ectopic pregnancy, which has occurred in multiple other case reports, even delaying diagnosis up to several weeks (5).

References

Adherence Rates of Person-Centered Language in Pediatric ADHD Research: A Cross-Sectional Analysis.

Kristyn Robling, B.S.,1 Caitlin Cosby, B.S.,1 Gunner Parent, B.S.,1 Swapnil Gajjar, B.S.,2 Tessa Cheshier, D.O.,3 Michael Baxter, D.O.,4 Micah Hartwell, Ph.D.3

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Introduction

Attention-deficit/hyperactivity disorder (ADHD), one of the most common neurodevelopmental disorders in children, has historically been associated with a negative stigma that often leads to mental health problems and a lower quality of life (Lebowitz, 2016).

The implementation of person-centered language (PCL) in medical literature is one way to decrease stigmas (Crocker & Smith, 2019) and provide better physician education for effective care of children with ADHD. Thus, we conducted a cross-sectional study to determine PCL compliance in current pediatric ADHD-related medical literature.

Methods

500 ADHD-related articles were screened for inclusion of pre-specified, non-PCL terminology. These articles were chosen using a systematic search of PubMed articles published from January 2014 to March 2021.

Each article was assessed for adherence to guidelines of PCL in the AMAMS (AMA Manual of Style, 2020). Screening was conducted in a masked, duplicate style and discrepancies were resolved by reaching 100% user agreement.

Results

After exclusion, 311 articles were retained, of which 131 (42.12%) adhered to PCL guidelines. Among articles with non-PCL, stigmatizing language was used with terminology such as “problem(s) with [the/a] child or problem child” and “suffers from,” used most frequently—occurring in 47.59% (148/311) and 5.79% (18/311) of articles, respectively. We found a significant association between PCL adherence and first author employment (P = 0.04). Other stigmatizing language included “mental/mentally ill/mental patient” found in 12 (3.86%) articles and “difficult child/child is difficult” found in 5 (1.61%) of articles.

Clinical Relevance

The use of stigmatizing language from physicians has been shown to have a damaging effect on the physician-patient relationship (Como et al., 2020). Using non-PCL language may reinforce the stigmas that surrounds children with ADHD and negatively impact the patient’s quality of care, mental health, and social life. Implementing PCL in clinical practice may have a positive impact on patient care and increase patient satisfaction.

Summary

Over half of the articles examined did not adhere to PCL guidelines. Due to the negative stigmas and harmful outcomes on mental and physical health that children with ADHD experience, it is our recommendation that literature and clinical practice shift away from non-PCL use. This change will reduce negative outcomes and improve patient satisfaction of those with ADHD.

Future Directions

Future research will focus on determining the importance of PCL language in journals, clinical practice, and medical education. PCL use within various medical conditions and research may also be explored.

REFERENCES


Association of Alcohol Use and Concussions Among High School Athletes

Phillip Tyree, B.S., Kennedy Sherman, M.H.A., Alicia Ito Ford, Ph.D., Anna Mazur, Ph.D., Doug Nolan, D.O., Micah Hartwell, Ph.D.

**BACKGROUND & OBJECTIVE**

- In 2017, an estimated 2.5 million high school students reported having at least one concussion related to sports or physical activity.  
- Individuals between 15 and 19 years of age experience the highest rates of concussion.  
- Alcohol is one of the most frequently used substances by adolescents of these ages.  
- A previous study found that injury rates were twice as high among athletes who drank weekly versus non-drinkers.  
- Objective: Determine if alcohol use is a significant risk factor for concussions in high school athletes and assess potential disparities among gender and race/ethnicity.

**METHODS**

- We performed a cross-sectional analysis of the Youth Risk Behavior Surveillance System (YRBSS).
- We included respondents who participated in one or more sports teams and responded to alcohol use and concussion prompts to analyze the prevalence of alcohol use and concussions among high school athletes.
- Respondents were also categorized by grade, race/ethnicity, sex, and BMI category to identify additional associations.

**RESULTS**

- 38.27% (n = 30710, N = 32759) of high school athletes reported having consumed alcohol in the past 30 days and 14.73% (n = 11,153, N = 12,899) reported having engaged in binge drinking.
- 20.65% (n = 2273, N = 2,815) of the athletes reported sustaining a concussion.
- There was a statistically significant difference in alcohol use prevalence by race/ethnicity (X² = 59.38, P < .001) with the highest rates among American Indian/Alaska Natives (AI/AN) athletes (46.87%), followed by white athletes (43.61), and Multi-racial athletes (43.01%) with the lowest rate reported among Asian American athletes (22.14%).
- Athletes reporting alcohol consumption in the last 30 days were significantly more likely to sustain a concussion (AOR = 2.02; 95% CI: 1.77-2.30) and those reporting binge drinking were also significantly more likely to sustain a concussion (AOR = 1.98; 95% CI: 1.64-2.40).
- AI/AN athletes were significantly more likely to have sustained a concussion (AOR = 2.47; 95% CI = 1.21-5.04), compared to white athletes.

**IMPLICATIONS**

- Given the high rates of alcohol use, and its association with concussions, short and long-term health may be impacted among these athletes.
- This risk factor is not currently recognized by the existing concussion evaluation guidelines or return to play guidelines, as outlined by the 2016 Berlin Consensus Statement on Concussion in Sport.
- A history of concussions alone significantly worsens mental health outcomes, which may be amplified due to the risk of concussions with alcohol abuse.

**CONCLUSION**

- Physicians can educate athletes, coaches, and parents about the risk of alcohol use, which may help protect young athletes from unnecessary concussions.
- Additionally, it is undetermined why there is an increased likelihood of AI/AN athletes to sustain a concussion, which provides a basis for future research.
- Future research is needed to further assess the effect of alcohol use and race/ethnicity on concussion prevalence to better protect young athletes.

**REFERENCES**

INTRODUCTION

Heterotopic pregnancy has a reported incidence of 1 in 30,000 spontaneous pregnancies and 1 in 100 pregnancies using In-Vitro Fertilization.1 Although rare, the incidence is rising and a consensus for management has yet to be published. Expectant management, laparoscopy, laparotomy, and fetal reduction are current management methods, yet each presents unique risks to the mother and intrauterine pregnancy.2 Due to the lack of guidance, clinicians are left to decide the best route based on the clinical scenario and their individual comfort.

CASE PRESENTATION

A 42-year-old G5P3P23 Hispanic female presented to the Emergency Department (ED) for vaginal bleeding and lower abdominal cramping. ß-hCG on presentation was 15,000 mIU/mL. A transvaginal ultrasound (TVUS) showed an irregularly shaped sac within the endometrial cavity and a cystic structure adjacent to the right ovary. She was hemodynamically stable and instructed to return in 48 hours for reevaluation. Repeat ß-hCG was 53,000 mIU/mL and the TVUS noted intrauterine and right-sided ectopic pregnancies consistent with gestational ages of 5 weeks and 6 days. She underwent a laparoscopic right salpingectomy without complications. She ultimately delivered a term neonate with no consequences from the early gestation laparoscopy.

REFERENCES

INTRODUCTION

Medical students frequently report poor sleep (i.e., inadequate sleep duration, sleep disruptions), predisposing them to various mental health conditions. Additionally, evidence suggests poor sleep diminishes neurocognitive functions, such as alertness and learning. To date, investigations on medical student sleep have relied on subjective evaluations (i.e., surveys, sleep diaries), while wrist actigraphy devices have been used to objectively evaluate sleep metrics among physicians, nurses, and pharmacy students.

OBJECTIVE

The goal of this study was to evaluate medical students’ sleep parameters using wrist actigraphy.

METHODS

Thirty medical students (first-year = 9, second-year = 9, third-year = 8, fourth-year = 4) wore a Fatigue Science ReadiBand™ for 14 days. The following data from the Fatigue Science SAFTÉ Model™ were analyzed: Sleep Quantity (hours), Awakenings per Night, Average ReadiScore (0-100), Sleep Quality (1-10), and ReadiScore Zones. Average ReadiScore represents average alertness at a given time. ReadiScore Zones (percent, %) represent the amount of time an individual spent with an Average ReadiScore during waking hours while wearing the ReadiBand™. ReadiScore Zones have been previously validated and correlate with blood alcohol content (BAC) levels of cognitive impairment and delayed reaction times. A higher Average ReadiScore and ReadiScore Zone indicates higher alertness and less cognitive impairment. Means and standard deviations were calculated for each variable followed by one-way ANOVAs by academic year with a Tukey post-hoc analysis.

RESULTS

Thirteen males and 17 females participated (age 26.50 ± 4.88 years and BMI 27.77 ± 7.45 kg/m²). Means and standard deviations for Sleep Quantity, Total awakenings per Night, Average ReadiScore, and Sleep Quality for all participants were: 6.52 ± 1.05 hours/night, 3.09 ± 1.35 awakenings per night, 87.80 ± 6.50, and 6.77 ± 1.68, respectively. Second-year students demonstrated the highest Average ReadiScore (88.78 ± 5.19), Sleep Quality (7.00 ± 1.41), and spent the most time at optimal cognitive attention levels. First-year students obtained the highest Sleep Quantity (6.76 ± 1.29 hours) and spent the least amount of with severely impaired alertness. Third-year students had the lowest ARS (86.63 ± 10.16) and Sleep Quantity (6.26 ± 1.24 hours). Fourth-year students had the lowest Sleep Quality (6.25 ± 1.71) and experienced the most sleep disruptions (3.58 ± 1.46 awakenings/night). In comparison, third and fourth-year students spent the most time with impaired alertness. One-way ANOVAs by academic year did not demonstrate any statistical significance.

CONCLUSION

Our results indicate that medical students are not sleeping the recommended hours per night, nor obtaining adequate sleep quality, potentially due to stress and sacrificing sleep for the demands of medical school. Second-year students generally demonstrated the best sleep metrics, possibly due to familiarity with curriculum. However, clinical rotations, erratic schedules, residency applications, and residency interviews, likely contributed to third and fourth-year students’ poor sleep metrics. Additionally, more senior medical students frequently function with diminished daily cognitive alertness. Noting the common theme of poor sleep behaviors often discovered among medical students, it is important to objectively identify sleep behaviors and eventually develop interventions to combat excessive stress, fatigue, and adverse health risk among physicians in training.

REFERENCES


Table 1. Sleep Metrics (Means and Standard Deviations) with One-Way ANOVAs by Academic Year

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<th>Mean ± Standard Deviation</th>
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<th>Significance</th>
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<td>Sleep Quantity</td>
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<td>Year 2 (N = 9)</td>
<td>6.32 ± 0.87</td>
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<td>Year 3 (N = 8)</td>
<td>6.95 ± 1.24</td>
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<td>Year 4 (N = 4)</td>
<td>6.31 ± 1.16</td>
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<td>Awakenings per Night</td>
<td>Year 1 (N = 9)</td>
<td>3.09 ± 1.35</td>
<td>0.23</td>
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<td>Year 2 (N = 9)</td>
<td>3.18 ± 1.18</td>
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<td>Year 3 (N = 8)</td>
<td>2.94 ± 1.06</td>
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<td></td>
<td>Year 4 (N = 4)</td>
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<td>Average ReadiScore</td>
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<td>87.80 ± 5.19</td>
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<td>Year 3 (N = 8)</td>
<td>6.98 ± 1.36</td>
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<td></td>
<td>Year 4 (N = 4)</td>
<td>6.75 ± 1.68</td>
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Endometrial Receptivity Testing and Subsequent Adjustment to Window of Implantation Timing Improve Pregnancy Success Rates of Women Undergoing Assisted Reproductive Technology

Zak Rose-Reneau DO, PGY2, Ryan Riggs MD, Derica Anderson, John R. Dobson MD

INTRODUCTION

For decades, REI research focused on solely on the creation of a viable embryo to increase pregnancy rates. Recently, research has identified the impact of endometrial adhesion molecule expression during the window of implantation (WOI) as playing a major role in embryo implantation.

METHODS

This is a retrospective case-control study of women undergoing assisted reproductive technology and the effects of the Igenomix Endometrial Receptivity Assay (ERA) on pregnancy success rates following frozen embryo transfer.

RESULTS

ERA results showed 29 of 60 patients were normal, 20 of 60 patients were Early Receptive (WOI existing 12 hours later than expected), and 11 of 60 patients were Pre-Receptive (WOI existing 24 hours later than expected). Ninety-one percent of patients with a corrected abnormal ERA had successful pregnancies while only 72% achieved successful pregnancy without using ERA to assess for their WOI (p = < 0.01, OR 3.82).

CONCLUSION

Endometrial Receptivity Assay testing has a significant impact on successful pregnancy rates among patients undergoing ART. Women should be encouraged to undergo ERA testing to ensure accurate timing of their WOI for embryo transfer. While numerous medication changes can be made by the physician to improve implantation success rates, if the WOI timing is not accounted for, these changes are for naught because the endometrium is not prepared to receive the embryo and subsequent embryo implantation into the endometrium will not occur. The use of ERA could save the patient tens-of-thousands of dollars and shave years off their time to achieving successful pregnancies.

Table 1: Patient Demographics

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<td>Maximum Age (yrs)</td>
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<tr>
<td>Average Age (yrs)</td>
<td>34.6</td>
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Table 2: Comparison of successful pregnancies in patients with normal vs abnormal ERA test results after failed FET

<table>
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<tr>
<th></th>
<th>Successful Pregnancy</th>
<th>Unsuccessful Pregnancy</th>
<th>Pregnancy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal ERA</td>
<td>16</td>
<td>13</td>
<td>55.2</td>
</tr>
<tr>
<td>Abnormal ERA</td>
<td>12</td>
<td>19</td>
<td>38.7</td>
</tr>
</tbody>
</table>

p = 0.24
OR = 1.98

Table 3: Comparison of Successful pregnancies in patients with corrected abnormal ERA vs. control group after failed FET

<table>
<thead>
<tr>
<th></th>
<th>Successful Pregnancy</th>
<th>Unsuccessful Pregnancy</th>
<th>Pregnancy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected ERA</td>
<td>20</td>
<td>2</td>
<td>90.9</td>
</tr>
<tr>
<td>Control Group</td>
<td>34</td>
<td>13</td>
<td>72.3</td>
</tr>
</tbody>
</table>

p = < 0.01
OR = 3.82

Table 4: List of major biomarkers associated with WOI and endometrial receptivity that are tested for by ERA

- Avb3 Integrin
- Leukemia Inhibitor Factor (LIF)
- HOXA10
- Glutathione Peroxidase 3
- CD56+ NK Cells
- NOTCH1

REFERENCES

What are patients asking about shoulder arthroplasty?  
An investigation of Google Searches

Samuel Shepard1 OMSIV, Griffin Hughes1 OMSIII, Landon Stallings2 DO, J. Michael Anderson 2 DO, Jeremy Scott2 DO, Chad Hanson2 DO, Clint Basener2 DO, Brian Chalkin2 DO, Matt Vassar1 PhD

1 Oklahoma State University Center for Health Sciences, Tulsa, OK, 2 Oklahoma State University Medical Center, Department of Orthopaedic Surgery, Tulsa, OK

INTRODUCTION

The utilization of shoulder arthroplasty has been increasing steadily over the last few decades.1 Given this continuous increase, we expect that patients will increasingly search the internet for sources of information regarding shoulder arthroplasty. The primary objective of this study is to characterize the content of the most frequently asked questions (FAQs) regarding shoulder arthroplasty. The secondary objective is to assess both the quality and transparency of the suggested information for shoulder arthroplasty.

METHODS

On October 9th, 2022 the following search terms were searched using Google “shoulder arthroplasty”, “total shoulder arthroplasty”, “reverse shoulder arthroplasty”, and “reverse shoulder surgery.” For each search, the “people also ask” function was queried until a minimum of 200 FAQs were generated for each search term. All FAQs were classified using the Rothwell Classification. All sources were assessed for transparency using JAMA Benchmark and quality with the Brief DISCERN tool.2,3

RESULTS

Our search returned a total of 1275 FAQs. After removing duplicates and unrelated FAQs our included sample size was 173. Fact questions were the most common classification type (102/173, 59%) followed by value questions (52/173, 30%) and policy questions (19/173, 11.0%). The most common fact questions were related to technical details (42/103, 40.7%). Medical Practices (67/173, 38.7%) were the most encountered source type followed by Academic sources (60/173, 34.6%). Both Academic and Medical Practices were associated with poor transparency (Table 1.). The one-way analysis of variance (ANOVA) revealed a significant difference in mean quality scores among the 5 source types (F = 18.6, P < .001) with Medical Practices averaging the lowest score (16.1/30). (Table 1)

On October 9th, 2022 the following search terms were searched using Google “shoulder arthroplasty”, “total shoulder arthroplasty”, “reverse shoulder arthroplasty”, and “reverse shoulder surgery.” For each search, the “people also ask” function was queried until a minimum of 200 FAQs were generated for each search term. All FAQs were classified using the Rothwell Classification. All sources were assessed for transparency using JAMA Benchmark and quality with the Brief DISCERN tool.2,3

CONCLUSION

Patients seeking online information for shoulder arthroplasty appear to search Google for questions related to a plethora of technical details and restrictions. The most common source type encountered by patients are those of Medical Practices; these were found to have both poor quality as well as poor transparency as measured by JAMA Benchmark and Brief DISCERN. Moving forward, medical practices should use validated tools as guidance for increasing the transparency and quality of the medical information they publish online. Physicians should know that their patients may be informing themselves about shoulder arthroplasty risks and management with low quality internet sources. Our findings reinforce the importance of well informed, evidence-based patient counseling before and after shoulder arthroplasty.

References


The Association between Steroid Use and Concussions among High School Athletes

Kennedy Sherman, M.H.A., Phillip Tyree B.S., Alicia Ito Ford, Ph.D., Anna Mazur, Ph.D., Doug Nolan, D.O., & Micah Hartwell, Ph.D.
Oklahoma State University: Center for Health Sciences/College of Osteopathic Medicine; Department of Psychiatry and Behavioral Sciences, and Office of Medical Student Research at Cherokee Nation

Background & Objective

- In 2017, almost 2.5 million US high school students experienced one or more concussions due to participation in a sport or physical activity.1
- There is an interest in concussed high school athletes and the long-term neurologic and mental health problems they may face.2
- Steroid use can cause behavioral changes like increased aggression which may lead to an increased risk for concussions.3
- Objective: To assess the prevalence of steroid use and concussions in high school athletes

Methods

- A cross-sectional analysis of the Youth Risk Behavior Surveillance System.
- Inclusion criteria: Respondents who had participated in a sport within the past year and responded to the steroid use and concussion prompts.
- Demographic variables: age, gender, race/ethnicity, body mass index (BMI), and education grade level.

Results

- Of high school athlete respondents, 3.66% (n = 2991, N = 3130) reported previous steroid use and 20.65% (n = 2273, N = 2,815) having sustained a concussion.
- The highest rates of steroid use occurred among American Indian/Alaska Native (AI/AN) (7.23%) and Native Hawaiian/Other PI (NH/PI) (7.09%) followed by Hispanic/Latino (4.3%) with the lowest rate reported in Asian (3%).
- There was a statistically significant difference in steroid use by race/ethnicity (X² = 5.78, P <.001).
- From 1999 to 2019, we found the weighted prevalence of steroid use dropped from 3.38% to 1.87% with the sharpest decline between 2015 and 2019.
- Athletes reporting steroid use were significantly more likely to have a concussion (AOR = 4.33; 95%CI: 3.19-5.88).
- Compared to white athletes, we found that AI/AN athletes were significantly more likely to have sustained a concussion (AOR = 2.25; 95%CI = 1.18-4.29).

Concussion Prevalence by Steroid Use

- Steroid use in adolescents can result in stunted growth, liver dysfunction, male infertility, mania, and aggression.4
- Alone, concussions may result in cognitive impairment, depression, anxiety, substance use, or more severe long-term effects such as Alzheimer’s disease or chronic traumatic encephalopathy, CTE.2
- Separately, steroid use and concussions have numerous health consequences; furthermore, in combination, these effects may be amplified and increase in severity.

Conclusion

- While it is unknown why AI/AN high school athletes are more likely to sustain a concussion and use steroids, this population may have increased health issues associated with these findings.
- Future research is needed to assess the role that steroids and race/ethnicity play in concussion prevalence to improve the safety of these athletes.

References

INTRODUCTION

- Chronic Traumatic Encephalopathy (CTE) is a progressive neurodegenerative brain condition thought to be caused by numerous forceful blows to the head and repeated sports-related concussions.
- Previously termed Dementia Pugilistica until 2005 when Dr. Omalu Bennet published the first autopsy report.
- Public interest has increased due to publicised sports injuries and media presence.
- Using Google Trends to explore events that have increased public interest in CTE.

METHODS

- Data was obtained using an RSI in Google Trends between 1/2004 and 11/2022.
- Major events displayed in Table 1 used to assess the increase in RSI starting in 2012.

RESULTS

- The release of Aaron Hernandez’s autopsy results in 2017 was the highest peak in RSI (100)—this was 87.81 (95%CI: 8.72-15.66) higher than forecasted, showing a 720.26% increase in RSI.
- There is a gradual increase in RSI of CTE from 2004 to 2022.
- Noticeable trends with significance to events occurring within a given month and year.
- Noticeable trends with significance to events occurring after increased media coverage such as movies (02-2016), autopsy reports (09-2017, 09-2018, 04-2021, and 07-2022), and documentaries (01-2020).

DISCUSSION

- Increased media attention involving NFL players and traumatic events can lead to increased funding for agencies to continue CTE research.
- Screening abilities made available earlier in order to educate the players of the NFL, and the public.
- Given the increased media exposure, clinicians should be aware of ongoing, fast-paced research regarding concussions and CTE among football players, and other athletes exposed to sports with increased risk of head trauma.

CONCLUSION

- Following the initial publishing of CTE research in 2005, there has been an increase in public interest in CTE.
- Search interest surged following well-known media events such as: the ‘Concussion’ movie, and media publications after Aaron Hernandez and Demaryius Thomas’ deaths.
- Already established concussion protocols should be followed prior to further testing.
- We recommend increased research funding for CTE, ongoing trials regarding repetitive concussions from combat sports, enforcement and amendment of sporting rules, and more protective equipment to prevent earlier onset of CTE.

REFERENCES

Depression Screening in Osteopathic Medical Students vs. Previous Depression Diagnosis

Haddon McIntosh BS, Luke Weaver BS, Hayden Crawford BS, Jennifer L. Volberding PhD, LAT, ATC

INTRODUCTION
Depression in individuals working in high stress fields is a well studied phenomenon. Depression rates in resident physicians have been measured to be between 20.9-43.2%, which puts both physicians’ health and patient outcomes at risk. As depression is a chronic disease, addressing the issue early on in a physician’s career presents a longitudinal opportunity to improve the mental health of future physicians. During medical school, depression may negatively impact a student’s performance, as the presence of depression is associated with a drop in GPA of 89% in undergraduate students with depression. Notably, this drop in GPA can be mitigated by effectively treating the depressive symptoms. Furthermore, depression is directly linked with increased burnout in front line healthcare workers. There is little literature investigating the prevalence of depression in American medical students. The most recent insight was provided by the University of Michigan in 2003, which utilized the PHQ-9 depression screening survey in their own medical student cohort. Within a 13 year window significant experiences of recent geo-political turmoil, COVID-19 and inflammatory impact on medical students have occurred. The current risks of depression in medical students is in dire need of re-examination. Furthermore, no such study has been completed at an Osteopathic medical university, where the emphasis on mind-body connection and whole person healthcare might influence changes in trends between an allopathic and osteopathic student body wellness. The current institution presents a dynamic campus location in which unique and cutting edge interventions on student mental wellness may be achieved. Identifying and treating depression early in medical students may help mitigate medical school dropout rates, negative trends in GPA, increase academic performance, and act as a preventative measure against longitudinal effects of depression on future physicians’ clinical careers.

METHODS
An anonymous survey including demographic questions and PHQ-9 was sent out to first through fourth year medical students during the fall semester at an osteopathic medical school. Survey results were placed in SPSS. Frequencies, means and standard deviations were calculated. One-way ANOVAs were performed for the PHQ-9 score by demographic variables. One specific question asked on the survey was whether or not a student had been previously diagnosed with depression. A calculation was then performed to compare the number of students who were previously diagnosed with depression to the number in the survey who were currently displaying depressive symptoms.

RESULTS

Key Findings
Among the 153 surveyed participants, 26.1% reported a previous diagnosis of a depressive disorder. 50.7% of participants scored a PHQ-9 survey indicating mild, moderately, or severely depressed, representing a 94.3% increase. When using a previous diagnosis of depression, those with a prior diagnosis had a statistically significant higher PHQ-9 score (F(1,151)=5.84, p<0.05).

Table 1: Stratification of student PHQ-9 scores

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal depression</td>
<td>74</td>
<td>48.4</td>
</tr>
<tr>
<td>mild depression</td>
<td>49</td>
<td>32</td>
</tr>
<tr>
<td>moderate depression</td>
<td>21</td>
<td>13.7</td>
</tr>
<tr>
<td>moderately severe</td>
<td>9</td>
<td>5.9</td>
</tr>
<tr>
<td>depression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>153</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Scoring Interpretation of PHQ-9

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total Score</th>
<th>For Score</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal depression</td>
<td>0-4</td>
<td>≤ 4</td>
<td>The score suggests the patient may not need depression treatment</td>
</tr>
<tr>
<td>Mild depression</td>
<td>5-9</td>
<td>5-14</td>
<td>Physician uses clinical judgment about treatment, based on patient’s duration of symptoms and functional impairment</td>
</tr>
<tr>
<td>Moderate depression</td>
<td>10-14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderately severe depression</td>
<td>15-19</td>
<td>&gt; 14</td>
<td>Warrants treatment for depression, using antidepressant, psychotherapy and/or a combination of treatment</td>
</tr>
<tr>
<td>Severe depression</td>
<td>20-27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSION
The Osteopathic tenet of “The body is a unit; the person is a unit of body, mind, and spirit,” provides the foundation of Osteopathic medical education and further emphasis on its meaning can aid the future wellbeing of Osteopathic physicians. Medical school attendance nearly doubled the risk of experiencing depressive symptoms in our study population. Significant findings in our study highlight the risk of mental health issues Osteopathic students face during their time in medical school. The continued depressive risk regardless of year classification in medical school demonstrates the strain each year of schooling places on an individual’s well being. Increasing mental health support while implementing curriculum changes targeting student wellness are a potential solution. Treating depression in medical students may even provide the ability to decrease future burnout in physicians. Current studies show physician burnout rates rose sharply during the Covid-19 Pandemic. Burnout in physicians has led to a rapidly increasing gap in provider shortage nationwide. Continued emphasis on medical student mental health throughout the education process is needed as our data suggests the majority of students are potentially facing mental health challenges.

REFERENCES
Trends and Disparities in Unmet Childhood Mental Health Care Needs: Analysis of National Survey of Children’s Health 2016-2020

Cassie McCoy, B.S., 1 Pedro Braga, B.S., 1 Covenant Elenwo, M.P.H., 1 Michael A. Baxter, M.D., 3 Tessa Chesser, D.O., 2 & Micah Hartwell, Ph.D. 1, 2

1. Oklahoma State University College of Osteopathic Medicine at Cherokee Nation, Office of Medical Student Research; 2. Oklahoma State University Center for Health Sciences, Department of Psychiatry and Behavioral Science, Tulsa, OK; 3. University of Oklahoma School of Community Medicine, Department of Pediatrics Tulsa, OK.

INTRODUCTION

- With 20% of children experiencing mental health disorders, it is critical to ensure mental health care (MHC) is accessible. 1
- MH disorders can hinder children from adequately developing psychological, cognitive, physical, and emotional characteristics essential for a healthy transition into adulthood. 2
- The COVID-19 pandemic created challenges in both MHC delivery and accessibility. 3
- Minority children have shown an increased risk for poor mental health (MH) correlated to the effects of both structural and individual racism. 4

OBJECTIVES

- Assessing trends in children’s unmet MHC needs from 2016-2020 may aid in the development of strategies to overcome those barriers, thus our objectives were to identify:
  1. the disparities among age groups, race/ethnicity, federal poverty level, or urbanicity
  2. the changes among each state
  3. the potential effects of the COVID-19 pandemic

METHODS

- We assessed the National Survey of Children’s Health to estimate trends of unmet MHC needs from 2016-2020.
- To identify state-level trends, we calculated each state’s percent change between 2016-2019 and between 2019-2020 to determine the impact of COVID-19.
- Lastly, we measured associations via logistic regression, between children’s unmet MHC needs and demographic factors to assess disparities.

RESULTS

Table 1. Unmet Mental Health Care needs among Children by Sociodemographics.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Multivariable logistic Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td>AOR</td>
</tr>
<tr>
<td>6-10</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>3-5</td>
<td>1.62**</td>
</tr>
<tr>
<td>11-14</td>
<td>0.91</td>
</tr>
<tr>
<td>15-17</td>
<td>0.84</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>1.91**</td>
</tr>
<tr>
<td>Indigenous, non-Hispanic</td>
<td>0.60</td>
</tr>
<tr>
<td>Asian, non-Hispanic</td>
<td>1.48</td>
</tr>
<tr>
<td>Native Hawaiian and Other Pac.</td>
<td>1.14</td>
</tr>
<tr>
<td>Multi-Race/Other Non-Hispanic</td>
<td>1.26</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.25</td>
</tr>
<tr>
<td>% Federal Poverty Level</td>
<td></td>
</tr>
<tr>
<td>400+</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>0-99</td>
<td>2.25**</td>
</tr>
<tr>
<td>100-199</td>
<td>1.73**</td>
</tr>
<tr>
<td>200-399</td>
<td>1.55**</td>
</tr>
<tr>
<td>Urbanicity</td>
<td></td>
</tr>
<tr>
<td>Metro</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>Non-metro</td>
<td>1.10</td>
</tr>
</tbody>
</table>

* P < .05, ** P < .01

Figure 1A. Difference in percentage of children unmet MHC needs among children from 2016-2019. Figure 1B. Difference in percentage of children unmet MHC needs among children from 2019-2020.

CONCLUSIONS

- There was no significant improvement in the number of children with unmet MHC needs from 2016-2019 nor 2019-2020.
- By 2020, 20.14% of the pediatric population did not receive MHC when it was needed.
- Nevada had the highest unmet MHC needs overall.
- Compared to White children, Black children were significantly more likely to have unmet MHC.
- Unmet MHC was significantly associated with household income, but not urbanicity.

REFERENCES

Demographics of individuals refusing cancer treatment and reported pain compared to those in treatment: An analysis of the 2017-2020 Behavioral Risk Factor Surveillance System

Linda Nguyen, B.S., Hunter Park, B.S., Kelsi Batioja, B.S., Natasha Bray, D.O., Benjamin Greiner, D.O., Micah Hartwell, Ph.D.
Oklahoma State University: Center for Health Sciences/College of Osteopathic Medicine; Department of Psychiatry and Behavioral Sciences, and Office of Medical Student Research at Cherokee Nation; University of Texas Medical Branch, Department of Internal Medicine, Galveston, Texas

BACKGROUND & OBJECTIVE
● More than 1.6 million people are diagnosed with cancer each year.
● Despite the different treatment options available for cancer, many individuals refuse treatment for various reasons.
● However, there is little known about the cumulative group of individuals who refuse treatment.
● Objective: To assess characteristics and associations among this group of individuals compared to those who receive cancer treatment.

METHODS
● A cross-sectional analysis was performed using the BRFSS data from 2017 to 2020.
● We included respondents who answered yes to the prompt “Do you have cancer?” and subsequently answered “Are you currently receiving treatment”, or “am waiting for treatment”.
● Demographic variables: sex (male or female), education (less than high school, high school graduate or GED, some college, college graduate or higher), and race/ethnicity (White or all other races).

RESULTS
Table 1. Characteristics of individuals with cancer by state of treatment (n = 6,238, N = 544,641).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>In Tx (%)</th>
<th>Refused (%)</th>
<th>Waiting (%)</th>
<th>Total (%)</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>68.85</td>
<td>5.73</td>
<td>25.42</td>
<td>83.29</td>
<td>6.17, .003</td>
</tr>
<tr>
<td>All other races</td>
<td>77.09</td>
<td>7.85</td>
<td>15.07</td>
<td>66.71</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>69.19</td>
<td>5.96</td>
<td>24.86</td>
<td>46.97</td>
<td>0.50, .59</td>
</tr>
<tr>
<td>Female</td>
<td>71.13</td>
<td>6.2</td>
<td>22.68</td>
<td>53.03</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; High school</td>
<td>66.74</td>
<td>11.57</td>
<td>21.69</td>
<td>15.27</td>
<td></td>
</tr>
<tr>
<td>Graduated High School</td>
<td>70.46</td>
<td>5.83</td>
<td>23.71</td>
<td>28.69</td>
<td>4.02, 0.002</td>
</tr>
<tr>
<td>Some college/tech</td>
<td>67.73</td>
<td>6.14</td>
<td>26.13</td>
<td>30.62</td>
<td></td>
</tr>
<tr>
<td>Graduated college/tech</td>
<td>74.94</td>
<td>3.05</td>
<td>22.01</td>
<td>25.42</td>
<td></td>
</tr>
<tr>
<td>Cancer Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast</td>
<td>86.33</td>
<td>4.41</td>
<td>9.26</td>
<td>19.14</td>
<td></td>
</tr>
<tr>
<td>Internal organs</td>
<td>73.02</td>
<td>8.43</td>
<td>18.55</td>
<td>31.06</td>
<td></td>
</tr>
<tr>
<td>Skin</td>
<td>62.25</td>
<td>5.94</td>
<td>31.82</td>
<td>31.54</td>
<td></td>
</tr>
<tr>
<td>Other (Blood, Bone, Head/Neck, other)</td>
<td>76.28</td>
<td>4.15</td>
<td>19.57</td>
<td>18.25</td>
<td></td>
</tr>
<tr>
<td>Age (M/SD)</td>
<td>65.24 (12.58)</td>
<td>60.03 (17.45)</td>
<td>61.72 (14.73)</td>
<td>64.09 (13.58)</td>
<td>11.83, .001</td>
</tr>
</tbody>
</table>

● The sample included 6,238 individuals of whom 83% were White, 53% were female, and over half reported attending college or technical school.
● Individuals with cancer of internal organs had higher rates of cancer treatment refusal at 8.43%, compared to 4.41% of breast cancer, 5.94% of skin cancer, and 4.15% of other types.
● Individuals who did not graduate high school were nearly twice as likely to refuse cancer treatment than other education groups (11.57%; p<0.01).
● We found no significant difference in reported cancer related pain among in the cancer refusal group compared to those in treatment (AOR: 0.59; 95% CI 0.21-1.61); however, those waiting for treatment were less likely to report cancer related pain (AOR: 0.3; 95% CI 0.17-0.52).

DISCUSSION
● Our investigations revealed statistically significant associations among treatment groups and race/ethnicity, cancer type, and educational attainment—the latter of which showed that individuals with less than a high school education were nearly twice as likely to refuse treatment than those with higher levels of education.
● Given low education is related to low health literacy, the Agency for Healthcare Research and Quality’s (AHRQ) Health Literacy Universal Precautions Toolkit may help increase patient understanding of their health and provide them with proper support based on their health literacy.

CONCLUSION
● Our findings showed that low educational attainment and being of a minority group were associated with higher rates of cancer treatment refusal.
● Previous research has shown these groups are more likely to have low health literacy, and focused efforts to improve cancer screening and treatment awareness.

REFERENCES
Trends and forecasted rates of Adverse Childhood Experiences among Adults in the United States: An Analysis of the Behavioral Risk Factor Surveillance System

Sadie Schiffmacher, B.S., Rachel Terry, B.S., Lauren Conway, D.O., Julie M. Croff, Ph.D. & Micah Hartwell, Ph.D.

INTRODUCTION

- The adverse childhood experiences (ACEs) study was one of the first to demonstrate the robust, life-long effects of family dysfunction, child maltreatment, and neglect during childhood. The initial study of well-educated, middle-class adults indicated that early life traumatic events are common and frequently co-occur with more than 66% reporting having at least 1 ACE and over 20% with 3 or more. There is a dose-response relationship with the ACEs accumulated and a range of adverse health outcomes.

RESEARCH QUESTION

- Our objective was to analyze the risk for ACEs in future generations due to the lasting behavioral and biological adaptations that occur as a result of the effects of ACEs in prior generations.

METHODS

- We performed cross-sectional analysis of data from the 2020 Behavioral Risk Factor Surveillance System (BRFSS).
- To assess trends in ACEs by year of birth, we summed the ACE items from the BRFSS ACEs module and calculated the mean number of ACEs by reported participant age with survey design and sampling weights provided by BRFSS.
- To determine participants’ year of birth, we subtracted the reported age from the survey year (2020).
- We then used an autoregressive integrated moving average (ARIMA) to forecast the year when US residents surpass a mean of 3 cumulative ACEs—a benchmark in which multiple studies have shown the disparities in comorbid diseases and disrupted education increases significantly.

RESULTS

- Of the participants reporting ACEs (n=116,378; N=63,076,717), the average number of participants per year age from 18-79 was 1714.6 (SD=355.9) and 10,071 respondents in the 80+ grouping.
- The mean number of ACEs reported by participants 80 years or older (born in or before 1940) was 0.79 (95% CI: 0.74-0.85), while the highest ACEs were reported by respondents who were 22 years of age (born in 1998; Figure 1).
- The forecasted model shows that individuals born in 2018 will, on average, surpass a cumulative of 3 ACEs.

CONCLUSION

- The accumulation of ACEs across the past 80 years supports behavioral and biological theories regarding the transmission of intergenerational trauma.
- Further, these analyses estimate that U.S. children born in 2018 will, on average, experience more than 3 ACEs.

CLINICAL IMPLICATIONS

- Implementation of resilience practices is necessary in order to prevent the continued intergenerational accumulation of ACEs and associated mental and physical comorbidities.
- Prevention of ACEs through strengthening economic support to families, teaching skills to families, and providing early intervention by trauma-informed primary care and victim-centered services may affect this trajectory.
- The Osteopathic Principles and Practice should guide an osteopathic physician’s early prevention of ACE’s by understanding that the body is a unit of mind, body, and spirit; capable of self-regulation, self-healing, and self-maintenance once that unity is restored.
- Not all children exposed to ACEs experience poor health outcomes; indeed, future research target inclusion of measures and interventions on protective factors associated with resilience.

ACKNOWLEDGEMENTS

This research was supported in part by the National Institute of Drug Abuse (U10DA055349 and R34DA050343; Julie Croff, PI), the National Institute of General Medical Sciences of the National Institutes of Health (R20GM109097; Jennifer Hays-Grino, PI), and the Health Resources and Services Administration (UA4MC44250-01-02, Andrea Haney, PI). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Health Resources and Services Administration.

REFERENCES

Background

Hallux valgus (HV) or a bunion is one of the most common forefoot deformities. Approximately one in four adults will develop HV with a higher prevalence in adult females. Up to 80% of adult internet users reference online sources for health related information. Overall, the high prevalence of HV combined with the numerous treatment options, we believe patients are likely turning to internet search engines for questions germane to HV. Previous orthopaedic investigations have used Google’s “People Also Ask” box to characterize frequently asked questions (FAQs) regarding total knee and hip arthroplasty. Yet, no such investigation has been conducted for HV. Using Google’s FAQs, we sought to classify these questions, categorize the sources, as well as assess their levels of quality and transparency.

Methods

On October 9, 2022, we searched Google using these four phrases: “Hallux Valgus Treatment,” “Hallux Valgus Treatment Surgery,” “Bunion Treatment Surgery,” and “Bunion Treatment Surgery.” For each search, we used a free Chrome extension, SEO Minion, until a minimum of 200 FAQs were produced; the extension extracted both the FAQs and sources. Information transparency was classified using Rothwell Classification. Next we categorized sources and assessed the level of transparency and quality using the Journal of the American Medical Association’s (JAMA) Benchmark tool and Brief DISCERN, respectively.

Results

Our Google search returned 299 unique FAQs after removing duplicates and unrelated FAQs. The majority were classified as fact based questions (149/299, 49.8%), followed by value (92/299, 30.8%) and policy questions (58/299, 19.4%). Overall the most common topic searched was related to the evaluation of treatment or surgery (79/299, 26.4%). The frequent answer sources were medical practices (158/299, 52.8%), followed by commercial (69/299, 23.1%) and academic (38/299, 12.7%). The one-way analysis of variance revealed a significant difference in mean quality scores among the 5 source types (F=54.49, P<.001) with medical practices averaging the worst score (12.1/30) compared to academic sources which were found to have the highest score (21.8/30).

<table>
<thead>
<tr>
<th>Source Type</th>
<th>Academic</th>
<th>Commercial</th>
<th>Government</th>
<th>Medical Practice</th>
<th>Media Outlet</th>
<th>Total</th>
<th>Chi-Square (DF = 4, P)</th>
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<td>45 (13.5)</td>
<td>12 (4.0)</td>
<td>11 (3.7)</td>
<td>20 (6.7)</td>
<td>115 (38.5)</td>
<td>144.09, P &lt; 0.001</td>
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<td>134 (38.3)</td>
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<td>Brief DISCERN</td>
<td>Score (mean, SD)</td>
<td>21.76 (5.07)</td>
<td>15.30 (3.28)</td>
<td>19.14 (4.49)</td>
<td>12.07 (3.88)</td>
<td>18.20 (4.20)</td>
<td>14.79 (5.27)</td>
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</table>

References

Childhood obesity is a growing public health problem with affected children being more likely to maintain obesity into adulthood and develop chronic diseases at a younger age. Social determinants of health (SDOH) are known to influence overall health. One component of SDOH is socioeconomic status (SES). We extracted sociodemographic variables to use as cross-sectional analysis of the 2021 National Survey of Children’s Health data to determine associations between childhood obesity and SDOH domains.

Our study objective was to use the National Survey of Children’s Health (NSCH) 2021 data to determine current associations between childhood obesity and SDOH.

We conducted a cross-sectional analysis of the 2021 NSCH to extract data from questions related to SDOH domains. We extracted sociodemographic variables to use as controls and constructed bivariate and multivariable logistic regression models to determine associations, via odds ratios, between SDOH and childhood obesity.

Children identified as having obesity were more likely than non-obese children to experience SDOH in all domains (Table 1). The prevalence and associations between a child having obesity and experiencing SDOH from 2021 National Survey of Children's Health.

BMI Classification

<table>
<thead>
<tr>
<th>BMI Classification</th>
<th>Yes n, (%)</th>
<th>Binary Model</th>
<th>Adjusted Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>n, (%), OR (95% CI)</td>
<td>AOR (95% CI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the past 12 months, was there a time when this child needed healthcare but it was not received?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI &lt; 95th percentile</td>
<td>12551 (69.62)</td>
<td>1 (Ref)</td>
<td>1 (Ref)</td>
</tr>
<tr>
<td>BMI &gt;= 95th percentile</td>
<td>2122 (65.79)</td>
<td>0.84 (0.69-1.03)</td>
<td>1.09 (0.88-1.35)</td>
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<tr>
<td>During the past 12 months, was this child safe at school?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI &lt; 95th percentile</td>
<td>739 (4.07)</td>
<td>1 (Ref)</td>
<td>1 (Ref)</td>
</tr>
<tr>
<td>BMI &gt;= 95th percentile</td>
<td>195 (6.32)</td>
<td>1.59 (1.07-2.38)</td>
<td>1.41 (0.92-2.20)</td>
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<td>Since this child was born, how often has it been hard to cover the basics on your family’s income?</td>
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<tr>
<td>BMI &lt; 95th percentile</td>
<td>1659 (11.26)</td>
<td>1 (Ref)</td>
<td>1 (Ref)</td>
</tr>
<tr>
<td>BMI &gt;= 95th percentile</td>
<td>564 (17.46)</td>
<td>1.63 (1.32-2.10)</td>
<td>1.22 (0.94-1.57)</td>
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<tr>
<td>Which of these statements best describes your household’s ability to afford food in the last 12 months?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI &lt; 95th percentile</td>
<td>3744 (26.27)</td>
<td>1 (Ref)</td>
<td>1 (Ref)</td>
</tr>
<tr>
<td>BMI &gt;= 95th percentile</td>
<td>1712 (40.18)</td>
<td>1.84 (1.37-2.47)</td>
<td>1.91 (1.36-2.39)</td>
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<tr>
<td>To what extent do you agree with this statement? This child is safe at school?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI &lt; 95th percentile</td>
<td>461 (3.9)</td>
<td>1 (Ref)</td>
<td>1 (Ref)</td>
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<tr>
<td>BMI &gt;= 95th percentile</td>
<td>144 (6.14)</td>
<td>1.61 (1.01-2.58)</td>
<td>1.16 (0.73-1.85)</td>
</tr>
<tr>
<td>To what extent do you agree with this statement? This child is safe in our neighborhood?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI &lt; 95th percentile</td>
<td>411 (2.37)</td>
<td>1 (Ref)</td>
<td>1 (Ref)</td>
</tr>
<tr>
<td>BMI &gt;= 95th percentile</td>
<td>100 (5.28)</td>
<td>1.09 (0.72-1.66)</td>
<td>0.9 (0.57-1.41)</td>
</tr>
</tbody>
</table>

**RESULTS**

 Associations of Social Determinants of Health and Childhood Obesity. A cross-sectional analysis of the 2021 National Survey of Children’s Health

**BACKGROUND**

- Childhood obesity is a growing public health problem with affected children being more likely to maintain obesity into adulthood and develop chronic diseases at a younger age.
- Social determinants of health (SDOH) are known to influence overall health.
- One component of SDOH is socioeconomic status (SES)
- Childhood obesity can have profound effects on overall health into adulthood, so research into potential associations with SDOH is warranted.
- Childhood obesity can have profound effects on overall health into adulthood, so research into potential associations with SDOH is warranted.

**OBJECTIVE**

- To what extent do you agree with this statement? This child is safe at school?
- To what extent do you agree with this statement? This child is safe in our neighborhood?
- To what extent do you agree with this statement? This child is safe at school?
- To what extent do you agree with this statement? This child is safe in our neighborhood?

**METHODS**

- We conducted a cross-sectional analysis of the 2021 NSCH to extract data from questions related to SDOH domains.
- We extracted sociodemographic variables to use as controls and constructed bivariate and multivariable logistic regression models to determine associations, via odds ratios, between SDOH and childhood obesity.

**RESULTS**

- Children identified as having obesity were significantly more likely to experience food insecurity when compared to non-obese children (AOR = 1.39; 95% CI: 1.13-1.70; Table 1).
- Children identified as having obesity were significantly more likely to experience SDOH in all domains (Table 1).

**CONCLUSION**

- Improving policies for programs such as SNAP as well as addressing lack of access to nutritious foods, especially within food deserts, may help alleviate some food insecurity.
- Improving access to adequate amounts of nutritious foods for children and their families is critical in addressing childhood obesity and thus, decreasing risk of chronic disease and poor long-term health outcomes.

**RESEARCH QUESTIONS**

- Early experiences with food insecurity may be a driver of childhood obesity and associated poor health outcomes.
- Addressing barriers to food and increasing access to supplemental food programs is a critical step in addressing childhood obesity.
- Among low-income families who may not qualify for governmental nutrition assistance programs, food pantries and food banks play a critical role in providing supplemental nutrition and helping to prevent childhood obesity.

**REFERENCES**

INTRODUCTION
An increasing population of Americans are struggling with diabetes and the long-term sequelae of DM and/or prediabetes, namely the cardiovascular risks that contribute to many of the top causes of morbidity and mortality here in rural SW Oklahoma. Unfortunately, many Americans (especially the SW Oklahomans in our demographic) do not have adequate education on lifestyle modification, particularly diet improvement, when it comes to adequately managing glucose control.

OBJECTIVES
In this study, we aim to measure the trends of A1c numbers over at least 6 months in adult diabetic patients of LCHC who attend diabetes education. This study will attempt to show the effectivity of nutritional counseling/diabetes education referral in diabetic adults as a means of improving patient education in regards to their eating habits. By demonstrating this effectiveness with (hopefully) positive results, we hope to promote increased nutritional/diabetic counseling referral in the future of our clinic.

METHODS
This retrospective cohort study is designed to demonstrate the effectiveness of diabetes education objectively through trends of A1c numbers. We will statistically analyze the A1c’s of diabetics who attend diabetes education sessions over a period of at least six months. As a control group, we can compare A1c number trends over a similar period of time in diabetics that did not attend diabetic education. This data will be gathered from Lawton Community Health Centers electronic health records over a study period from January 1 2021-June 30 2022.

RESULTS
Over 12,000 Patients were enrolled in this analysis across multiple outpatient locations in the Lawton Community Health Centers network of clinics. Of diabetics who got referral for diabetic education, the average initial A1c was noted to be 8.84. In this cohort, their most recent A1c’s were noted to be an average of 8.15. Although not yet at goal of 7, there was a measured improvement of lowered A1c values of 0.69 points on average. In a control cohort group, we measured average A1c numbers over a similar period for patients who did not receive referral to diabetic education. Initial average A1c was noted to be 6.46 and the subsequent most recent A1c was noted to be 6.82. This actually showed a measured increase of A1c values of 0.36 on average. According to our analysis, those who got diabetic education referral had a demonstrable improvement in A1c, whereas, those who did not had a demonstrable worsening in A1c values.

In this study, we aimed to use this study as a motivation across our clinics to promote referral to diabetic education. Of note, and the cohorts that we analyzed, patients who received referral to diabetic education had demonstrably improved A1c’s as compared to those who did not receive referral to diabetic education. Our data also showed that those who did not receive referral to diabetic education actually had statistical worsening of their A1c lab values.

Secondarily, another trend was noticed in our statistical analysis. Those he received referral to diabetic education did so add an average A1c of 8.84. However, those who did not receive referral to diabetic education had an initial A1c value in our study of 6.46. This finding seems to suggest that practitioners have a higher threshold of referring to diabetic education than should be desired. According to these numbers, practitioners did not refer to diabetic education until the A1c reaches a value of nearly 7. Although not yet at goal of 7, there was a measured improvement of lowered A1c values of 0.69 points on average. In a control cohort group, we measured average A1c numbers over a similar period for patients who did not receive referral to diabetic education. Initial average A1c was noted to be 8.84. In this cohort, their most recent A1c’s were noted to be an average of 8.15. Although not yet at goal of 7, there was a measured improvement of lowered A1c values of 0.69 points on average. In this study, we aimed to use this study as a motivation across our clinics to promote referral to diabetic education. Of note, and the cohorts that we analyzed, patients who received referral to diabetic education had demonstrably improved A1c’s as compared to those who did not receive referral to diabetic education. Our data also showed that those who did not receive referral to diabetic education actually had statistical worsening of their A1c lab values.

Secondarily, another trend was noticed in our statistical analysis. Those who received referral to diabetic education did so add an average A1c of 8.84. However, those who did not receive referral to diabetic education had an initial A1c value in our study of 6.46. This finding seems to suggest that practitioners have a higher threshold of referring to diabetic education than should be desired. According to these numbers, practitioners did not refer to diabetic education until the A1c reaches a value of nearly 7. To correlate with this evidence, we suggest that practitioners should try to lower their threshold for referral to diabetic education as it can demonstrably decrease A1c.

CONCLUSION
Our analysis shows that referral to diabetic education does demonstrably improve A1c’s, with an improved value on average of 0.69 points per patient. Practitioners know all too well the risks to cardiovascular morbidity and mortality that diabetes incurs. We also know that both oral and IM pharmacologic treatment as well as diet modification/improved exercise regimen can demonstrably improve A1c’s with statistical significance. However, this data suggests that we are not often enough seeking referral for diabetic education for our patients that have elevated A1c’s. Diabetic education can assist with patient management of diabetes in the realms of both pharmacologic management and lifestyle modification. We hope in the future to use these findings to encourage better referral practices to diabetic education.

REFERENCES
Association and Disparities of Food Security and Child Abuse: Analysis of the National Survey of Children’s Health

Molly Bloom, B.S.,1 Cassie McCoy, B.S.,1 Michael A. Baxter,2 Sara Coffey, D.O.,3 Amy D. Hendrix-Dicken, M.A.,2 Micah Hartwell, Ph.D.1,3

1. Oklahoma State University College of Osteopathic Medicine at Cherokee Nation, Office of Medical Student Research, Tahlequah, Oklahoma; 2. Oklahoma State University Center for Health Sciences, Department of Psychiatry and Behavioral Sciences, Tulsa, Oklahoma; 3. Oklahoma State University Center for Health Sciences, Department of Pediatrics, Tulsa, Oklahoma

INTRODUCTION

• At least 1 in 7 children have experienced child abuse or neglect.1,2
• Children from families of lower socioeconomic status exhibit a five times greater rate of child abuse as well as higher rates of food insecurity.2
• Given that 20% of children in food-insecure homes experience parental aggression compared to 7% in food-secure households, assessing the relationship between child abuse and food insecurity is critical.3
• Rates of child abuse and food insecurity also disproportionately affect children of different demographic groups, especially racial/ethnic minority groups.

OBJECTIVES

• Given the adverse effects of child abuse and food insecurity, investigating the relationship between the two may aid in developing mitigation strategies.
• Our primary objective is to assess the relationship between child abuse and food insecurity among children.
• Given that these disproportionately affect children of different demographic groups, our study aims to also identify the association amongst varying demographic factors.

METHODS

• We assessed the National Survey of Children’s Health (2016-2021) to investigate the relationship between child abuse and food security, using survey weights provided by NSCH.4
• We determined population estimates and rates of children experiencing food insecurity and child abuse.
• We then constructed logistic regression models to assess associations, via odds ratios (OR), between food security groups and whether the child experienced child abuse.
• Finally, we constructed logistic regression models via odds ratio to assess food security and child abuse by demographic factors.

RESULTS

Table 1. Interaction terms for race and food security on child abuse

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Interaction Term AOR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>Black</td>
<td>1.61 (1.37-1.88) *</td>
</tr>
<tr>
<td>Indigenous</td>
<td>2.1 (1.45-3.83) *</td>
</tr>
<tr>
<td>Asian</td>
<td>0.78 (0.59-1.03)</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>1.71 (1.44-2.04)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.11 (0.94-1.31)</td>
</tr>
<tr>
<td>White</td>
<td>2.58 (2.24-2.84) *</td>
</tr>
<tr>
<td>Black</td>
<td>3.59 (3.03-4.26) *</td>
</tr>
<tr>
<td>Indigenous</td>
<td>4.82 (3.49-6.67) *</td>
</tr>
<tr>
<td>Asian</td>
<td>0.98 (0.68-1.42)</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>4.09 (3.43-4.86) *</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.44 (2.07-2.87) *</td>
</tr>
<tr>
<td>White</td>
<td>7.02 (5.88-8.72) *</td>
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<tr>
<td>Black</td>
<td>6.78 (5.31-8.65) *</td>
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<tr>
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<td>9.26 (4.07-17.63) *</td>
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<td>8.26 (5.67-12.04) *</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5.27 (3.94-7.07) *</td>
</tr>
</tbody>
</table>

CONCLUSION

• While rates of food security were similar across age groups, households with lower income had higher rates of marginal or low food security, as well as homes with Black, Indigenous, multi-racial, and Hispanic children.
• Compared to those with high food security, the odds of children experiencing child abuse were significantly more likely to experience child abuse (AORs: 5.24, 95% CI: 4.59-6.00 and 2.36, 95% CI: 2.17-2.57, respectively).
• Compared to white children with high food security, Indigenous, Black, and White children were increasingly more likely to experience child abuse as household food security decreased (Table 1).

REFERENCES

 Associations of Cesarean Sections with Comorbidities within the Pregnancy Risk Assessment Monitoring System

Jordyn Austin, B.S.1, Alexis Wirtz, B.S.2, Morgan Garrett, B.S.2, Sydney C Ferrell, B.S.2, Elise Stephenson, B.A.1, Swapnil Gajjar, B.S.3, Spenser Perloff, M.D.,4 Micah Hartwell, Ph.D.1,5

BACKGROUND

● Cesarean section (CS) is a common obstetric surgical procedure aimed at reducing maternal and infant morbidity and mortality in the context of complicated pregnancies and medical emergencies.1

● Despite these aims, CS carries potential complications including higher rates of intraoperative or postpartum hemorrhage, hysterectomy, hematoma, major puerperal infection, venous thromboembolism, and neonatal respiratory morbidity when compared to vaginal delivery.2,3

● CS rates in the United States have increased over the years, as have the number of women living with comorbidities.4,5

OBJECTIVES

Our objective was to use the Pregnancy Risk Assessment Monitoring System date to identify the likelihood of a woman having a CS when comorbidities—diabetes, hypertension, or depression—are present.

METHODS

● We conducted a cross-sectional analysis of the 2019 Pregnancy Risk Assessment Monitoring System.

● Binary and multivariable logistic regression were used to calculate adjusted odds ratios (AORs) to determine associations between pre-existing comorbidities and CS among pregnant women.

RESULTS

● Compared to those without a diagnosis, women with pre-existing diabetes (AOR: 1.69; CI: 1.54-1.86), HBP (AOR: 1.58; CI: 1.47-1.71), and depression (AOR: 1.16; CI 1.10-1.22; Table 1) were more likely to have a CS.

● Additionally, participants with gestational diabetes (AOR 1.43; CI 1.34-1.52), HBP (AOR 1.86; CI 1.76-1.95) and depression (AOR 1.16; CI 1.09-1.22) were also more likely to have a CS than those without comorbidities.

Table 1: Prevalence and adjusted odds ratios (AORs) of comorbidities in participants having a C-Section.

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>No C-Section (n=94,266, N=4,858,325)</th>
<th>C-Section (n=46,451, N=2,139,436)</th>
<th>Missing Values (n=140,817, N=2,003,967)</th>
<th>Logistic Regression AOR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>3.38 (2.83-3.99)</td>
<td>7.96 (7.69-8.24)</td>
<td>10.12 (9.50-10.53)</td>
<td>1.43 (1.34-1.52)</td>
</tr>
<tr>
<td>HBP</td>
<td>4.66 (3.64-4.99)</td>
<td>12.03 (11.56-12.51)</td>
<td>12.39 (11.89-13.94)</td>
<td>1.04 (1.00-1.08)</td>
</tr>
<tr>
<td>Depression</td>
<td>7.51 (6.39-7.95)</td>
<td>2.92 (2.63-3.22)</td>
<td>12.38 (11.89-13.94)</td>
<td>1.13 (1.07-1.19)</td>
</tr>
</tbody>
</table>

Model controlled for age, race, cigarette use, and income group.

CONCLUSION

● Higher rates of CS were found among individuals with a pre-existing or gestational diagnosis of diabetes, HBP, or depression than those without these diagnoses.

● With increasing rates of these conditions, it is likely that CS rates will continue their trajectory in the US. Thus, organizations must provide evidence-based guidance for physicians caring for these individuals.

SIGNIFICANCE OF FINDINGS

● There is a clinical need for medical providers to be equipped to address comorbidities both before and during pregnancy, as these increase the risk for obstetrical complications and frequency of CS.

● As comorbidities negatively impact pregnancy outcomes, public policy changes can improve insurance coverage and proactive treatment of these diagnoses.

● Relationships have been shown to exist between postpartum depression and CS, but research is limited regarding CS and pre and peripartum depression.

REFERENCES

Our primary aim was to analyze trends in vaccination. We anticipate differences in individual and dual vaccination status based on teen demographics and that teens living in states with vaccine mandates will exhibit higher rates of dual vaccination against both HPV and meningococcal disease compared to states without any mandates.

Our secondary aim was to assess if state of residence influenced likelihood of dual vaccination. We anticipate differences in individual and dual vaccination status based on teen demographics and that teens living in states with vaccine mandates will exhibit higher rates of dual vaccination against both HPV and meningococcal disease compared to states without any mandates.

We also found associations in vaccination status between sex, race/ethnicity and income-to-poverty ratio.

Vaccination against both Human papillomavirus (HPV) and meningococcal disease is recommended for all adolescents aged 11-12 years in the United States. Meningococcal conjugate vaccines became recommended for preteens in 2005. Quadrivalent HPV vaccines were first recommended for adolescent females in 2007 and males in 2011. The National Immunization Survey expanded in 2006 to include the NIS-Teen which was designed to gather more information about adolescent immunizations, including the HPV and meningococcal vaccinations.

Our primary aim was to analyze trends in vaccination for both HPV and meningococcal disease and determine factors associated with increased likelihood of dual vaccine uptake.

Our secondary aim was to assess if state of residence influenced likelihood of dual vaccination.

We anticipate differences in individual and dual vaccination status based on teen demographics and that teens living in states with vaccine mandates will exhibit higher rates of dual vaccination against both HPV and meningococcal disease compared to states without any mandates.

We analyzed data on 31,083 adolescents aged 13-17 years from the National Immunization Survey - Teen 2020.

Bivariate and multivariate logistic regression models were constructed to determine dual vaccination rates and associations between vaccination status and sociodemographic characteristics.

We also found associations in vaccination status between sex, race/ethnicity and income-to-poverty ratio.
**Frequency and Severity of Depression amongst Pregnant Healthcare Workers: An Analysis Before and After the SARS-CoV-2 Pandemic**

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1. Oklahoma State University Center for Health Sciences, Office of Medical Student Research, Tulsa, Oklahoma
2. Oklahoma State University College of Osteopathic Medicine at the Cherokee Nation, Office of Medical Student Research, Tahlequah, Oklahoma
3. Oklahoma State University Center for Health Sciences, Department of Psychiatry and Behavioral Sciences, Tulsa, Oklahoma

**INTRODUCTION**

- COVID-19 pandemic has intensified stressors and worsened mental health outcomes for healthcare workers (HCWs), which is often exacerbated in those who are pregnant.
- Depression in HCWs is influenced by fears for personal safety, higher workload, and social isolation.
- Pregnant HCWs report a higher prevalence of psychological symptoms exacerbated by the pandemic.
- High emotional stress can lead to lower productivity, increased medical errors, and decreased empathy affecting patient care.
- Aim of the study is to identify trends of depression frequency, severity, and medication use in pregnant HCWs throughout the stages of the pandemic (2019-2021).

**METHODS**

- Data was obtained from National Health Interview Survey combining the 2019-2021 cycles (N=613).
- Associations were categorized in COVID-19 stages of pre-pandemic (2019), during (2020), and endemic (2021) via multivariable regression controlling for age, income-to-poverty ratio, and additional children in the home.

**RESULTS**

- We found no observable differences in the rates of pregnancy, reported depression or symptomatology between HCW and non-HCW.
- During the pandemic, pregnant HCWs in 2021 were more likely to report ever having depression compared to pregnant HCWs in 2019 (AOR: 3.33; 95% CI:1.92-5.79).
- During 2021, HCWs were also more likely to report a moderate to severe level of depression compared to 2019 (AOR: 2.55; 95% CI: 1.54-4.24).

**CLINICAL IMPLICATIONS**

- Infants born to women with untreated depression are at risk of prematurity, low birth weight, and intrauterine growth restriction.
- Postpartum deaths due to depression/suicide accounts for nearly 20%.
- Pregnant HCWs can request to be deployed to other work areas such as phone triages or telescreening to limit burden.
- Rapid interventions needed to reduce exacerbated depression in HCWs includes talk therapy, support groups, and spiritual practices.

**CONCLUSION**

- Rates of pregnancy amongst HCWs and non-HCWs were similar, as well as rates of depression and symptomatology in those who were pregnant.
- Rates of reporting ever having depression and severity was greater during the endemic stage of the COVID-19 pandemic compared to pre-pandemic.
- Exacerbated rates and severity amongst pregnant healthcare workers during the endemic stage should be prioritized to ensure positive maternal and child outcomes plus that they are able to return to the workforce when ready.

**REFERENCES**

The goal of this study was to evaluate cognitive impairment and delayed reaction times. The authors suggest that the results could be due to sleep disruptions, which predispose them to various mental health conditions. Additionally, evidence suggests poor sleep diminishes cognitive alertness, such as alertness and learning. To date, investigations on medical student sleep have relied on subjective evaluations (e.g., surveys, sleep diaries), while wrist actigraphy devices have been used to objectively evaluate sleep metrics among physicians, nurses, and pharmacy students.

**OBJECTIVE**

The goal of this study was to evaluate medical students’ sleep parameters using wrist actigraphy.

**METHODS**

Thirty medical students (first-year = 9, second-year = 9, third-year = 8, fourth-year = 4) wore a Fatigue Science ReadiBand™ for 14 days. The following data from the Fatigue Science SAFTE Model™ were analyzed: Sleep Quantity (hours), Awakenings per Night, Average ReadiScore (0-100), Sleep Quality (1-10), and ReadiScore Zones. Average ReadiScore represents average cognitive alertness at a given time. ReadiScore Zones (percent, %) represent the amount of time an individual spent with an average ReadiScore during waking hours while wearing the ReadiBand. ReadiScore Zones have been previously validated and correlate with blood alcohol content (BAC) levels of cognitive impairment and delayed reaction times. A higher Average ReadiScore and ReadiScore Zone indicates higher alertness and less cognitive impairment. Means and standard deviations were calculated for each variable followed by one-way ANOVAs by academic year with a Tukey post-hoc analysis.

**RESULTS**

Thirteen males and 17 females participated (age 26.50 ± 4.88 years and BMI 27.77 ± 7.45 kg/m²). Means and standard deviations for Sleep Quantity, Total awakenings per Night, Average ReadiScore, and Sleep Quality for all participants were: 6.52 ± 1.05 hours/night, 3.09 ± 1.35 awakenings per night, 87.80 ± 6.50, and 6.77 ± 1.68, respectively. Second-year students demonstrated the highest Average ReadiScore (88.78 ± 5.19), Sleep Quality (7.00 ± 1.41), and spent the most time at optimal cognitive attention levels. First-year students obtained the highest Sleep Quality (6.76 ± 1.29 hours) and spent the least amount of time with severely impaired alertness. Third-year students had the lowest ARS (86.63 ± 10.16) and Sleep Quantity (6.26 ± 1.24 hours).

**CONCLUSION**

Our results indicate that medical students are not sleeping the recommended hours per night, nor obtaining adequate sleep quality, potentially due to stress and sacrificing sleep for the demands of medical school. Second-year students generally demonstrated the best sleep metrics, possibly due to familiarity with curriculum. However, clinical rotations, erratic schedules, residency applications, and residency interviews, likely contributed to third and fourth-year students’ poor sleep metrics. Additionally, more senior medical students frequently function with diminished daily cognitive alertness. Noting the common theme of poor sleep behaviors often discovered among medical students, it is important to objectively identify sleep behaviors and eventually develop interventions to combat excessive stress, fatigue, and adverse health risk among physicians in training.

**REFERENCES**

Examination of Pediatric Oncology Trials within the United States’ National Library of Medicine’s Clinical Trials Database.

Carly Stewart, B.S., Kristen McPherson, M.P.H., Liza-Ann Whitaker, B.S., Nicholas B. Sajjadi, B.S., Randi Kerr, B.S., Michael A. Baxter, D.O., Micah Hartwell Ph.D.

BACKGROUND

- Pediatric oncology treatment is an expensive and understudied research area. Thus, it is vital that the studies that are performed are reporting novel results.

- A majority of trials focused on pharmaceutical interventions for cancers of the brain and blood and were in early phases. With few trials making it to stage 3 or 4, new medications for cancer treatment in children may be lacking.

- Because pediatric oncology trials subject children to sometimes painful and risky procedures, it is concerning that 15% were discontinued and nearly 65% were lacking results.

- Limiting the amount of research waste in this field will lead to a better understanding of pediatric oncology and further advancement of treatment options for this patient population.

OBJECTIVES

- Discontinuation and non reporting of clinical trials has not been quantified in relation to pediatric oncology.

- The aim of this study was to assess various pediatric oncology trial characteristics and their associations with the likelihood of being discontinued.

METHODS

- ClinicalTrials.gov was searched to identify pediatric oncology trials, and their current project status.

- Trial characteristics such as trial phase, location, intervention type, funding source and enrollment numbers were determined.

- Statistical analysis was completed to determine the relationship between trial characteristics and their rates of discontinuation.

RESULTS

- The majority of studies were funded by sources other than industry or NIH (192/349; 55%) and most were phase 2 trials (140/349; 40%).

- 14.90% of pediatric oncology trials between 2008-2021 were discontinued (52/349).

- The majority of trials investigating Acute Lymphocytic Leukemia (15/20; 75%), retinoblastoma (5/6; 83.3%), and Neuroblastoma (10/14; 71.4%) did not report their results.

- 14.90% of pediatric oncology trials between 2008-2021 were discontinued (52/349).

CONCLUSION

- A majority of trials focused on pharmaceutical interventions for cancers of the brain and blood and were in early phases. With few trials making it to stage 3 or 4, new medications for cancer treatment in children may be lacking.

- Because pediatric oncology trials subject children to sometimes painful and risky procedures, it is concerning that 15% were discontinued and nearly 65% were lacking results.

- Limiting the amount of research waste in this field will lead to a better understanding of pediatric oncology and further advancement of treatment options for this patient population.

KEY REFERENCES

3. The National Children’s Cancer Society. The Economic Impact of Childhood Cancer. Published online November 30, 2018.
We obtained a sample size of 45 studies for study inclusion. The most reported health inequities were income (18/45, 40.0%), under-resourced/rural (15/45, 33.3%), race/ethnicity (15/45, 33.3%). The least reported health inequity was LGBTQ+. (0/45, 0.0%).

**Table 1. Descriptive Statistics**

<table>
<thead>
<tr>
<th>Health Inequity</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>18</td>
<td>40.0%</td>
</tr>
<tr>
<td>Racial/Ethnicity</td>
<td>15</td>
<td>33.3%</td>
</tr>
<tr>
<td>Occupation</td>
<td>13</td>
<td>29.0%</td>
</tr>
<tr>
<td>Race</td>
<td>12</td>
<td>26.7%</td>
</tr>
<tr>
<td>Gender</td>
<td>13</td>
<td>29.0%</td>
</tr>
<tr>
<td>Health Literacy</td>
<td>11</td>
<td>24.4%</td>
</tr>
<tr>
<td>LGBTQ</td>
<td>1</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

**ACKNOWLEDGEMENTS**

We are grateful to the OSU medical library for their procurement of relevant literature and Reece M. Anderson, M.P.H. who provided invaluable assistance in our statistical analyses and data management systems.
Characterization of Biofilm Formation by Environmental \textit{Clostridioides difficile} Isolates

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\textsuperscript{a}Oklahoma State University College of Osteopathic Medicine. \textsuperscript{b}Oklahoma State University Center for Health Sciences, Department of Biochemistry and Microbiology.

\textbf{Abstract}

\textit{Clostridioides difficile} is a gram-positive, spore-forming bacteria capable of causing disease, referred to as \textit{Clostridioides difficile} infections (CDI), which may include symptoms such as severe diarrhea and colitis. Every year in the United States, about half a million of these CDI cases result in approximately $6$ billion in medical costs. \textit{C. difficile} is difficult to eradicate due to its antibiotic resistance, virulent properties, and the fact that there is no available vaccine. CDI's are thought to be iatrogenic, but accumulating evidence suggests that environmental transmission may play an important role as well.

Previously, we were able to isolate multiple \textit{C. difficile} samples from fish markets, hospital wastewater, and wastewater treatment plants in southern Taiwan. Genotypic analysis revealed the presence of toxigenic \textit{C. difficile} isolates closely related to ones prevalent among humans and animals infected by \textit{C. difficile}. To gain a better understanding of the virulence capabilities of these environmental isolates, a series of studies including growth rates, spore production, and cytotoxicity were performed; however, the biofilm forming abilities were not well characterized.

In this study, biofilm formation ability of those isolates was observed over a 72-hour period, then biofilm mass was measured using a crystal violet staining assay. By using a One-Way ANOVA, results were compared to the control lab strains 630 and R20291 to identify any significant differences. Further comparisons were made between isolates based on biofilm morphology. We observed a diverse range in biofilm formation abilities as well as biofilm morphology, but we did not detect any significant correlation between the robustness of the biofilms and the presence of toxin genes. Ongoing experiments focus on assessing the ability of \textit{C. difficile} isolates to resist antibiotics. In summary, our preliminary results were compared to the control lab strains 630 and R20291 over a 72-hour period, then biofilm mass was measured.

\textbf{Methods}

\textbf{Isolate Selection}

Our samples included \textit{C. difficile} isolates in Tainan City, Taiwan from wastewater near hospitals and water treatment plants, as well as oysters and clams from a local seafood market. Lab strains, R20291 and 630, were utilized as controls to compare environmental isolates.

\textbf{Biofilm Assay}

Environmental isolate broth cultures grown in BHI-s were normalized to OD600nm of 1.0, then a 1:100 dilution was performed and aliquoted into a 24-well plate incubated at 37°C for 72 hours. Biofilms were washed twice with PBS, incubated with 20µL/well of a 0.25 aqueous crystal violet solution for 15 minutes, then washed five times with PBS. The biofilm was suspended in 1mL of methanol then centrifuged at 13,000 RPM/30 seconds. The supernatant was removed and absorbance was measured at 570nm using an ELISA Microplate Reader.

\textbf{Biofilm Formation}

The isolates that grew the greatest mass of biofilm belonged to the 078-lineage, toxigenic, and non-toxigenic groups.

\textbf{Significant Findings}

\textbf{Biofilm Morphology}

Changes in morphology were seen, but there lacked a correlation between morphology and toxigenicity.

\textbf{Future Directions}

- We will test the hypothesis that prolific biofilm producing \textit{C. difficile} isolates confer greater vancomycin resistance. \textit{C. difficile} isolates to be tested:
  - Lab Strains: R20291 and 630
  - Non-Toxigenic Isolates: 9-2 and 17-2
  - 078-Lineage Isolates: 10-1 and HW12F

\textbf{Further Information}

- Environmental isolates can be categorized based on PCR ribotypes to compare toxigenicity.

\textbf{Tables}

<table>
<thead>
<tr>
<th>Isolates</th>
<th>PCR Ribotype</th>
<th>Toxin Genotype</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>R20291</td>
<td>RT002</td>
<td>tcdA (+)</td>
<td>Lab Strain</td>
</tr>
<tr>
<td>Ap-11</td>
<td>RT012</td>
<td>tcdA (-)</td>
<td>Lab Strain</td>
</tr>
<tr>
<td>1-1</td>
<td>RT106</td>
<td>tcdA (+)</td>
<td>Lab Strain</td>
</tr>
<tr>
<td>9-2</td>
<td>RT147</td>
<td>tcdA (-)</td>
<td>NCKUH</td>
</tr>
<tr>
<td>17-2</td>
<td>RT462</td>
<td>tcdA (-)</td>
<td>NCKUH</td>
</tr>
<tr>
<td>10-1</td>
<td>RT460</td>
<td>tcdB (-)</td>
<td>Oyster</td>
</tr>
<tr>
<td>115-A</td>
<td>RT060</td>
<td>tcdB (-)</td>
<td>Oyster</td>
</tr>
<tr>
<td>630</td>
<td>RT007</td>
<td>tcdB (-)</td>
<td>Oyster</td>
</tr>
<tr>
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<td>RT132</td>
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<td>Oyster</td>
</tr>
<tr>
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<td>RT013</td>
<td>tcdB (-)</td>
<td>NCKUH</td>
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<td>NCKUH</td>
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<tr>
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<td>RT145</td>
<td>tcdB (+)</td>
<td>NCKUH</td>
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<tr>
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<td>RT143</td>
<td>tcdB (-)</td>
<td>NCKUH</td>
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<tr>
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<td>tcdB (-)</td>
<td>HW12F</td>
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<td>tcdA (-)</td>
<td>Oyster</td>
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<tr>
<td>115-B</td>
<td>RT069</td>
<td>tcdA (-)</td>
<td>HW12F</td>
</tr>
</tbody>
</table>

\textbf{References}


\textbf{Acknowledgments}

- Ya-Ru Li, M.S. (NCKU)
- Dr. Franklin Chaplin, Ph.D. (OSU-CHS)
- Gianna Moulik, M.S. (OSU-CHS)
Health Inequities in Melanoma: A Scoping Review
Payton Clark, B.A., B.S.¹, Haley Howard, B.S.¹, Elizabeth Garrett, B.A.¹, Philo Waters, B.S.¹, Kelsi Batioja, B.S.¹, Mitchell Love, B.S.¹, & Matt Vassar, Ph.D.¹,²

1. Office of Medical Student Research, Oklahoma State University Center for Health Sciences, Tulsa, Oklahoma
2. Department of Psychiatry and Behavioral Sciences, Oklahoma State University Center for Health Sciences, Tulsa, Oklahoma

Introduction
Skin cancer is one of the most common cancers worldwide, with melanoma resulting in 90% of deaths from all skin cancers.¹ Evaluating the extent of health inequities regarding the diagnosis, staging, and treatment of melanoma has become essential for under-resourced groups. With goals to guide future research, the objective of this scoping review is to map existing research surrounding health inequities and melanoma patients.

Methods
This review follows the Joanna Briggs Institute (JBI) Manual² and the PRISMA extension for scoping reviews.³ We searched Ovid Embase and MEDLINE for studies from 2017-2021, published in English, investigating at least one health inequity as defined by the NIH.⁴ Text screening and data charting were conducted in a masked, duplicate manner. We analyzed frequencies for each health inequity investigated, and summarized all findings from each study.

Results
Sex or gender and race/ethnicity were the most commonly researched inequities within melanoma literature, while LGBTQ+ identity, occupation status, and rural/under-resourced were the least researched.

To expand the scope of melanoma research and provide an opportunity to address the gaps, we recommend the following: (1) including LGBTQ+ identity as a baseline data element, (2) producing more occupation-specific melanoma awareness campaigns, (3) improving accessibility of teledermatology services, (4) introducing more images of skin of color in medical education and research, and (5) evaluating diagnostic efficacy of AI on skin of color.

Conclusions

References

Acknowledgements: We are grateful to Reese Anderson, who assisted in our statistical analyses.
Background

Spinal fusions are the most common surgical intervention for lower back pain with an alternative being total disc replacement. Given the FDA’s expansion of lumbar disc replacement indications, we suspect patients will increasingly search the internet for sources of information when deciding between these two interventions. We explored frequently asked questions (FAQs) generated by Google to assess commonly searched questions about lumbar surgery treatments. We also sought to classify the FAQs and categorize the sources of information and determine the levels of transparency and quality of the source’s information.

Methods

On October 21, 2022, we searched Google using four terms: “lumbar spine fusion surgery,” “lumbar spine disc replacement surgery,” “lumbar fusion,” and “artificial lumbar disc replacement.” Using the People Also Ask function powered by Google we searched for at least 100 FAQs and their answer links were extracted from each search. We used Rothwell’s Classification of Questions to categorize the FAQs and the Journal of the American Medical Association’s (JAMA) Benchmark Criteria was used to assess information transparency. Information quality was assessed using the Brief DISCERN tool.

Results

Our Google search returned 1,133 unique FAQs. After removing duplicates and unrelated FAQs our final count was 309 FAQs. The majority were classified as Fact based questions (159/309; 51.5%; Figure 1) and most of those were related to restrictions or timeline of recovery (80/159, 50.3%). Policy questions and Value questions were evenly distributed with (76/309; 24.6%) and (74/309; 23.9%) respectively. The most common answer sources were medical practices (141/309, 45.6%; Figure 2), followed by commercial (96/309; 31.1%) and then academic (38/309; 12.3%). Nearly two-thirds of the answer sources (192/309, 62.1%) were found to be lacking in transparency. One-way analysis of variance revealed a significant difference in mean quality scores among the 4 source types (F = 21.3, P < .001) with medical practices averaging the worst score (16.9/30) compared to government sources which were found to have the highest quality of all included sources (24.9/30). (Table 1)

Summary

Patients searching for online information regarding lumbar fusions or lumbar disc replacement most commonly are interested in information about restrictions or the timeline of recovery. These questions were most answered by medical practice sources which were associated with poor transparency and below average quality. To increase the transparency and quality of online information regarding lumbar fusions and lumbar disc replacement, medical practices should use established rubrics when publishing online information. Physicians should be aware that patients are commonly searching for information regarding restrictions and timeline of recovery from lumbar fusions or lumbar disc replacements.

References


Conflicts of Interest: None

Funding: This work was supported by internal funding from Oklahoma State University Center for Health Sciences, Department of Orthopaedic Surgery, Tulsa, OK, and Oklahoma State University Medical Center, Department of Psychiatry and Behavioral Sciences, Tulsa, OK.

Table 1. JAMA Benchmark Criteria and Brief DISCERN criteria by Source Type

<table>
<thead>
<tr>
<th>Source Type</th>
<th>JAMA Benchmark Criteria</th>
<th>Brief DISCERN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic</td>
<td>(n=86)</td>
<td>55.0%</td>
</tr>
<tr>
<td>Commercial</td>
<td>(n=96)</td>
<td>35.7%</td>
</tr>
<tr>
<td>Government</td>
<td>(n=38)</td>
<td>91.1%</td>
</tr>
<tr>
<td>Medical Practice</td>
<td>(n=141)</td>
<td>41.5%</td>
</tr>
</tbody>
</table>

**Results**

- Our Google search returned 1,133 unique FAQs.
- After removing duplicates and unrelated FAQs, our final count was 309 FAQs.
- The majority of FAQs were classified as Fact based questions (159/309, 51.5%).
- Policy questions and Value questions were evenly distributed with (76/309; 24.6%) and (74/309; 23.9%) respectively.
- The most common answer sources were medical practices (141/309, 45.6%).
- Nearly two-thirds of the answer sources (192/309, 62.1%) were found to be lacking in transparency.
- One-way analysis of variance revealed a significant difference in mean quality scores among the 4 source types (F = 21.3, P < .001) with medical practices averaging the worst score (16.9/30) compared to government sources which were found to have the highest quality of all included sources (24.9/30).

**Summary**

- Patients searching for online information regarding lumbar fusions or lumbar disc replacement most commonly are interested in information about restrictions or the timeline of recovery.
- These questions were most answered by medical practice sources which were associated with poor transparency and below average quality.
- To increase the transparency and quality of online information regarding lumbar fusions and lumbar disc replacement, medical practices should use established rubrics when publishing online information.
- Physicians should be aware that patients are commonly searching for information regarding restrictions and timeline of recovery from lumbar fusions or lumbar disc replacements.
Increasing Advance Care Planning: A Follow-Up on Previous Quality Improvement Measures

Henry Gutierrez, D.O., PGY2
Faculty Mentors: Eric Gillette, D.O. and Ashton B. Clayborn, D.O.
Choctaw Nation Family Medicine Residency

INTRODUCTION

We previously reported on mechanisms to address barriers to advance care planning (ACP) and access to advance directives (AD) within our health system. Over the past three years, two quality improvement projects were completed with aims of increasing discussions on ACP between resident physicians and their patients and to improve access to ADs in our electronic health record system. Prior to these projects, we found it cumbersome to determine if a patient had a scanned directive document on file and to extract the AD for use in end-of-life scenarios that required rapid retrieval. The data presented here reflects three years of follow-up since the quality improvement initiatives began.

OBJECTIVES

The previous quality improvement projects were undertaken with the goal of increasing ACP discussions and improving ease-of-use of our electronic health record to quickly determine if a patient has an advance directive on file and hasten retrieval if the document existed. In addition, we hoped that the access icon created for this purpose will serve as a reminder for physicians to increase documentation of patients’ wishes by encouraging advance care planning.

Initial data indicated success; and this data reflects 3 years of follow up.

METHODS

• Initial quality improvement efforts included use of an educational video as a prompt for ACP discussions between physicians and their patients.
• The multi-dimensional project included a policy change to ensure that ADs were honored in all clinical settings within our health system.
• Next followed conceptualizing and programming an access icon in our electronic health record that secondarily served as a reminder to physicians to assist in ACP and composition of ADs when such documentation was not scanned into the patient’s chart.
• Follow up data was collected on the number ACP discussions held by running a query for the code 99497 for each fiscal year in the electronic health record system.

CONCLUSIONS

• Efforts to increase the number of ACP discussions held were successful.
• There was a nearly 18-fold increase in the number of ACP discussions documented and coded over the three-year period.
• Limitations of the project include difficulty in extracting data from the electronic health record necessitating the query for the code 99497 (indicating documented ACP occurred); however, this also reflects dependence upon physician coding and documentation.

REFERENCES