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Educating Healthcare Providers on the Impacts Electronic Device Overuse has on Health

Lacy Estes

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Device Overuse has on Health

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Mississippi University for Women

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Graduate Committee Approval

The Graduate Committee of Lacy Estes

hereby approves her research project as meeting partial

fulfillment of the requirements for the Degree of

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Date: _____   Approved: _____
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Approved:

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Educating Healthcare Providers on the Impacts Electronic Device Overuse has on Health

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Mississippi University for Women, 2022

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Abstract

Healthcare concerns develop from various external mechanisms that impact health. Overtime it has been witness that such mechanisms can include the food we consume, environmental hazards, lack of activity, chronic exposure to carcinogens, and even natural parts of the eco system such as bacteria or virus. Electronic devices have evolved over the past century and can be contaminates of health. They decrease physical activity times, limit face-to-face communication, and may interfere with mental health. As technology continues to evolve limitations and safe use should be well understood to decrease the negative impact electronic devices may have on health. Electronic device overuse associated health risks have been overlooked and understudied in the medical community (Poznyak, 2018). Gaps have been identified in the knowledge of providers with the associations of electronic device overuse, screenings for overuse, and ways to reduce exposure (Hill et al., 2019). Once providers are educated and made aware of the impacts, only then can they begin to understand the impact electronic overuse may have on their health.

Dedication

I would like to dedicate this project to my husband and family. They have supported me endlessly through my journey to obtain my Doctor of Nursing Practice. To my loving husband, I appreciate you always encouraging me to pursue my dreams. You have always been my number one fan. To my eldest daughter Ainsley, thank you for always encouraging me to continue going no matter how many times I wanted to give up. To my baby Sadie Beth, thank you for accepting my sideway cuddles on those late nights when I took my computer to bed with us. To my father, thank you for always believing in me. You always knew what to say to give me my second wind. To my sweet in-laws, your prayers and faith gave me strength through the toughest days. To you all, I could have never done this without your love, support, and encouragement. You all sacrificed so much so I could to achieve this. I love you all so much and will never forget your help through this chapter of my life.

To my classmates, this has been an amazing whirlwind of a tribulation, but the end is in sight. The lord brought us all together for a reason. We have walked through this chapter together and I am so grateful to have met you all. Our paths have all crossed and for a moment in time we have a shared experience that we will never forget. I wish you all the best throughout life and your career. Now let's wrap this up in blue and white with a stroll down the long blue line one last time.

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Educating Healthcare Providers on the Impacts Electronic Device Overuse has on Health

Electronic devices have been identified as having addictive properties since 1977, when Marie Winn coined the catch phrase "Plug-in Drug." Winn's essay described increasing reports of television screen time in American homes. Since Winn's striking honesty, boldly proclaiming television having, "robbed children of their normal opportunities to talk, play and do," more psychologists have begun speaking on the effects of electronic devices (Winn, 1978, Chapter 1).   Winn so passionately advocated for families to turn off televisions and get back to basic interaction. Not only have electronic devices became a part of everyday life, but with the introduction of the internet and world wide web, such devices have become even more attractive to consumers and users.   Another noteworthy advancement was made shortly after a psychologist by the name of Kimberly Young proposed Internet Use Disorder be classified and treated in the 4th edition of *Diagnostic and Statistical Manual of Mental Disorders* with her seminal paper in 1996 (Young, 2009). Both Young and Winn were able to associate psychological, mental, and social problems with electronic devices or internet usage.

One emergence neither Young nor Winn could predict was the development of the smart phone. The smart phone combined two addictive properties into one device: handheld mobile unit gaming and internet usage. With mass production, electronic devices are more affordable than ever before. The accessibility to such products like smartphones, mobile internet devices, social media, gaming systems, and computers has expanded communication, knowledge attainment and entertainment to a constant availability. Ninety-six percent of all Americans now own cellphones, with 81% of those

cellphones being deemed smart phones due to their capabilities to access the internet (Pew Research Institute, 2019a). Home internet usage of American adults has increased from 50% to 90% from 2000-2019 (Pew Research Institute, 2019b). Social media platform usage has grown the most in the 18-39 year-old age group, from 7% in 2006 to 90% as of 2019 (Pew Research, 2019c). Americans now average seventeen hours per day interacting with electronic devices (Mobile Phones, Society, & Culture, 2020). An even more astonishing report concludes the first age of interaction with an electronic device is prior to two-years-old (Pew Research Center, 2020) To add significance to the problem, all of these statistics were recorder in a pre-covid era.

Significance

Historically, national suicide and self-harm rates among teens and pre-teens have been   stable until 2010. Since 2010, national suicide and self-harm rates have been consistently on the rise (Curtin, 2020). Mental health instability has correlated very close to the rising trend in social media, smart phones, and internet use (Twenge, 2020). Mental health is not the only category of health affected, but physical effects of electronic device use have been investigated as well. Over 26 physical complaints have been identified that can correlate to increase use of electronic devices including neck, shoulder, and cervical spine strains, just to name a few (Tegtmeier, 2017). Subsequent conditions that can be linked to electronic device over use include inattention (Ward et al., 2017), anxiety (Clayton et al., 2015), ADHD (Ra et al., 2018), behavioral issues in pediatrics (Nathanson & Beyens, 2016), depression, isolation, and loneliness (Öztekin & Öztekin, 2020), no mobile device phobia (Bhattacharya, Bashar, Srivastava, & Singh, 2019), smartphone addiction (Hawi & Samaha, 2017), obesity (Tripathi & Mishra, 2029), and

insomnia (Boonluksiri, 2018). Electronic device overuse affects those of all ages. It has even been linked to poor speech articulation with increase screen time (The Hanen Centre, n.d.). When a common practice has been identified in poor health outcomes across the lifespan, change must be pursued.

Purpose

As healthcare has transitioned from treatment of illness to health promotion and prevention, healthcare providers are called upon to help decrease exposure to at risk behavior. Previous researchers have identified poor health outcomes associated with electronic device overuse. It is because of this, that health care providers must educate patients and parents of patients on these harmful effects across the lifespan. Electronic device overuse associated health risks have been overlooked and understudied in the medical community (Poznyak, 2018)(Clay, 2018). Gaps have been identified in the knowledge of healthcare providers in electronic device overuse. This includes acknowledging the age in which overuse begins to affect health (Hill et al., 2019). Raising awareness will challenge providers to examine their knowledge and educational efforts on the health risks associated with electronic device overuse and promotion of safe electronic use across the lifespan.

Goals

The goal is to reach at least 50 healthcare providers in Mississippi and offer in person or digital educational sessions on the impacts of electronic device overuse on health. Raising awareness may prompt providers to examine their knowledge, screenings practices and educational efforts on the adverse effects of electronic device

overuse as well as promoting safe electronic device use for their patients and communities.

Objectives

1. Pre-test of healthcare providers for knowledge deficits related to the impacts of electronic device overuse has on health.

2. Educate providers on the impacts electronic device overuse has on health.

3. Introduce educational material and action plans for implementation of safe electronic device use across the lifespan.

4. Introduce screening tools for providers to use that will help in identify at risk populations

5. Reevaluate knowledge, education efforts and screening practices to trend a practice change among providers with post-test score correlations.

PICOT Question

Will educating Healthcare Providers on the impact electronic device overuse has on health prompt a self-reported practice change, and improve provider knowledge?

Hypothesis

Raising awareness will prompt providers to examine their knowledge, screenings, and educational efforts on the adverse effects of electronic device overuse and safe electronic use promotion across the lifespan.

Terms

Educating

Theoretical- "give intellectual, moral, and social instruction to (someone, especially a child), typically at a school or university (Merriam-Webster, n.d.-b)."

Operational- presenting a healthcare provider with a PowerPoint presentation on the impacts electronic device overuse has on the health of an individual.

Healthcare Provider

Theoretical- "a provider of services (as defined in section 1861(u) of the Act, 42 U.S.C. 1395x(u)), a provider of medical or health services (as defined in section 1861(s) of the Act, 42 U.S.C. 1395x(s)), and any other person or organization who furnishes, bills, or is paid for health care in the normal course of business (Legal Information Institute, 2013)."

Operational- A Medical doctor, Doctor of Osteopathic Medicine, Physician's Assistant, or Nurse Practitioner that actively practices in the state of Mississippi.

Electronic Device

Theoretical- "A device that accomplishes its purpose controlling the flow of electrons applied to digital electronics, analog electronics, microelectronics, optoelectronics, or integrated circuits (IGI Global, n.d.)."

Operational- A device that electronically provides entertainment or grasp users attentions with digital or electronic screens. Examples include tables, laptop computers, desk top computers, smart phones, cellular phones, smart televisions, video game consoles and handheld gaming devices.

Overuse

Theoretical- "to use (something) too much; to use (something) excessively or too frequently (Merriam-Webster, n.d.)."

Operational- The amount of use of an electronic device that creates detrimental effects on health. This can vary by age, gender, profession, and type of usage.

Knowledge

Theoretical- "acts, information, and skills acquired by a person through experience or education, the theoretical or practical understanding of a subject (Merriam-Webster, n.d.-a)."

Operational- the act of retaining the information presented in the educational Power Point based on the impacts of electronic device overuse has on health and how to screen and prevent overuse in a healthcare providers population serviced.

Self-Reported Practice Change

Theoretical- "Is a complex, collaborative and generally trans-disciplinary process that uses the best available evidence to improve health care and health (Gawlinski & Rutledge, 2008)."

Operational- a provider responding to evidenced-based practice of electronic device overuse by increasing knowledge bases where deficits are acknowledged, implementing screening practices where they lack, and providing education regarding safe electronic use across all lifespans a provider may service.

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Theoretical Model

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Prochaska and Velicer's (1997) in a smoking cessation study, evaluated the process of change utilizing multiple change theories. They discovered that participants utilized different stages of The Change Theory, at different times during the cessation process. Utilizing previous change theories and incorporating newly discovered steps of their own, prompted the formation of *The Transtheoretical Model of Health Behavior.* The core constructs were identified as *precontemplation, contemplation, preparation, action, maintenance,* and *termination*.

The *precontemplation stage* is a stage that identifies if a patient has no desire to change or are uninformed about the need for change. The next step identifies *contemplation* as the stage in which a person is intending to change within a given time period. They now are exposed to the benefits or potential harm caused by not inducing change. Next is the *preparation stage*. People in *preparation* have a plan to take immediate action to promote the change needed. The *action stage* follows *preparation*. In the *action stage*, people make "specific overt modifications in their lifestyles" to promote the establishment of change (Prochaska & Velicer, 1997, p. 39). After *action* has been taken, the *maintenance stage* is follows with a person continually working towards a goal and away from the behavior being changed. At this point a person can then *relapse* or progress to a stage called *termination*. *Relapse* is entered when temptation overcomes, and the behavior is demonstrated once again. If a patient is not tempted and continues avoidant behavior, *termination* of the change cycle can be established. A patient can enter in stage at any given time without constraints as to the amount of time given in the stage's predecessor. The cycle can continue as long as needed for a patient to established 100% self-efficacy with zero temptation.

Procheasja & Velicer's (1997) model was utilized in the current project to promote provider awareness of the impact that electronic device overuse has on health. Incorporated stages included were those that help change occur more specifically the *precontemplation* through *contemplation* stage. Terms from the model included *decision balance* which is the relationship of pros and cons weighed by a person when contemplating, attempting, or failing at change. *Self-efficacy* is "situation-specific confidence" that an individual embodies to help them overcome temptations and avoid

relapse in behavior and *temptation* is understood to be any urge to partake in a habit or behavior that change is being provoked away from.

Important assumptions Prochaska and Velicer (1997), recognized within their model included the assumption that changing behavior is a process that occurs over time through a sequence of stages. Without early interventions, population can be stuck in the earlier stages if there is no inherent motivation to progress with intentional change. At-risk populations are not prepared for action and are served by traditional action-oriented prevention programs. Chronic behavior patterns are usually under some combination of biological, social, and self-control.

Utilization of Model

Utilization of this model in the current project focused on the *precontemplation* and *contemplation* stage. Prior to participation healthcare providers were unaware of the risk that electronic device usage could impact an individual's life. After education healthcare providers are now assumed to be in the *precontemplation* phase of *The Transtheoretical Change Model*. There is a need to educate on potential health implications associated with electronic device overuse. Through the use of educational sessions, providers were exposed to the health risks associated with electronic device overuse. The education session incorporated *self and social liberation*, *counterconditioning*, and *stimulus control* to acknowledge the lack of knowledge. Tools needed to combat the problem were incorporated as well. Consideration of *decision balance* was included while building the education session by realizing healthcare providers have to balance their time and attention to medical illness of importance to the community they serve.

Once healthcare providers were appropriately educated on the risk, they began transitioning into the *contemplation* stage. Healthcare providers have now been given the knowledge, tools, and example of incorporations needed for change to begin reversing the effects that have already been acknowledged. Thus, utilizing counterconditioning as identified in the Transtheoretical Model of Health Behavior Change. They will be left at the verge of the preparation stage. It will be up to them to produce change within the environment they serve promoting self-efficacy as the model reflects.

The research concluded with environmental reevaluation. It assessed if the environment around the provider invoked change. Correlation in pre-education knowledge and post educational knowledge was collected to evaluate the effectiveness of the information provided. The project change will be conducted with the belief that the change cycle has no timeline in implementation and that change can regress or grow just as *The Transtheoretical Change Model* suggests.

Review of the Literature

Healthcare providers should be aware of the evidence and resources available to them in order to decrease risks associated with electronic device overuse. Impacts of electronic device overuse can affect psychological, physical, and social well-being.

Mental Health and psychological well-being have been impacted the most from electronic device overuse. One of the most profound correlations of electronic device overuse resulted from a systemic review across 9 databases (Sedgwick et al., 2019). Seven out of 10 reviews showed independent association between problematic use of social media/internet and suicide attempts in young people. Another large systemic review found 25 out of 33 articles reviewed established a correlation with

cybervictimization with self-harm or suicidal behaviors and between perpetrating cyberbullying and suicidal behaviors (John et al., 2018). With suicide ranking second leading cause of death among 10-20-year old's, any identified cause relating to mortality should raise attention (Sedgwick et al., 2019).

Kim et al (2017), correlated psychological factors, such as stress, depression, and suicidal ideation among a population of 608 Korean college student with electronic device overuse. They discovered that Students who reported feeling unhealthy were more likely to overuse smartphones than those students reporting feeling healthy. Sixty-seven percent of the population questioned reported they felt stressed and utilized their smart phone 2.2 times more that those who were not stressed. Kim et al (2017), found that psychological health conditions, such as stress, depression symptoms and suicidal ideation were in fact associated with characteristics of disruption adaptive life functions, virtual life orientation, withdrawal from electronics and tolerance of others.

In a descriptive study, conducted on students of Nursing/Midwifery of a state university in Turkey investigated the correlation between smartphone addiction and dysfunctional attitudes. Participant were noted to have a mean score of 27.25 ± 11.41 in smartphone addiction scale and a mean score of 27.96 ± 14.74 in dysfunctional attitudes scale. The number of students' friends was found to affect their problem-solving skills while, loneliness levels of participant students affected their dysfunctional attitude scores (Serin, Durmaz, & Polat, 2019).

Di Giacomo et al. (2020), conducted a cross-sectional study observed psychological effects of electronic devices in 117 adults (n=64 female, n=53 male) aged 50 and above. It found self-perception to be key in digital applications in order to exploit

digital living benefits. Di Giacomo et al. (2020), found that computer anxiety in adulthood related to the self-perception of one's own ability to use the technology autonomously. They concluded that digital living does have negative impacts on the daily life of adults. Emerging new emotional patterns related to modern living can affect the wellness of adults when digital health is incorporated due to the anxiety it creates. It thus, reduces the chance to improve the quality of life with technology. The research ultimately encouraged active assistance with technology as it becomes a center of all interaction (Di Giacomo et al., 2020).

Further supporting psychological effects on electronic device overuse was the establishment of Nomophobia. The emerging diagnosis of Nomophobia was recently the center of an investigation survey that included 242 Spanish students ranging between the age of 16-25. The term no-mobile-phone phobia describes a psychological event inducing intense anxiety. No-mobile-phone phobia is defined as the fear of being unable to use or being unreachable via one's mobile phone due to not having device or lacking service on the device.

Respondents to the survey were asked the extent to which they agreed to each of the 40 items regarding Mobil Phone Involvement Questionnaire (MPIQ). They rated their involvement using a five-point scale (1-strongly disagree- 5-strongly agree). On data review, correlation was made on how devices negatively affected five variables: self-esteem, emotional stability, conscientiousness, agreeableness, and openness. On conclusion of this study Argumosa-Villar et al. (2017) urge for more research to identify at risk groups and establish treatment programs and adequate prevention strategies in the

form of awareness campaigns about problematic smartphone use (Argumosa-Villar et al., 2017).

Bhattacharya et al. (2019), performed a systemic review resulting in the relationship of mobile phone usage to nomophobia. Psychological factors involved with a person's overuse included low self-esteem, extrovert personality and other mental disorders such as, social phobia/anxiety and panic disorder are precipitates of NOMOPHOBIC symptoms. They identified physical symptoms that correlated with nomophobia including anxiety, respiratory alterations, trembling, perspiration, agitation, disorientation, and tachycardia (Bhattacharya et al., 2019).

Overuse of electronic devices has been found to negatively impact physical health as well. A systemic review conducted by Patricia Tegtmeier (2017), linked several conditions to electronic devices. She found that out of 36 articles reviewed, 26 physical illness could be contributed to electronic devices use. Among these conditions were postural injuries to the neck, shoulders, back and wrist. Another study by Derakhshanrad et al. (2020) focused more of specific injuries involving the neck. They utilized a cross-sectional report of a cohort study, assessing demographic, abnormal symptoms of pain in the neck, physical activity, and psychological behavior characteristics in 1602 office workers. They found, 326 or 30 % of employees studied had characteristics of smartphone addiction including anxiety without phone and inattention. The correlation to smartphone addiction and neck pain was confirmed as those with smartphone overuse were approximately 6 times more likely to have neck pain.

Another component of physical health that has been impacted by electronic device use is the increasing incident of obesity linked with screen time (Tripathi & Mishra, 2019). A systemic review that included 31 cross-sectional studies, six longitudinal studies and one interventional study reviewed screen-related activities included TV viewing, computer use, video game playing and Internet use. Adiposity was measured by abnormal values in BMI, percentage of body fat, and for waist circumference. Eighty-five present of participants indicated positive association between the time spent on screens and adiposity.

Another physical function impacted by electronic device overuse is sleep. In a recent cross-sectional study, 294 medical students took part in an anonymous electronic questionnaire to investigate the link between blue light device use and sleep quality (Jniene et al., 2019). It was found that 97 % of students reported use of blue light emitting devices at bedtime with 35% reporting poor quality of sleep and 67% reporting sleep disturbances contributed to devices. This study also found a high prevalence in blue light-emitting device use at bedtime to worrying and unhealthy habits such as, poor sleep quality. It ultimately increased poor daytime functioning among young medical students of any gender.

Correlations have been established with electronic device overuse and a decline in social well-being. In a study investigating the relation between preschoolers' mobile electronic device (MED) use and sleep disturbances, evidence found that even with television viewing controlled, MED use was related to sleep disturbances among preschoolers. Correlations were made between the amount of mobile electronic device

use and varying bedtime resistance as well, supporting the idea that electronic devices can affect behavior. Another correlation found that children's tablet use ($\beta = .09$, $p < .10$) was marginally significantly related to daytime sleepiness. Thus indicating, that more tablet use was related to more daytime sleepiness and in class nap taking.

Social well-being was also investigated in a longitudinal cohort of convenience sampled students at 10 Los Angeles counties of California (Ra et al., 2018). Baseline and 6-, 12-, 18-, and 24-month follow-up surveys were administered from September 2014 (10th grade) to December 2016 (12th grade). Of 4100 eligible students, 3051, 10th-graders (74%) were surveyed at the baseline assessment for self-rated frequency for 18 attention deficit hyperactive disorder (ADHD) symptoms. At the end of the two-year study, statically significant values relate higher frequency of digital media use and subsequent symptoms of ADHD. Thus, indicating the more exposed adolescence were to social media, the more at risk they were to develop ADHD.

It is apparent that electronic device usage has a direct effect on many health disorders. Enough so that initiatives must be started to increase awareness and demand change. Education on the health risks associated with electronic device overuse is needed on its detrimental effects.

Implementation

This quality improvement project regarding the raising awareness of the impacts of electronic device overuse on health was conducted in adherence to Mississippi University for Women's guidelines with approval from Mississippi University for Women Institutional Review Board obtained prior to implementation (Appendix A). Nurse Practitioners, Physician Assistance, Medical Doctor's and Doctor of Osteopathic

Medicine, were invited to participate in the current project. Participants were recruited by social media invitation, email, and personal request. Educational sessions were performed via in person or through virtual link embedded in an email request for participation (Appendix B)

A pre-test assessment was collected (Appendix C). Then, participants were given a brief educational session which included overview of the problem, impacts of device over use and ways to screen and educate for device overuse. After the educational session, providers completed a posttest to evaluate educational retainment and practice changes within 1-3 month (Appendix D). Reminder emails were sent out prior to post-test conclusion date.

Tools/Instrumentation

Pre and posttest questionnaires utilized in the project were reviewed by researcher and IRB and therefore only have face validation. The questionnaires and PowerPoint were reviewed by the project advisor and committee members prior to application for IRB approval (insert appendix). The pre-test survey was composed of seven questions. The pre-test included questions regarding basic knowledge of electronic device overuse and self-perception of affected patient population they serviced. Participants were also asked to report their confidence level in educating patients in safe electronic device usage. The post-test survey included the same questions so that knowledge improvement and confidence scores could be evaluated for changes after educational. The post-test survey also included a question to record if a self-reported practice change had been made as a result of the information exposure through participation.

Evaluation methods

To determine the effectiveness of the project implementation, statistical analysis was conducted of each questionnaire as an independent sample. Descriptive statistics were completed by the researcher. The data was stored electronically through Survey Monkey and analyzed in collaboration with a professional statistician. The project had two goals: improving provider knowledge of electronic device overuse and prompting a self-reported practice change to increase education and screening for electronic device overuse.

Project Timeline

The initial proposal was completed in the fall semester of 2020. The researcher continued literature review and developed pre and post-tests throughout the spring semester of 2021. After submission and approval of MUW's IRB, project was critiqued and ready for implementation. Beginning August 2021 candidates were contacted for scheduling of education sessions. Due to Covid-19 and inability to visits clinics face-to-face, IRB was amended, and post-test time lapse was shortened to immediate or within one month participation. Beginning November 2021 more energy was placed into virtual distribution to reach a larger base of providers. Face-to-face sessions were carried out with three providers, and the rest were completed through electronic contact. Pre and posttest access was closed as of February 1, 2022. Results were compiled within the next week and sent to statistician for analysis. Final data analysis was received February 27, 2022. Final defense of project took place at the closure of spring 2022 semester.

Results

Results were recorded using complete anonymousness. Results were compiled

through survey monkey software. The results were then downloaded into excel

spreadsheets containing raw data and submitted to professional statistician for data

extraction. The education was given to 37 providers, with 15 completing the full course

and 17 completing pretest and educational video. This data was analyzed using SPSS

28.0. This study used a pre- post-test design. Unfortunately, pre- and post-test data could

not be matched, so the data were analyzed as independent samples data.

Descriptive Statistics

All but one of the respondents of the pre-test (N=17) reported they were

Advanced Practice Registered Nurses. The remaining respondent reported being a

Medical Doctor. There were 15 respondents that completed the post-test. The questions

on licensure were not asked on the post-test questionnaire.

Licensure
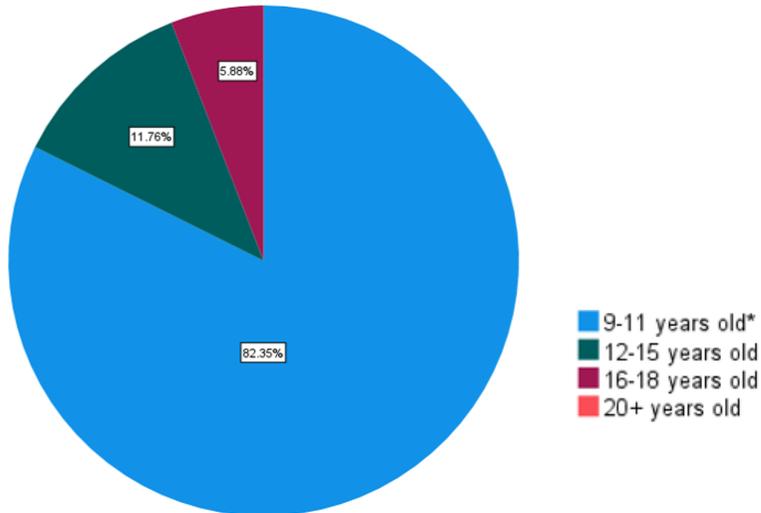
For both pre and post-tests, all respondents (N=17) reported being licensed to
practice medicine in the state of Mississippi.

Knowledge questions

Figure 1

Pre-test question 1: What is the average age of a person when acquiring their first electronic device?

Note: Figure 1 represents the participants responses for the first knowledge-based question on the pre-test survey.

Figure 2

Pre-test question 2: What is the average age of a person's first interaction with an electronic device?
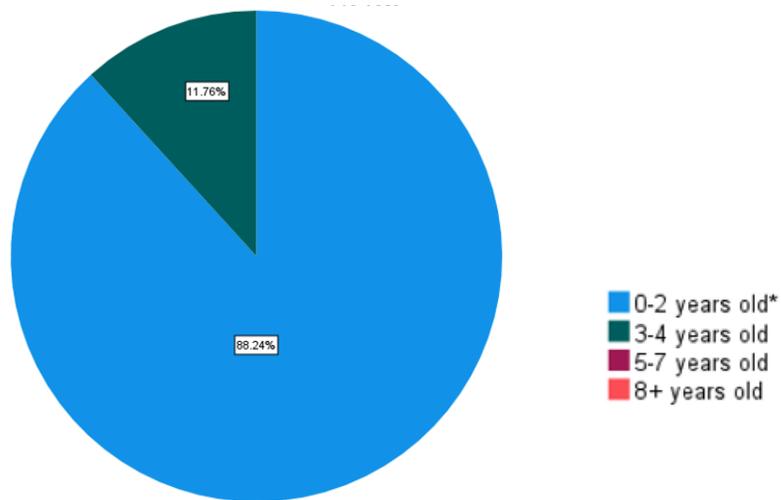
Note: Figure 2 represent the participants responses to the second knowledge-based

question of the pre-test survey

Figure 3

Pre-test question 3: What is the average daily digital use of Americans?

Note: Figure 3 represent the responses of participants of the third knowledge-based

question of the pre-test survey

Pretest Knowledge Score

The Pre- and Post-test knowledge were calculated by adding one point for each correct response to each of the three knowledge questions. Knowledge scores ranged from 0 to 3.

Knowledge Score

	Test Score	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	11.8	11.8	11.8
	1	1	5.9	5.9	17.6
	2	11	64.7	64.7	82.4
	3	3	17.6	17.6	100.0
	Total	17	100.0	100.0	

The mean of the Pretest Knowledge Score was 1.88 (SD=0.86).
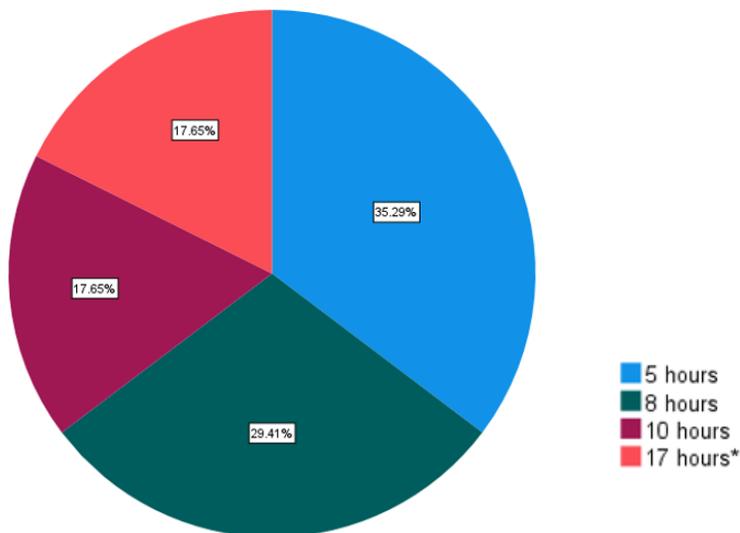
Post-test Knowledge Score

The first knowledge question was "What is the average age of a person when acquiring their first electronic device?" All respondents on the post-test (N=15) answered this question correctly.

The same was true for the second knowledge questions. All post-test respondents correctly answered that the average age of first interaction with an electronic device was 0-2 years old.

For the third knowledge question, all but one respondent correctly answered that the average daily digital device use of Americans was 17 hours.

Figure 4

Post-test question 3: What is the average daily digital use of Americans?
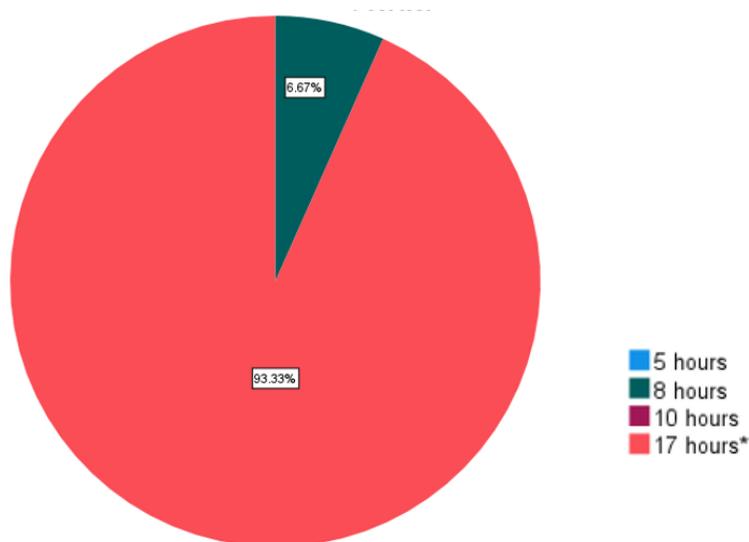
Note: Figure 4 represent the participants responses to the third knowledge-based question on the post test.

Current Practice Habit Scores

There were four questions about practice habits that were included in both the pre- and post-test. The frequency tables for both those questions are below.

Do you currently utilize screening practices regarding electronic device, social media, or gaming over use in your current practice?

		Pretest Frequency	Pretest Percent	Post-test Frequency	Post-test Precent
Valid	Yes	6	35.3	5	33.3
	No	11	64.7	10	66.7

Do you feel like your current patient population suffers from illnesses related to electronic device, social media, or gaming overuse?

		Pretest Frequency	Pretest Percent	Post-test Frequency	Post-test Percent
Valid	Yes	12	70.6	15	100.0%
	No	5	29.4	0	0%

How often do you incorporate safe electronic device use into the care that you deliver?

		Pretest Frequency	Pretest Percent	Post-test Frequency	Post-test Percent
Valid	Daily	2	11.8	2	13.3
	1-2 times per week	1	5.9	1	6.7
	1-2 times per month	2	11.8	3	20.0
	Rarely	6	35.3	8	53.3
	Never	6	35.3	1	6.7

How would you rate your confidence level in addressing or educating on electronic device over use, including safe screen habits and social media use?

		Frequency	Percent	Post-test Frequency	Post-test Percent
Valid	Confident	1	5.9	8	53.3
	Comfortable - knowledgeable but there is room for improvement	10	58.8	7	46.7
	Not Confident - would like more education in these subjects	6	35.3	0	0
	Total	17	100.0	100.0	

The post-test included additional questions not included in the pretest. There questions were: "Have you changed, or do you plan to change how you practice in regard to electronic devised overuse screening?"; "Have you changed or do you plan to change your educational efforts about how electronic device use can impact health?"; and "Have you changed or do you plan to change your educational efforts on healthy screen time habits across the lifespan?" For these three questions, all of the post-test respondents answered yes.

Answering Research Questions

To address the research questions, SPSS was used to generate cross tabulations, Chi-Square statistics, and t-tests of independent samples.

Research Questions:

Will educating Healthcare Providers on the impact electronic device overuse has on health improve provider knowledge?

This research question was investigated using an independent samples pretest, since the pre and post test data could not be matched. The data from this sample suggests that education healthcare providers will improve provider knowledge regarding the impact electronic device overuse has on health at the p=.05 level of significance. The 15 participants that responded to the post-test (M=2.93, SD=0.26) compared the 17 participants that completed the pretest (M=1.88, SD=0.86) scored higher on the knowledge questions, t(30)=-4.56, p=.02

Will educating Healthcare Providers on the impact electronic device overuse has on health prompt a self-reported practice change?

The data for this question was a difficult to interpret, since not all the questions were asked in both pretest and posttest surveys.

There were four questions asked both in the pre- and post-test surveys

1) Do you currently utilize screening practices regarding electronic device, social media, or gaming over use in your current practice?

- Cross tabulation of how this question was answered in the pre and post-test.

Do you currently utilize screening practices regarding electronic device, social media, or gaming over use in your current practice? * Test Cross tabulation

		Test		
		Pre	Post	Total
Do you currently utilize screening practices regarding electronic device, social media, or gaming over use in your current practice?	Yes	6	5	11
	No	11	10	21
Total		17	15	32

The response to this question did not statistically differ in the pre- and post-test survey responses. The proportion of subjects that said yes did not differ in the pre- and post-test, X^2 (1, 32) = 0.014, p= .907

2) Do you feel like your current patient population suffers from illnesses related to electronic device, social media, or gaming overuse?

- Cross tabulation of how this question was answered in the pre and post-test

Do you feel like your current patient population suffers from illnesses related to electronic device, social media, or gaming overuse? * Test Cross tabulation

		Test		
		Pre	Post	Total
Do you feel like your current patient population suffers from illnesses related to electronic device, social media, or gaming overuse?	Yes	12	15	27
	No	5	0	5
Total		17	15	32

All respondents in the post test answered that yes, they felt that their current patient population suffered from illnesses related to electronic devices, social media, or gaming overuse. Having 100% of respondents in the post-test answer in the affirmative suggests that the education changed beliefs and practice.

3) How often do you incorporate safe electronic device use into the care that you deliver?

- Cross tabulation of how this question was answered in the pre and post-test

How often do you incorporate safe electronic device use into the care that you deliver? * Test cross tabulation

		Test		
		Pre	Post	Total
How often do you incorporate safe electronic device use into the care that you deliver?	Daily	2	2	4
	1-2 times per week	1	1	2
	1-2 times per month	2	3	5
	Rarely	6	8	14
	Never	6	1	7
Total		17	15	32

There was no significant different in how respondents answered this question in the pre- and post-tests: X^2 (4, 32) = 3.95, p = .413.

4) How would you rate your confidence in addressing or educating on electronic device usage including safe screen habits and social media use?

- Cross tabulation of how this question was answered in the pre and post-test

How would you rate your confidence level in addressing or educating on electronic device over use, including safe screen habits and social media use? * Test cross tabulation

		Test		
		Pre	Post	Total
How would you rate your confidence level in addressing or educating on electronic device over use, including safe screen habits and social media use?	Confident	1	8	9
	Comfortable - knowledgeable but there is room for improvement	10	7	17
	Not Confident - would like more education in these subjects	6	0	6
Total		17	15	32

For this question, there was a significant difference in how respondents answered in the pre- and post-test surveys (X^2 (2, 32) = 11.90, p= .001) with more respondents in the post-test indicating the they felt confident or comfortable with addressing use of electronic devices.

Even more evidence that the educational intervention changed intention to change practice and practice itself comes from the three question questions that were included only in the posttest.

Posttest Only Questions

For all three posttests only questions, all respondents answered yes to the following questions:

- Have you changed or plan to change how you practice in regard to electronic device overuse screenings?

- Have you changed or do you plan to change your educational efforts about how electronic device overuse can impact health?

- Have you changed or do you plan to change your educational efforts on healthy screen time habits across the lifespan?

Summary of Analysis Addressing Research Questions

Will educating Healthcare Providers on the impact electronic device overuse has on health improve provider knowledge?

The answer is YES. The 15 participants that responded to the posttest (M=2.93, SD=0.26) compared the 17 participants that completed the pretest (M=1.88, SD=0.86) scored higher on the knowledge questions, t(30)=-4.56, p=.02

Will educating Healthcare Providers on the impact electronic device overuse has on health prompt a self-reported practice change?

The answer is YES. There were four questions that appeared in the pre and posttest. Two of these questions did not differ significantly from pre to posttest. However, for the remaining two questions, the data suggests that at posttest, respondents were more aware of the impact that digital device use has on their patients and were confident in addressing and educating their patients on digital device usage.

Finally, posttest respondents were unanimous in asserting that they had changed or planned to change their practice regarding electronic device use, that they had changed or planned to change their educational efforts on how using digital devices can impact

health, and that they had changed or planned to change their education efforts on screen time habits across the lifespan.

Data Analysis

Statistical data review concludes that with exposure to up-to-date statistical data on the impacts of electronic health overuse, providers gained confidence in their knowledge, education efforts, and recognition of electronic device overuse and the impacts to health. Posttest knowledge questions were answered with more accuracy than pretest evaluations.

Project Limitations

During implementation several limitations were found. The covid-19 pandemic severely limited the amount of healthcare facilities that welcomed outside resources into their clinic. This transitioned the project from in person to virtual. Virtual education can always limit the participants. Another limitation was the small sample size. Only 15 completed the educational course in its entirety. This small of a population cannot fully represent the healthcare providers in the state of Mississippi. A third limitation is the way the educational course was delivered. Three were delivered in person while the rest of the participants performed the course virtually. Survey was anonymous and the data was not able to compare the educational absorption in person versus virtual participation.

Recommendation for Future Research

Going forward, more research should be placed on specific screening tool implementations by providers in combination with education on how and when to initiate screening measures. Possible algorithms could be produced and educated to help providers plan care once a patient screens positive for electronic device overuse. More

emphasis should be placed on screening all patients with a mental health disorder for involvement of electronic device overuse. Researchers could also broaden this project to include education of medical personnel that may be involved in data collection, clinic triage, and medical record review to acknowledge patients that could be at high risk of electronic device overuse. Researchers can design, implement, and assess incorporation of electronic device overuse screening in well/routine visits. Specific research on when to incorporate each screening tool could prove useful in future screening tool adoptions.

Project Significance

Healthcare providers can recognize, treat, and prevent only illnesses that they are knowledgeable about. If providers are made to understand the significance of electronic device overuse on health, more will begin acknowledging the issue at hand. Though this is an up-and-coming health crisis, more attention and efforts should be made in understanding how extensive electronic device overuse is on a human's overall health. Implications for electronic device usage increasing suicidal ideations and self-harm in teens should alone be a large enough driving force to open the eyes of the American public and healthcare providers.

Implications & Recommendations

The project proved that with education providers not only gained knowledge but felt more comfortable acknowledging electronic device overuse in their practice. With a broader base of a population a larger impact can be made in raising awareness of electronic device overuse. It is recommended that this project be recreated on a larger scale to include a higher population of healthcare providers. In order to slow the

progression of impact, more healthcare providers should be made to recognize electronic device overuse.

Project Budget/Cost

The total cost of the project was relatively low, and time spent outside of working hours of researcher was not included in total cost. An itemized cost table can be found below:

Itemized Cost

Cost	Estimated cost
Travel	$50.00
Printing material	$100.00
Small food item for participants	$50.00
Total	$200.00

Conclusion

This quality improvement project was completed in order to raise provider awareness of the impacts electronic device overuse can have on health. A pre and posttest evaluated providers knowledge of the issue at hand. The educational session allowed providers' the exposure to the epidemiology, significance, and recommendations needed to fully understand and begin preventing electronic device overuse in the community each provider serviced. Statistical analysis determined that the sessions were unanimous in asserting that providers had changed or planned to change their practice regarding electronic device use, that providers had changed or planned to change their educational efforts on how using digital devices can impact health, and that providers had changed or planned to change their education efforts on screen time habits across the lifespan. Acknowledging a problem is the first step in being able to treat and stop impacts to health.

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Appendix

Appendix A: IRB Approval

IRB Approval

The **W** Mississippi University for Women
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March 30, 2021

aalester@muw.edu

Dear Dr. Lester:

I am pleased to inform you that the members of the Institutional Review Board (IRB) have reviewed the following proposed research and have approved it as submitted:

Name of Study:	Educating healthcare providers on the impact of electronic device overuse on health
Research Faculty/Advisor:	Alena Lester
Investigators:	Lacy Estes

I wish you much

success in your

research. Sincerely,

Scott Tollison

Scott Tollison, Ph.D.

Provost and Vice President for

Academic Affairs ST/tc

pc: Irene Pintado, Institutional Review Board Chairman

Appendix B: Participation Request Email:

Good afternoon,

Thank you for taking time out of your busy schedule to participate in my DNP project. I have found through research that electronic device overuse can impact health in a variety of ways. Mental, physical, and psychological health issues have been linked back to unhealthy screen habits and electronic device overuse. Please start this project by taking the pretest survey, followed by the youtube educational session. After completion of the video please do not forget to complete the post test. Thank you again for your participation. I hope you have a wonderful day.

Sincerely,

Lacy Estes, MSN, APRN, FNP-c

Pretest

Pre-Test for Electronic Device Overuse Survey (surveymonkey.com)

Educational video

Impact of Electronic Device Overuse on Health - YouTube

Posttest
Post-Test for Electronic Device Overuse Survey (surveymonkey.com)

Appendix C: Survey Monkey Pretest

Survey Questions Pretest

1. What is the average age of a person when acquiring their first electronic device?
    a. 9-11 years old
    b. 12-15 years old
    c. 16-18 years old
    d. 20 + years old

2. What is the average age of with their first interaction to an electronic device?
    a. 0-2 years old
    b. 3-4 years old
    c. 5-7 years old
    d. 8+ years old

3. What is the average daily digital device use of Americans?
    a. 5 hours
    b. 8 hours
    c. 10 hours
    d. 17 hours

4. Do you currently include screening questions regarding electronic device, social media or gaming overuse in your current practice?
    a. Yes
    b. No

5. Do you feel like your current patient population suffers from illnesses related to electronic device, social media or gaming overuse?
    a. Yes
    b. No

6. How often do you incorporate safe electronic device use into the care that you deliver?
    a. 1-2 times per month
    b. 1-2 times per week
    c. Daily
    d. Rarely
    e. Never

7. How would you rate your confidence in addressing or educating on electronic device usage including safe screen habits and social media use?
    a. Confident
    b. Comfortable – knowledgeable, but has room for improvement
    c. Would like more education in these subjects

Appendix D: Survey Monkey Posttest

1. What is the average age of a person when acquiring their first electronic device?
    a. 9-11 years old
    b. 12-15 years old
    c. 16-18 years old
    d. 20 + years old

2. What is the average age of with their first interaction to an electronic device?
    a. 0-2 years old
    b. 3-4 years old
    c. 5-7 years old
    d. 8+ years old

3. What is the average daily digital device use of Americans?
    a. 5 hours
    b. 8 hours
    c. 10 hours
    d. 17 hours

4. Do you now include screening questions regarding electronic device, social media or gaming overuse in your current practice?
    a. Yes
    b. No

5. Do you feel like your current patient population suffers from illnesses related to electronic device, social media or gaming overuse?
    a. Yes
    b. No

6. How often do you incorporate safe electronic device use into the care that you deliver?
    a. 1-2 times per month
    b. 1-2 times per week
    c. Daily
    d. Rarely
    e. Never

7. How would you rate your confidence in addressing or educating on electronic device usage including safe screen habits and social media use?
    a. Confident
    b. Comfortable – knowledgeable, but has room for improvement
    c. Would like more education in these subjects

8. Have you changed or plan to change how you practice in regard to electronic device overuse screenings?
    a. Yes
    b. No

9. Have you changed or do you plan to change your educational efforts about how electronic device overuse can impact health?
    a. Yes
    b. No

10. Have you changed or do you plan to change your educational efforts on healthy screen time habits across the lifespan?
    a. Yes
    b. No