

The Effect of Smartphone Applications on Graduate Student Stress Levels

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April 24th, 2023

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Abstract

Nurse anesthesia students encounter stress in academics, clinical, and personal life. Excessive stress can be a product of poor emotional intelligence (EI) and decreased self-efficacy (Chipas et al. 2012; Molero Jurado et al., 2019). Appropriate use of smartphone applications (app/apps), such as medical resource apps, decreases the stress of decision-making in the clinical setting and increases positive patient outcomes, as well as increases self-efficacy (Molero Jurado, 2019; Green et al., 2017; Ross & Myers, 2017). The aim of this scholarly project is to evaluate the appropriate utilization of the smartphone app UpToDate and its effect on stress among graduate students currently enrolled at AdventHealth University (AHU). This scholarly project will consist of a pretest assessing participants' baseline knowledge of the UpToDate app, how often per week they use the app, and their perceived stress. Following the pretest, a 60-minute educational presentation on the appropriate uses of smartphones and the UpToDate app will be presented. Following the intervention, a post-test will be administered to assess the participant's retained knowledge of the topic. Four weeks following the intervention, a post-test will be administered to assess the participant's perceived stress levels and how often UpToDate was utilized. The objectives of this scholarly project will be for graduate healthcare students who are in clinical trimesters to identify the appropriate utilization of the app UpToDate, increase knowledge of navigation within the app UpToDate, increase the use of the app UpToDate and reduce stress during the student's clinical rotation at the end of the 4-week period. The anticipated outcome of this project is to have a positive impact on student health, productivity, and clinical and academic performance by reducing the stress of graduate students through the utilization of UpToDate.

The Effect of Smartphone Applications on Graduate Students' Stress

It is common to see smartphones used in the operating room and education settings by anesthesia providers and graduate healthcare profession students. There are consequences and benefits to having smartphones so readily available during patient care; they can be used for entertainment and coping mechanisms, as well as used for professional and educational purposes (AlFaris et al., 2018; Alkhalaf et al., 2018; Salmela-Aro et al., 2016). For instance, smartphones that are used excessively may impact healthcare graduate students' self-efficacy and play a role in emotional intelligence (EI) (Alavi et al., 2020; AlFaris et al., 2018; Alkhalaf et al., 2018; Kuang-Tsan & Fu-Yuan, 2017). Due to the stressful nature of graduate-level clinical training programs, students may use their phones in unproductive manners, which contributes to increased stress; however, by educating students on resources provided by their university, we hope to increase the usage of the app, promote affecting coping in stressful situations, increase self-efficacy in practicum, and ultimately reduce stress.

Significance and Background of Problem

Smartphone apps have become an integral part of healthcare professionals' lives, with up to 90% of providers utilizing them for entertainment, time management, healthcare record management, communication, consulting, medical education, and training (Aungst et al., 2015; Green et al., 2017). During medical or nursing training, students can utilize a variety of apps such as social media or medical resource apps to help manage patient care, especially during interventions that require high cognitive recall. Social media applications can have positive effects on students by providing education, access to collaboration in science, and professional connections (Alkhalaf et al., 2018; Ross & Myers, 2017). In addition, clinical and academic

competence is enhanced with the use of medical resource apps by increasing knowledge and coping skills (Rice, 2015; Ross & Myers, 2017). Although apps have many positive contributions, institutions may have reservations about their use due to distractions and violations of ethical and privacy policies (Alkalaf et al., 2018; Greer et al., 2019, Ross, 2017). Previous studies on personal digital assistants (PDAs) showed physicians had a reduction in time to clinical decisions with increases in positive patient outcomes (Green et al., 2017). Similar outcomes may arise with the appropriate integration of smartphone apps for graduate students in clinical settings, and therefore reduce stress related to making clinical decisions and have a positive effect on EI and self-efficacy (Chipas et al., 2012; Rice, 2015; Ross & Myers, 2017). By educating students on how to navigate medical resource apps that are already provided by their institution and clinical sites, there could be an increase in their use and a reduction in the student's perceived stress, thus having a positive effect on their EI.

Emotional Intelligence (EI) is the ability to manage emotions; and therefore, the feelings of stress (Alavi et al., 2020; Molero Jurado et al., 2019). Healthcare students are familiar with the feelings of prolonged stress during their programs and may resort to using their phones to overcome these negative emotions (Chipas et al., 2012; Molero Jurado et al., 2019; Rice, 2015). The purpose of this literature review is to understand how smartphone social media apps affect graduate-level students, and how there may be a reduction in stress by their use.

PICOT Search Format Questions

Two questions in PICOT format were formulated. From an education standpoint: In students of healthcare professions (P) how do smartphones and social media usage (I) influence self-efficacy and affect emotional intelligence (O)? There was a lack of literature without any conclusive evidence related to social media and its influence on self-efficacy and EI. However,

there was a literature focus on how smartphone apps affect students of healthcare; therefore, an innovation question was formulated to address this topic: In graduate students who are attending clinical rotations and enrolled in the Doctor of Nurse Anesthesia Program, Physician's Assistant Program, and Family Nurse Practitioner Program at AdventHealth University (AHU) in Central Florida (P), does a 1-hour education session on the use of smartphone application UpToDate (I) affect their knowledge of the app and decrease stress in the clinical setting(O) over 4 weeks (T)?

Search Strategies

For the review of literature, Google Scholar, CINAHL, and Medline Ovid were used and produced 1,290 articles. The search terms used were *mobile phones AND addiction AND students AND academic performance AND social media AND self-efficacy AND emotional intelligence AND nursing students AND stress perceptions AND anesthesia AND smartphones AND productivity AND productivity AND depression AND UpToDate AND Students of Healthcare*. MESH terms were social media, academic performance, mental health, and health occupations students. Inclusion criteria were full text, humans, and published from 2008-2020. Articles that were included in the review must include test subjects that were students of healthcare professions, nursing students, graduate students, and medical students. 2 articles were included that provide background knowledge of how internet use affects adolescent students and provides insight into mental health aspects. Furthermore, the articles included were pertaining to stress perceptions, self-efficacy, EI, mobile phone use, smartphone use, internet use, and social media use. With this inclusion criteria, 19 articles were used.

GRADE Level of Evidence

The combined quality of evidence in support of EI and self-efficacy in healthcare students related to social media usage was rated using the Grading of Recommendations

Assessment, Development, and Evaluation (GRADE) criteria. For the original review of the literature, the GRADE level was moderate-3 due to the types of studies (cross-sectional correlation studies and stratified random sampling). The literature was rated down to low-2 due to methodological flaws, including no blinding or concealment, self-reporting assessment measures, homogenous sampling, and convenience sampling. In addition, the research can have a large effect on healthcare graduate student populations and consequently increases the final GRADE level to moderate-3.

Review of Literature

Healthcare graduate students rely on smartphones for clinical resources, communication with classmates and faculty, and entertainment via social media (AlFaris et al., 2018; Alkhalaf et al., 2018). A review of the literature was conducted to identify if social media and smartphone use influenced the self-efficacy and EI of graduate students of healthcare professions. Three basic themes were found: social media used as a coping mechanism to relieve stress, the correlation between EI, self-efficacy, and smartphone use, and the prevalence of smartphone apps used in clinical settings.

For this review, stress, EI, self-efficacy, and social media applications were defined. *Stress* is “the reactive process behind an individual’s perception of threat or danger in their environment” (Molero Jurado et al., 2019). *Social media* is “a blanket term for smartphone applications referencing specific types of Web 2.0 technology, such as Wikis (Wikipedia), blogs, and content and video sharing (Ross & Myers, 2017)”. *Emotional intelligence (EI)* is defined “as the subset of social intelligence that involves the ability to monitor one’s own and other’s feelings and emotions, to discriminate among them and to use this information to guide one’s thinking and actions (Salovey & Mayer, 1990)”. *Self-efficacy* is defined as “an individual’s belief

in their capacity to execute behaviors necessary to produce specific performance attainments (Bandura & Wessels, S 1994)”.

Social Media as a Coping Mechanism

Students use smartphones and social media as a coping mechanism with the intention of relieving stress and depression, yet unintentionally creating more mental health illnesses and developing an addiction to their phones (Jiang & Shi, 2016; Kuang-Tsan & Fu-Yuan, 2017; Salmela-Aro et al., 2016). Students may resort to compulsive buying on smartphones, which can add to an already increasing financial burden and increase stress (Jiang & Shi, 2016; Kuang-Tsan & Fu-Yuan, 2017). Students may also experience less time with family and friends and look to social media to relieve their interpersonal relationship stress, but instead, experience fear of missing out (FOMO), which research suggests exacerbates depression, increases stress, and causes anxiety (Kuang-Tsan & Fu-Yuan, 2017; Abel et al., 2016). Additionally, they may also exhibit low EI due to the inverse relationship to smartphone addiction caused by their effort to use social media and smartphones to relieve the stress and depression associated with their educational programs (Alavi et al., 2020; Chipas et al., 2012; Dehghankar et al., 2019). Social media can be used as a platform to support self-efficacy via peer learning through educational groups but with poor EI students can resort to entertainment more than education (Alfaris et al., 2018; Ross & Myers, 2017).

Correlation Between EI, Self-Efficacy, Stress and Smartphone App Uses

Studies suggest that nursing students and professionals are at the highest risk for stress in both the academic and occupational setting; therefore, mismanagement of negative emotions may result in a decrease in EI and self-efficacy, leading to ineffective coping mechanisms and increased stress (Alavi et al., 2020; Chipas et al., 2012; Molero Jurado et al., 2016; Kuang-Tsan

& Fu-Yaun, 2017). Smartphone apps can help diminish these negative effects when utilized appropriately. It was discovered that 95% of students reported using smartphones and social media for entertainment, (a coping mechanism) with the intention of relieving stress and depression, yet unintentionally creating an unhealthy relationship with their device, thus exhibiting poor EI (Jiang & Shi, 2016; Kuang-Tsan & Fu-Yuan, 2017; Ross & Myer, 2017; Salmela-Aro et al., 2016). Improvements in EI positively correlate with increased self-efficacy in skills and increased feelings of competence (Molero Jurado et al., 2016; Rice, 2015). Students can increase their EI by recognizing increased stress and using effective coping mechanisms to manage them. For example, 40% of students use smartphones and social media apps for education, and when used as educational resources, there is an increase in diagnostic reasoning, and clinical judgment, which improves self-efficacy and results in decreased stress in the clinical setting (Greer et al., 2018; Rice, 2015; Gomathi, 2017). A study that examined students' perception of their ability to utilize evidence-based practice, found that the more time students referenced their smartphone app, the more confident they felt engaging in evidence-based practice, thus improving their confidence and patient outcomes (Greer et al., 2019). Students who are adaptable, and problem-focused; a component of critical thinking, have improvements in their mental health (Gorji et al., 2018). Smartphones can improve students' self-efficacy and EI when applied appropriately by understanding the device's usefulness and the emotions it may provoke, and therefore can be used to reduce stress (Gorji et al., 2018; Greer et al., 2019).

Smartphone App Uses in the Clinical Setting

Apps have been used in clinical settings since the introduction of PDAs in the early 2000s and have helped physicians make quicker decisions with improved accuracy, efficiency, and positive patient outcomes with reduced adverse events (Aungst, 2015; Green, 2017). With the benefits of

smartphone app resources in clinical settings, students still do not use them for educational resources, but instead use them for communication and social networking 60% of the time during clinical practicums (Aungst, 2015; Green, 2017, Greer, 2019). A 2008 study by Phua and Lim found that in a tertiary hospital institution that included the subscription to UpToDate, although the app was free of charge, only 56.6% of staff utilized it. Of the physicians that used UpToDate, 64.5% described it as being “very useful”, however, 30.6% of residents and interns did not know about the institution's subscription. The same 2008 Phua and Lim study also found that residents were more likely to utilize the application than interns, meaning perhaps the more experienced staff were likely to recognize its usefulness. By promoting awareness of the app’s purpose in the clinical setting and the benefits in practice, it may increase its utilization, as well as decrease the stress of working in situations requiring high cognitive recall (Dimond et al., 2016; Phua & Lim, 2008). Education is positively correlated with increased self-efficacy, and increased self-efficacy is positively correlated with decreased stress, therefore, students could decrease their stress levels if they used smartphone apps responsibly for education purposes in clinical settings (Molero Jurado,2019; Gorji, 2018; Rice, 2015).

Applicability to Practice

There is evidence that increased EI leads to responsible smartphone use, and smartphones used appropriately can increase students’ self-efficacy in practice and result in decreased stress (Aungst et al., 2015; Greer et al., 2019; Molero Jurado et al., 2019; Rice, 2015). This study proposes that graduate healthcare students may perceive their stress lower in the clinical setting by educating them about the appropriate utilization of a smartphone and the app UpToDate in clinical settings. Many students, although they are aware of the app being provided to them by the university or clinical sites, do not utilize it based on the unfamiliarity of how to find what

they are looking for, and therefore miss out on an opportunity to appropriately manage their stress levels during patient care.

Project Aims

Graduate students' health and well-being while in their programs may be positively affected by a reduction of stress and management of the emotions brought forth by prolonged stress (Chipas et al., 2012). Therefore, the aim of this scholarly project is to evaluate the appropriate utilization of the smartphone application UpToDate and its effect on stress among graduate students currently enrolled at AHU. The objectives of this scholarly project will be for graduate healthcare students who are in clinical trimesters to identify the appropriate utilization of the app UpToDate, increase knowledge navigation within the app UpToDate, increase the app UpToDate usage within one week, and reduce stress during the student's clinical rotation at the end of the 4-week period.

Methods

The design of this scholarly project is a correlational analysis. The participants received an electronic pretest prior to the intervention to assess their baseline knowledge and current perceived stress levels. A 1 hour-long intervention was administered, and following the intervention, a post-test was administered to assess retained knowledge of the topic. Following four weeks of clinical practice, a post-test was administered to assess the participant's perceived stress levels and the number of times UpToDate was utilized. The participants received a letter of invitation to participate in this scholarly project before receiving a link to the tests (see appendix B). The pretest and posttests were administered through the OneNote platform. Participants created an identification profile using their mother's maiden name and the first three numbers of their addresses to ensure their anonymity. The pretest/posttest consisted of a face-validated

educational multiple-choice questionnaire and a validated perceived stress scale (PSS) from Penn State made by Sheldon Cohen in 1988 (see Appendix C). The multiple-choice test questions are face-validated by three students from the same cohort, one end-user, two nurse anesthesia faculty, and one faculty member outside the nurse anesthesia department. The multiple-choice questions' results were compared via the Wilcoxon signed-rank test. The difference in results of the pretest/posttest for stress and the pretest/posttest for knowledge were compared and analyzed via the spearman RHO correlation Test. All data is stored on a password-protected drive in Microsoft Teams for seven years. The scholarly project took place at AHU, where multiple interdisciplinary healthcare programs are taught. Participants included students of the Family Nurse Practitioner program, Physicians Assistants program, and Doctor of Nurse Anesthesia Program. Inclusion criteria will be individuals in a clinical trimester, participating in direct patient care. A G power analysis was performed with an alpha of .05 and a power standard of .80, giving a minimal effective sample size of 27.

Planning/Timeline

This is a scholarly project with the goal of benefiting interprofessional departments at AHU. Therefore, key stakeholders were identified as Ingrid Murray, a Physician Assistant (PA-C), who is the Academic Director of the Physician Assistant Studies; Edith Britton, Doctor of Philosophy (PhD.); and Hannah Zinman, Doctor of Nurse Practice (DNP) employed with AdventHealth. The co-investigators will need to establish if all participating departments need to purchase the application for their students. In addition, copyright permission from UpToDate was obtained prior to implementation to use the app in this scholarly project. The timeline for implementation of the scholarly project occurred in April 2022, when all participants are in a

clinical trimester. The pretest and presentation were completed in April 2022 and the posttest was administered in May 2022.

Results/Findings

Analysis of results was conducted using a nonparametric test called Wilcoxon signed rank to compare pre and first post-tests for each variable of multiple test questions, stress tests, and UpToDate usage. The number of participants who completed the second posttest was smaller than 5, it is not statistically significant to run tests. A correlation test, spearman RHO, was analyzed between stress levels and knowledge of the PowerPoint lesson, and between stress levels and UpToDate Usage, there was no statistical difference within the data. There was an insignificant moderate negative correlation between the variables of multiple test questions and stress. Also, an insignificant moderate negative correlation between UpToDate usage and stress. UpToDate pretest and posttest scores could not be compared due to no differences between the usage. (See table 1.1, Appendix D).

There were a total of 14 participants with 6 participants completing both multiple question pretest and posttest (See table 1.2, Appendix D). One participant had no change between the pretest and posttest, with an absolute difference of zero. Another single participant had an absolute difference of 1, sign 1, and signed rank 1.5, making data results insignificant. The remaining four participants who completed the multiple-question pretest and posttest had an absolute value of 2, 2, 1, and 3: with a signed rank of -3.5, -3.5, -1.5, and -5. The positive summary was 1.5 and the negative summary of -13.5. The two-sided critical value is positive 1 at alpha 0.1. There was no significant difference within the data, $1.5 > 1$, at alpha 0.1. There is no difference before and after the first test scores and after the intervention.

Six participants completed the perceived stress pretest and posttest, two participants had an absolute difference of 1, two participants had an absolute difference of 2, and two participants had an absolute difference of 3. Four participants had a sign of -1 and two participants had a sign of 1. Signed rank values were as follows: -1.5, -1.5, -5.5, 3.5, -3.5, 5.5. The positive summary was 9 and the negative summary was -12. The two-sided critical value was 2 at alpha 0.1. There was no significant difference within the data, $9 > 2$, at alpha 0.1. There is no significant difference before and after the first test scores after the intervention (See table 1.3, Appendix D).

Spearman's RHO correlation was conducted between the multiple test questions and stress, and between UpToDate usage and stress. There was an insignificant moderate negative correlation between the multiple test questions and stress of 0.375, with a p-value of 0.1861. There was an insignificant moderate negative correlation between UpToDate usage and stress of -0.417, with a p-value of 0.1379 (See table 1.3, Appendix D).

Discussion/Applicability to Practice/Contribution to Professional Growth

Graduate students endure 24-36 strenuous months of didactic and clinical studies, and during that time students experience a variety of stressors. These stressors include the inability to work during the program, personal and family stresses, and stress related to course load and material. The use of smartphones (or cellphones) can have a direct impact on the stress levels of such students, which can lead to both negative and positive outcomes. Many students were found utilizing cellphones as a coping mechanism and disassociating from their reality, exhibiting FOMO, online shopping, addictive tendencies toward social media, and other resulting negative outcomes. Positive outcomes included students utilizing various platforms and social media applications to increase their knowledge, professional networking, and aid in recall. The purpose of this scholarly project was to increase students' emotional intelligence, and how to utilize a specific tool (UpToDate), to help reduce their stress during their clinical rotations.

As technology advances more information is available to students via medical resource apps and attitudes towards phones in the professional working environment are shifting to becoming more welcoming. There is still a stigma to using cellphones, especially during critical times, such as during an emergency or rounding in front of patients and their families. However, with peer-reviewed information and best practices at the fingertips of students and clinicians, at times of high stress and the need for an immediate need for information, utilizing such technology can reduce such stress and decrease errors, as evidenced by the literature review.

This scholarly project was developed during the Coronavirus 2019 pandemic when there were difficulty meeting individuals face to face. This scholarly project was initially intended to be given during a live interactive session on campus, however, due to social distancing safety concerns, it was implemented via a voice-over PowerPoint presentation. This led to a total of 14 participants, not meeting the criteria for the effective sample size of 27, and therefore not resulting in statistically significant data or criteria for publishing.

Student Nurse Anesthetists are expected to arrive at clinical early enough to set up their operating rooms, in preparation for their specific patients and cases they are competing for the day. Many facilities do not allow students to carry personal items such as books, or bags into the operating room, so when faced with a disease, or condition that affects their patient they can rely on their cell phone for education purposes and to help prepare for their case. This also applies to nurse practitioner students and physician assistant students in preparation for their clinical training as well. the app UpToDate was chosen for this specific scholarly project due to its accessibility of peer-reviewed evidence, and its application to multiple disciplines within professional healthcare training. Utilizing medical resource apps is the future of graduate healthcare training, and training students to utilize their cellphones as a tool to look up resources

may help to reduce stress during the clinical time. More research studies especially in American healthcare systems are needed to establish these benefits.

Conclusion/ Limitations

There are a few major limitations to this project mostly focused on the development of the scholarly project during the height of the Coronavirus 2019 pandemic. As nearly every step during development changed due to campus policy on social distancing, this affected the participation rates significantly. As previously stated, when first developed during the Fall of 2020, the future of the virus was still uncertain, and there were hopes that face-to-face instruction would resume. However, that was not the case with this project, and therefore the voiceover PowerPoint presentation was developed and implemented via email to the participants. The email implementation may have led to fatigue of students answering and checking their email, in addition to their online course load. The scholarly project teams believe that with more projects and studies that are focused on the benefits of medical resource apps, there could be more data collected showing more insight into the relationship between stress and the use of resource apps in graduate students.

Dissemination

The scholarly project results will be presented on a poster with key points to the students and faculty of AdventHealth University in April of 2023.

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Purpose	Variables	Setting/Subjects	Measurement and Instruments	Results	Evidence Quality
<p>Study one: Examine the relationship between WhatsApp and the academic performance of medical students.</p> <p>Study two: Investigate the prevalence of internet addiction and its relationship with emotional intelligence among medical students.</p>	<p>Study one Primary outcome: GPA correlation with the use of WhatsApp. Secondary outcome: symptoms of addiction associated with WhatsApp use.</p> <p>Study two Primary outcome: predictive factors of internet addiction and relationship with emotional intelligence.</p>	<p>Study one Settings: the University of AlBaha and University of Damman, Saudi Arabia Subjects: 160 medical students, 79 from Albaha and 81 from Damman, age 18-25</p> <p>Study two Settings: Qazvin University of medical sciences Subjects: 325 medical students</p>	<p>Study one: Likert scale, 39 questionnaires from 3 published sources, social media addiction scale (psychometric scale). Chi-squared and factor analysis.</p> <p>Study two: Internet addiction test, Schutte emotional intelligence scale, descriptive and inferential statistics</p>	<p>Study one: WhatsApp use and addiction ($r=0.43$, $p<0.01$), Mean GPA Albaha 3.06 (SD 0.49) Damman 3.27 (SD= 0.45)</p> <p>Study two: inverse and significant relationship between IA and EI ($r=-0.163$, $p=0.003$)</p>	<p>Methodological flaws: Nonblinding, homogenous sampling, self-report assessments, convenience sampling Inconsistency: none Indirectness: none Imprecision none Publication bias None</p>
Design				Implications	
<p>Study one: Not clearly stated but appears to be a correlation cross-sectional study</p> <p>Study two: Cross-sectional study</p>				<p>Study one: Whatsapp had no relationship with GPA but did correlate with addiction. Study two: the significant relationship between IA and EI</p>	

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Purpose	Variables	Setting/Subjects	Measurement and Instruments	Results	Evidence Quality
<p>Study one: To investigate social media use and its association with academic performance.</p> <p>Study Two: Assess the impact of social media on academic performance in 2nd-year medical students.</p>	<p>Study one: Primary outcome: Social media usage and effect on GPA.</p> <p>Secondary outcome: the purpose of social media usage.</p> <p>Study two: Primary outcome: type of social media users</p>	<p>Study one: King Saud University, College of Medicine, all five academic years. 388 students, 229 males, 159 females, 65.3% age 20-22 years, 98% single.</p> <p>Study two: the University of Babylon, College of Medicine. 57 participants, 23 male,</p>	<p>Study one: 36 questionnaires on survey monkey, chi-square, and fisher table.</p> <p>Study two: Normality distribution test by Shapiro-will test and histograms. One-way analysis of variance. Pearsons correlation coefficient.</p>	<p>Study one: 14% low performing checked SM 4x day, and 6% of top-performing checked SM 4x day. No statistical significance.</p> <p>Study two: time spent on SM= 5 hr/day. No statical correlation with grades ($r=0.110$, $p=0.487$)</p>	<p>Study one: Methodological flaws: Sample from a single medical school. Self-reported GPA. The self-estimating pattern of social media use.</p> <p>Inconsistency: none</p> <p>Indirectness: none</p> <p>Imprecision none</p>
Design				Implications	

<p>Study one: Stratified random sample</p> <p>Study two: Cross-sectional study</p>	<p>and amount of time used daily.</p> <p>Secondary outcome: Students' opinions on the effect of social media on their grades.</p>	<p>24 female, 43 Hilia residents, 12 Babyl districts residents.</p>		<p>Study one: social media does not affect academic performance</p> <p>Study two: Facebook is very popular o medical students and shows no correlation with student grades.</p>	<p>Publication bias None</p> <p>Study two: Methodological flaws: self-reporting biases, small sample size N=57</p>
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Rice E. (2015). Predictors of Successful Clinical Performance in Associate Degree Nursing Students. *Nurse Educator*, 40, 207-11. <https://doi.org/10.1097/NNE.000000000000136>, 10.1097/NNE.000000000000136

Purpose	Variables	Setting/Subjects	Measurement and Instruments	Results	Evidence Quality
<p>Article one: Describes the relationships of self-efficacy and emotional</p>	<p>Article one: how self-efficacy, emotional intelligence,</p>	<p>Article one: 1777 nurses from Spain randomly selected. The</p>	<p>Article one: perceived stress questionnaire by Levinstein et al. The</p>	<p>Article one: negative correlations with self-efficacy and stress.</p>	<p>Methodological flaws: Article one: none</p>

<p>intelligence in RN professionals</p> <p>Article two: Self-efficacy and emotional intelligence as a predictor for successful clinical performance</p>	<p>intra/interpersonal relationships, stress management, perceived stress</p> <p>Article two: stress management, mood, adaptability, interpersonal skills, and self-efficacy</p>	<p>mean age is 32 years old, 1517 females and 260 men.</p> <p>Article two: students enrolled in 5 ANN programs. 56 total usable surveys. 7 males and 52 females submitted surveys initially. No report of which was not used</p>	<p>General self-efficacy scale, the brief emotional intelligence survey for senior citizens adapted from the emotional intelligence inventory: young version</p> <p>Article two: General self-efficacy scale, self-efficacy in clinical practice scale, MSCEIT, short nursing competence questionnaire. Clinical evaluations</p>	<p>Positive correlations between energy and joy</p> <p>Article two: no scores less than “3” (failing) from clinical evaluators, other scores between 2.3-4 on self-reports</p>	<p>Article two: population small, Inconsistency: Article one: none Article two: scores from only ADN students Indirectness: Article one: none Article two: 57% were already HCP Imprecision Article one: none Article two: multiple surveys Publication bias Article one: none Article two: none stated</p>
<p>Design</p>				<p>Implications</p>	
<p>Article one: descriptive correlational</p> <p>Article two: descriptive correlational</p>				<p>Study One:</p> <p>Article one: more research needed</p> <p>Article two: higher self-efficacy students, self-reported higher clinical competence</p>	

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Purpose	Variables	Settings/Subjects	Measurement and Instruments	Results	Evidence Quality
<p>Study one: understand the pattern of utilization of mobile apps specifically created for anesthesia providers.</p> <p>Study two: Examine the prevalence of self-initiated nonclinical distractions and their effects of anesthesia workload, vigilance, and the occurrence of non-routine events.</p>	<p>Study one: Primary outcome: How often anesthesia providers used apps and integrated apps into their practice Secondary outcome: How much money anesthesia providers were willing to spend on apps</p> <p>Study two: Primary outcome: How often anesthesia providers were distracted by non-clinical distractions Secondary outcome: Does distracting activity impair vigilance and responsible for adverse effects</p>	<p>Study one: 416 anesthesia providers at 136 anesthesiology residencies Programs</p> <p>Study two: anesthesiology residents and nurse anesthetists in 319 observed anesthesia cases in an academic medical center</p>	<p>Study one: IRB approved, nine question survey, analyzed utilizing SPSS version 12.</p> <p>Study two: web-based electronic medical chart, a trained observer recorded video and performed behavioral task analysis. Pearson Chi-square test</p>	<p>Study one: 11.4% never used apps, 12.4 used < once/month, 6% used once a month, 12.3% used 2-3 times per month, 13.6% used once/week, 21% used 2-3 week, 23.5% daily</p> <p>Study two: 54% of cases observed at least one self-initiated distraction</p> <p>Implications Study one: Apps are being used by anesthesia providers, in all age groups. Most Apps are not regulated and cannot be used as a substitute for a fully trained anesthesia provider. Study two: Anesthesia providers performed distracting personal tasks.</p>	<p>Methodological flaws: Study one: Self-report, only sampled academic anesthesia providers Study two: small, single population</p> <p>Inconsistency: Study one: none Study two: none</p> <p>Indirectness: Study one: none Study two: observer presence</p> <p>Imprecision: Study one: none Study two: expert review may have incorrectly identified personal distraction</p> <p>Publication bias: Study one: none Study two: none</p>

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Purpose/Objectives	Variables	Settings/Subjects	Measurements and Instruments	Conclusions/Implications	Evidence Quality
<p>Study one: Evaluate smartphone overuse and its association with psychiatric disorders among students.</p> <p>Study two: Analyze and explore the relationship among university student types of stress, smart mobile phone addiction, and life satisfaction.</p> <p>Design</p> <p>Study one: Cross-sectional study</p> <p>Study two: Not clearly stated but appears to be a cross-sectional study with controlled background variables. and systematic review</p>	<p>Study one: Primary outcome: excessive mobile phone use causes mental health problems Secondary outcome: technological addictions</p> <p>Study two Primary outcome: the stress of interpersonal relationships, self-career, family life, time management influence life satisfaction. Secondary outcome: smart mobile phone addiction</p>	<p>Study one: Settings: Various universities in Tehran, Isfahan, and Karaj.</p> <p>Subjects: 1400 students, 955 females, 445 males, 924 single, 476 married.</p> <p>Study two: Settings: University in Taiwan</p> <p>Subjects: 332 students, 64.8% male, 35.2% female</p>	<p>Study one: Individual structured clinical interviews by two psychologists, cellular phone dependency questionnaire, semi structures interviews, million multiracial clinical inventory (MCMI-III), Chi-square.</p> <p>Study two: Descriptive statistics, correlation analysis, and multiple stepwise regression analysis of smartphone addiction scale, scale of university students' daily life stress, the scale of university life satisfaction</p>	<p>Study one: females 1.2X addicted, dependent personality 3.1X addicted, OCD 3.2X addicted, Bipolar 4.2X addicted to phone. Study two: academic stress (M=2.77), substitute satisfaction for mobile addiction (M=2.46), time management (M=2.01)</p> <p>Implications</p> <p>Study one: Strong associations between depression, anxiety, bipolar, and OCD with addiction to phones. Study two: academic stress is higher than any kind of stress for academic students.</p>	<p>Methodological flaws: Self-reporting biases MCMI-III not designed for general population Selective reporting outcomes</p> <p>Inconsistency: None</p> <p>Indirectness: None</p> <p>Imprecision None</p> <p>Publication bias None</p>

Appendix B

Letter of invitation

Dear Sir or Madam,

We are Jacob McDuffie and Amanda Spence and currently are Doctor of Nurse Anesthesia students at AdventHealth University. For our scholarly project, along with Dr. Martin Rivera, our faculty chair, we have chosen to assess students' understanding of the smartphone application "UpToDate", and if there is a correlation to reduced stress in the student's clinical practice. We invite you to participate in this project.

When we developed this project, we understood how clinical rotations in the hospital or outpatient settings may bring the student increased perceived stress while also undergoing academic stress. By voluntarily participating in this project, we hope to educate students on possible resources the University offers and evaluate how these resources are currently being utilized.

Your participation in this project is completely voluntary and may be withdrawn at any time without any penalty. This project will in no way affect your grades, and all data will be completely confidential. If you so choose to participate, you will take two pretests to assess your current knowledge of the application and current stress levels within the program. Following the pretests, you will watch a one-hour presentation, educating you on utilizing the application with a posttest. At the end of the semester, we will administer the same two tests you took before.

If you have any additional questions, please reach out to the investigators at amanda.spence@my.ahu.edu or jacob.mcduffie@my.ahu.edu

Thank you for your consideration,

Jacob McDuffie, SRNA and Amanda Spence, SRNA

Appendix C

Perceived stress scale – Sheldon Cohen

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset

because of something that happened unexpectedly?.....	0	1	2	3	4
--	---	---	---	---	---

2. In the last month, how often have you felt that you were unable

to control the important things in your life?.....	0	1	2	3	4
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3. In the last month, how often have you felt nervous and “stressed”?	0	1	2	3	4
--	---	---	---	---	---

4. In the last month, how often have you felt confident about your
ability

to handle your personal problems?	0	1	2	3	4
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5. In the last month, how often have you felt that things

were going your way?.....	0	1	2	3	4
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6. In the last month, how often have you found that you could not cope

with all the things that you had to do?	0	1	2	3	4
--	---	---	---	---	---

7. In the last month, how often have you been able

to control irritations in your life?.....	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?..	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?.....	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

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References

The PSS Scale is reprinted with permission of the American Sociological Association, from Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 386-396.

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Appendix D

Table 1.1

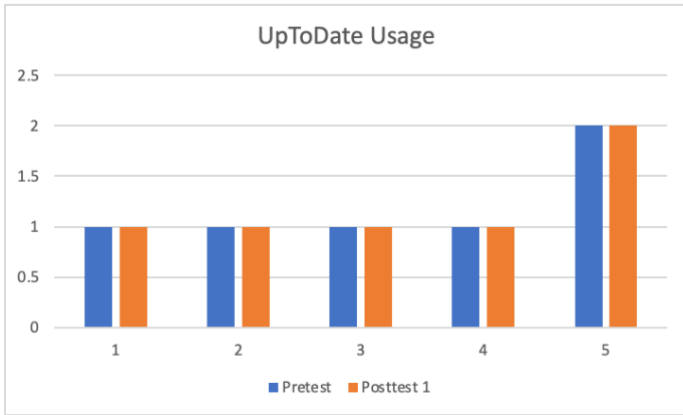


Table 1.2

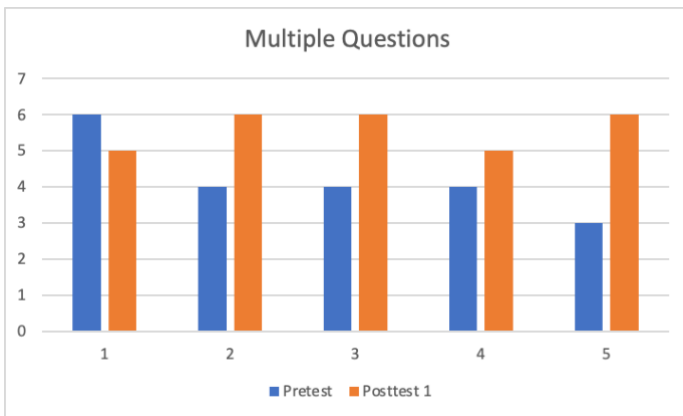


Table 1.3

