

**Identification of Anxiety and Depression in Adolescents through Screening in Primary  
Care**

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## Abstract

As the prevalence of mental health issues increases in our society, screening for such conditions is a leading factor in preventing the psychological and physical effects experienced when left untreated. The inquiry of screening for anxiety and depression in the adolescent will focus on early detection and treatment initiation, preventing the detrimental effects that can carry into adulthood. The Evidence Based Quality Improvement (EBQI) project utilized a quasi-experimental, single cohort design. Participants were recruited through a convenience sample with predetermined inclusion and exclusion criteria, with a total of 44 participants. The project took place within a rural primary care clinic, which is also a Federally Qualified Health Center. The intervention was to provide anxiety and depression screening questionnaires in an attempt to provide early detection and initiation of care for these disorders. The primary outcome was the early identification and initiation of treatment for anxiety and depression in the previously undiagnosed adolescent with improvement in their perception of quality of life. The outcome showed statistically significant improvement in the pre-posttests. The improved detection and early intervention can decrease the number of visits for somatoform symptoms experienced from untreated anxiety and depression, as well as prevent lingering effects into adulthood (Appendix A).

*Keywords:* anxiety and depression, adolescents, mental health, screening

## **Screening for Anxiety and Depression in Adolescents**

### **Introduction**

Anxiety and depression are being seen with increasing frequency in the adolescent child. According to the Centers for Disease Control and Prevention (CDC, 2019), the rate of these disorders have increased from 5.4% in 2003 to 8% in 2007, with a further increase to 8.4% in 2011-2012. Data gathered from the National Comorbidity Survey Adolescent Supplement (NCS-A), calculated the prevalence of these disorders among adolescents, ages 13-18, in the United States to be 31.9%. Within that population, 8.3% had severe impairment. The percentage of females to males was 38% for females and 26.1% for males. However, the prevalence was similar across age groups (NIH, 2017). Anxiety and depression have an effect on behavioral, physiological, cognitive, and neural responses, with self-reported feelings of fear and heightened anxiety (Craske, et al., 2011). Depression symptoms, while they may include anxiety, often present with loss of interest, feelings of hopelessness, or isolation. However, according to the World Health Organization (2017) the two disorders share many common symptoms such as, but not limited to, changes in appetite, weight gain or loss, difficulty concentrating, and alterations in sleep patterns.

Anxiety and depression can lead to thoughts of self-harm, with suicide being the leading cause of death among youth, ages 10-24 years (World Health Organization, 2017). The impact suicide has on a community is immense, with possible worsening of symptoms in those not yet diagnosed as an effect from dealing with that loss. The adolescent age group often does not show or talk about these feelings with others willingly (CDC, 2019). According to Bhatia and Goyal (2018), this population is not typically forthcoming with this type of information, therefore early diagnosis through screening in the primary care setting, can assist with early detection and

initiation of care. Early intervention can further prevent more severe outcomes or disturbances into adulthood. Screening could also assist in finding other comorbidities that might mimic anxiety and depression symptoms, such as hyperthyroidism (Bhatia & Goyal, 2018).

These mental disorders can have a powerful influence on many aspects of life, but in particular, the education of the child. A study done by Ameringen et al. (2003), showed that of the 49% of students that left school early, 24% of those students indicated that their level of anxiety, which can cause a multitude of symptoms, was the reason for their decision to leave. The more school days that are missed, the more at risk those students are for struggling in, or even failing classes, having to repeat a year of school, or dropping out of school altogether. The child's general health is also disturbed, as many of the symptoms are manifested physiologically (Bhatia & Goyal, 2018). If these conditions are not diagnosed and treated early, the impact on the child's life can extend into adulthood, resulting in physical, financial, social, and economic hardships (Bhatia & Goyal, 2018).

Locally, 21% of the population is within the age group of 12 to 18 years (Andrew County Health Department, 2018). The number of students reporting depression and anxiety symptoms continue to increase with those reporting suicide consideration increasing from 8.88% in 2010 to 11.37% in 2012 (Missouri Department of Mental Health, 2015). The population diversity includes 0.8% African-American, 0.5% Asian, 1.7% Hispanic, 96.9% Caucasian, and 1% classified as Other (Andrew County Health Department, 2018).

The U.S. Preventive Services Task Force (2016) shows that screening instruments can be used, and are found to be adequate and valid in the adolescent population, ages 12 and older. Though the USPSTF has found no evidence to support a recommendation related to the screening intervals, the American Academy of Pediatrics' Bright Futures program, recommends

screening annually, and periodically for those at a higher risk (U.S. Preventive Services Task Force, 2016).

## **Problem Statement and Purpose**

### ***Problem Statement***

Undiagnosed anxiety and depression in adolescents, partly through lack of screening, leads to disturbances in behavioral, physiological, cognitive, and neural responses, with increased rates of suicide.

### ***Purpose***

Anxiety and depression effect on all manners of the adolescent's life. The literature shows these disorders are associated with premature withdrawal from school, poor academic achievement, impaired relationships with friends and family, and diminished work performance (National Institute of Health, 2017; World Health Organization, 2017; Schleider & Weisz, 2016). Left untreated, these conditions can lead to detrimental outcomes extending into adulthood. It is preferential to prevent these issues if possible, but early detection and treatment is paramount to the health of the child, extending to the community as well (Topper et al., 2017; Rice et al., 2017). The purpose of the quasi experimental, evidence-based project was to determine if screening adolescents in the primary care setting would provide early detection and treatment for adolescents with anxiety and depression, further preventing complications in adulthood.

### **Facilitators, Barriers and Sustainability**

The project leader's collaborating physician served as the facilitator. Barriers to the author included staff perception of the value of the project being carried out, the perceived increase in the workload of the nursing staff, willingness of the patient and parent or guardian to participate, and the number of available patients that fell within the studied age group. The

realistic potential of this quality improvement project is valid, as the company holds preventative services in high regard and encourages practice change to follow this mission. Sustainability within a non-profit organization, such as a Federally Qualified Health Center (FQHC), is crucial. According to Hatton (2017), organizational values often serve as criteria for making decisions for practice change implementation, and as the FQHC serves to increase health prevention strategies within a community, this project aligns with their goals. This project was also very low cost, further serving as a facilitator to long-term change, as a non-profit organization would easily be able to continue this practice. During the project, a factor in favor of promoting the continued practice included the timing. Potential participants were in school, and frequently were brought to the office for behaviors that affected their school work or peer relationships. As these numbers were seen with increased frequency during this time, it provided support for the need to continue screening due to the increased number of cases.

## **Evidence Review**

### **Inquiry**

In adolescents, ages 12 to 18, does routine screening of anxiety and depression increase identification and treatment and improve anxiety and depression in a primary care setting?

### **Literature Search**

A comprehensive search of the literature utilizing CINAHL, EBSCO Health, MEDLINE Complete, PubMed, Google Scholar, and the Cochrane Library was completed to provide evidence for the inquiry. The keywords used in this search were anxiety and depression, adolescents, mental health, and screening. Inclusion criteria included studies targeting adolescents. The disorders of anxiety and depression, both individually and together, were included along with screenings utilized for diagnosis. Also included were studies involving

anxiety and depression symptoms, along with outcomes with and without treatment. Excluded from the literature used were those that targeted younger children and adults, inpatient adolescents receiving treatment, and those that were not research based. Studies dated prior to 2010 were also excluded (Appendix B).

Upon review of the 30 studies gathered, the hierarchy design by Melnyk and Fineout-Overholt (2015), was utilized to determine the highest level of evidence, with the Evidence Based Practice Guidelines, as a Level 1. A single guideline was identified throughout the search from the U.S. Preventive Services Task Force (2016). Also in the Level 1 category are systematic reviews and meta-analyses of randomized controlled trials. One article was identified to fit into this category. Nine articles that were randomized controlled trials fit into the level of evidence category two. Two controlled trials without randomization were used, categorizing them as a level of evidence three. Also a level of evidence three was a single retrospective study. Four articles were identified as a level of evidence four, and were all cohort studies. Two additional longitudinal studies were also included under a level of evidence four. A single qualitative survey study was included and listed as a level of evidence six. Finally, two articles utilizing expert opinion and seven articles that were literature reviews are listed as a level of evidence seven (Appendix C).

### **Synthesis of Evidence**

There were five themes identified within the articles. The first theme was Screenings in Adolescents, which led to another theme of Symptoms of Anxiety and Depression in Adolescents. A third theme identified was School Performance in Adolescents with Anxiety and Depression. The final two themes identified were Outcomes of Untreated Anxiety and Depression as well as the general theme of Depression and Anxiety in Adolescents. The chosen

articles fit into a single overarching theme, but also contained information that could cross into the other themes, showing that the information is interconnected (Appendix D).

### **Screening in Adolescents**

Within this theme, Bernaras et al. (2019) found through screening that biological factors influence the appearance of depression. Interpersonal relations, environment, and social-cultural changes can be observed in the prevalence of depression (Bernaras et al., 2019). There is a need for prevention programs at an early age, and multiple screening instruments, with high validity and reliability, can be utilized to identify adolescents at risk (Bernaras et al., 2019). As not everyone will present the same, screening is paramount for an accurate diagnosis. A study published by the National Institute of Health by Bhatia (2018), looking to demonstrate the prevalence of anxiety disorders, revealed that girls have a increased prevalence of anxiety as well as children in middle and upper classes in metropolitan cities. Within that study, Bhatia (2018) used multiple screening tools, such as the Spence Children's Anxiety Scale (SCAS), Pediatric Anxiety Rating Scale, Preschool Anxiety Scale-parent report, and SCARED. In a cohort study by Mossman et al. (2017), the mean age of 14 was identified in positive anxiety screening using the Pediatric Anxiety Rating Scale (PARS) and the Generalized Anxiety Disorder (GAD-7). Using the Patient Health Questionnaire-4 item (PHQ-4) with a Cronbach's alpha of .8, and the Generalized Anxiety Disorder-2 item (GAD-2) with a Cronbach's alpha .82, to screen for anxiety and depression, Khubchandani et al. (2016), found that depression and anxiety are common disorders among college students as well, and are frequently undiagnosed and untreated (Siegel and Dickstein, 2012).

Adolescents identified as high risk need support to help them cope with the symptoms experienced with anxiety and depression. Ruger et al. (2016) sought to provide an estimated

outcome of the association among social support and depression in youth, with reliability tested using kappa, was .81 to .99. It was found that social support offers clear benefits across different sources of support for adolescents (Ruger et al., 2016). In a cohort study, in which the aim was to discuss how school nurses, utilizing two screening tools, PHQ-9 Questionnaire and SCARED, could detect anxiety in middle and high school-aged children in schools within an urban setting, yet no difference was noted regarding race, age, or grade level in regards to the symptoms of anxiety and depression (Allison et al., 2013). These disorders cross socio-economic borders, indicating the need for early recognition and treatment in all adolescents regardless of background. Additional longitudinal studies are needed to expand on this knowledge (Allison et al., 2013).

Prevention strategies can also be used if screenings are positive. In a randomized controlled trial, with a sample size of 5,481 students, Topper et al. (2017) aimed to test the usefulness and effectiveness of a preventive mediation focusing on rumination and worry in adolescents and young adults and to investigate the underlying mechanisms of the preventive intervention. It was found that preventative interventions can be used to reduce symptoms of anxiety and depression including excessive worry and rumination (Topper et al. 2017). In a prospective longitudinal study, the determinative avenue that drove the initial event of adolescent-onset MDD was studied in those with high risk factors in the family. Rice et al. (2017) studied a cohort of 337 families from the United Kingdom with children between nine and seventeen years of age. Using semi-structured diagnostic interviews and questionnaires, Child and Adolescent Psychiatric Assessment (CAPA), Mood and Feelings Questionnaire, Screen for Child Anxiety Related Emotional Disorders Questionnaire, and a Life history calendar, it was found that adolescents had a mean of 1.85 symptoms of Major Depressive

Disorder (MDD) at follow up (Rice et al., 2017). Additionally, twenty had new onset MDD with a mean onset of age 14, with irritability being associated with MDD, and those with familial depression had higher levels of new onset MDD in children (Rice et al., 2017). Prevention and mediation strategies can also assist in targeting the high risk child as well as promote public and community mental health (Rice et al., 2017). A single evidence based practice guideline was listed by the U.S. Preventive Services Task Force (2016) stating the need for screening for Major Depressive Disorder (MDD) in adolescents between the ages of 12 and 18, ensuring there are systems in place to secure proper diagnosis, ample treatment, and appropriate follow up.

### **Symptoms of Anxiety and Depression in Adolescents**

A variety of symptoms are recognized in those suffering with anxiety and depression. In regards to the ability of adolescents to regulate their emotions, a randomized controlled trial with a sample size of 156 participants in grades eight through ten, done by Theurel and Gentaz (2018), showed that age was a significant factor in the ability to use positive refocusing to be able to regulate their emotional state. This study aids in filling the disparity in the literature on the management of emotions across this specific age group with new discoveries regarding differences in age. Along with emotional maturity, a cohort study by Pailing and Reniers (2018) was done to evaluate the interrelation of domains in adolescents and young adults. Many tools were used and tested for reliability, such as Patient Reported Outcome Measurement Information System-Depression with Likert scale with a Cronbach's alpha of .95, Social Interactions Anxiety Scale and Social Phobia Scale with a Likert scale, with a Cronbach's alpha of .92, Weinberger Adjustment Inventory with Likert scale with a Cronbach's alpha of .85, Bentin Risk Perception Scale with Likert scale with a Cronbach's alpha of .78, Bomb Risk Elicitation Task (BRET) and RT-18 Reliability both with a Cronbach's alpha of .80 (Pailing & Reniers, 2018). This study

revealed that manifestations of social anxiety and psychosocial maturation were predictive of decreased risk taking behavior, and a correlation between anxiety and depression symptoms and psychosocial maturity was also found (Pailing & Reniers, 2018). When reviewing symptoms of anxiety and depression, Rosenström and Jokela (2017) searched to determine an empirically-based recommendation for a definition for Major Depression, and stated that a definition that does not include the symptom of sadness more accurately captures clinically relevant cases of depression. The definition was constructed by using Taylor Series Linearization, Exploratory Factor Analysis, and quasi-Poisson regression coefficients (Rosentrom & Jokela, 2017). In a randomized controlled trial, with a sample of 77 adolescents, ages 11 to 17, five aspects of depression were identified using a framework analysis. These aspects were misery, despair and tearfulness, anger and violence towards self or others, a grim view of the world, isolation and avoiding work, and impact on education (Midgley et al., 2015). These variations are essential when analyzing what symptoms will be taken into account while screening.

Anxiety and depression often manifest as physical symptoms which cause individuals to seek medical care. In a study by Gates et al. (2016), to evaluate and correlate the prevalence of depression and anxiety diagnoses in patients with a physical reason for a visit to the primary care provider, there was a low depression and anxiety diagnosis in those with somatoform reasons for their visit, with fewer than 4% being diagnosed with depression or anxiety. Also notable, less than 2% were even screened for depression at the visit (Gates et al., 2016).

### **School Performance in Adolescents with Anxiety and Depression**

Academic performance is affected in anxiety and depression disorders. In adolescents, the school environment encompasses a large portion of each day. Academic performance can be significantly altered if anxiety and depression symptoms become so overwhelming that the

individual is not able to cope. Finning et al. (2019) utilized a controlled trial to look at the relationship between anxiety, depression, and school absences. A representative sample of children ages five to 16, living in private households with a total sample of 7,797 children participated in Development and Wellbeing Assessment ( $\alpha=.98$ ), and Strengths and Difficulties Questionnaire ( $\alpha=.73$ ), and with a multivariable negative binomial regression, anxiety, depression, and emotional difficulties were all been found to be related to higher rates of all types of school absences, with the strongest correlation being with depression (Finning et al., 2019). Showing that these disorders are prevalent in this age group is a retrospective study done by Ameringen et al. (2003) that revealed the age of onset of panic disorder was 11, and social phobia onset at age 14. On average, 14.48% of students with a diagnosis of Obsessive Compulsive Disorder (OCD) left school prematurely, 22% of students felt nervous in school, 20% reported difficulty getting a job, 20% admitted to being uninterested in school, and 16% had trouble speaking in class (Ameringen et al., 2003). Ameringen et al. (2003) state that identifying and treating childhood anxiety may be critical to preventing the development of a debilitating adult disorder. Adolescents seek help from peers, but also from parents, guardians, or trusted school affiliates. In a qualitative survey study by Vulpen et al, (2018), using a Likert scale questionnaire with a random sample of 607 parents, it was found that parents were in favor of schools taking part in helping to address mental health issues. Anxiety, depression, and bullying were identified as the dominant reason for emotional and behavioral issues (Vulpen et al., 2018). A lack of parental support, accurate understanding of mental health in youth, and a lack of support programs were key risk factors to development or worsening of symptoms (Vulpen et al., 2018). School involvement in recognizing these symptoms could help fill the gap in those who do not seek medical care (Vulpen et al., 2018).

## **Outcomes of Untreated Anxiety and Depression**

Outcomes of anxiety and depression, when left untreated, are multifactorial and vary based on the history of the individual. In a randomized controlled trial, with a random sample of 115 adolescents, a Computerized Diagnostic Interview Schedule for Children ( $\alpha > 0.6$ ), a Suicidal Ideation Questionnaire ( $\alpha = .86$ ), and a Suicide Severity Rating Scale was used to examine the commonality of anxiety disorders with suicidal tendencies and depression symptoms, and the correlation between specific anxiety disorders and suicide ideation (Herres et al., 2019). One of the most tragic outcomes, suicide, is on the rise in this age group, with anxiety disorders being specifically associated with more severe suicidal ideation (Herres et al., 2019). Depression also carries long term morbidity, but is responsive to various treatments (Moukaddam et al., 2019). The disorders also relate to how satisfied an individual is with their life. Higher life satisfaction correlates with lower anxiety, depression, and behavior problems (State & Kern, 2017). Female and Hispanic students reported lower satisfaction, and overall satisfaction shows variability across time (State & Kern, 2017).

As educators have first-hand knowledge of their students, they should be instructed on how to recognize at-risk students, for referral for treatment, to increase satisfaction long term (State & Kern, 2017). Symptoms of anxiety and depression can lead to feelings of loss of control. Lower perceived life control was associated with higher depression and anxiety symptoms, though no differences in age, ethnicity, or family income were noted (Schleider & Weisz, 2016).

Life events also play a critical role in anxiety and depression. The higher a childhood life-event score was, the less education and higher scores of severity for both anxiety and depressive symptoms were found (Hovens et al., 2015). Symptoms were also noted to be higher in females

and a positive chronic history of depressive or anxiety disorder (Hovens et al., 2015). Emotional oversight and abuse, including psychological, physical, and sexual, were associated with a two-year occurrence rate of depression, anxiety, or comorbidity (Hovens et al., 2015).

### **Depression and Anxiety in Adolescents**

Graham et al. (2014) sought to explore morality of research associated with children and to gather best evidence to be useful in social, cultural, methodological and disciplinary backgrounds, which led to a development of a framework for approaching ethical research involving children. By producing these resources, it served as a catalyst for continued international partnerships to improve research with children, as this is particularly important in such a vulnerable group (Graham et al., 2014). Another consideration of the research for anxiety and depression in adolescents is the type of studies that are carried out and in what number. Studies for anxiety and depression can be quantitative or qualitative, with a large portion being qualitative in nature. It is important to understand that qualitative studies provide important information in primary care, but differ based on the nature, ontology, epistemology, and the variable methods used (Leung, 2015, Green, 2014). Opinions also vary on the very definition of mental health with Galderisi et al. (2015) listing a suggested definition that is consistent with the healing movement mindset, in which recovery following an illness is a process designed to maintain a full and valued life in spite of the illness.

In a randomized controlled trial, a Health Risk Behavior Index (HRBI) and HRBI-S, Depressive symptoms (CES-D) was used to determine if decreasing health risk behaviors would lower depressive symptoms (Bai et al., 2018). Bai et al. (2018) found that symptoms decreased for 88% at six months, and 89% at 12 months. In congruence with the symptom improvement, mental health satisfaction increased, showing that health risk and depression can be precisely

targeted together in a primary care setting (Bai et al., 2018). In a literature review, Craske et al. (2011) sought to evaluate if anxiety disorders share features that represent them, yet make them dissimilar from depressive disorders. The study results showed that anxiety symptoms were both similar and distinct from depression symptoms (Craske et al., 2011).

Many screening tools and therapeutics are now offered in an online format. In a randomized controlled trial study, van der Zanden et al. (2012) sought to investigate the efficacy of a group course delivered online, for depression in adolescents and young adults. The screening tools utilized in the study were the CES-D with 4 point Likert Scale ( $\alpha=.93$ ), Hospital Anxiety and Depression Scale ( $\alpha=.74$ ), and a 5-Item Mastery Scale ( $\alpha=.77$ ) (van der Zanden et al, 2012). Using t-tests, chi-square, logistic regression, and effect size using Cohen-d, results showed significant improvement in depressive symptoms ( $p<.001$ ) with a group effect size of  $d=.94$ , and improvement in anxiety symptoms ( $p<.001$ ) (van der Zanden et al., 2012). The findings revealed promising results in yet another treatment to reduce symptoms in adolescents.

### **Evidence Summary and Discussion**

One evidence based practice guideline by the U.S. Preventive Services Task Force (2016) supports the screening of adolescents, ages 12 to 18 years. Out of the 30 articles used in the literature analysis, nine were categorized as a level of evidence two, and three articles were a level of evidence three, according to Melnyk and Fineout-Overholt (2015). As levels one through three are considered to be the most valid, it is encouraging to see that there is strong supportive evidence. As discussed earlier, qualitative research is also significant regarding this topic and is especially useful in a primary care setting, in which there were qualitative studies that supported this as well. As the inquiry entails an intervention in primary care, it is crucial to note that less than 2% were screened for depression at the primary care visit in the study done by Gates et al.

(2016) that was categorized as a level of evidence three. There are also multiple studies that utilized the screening tools that will be applied in the project, with proven validity (Mossman et al., 2017, Allison et al., 2013, Khubchandani et al., 2016, Topper et al., 2017, Gates et al., 2016).

### **Limitations and Gaps**

Limited data in regards to normal function and pathophysiology of anxiety across development was found, with an increased rate of comorbidity and overlap of symptoms in anxiety and depression, making it difficult to study one disorder without taking into account the other (Craske et al., 2011). Some of the studies had small sample sizes, making generalizability difficult (Green, 2014; Leung, 2015; Allison, 2013; Mossman et al, 2017). There was also a lack of a significant amount of longitudinal studies to show the long-term effects of treated versus untreated disorders. Limitations also exist in studies that included self-reported data, as this has a great deal of variability depending on subject, history, time, and willingness to share (Khubchandani et al., 2016; Rueger et al., 2016; Finning et al, 2019; State & Kern, 2017). The limited ability or inability to recognize symptoms of anxiety and depression further lead to missed opportunities to provide early intervention (State & Kern, 2017; Allison et al., 2013; Gates et al., 2016). There is also a need to better understand how adolescents experience depression, so all symptoms can be taken into account when determining at-risk patients (Midgley et al, 2015). Because all adolescents who are experiencing symptoms of anxiety and depression do not always seek medical attention, it is essential for the school nurse to be able to recognize these symptoms to be able to make appropriate referrals for screening (Allison et al., 2013). Studies evaluated also had a lack of diversity in the sample obtained (Vulpen et al., 2018, Bai et al., 2018, Midgley et al., 2015).

Additional studies need to include the most sensitive age group of 11 to 18 years, excluding children and young adults (Siegel & Dickstein, 2012). The project inquiry uses the evidence and may provide some additional insight regarding age and setting associations with anxiety and depression. The evidence presented demonstrates the foundational need for early detection and intervention in this vulnerable age group. The literature provides guidance for the use of valid and reliable screening tools to yield the most impactful results. The acknowledgement of the overlap of depression and anxiety symptoms allows for a more comprehensive evaluation of presenting individuals. The possible outcomes of untreated anxiety and depression lend credence to the need for early intercession. As this study was quantitative in nature, and performed in a primary care setting, it served to implement the evidence in preventing the tragic progression of anxiety and depression into adulthood.

### **Theory**

The Health Related Quality of Life theory is applicable to the DNP project, as a screening tool assesses the patient's perception of their quality of life. The quality of life questions include the linked concepts to gather multiple facets of the problem. As noted by the Anxiety and Depression Association of America (2018) subjective symptoms of anxiety and depression include, but are not limited to, irritable mood, difficulty sleeping or concentrating, mood swings, changes in appetite, withdrawal, feelings of sadness, crying, and low self-esteem. All of these symptoms are assessed on a subjective level and are often not detectable by others. (Appendix E)

### **Concepts**

#### ***Family Influence***

Family influence employs a variety of aspects. Brown, Manning, and Stykes (2015) define family influence as the interpersonal relationships among the family members, family

structure, family complexity, economic well-being, parental educational level, and behaviors. Therefore, it is important to determine at-risk adolescents according to the above definition to ensure they are screened at least annually.

### ***Stressful Environment***

A stressful environment, as defined by Elovainio et al (2015), includes an environment in which there are multiple demands, and a loss of control, justice, and personal well-being. For an adolescent, the multiple demands can come from school, work, or home. The loss of control is perceived by the adolescent and can be experienced anywhere.

### ***Internal Factors***

Internal factors relate directly to how someone feels. The Center for Disease Control and Prevention (2019) provides examples of internal factors such as feeling afraid, fearful, or worried when experiencing anxiety. Depression symptoms include feeling sad, hopeless, useless, and feeling no enjoyment in doing things that were once enjoyed (CDC, 2019). All of these internal factors are subjective in nature and unable to be identified unless the appropriate questions are asked.

## **Methods**

### **Institutional Review Board**

This project was not human subject research, but an evidence-based quality improvement project as determined by the University of Missouri-Kansas City. The purpose of the project was to increase screening for anxiety and depression in adolescents, in an attempt to provide earlier identification and treatment of these disorders. The project posed minimal risk to the participants.

## **Ethics**

The site provided HIPAA policies to the participants. The participant's privacy was protected, as the only information gathered was the scores of the questionnaires, the participant's gender, and age. No other personal identifying information was obtained during the project. Confidentiality was maintained by keeping all documentation in a secure location. Also, only those essential to the project had access to the information. Team members and participants involved signed a confidentiality agreement as well. The participant and guardian were provided information about the study, along with all risks and benefits. The project leader made clear to the participants that all measures were taken to protect their private information. They were given the right to discontinue their participation at any time without repercussion. Diagnosis, care, and treatment were not altered by decision to participate. Participants were also be given the right to the results of the study. A Subpart D application was included, as children fell into the vulnerable population category. The Conflict of Interest Disclosure (CID) was also included in the project.

## **Ethical Considerations**

The project location serves a population in which healthcare coverage is varied. The location is also a Federally Qualified Health Center (FQHC) that serves uninsured, underinsured, and private insurance patients. There are multiple locations within this healthcare system; however, the site for this project was in one of the rural clinics. The diverse cultures were taken into account when providing consent and education regarding the project. Spanish-speaking patients had access to an interpreter in order to insure understanding and proper communication. This project had no bias on educational, cultural, or socioeconomic status. The written materials

provided were aimed at an eighth grade reading level to accommodate the minimal level based on local educational data (“Andrew County, MO, Data USA,” 2017).

### **Funding**

The cost of the project is minimal at an estimation of \$40.95. The project leader was providing the funding needed to implement the project, therefore no other source is needed (Appendix F).

### **Participants, Sampling, and Setting**

A convenience sample was used for this study with a total of 44 subjects recruited. Participants were recruited with inclusion criteria of ages 12 to 18 who are displaying symptoms of anxiety and depression, and had not been previously diagnosed with anxiety or depression. Also included were those that had never been screened, or were deemed to be at high risk. Those patients who were outside the age range or had a current diagnosis of anxiety or depression were excluded from participation in the study. The project took place within a primary care setting.

### **EBP Intervention**

The evidence-based intervention provided screening questionnaires to adolescents within the age range identified once per year. This screening was also done more frequently in children who were at higher risk for anxiety and depression, as evidenced by certain complaints that were verbalized by the patient along with assessment findings that demonstrated a need for further questioning. The project leader used the Patient Health Questionnaire – 9 (PHQ-9) for depression screening, and the Generalized Anxiety Disorder – 7 (GAD-7) for anxiety screening.

### **Intervention Protocol**

The office employees were educated about the project and its importance. The gathered information and research was shared with the staff, along with their role in the gathering of data.

Prior to initiation of the participant recruitment, the nurse and medical assistant were educated on the administration of the PHQ-9 and GAD-7 questionnaires. The project leader was a nurse practitioner, and the collaborating physician was included in the briefing, but, as he does not see any patients in this setting, only one provider was involved in the implementation.

Participants were recruited using a convenience sample of previously scheduled patients. Once determined to meet the inclusion criteria, the participant and their parent or guardian were provided with written materials that described the efforts that were taken to protect their private information. They were given a Privacy Practice notice, and all risks and benefits were disclosed, along with notification that they could withdraw from the study at any time with no repercussions. The participants and their guardian were made aware that they had access to the study results. Once all questions were answered, a brief information letter was given to the patient and their guardian (Appendix N). The nurse or medical assistant initiated the completion of the tools by the participants. The PHQ-9 was on one side of the paper, with the GAD-7 on the opposite side. The participant was asked to answer all questions on both sides, with the addition and scoring done by the project leader. The participant was left alone while completing the questions and any questions or concerns were addressed by the project leader in the visit. The questionnaire took approximately ten minutes to complete, and the scores were recorded, along with a diagnosis. If a diagnosis of anxiety and depression was verified, treatment appropriate treatment was initiated. A one month follow-up appointment was also made for patients that were diagnosed with anxiety and depression, with post-test given to compare scores prior to treatment. The data was collected over a period of six months (Appendix G & H).

## **Organizational Change Process**

The organizational change theory that guided this project is Lewin's change theory. Lewin's theory of change involves three important concepts: driving force, restraining force, and equilibrium (Petiprin, 2019). The theory is also implemented using a three step process, which includes unfreezing, change, and refreezing (Petiprin, 2019). In this project, the unfreezing was the education related to the lack of screening that takes place, providing the change of screening, and maintaining the change at project completion. The Iowa Model for evidence-based practice was also used to guide the project. This model focuses on improving quality care and controlling healthcare costs (Melnik & Fineout-Overholt, 2015). The specific steps for implementation was guided by the PDSA framework.

The PDSA framework consists of four steps, plan-do-study-act (Agency for Healthcare Research & Quality, 2015). According to the Agency for Healthcare Research and Quality (AHRQ) (2015), the PDSA framework often includes a single intervention, for a short duration, typically with a small sample size. The sustainability was realistic given the short amount of time needed and low cost of the screening (Appendix I).

## **Study Design**

This was an evidence-based quality improvement project to be carried out in a primary care setting. Valid screening tools were utilized to screen adolescents between the ages of 12 and 18 for anxiety and depression. Once data was collected, a quasi-experimental regression analysis was used to interpret the data.

## **Validity**

### ***Internal validity***

In this evidence-based quality improvement project, to promote internal validity, the same valid instrument was utilized for every participant. The sample size targeted a power of .8. Maturation was not a factor in this EBQI, as the time was limited to six months.

### ***External validity***

As noted by Patino and Ferriera (2018), external validity can be increased by using broad inclusion criteria that result in a cohort that most resembles the general population. In this particular EBQI, external validity was protected by having a clearly defined population. Also, this project took place in a natural setting of a primary care office in which the participants had visited prior to the study. The location remained the same throughout the study, as well as the project leader that collected the data.

## **Outcomes**

The primary outcome of the EBQI was the early identification and initiation of treatment for anxiety and depression in the previously undiagnosed adolescent, with improvement in their PHQ-9 and GAD-7 scores, reflecting their perception of quality of life. The secondary outcomes, though not measured, was the improvement in the various aspects of their lives, such as school, work, and relationships. The literature showed that secondary outcomes were helpful in interpreting the results of the primary outcome but many times were not specifically measured, which was the case in this project as well (Mellor & Knapp, 2020, pp. 167-183). The intervention provided a significant impact on the adolescent population by providing early identification of anxiety and depression that will be disseminated throughout the organization to benefit adolescents in surrounding areas.

## **Measurement Instrument**

The first tool was the Patient Health Questionnaire – 9 item (PHQ-9), which was used to identify the presence and severity of depression. This tool also utilized a self-rated scale which was easily calculated. The internal reliability of the PHQ-9 was exceptional with a Cronbach's alpha 0.89 in a primary care setting (Kroenke, et. Al., 2001). Data was collected from two studies and 6,000 patients to provide this strong validity of the instrument, with a sensitivity of 84% and a specificity of 72% (Kroenke, et. Al., 2001; Appendix J).

The second tool was the Generalized Anxiety Disorder – 7 item (GAD-7) questionnaire. This is a self-rated scale which measures for the presence and severity of anxiety, which is easily scored and originally created for screening in primary care settings (Rutter & Brown, 2016). As noted by Rutter and Brown (2016), the original validation of the tool took place with a large sample in a primary care setting, showing good reliability, criterion, factorial and procedural validity, but has also been studied in multiple settings with varied populations. The cutoff score of 10 was shown as the optimal point for sensitivity (89%) and specificity (82%), with the scale reliability being favorable ( $p = .85$ ; Rutter & Brown, 2016; Appendix K).

Also important was ensuring that all tools used in the project had the appropriate permissions granted before use. Both the PHQ-9 and GAD-7 are in the public domain, and no permissions were needed to utilize the tools in the EBQI project.

## **Quality of Data**

The quality of data was maintained by ensuring all staff were trained on the screening tool and how it is scored. They were also instructed on how to describe it to the patient before completion. Each tool was printed the same, using the same paper, font and color. The original score was maintained so comparisons could be made on their follow up appointment, one month

later, with repeat administration of the questionnaires. The questionnaires were delivered in a paper format, then entered into the electronic medical record. The benchmark for the follow up questionnaires had a score of less than ten on both the GAD-7 and PHQ-9. The explanation for this particular benchmark is that a score greater than or equal to ten, should have treatment initiated and follow up scheduled (Williams & Nieuwsma, 2020).

Using a statistical calculator, a sample size of 34 was needed to achieve a power of 80% and a significance level of 0.05 (Khatkar, 2014). A study used for comparison showed that through screening, 439 adolescents were deemed positive for anxiety and depression and subsequently enrolled in treatment programs (Mahoney et al., 2017; Appendix L).

### **Analysis**

The analysis of the data from the EBQI project was a pretest-posttest design. The dependent variable in the study was the primary outcome of early identification and initiation of treatment of anxiety and depression while the independent variable was the intervention. There was a single cohort, therefore a paired t-test for scale data was used to determine the statistical significance of the findings for number, treatment, anxiety, and depression. Also, a Wilcoxon signed rank test was used for ordinal data. (Appendix M).

## **Results**

### **Setting and Participants**

The project was completed in a rural, primary care clinic, with the collection of data occurring between August 2020 and January 2021. Of the 44 participants that were included by meeting the inclusion criteria, the distribution of gender was 17 (38.6%) male and 26 (59.1%) female. Three of the participants were age 12 (6.8%), seven were age 13 (15.9%), seven were

age 14 (15.9%), six were age 15 (13.6%), ten were age 16 (22.7%), six were age 17 (13.6%), and four were age 18 (9.1%) (Appendix T, Tables 2 and 3) (Appendix U, Graphs 1 and 2).

### **Intervention Course**

Prior to the onset of the project, the project leader briefed the staff on the supporting research and how the data would be gathered. Staff was informed of their role in the project and trained on the use of the screening tools. Recruitment of participants began August 2020, using inclusion criteria. If the participant screen positive for anxiety and depression using the PHQ-9 and GAD-7, appropriate intervention was implemented by the project leader, and a one month follow up appointment was made. During the follow-up appointment, the PHQ-9 and GAD-7 were given to compare pre and post scores to determine improvement in symptoms. The last participant's data was gathered January 2021. Statistical analysis was completed in February 2021 with subsequent dissemination of results to the company.

### **Outcome Data**

The primary outcome of this project was to determine if screening for anxiety and depression would increase detection, therefore initiating early treatment. The statistical analysis provided support for screening, as there was significant improvement between pre and post test scores. A descriptive statistics analysis was run, which showed a statistically significant improvement in scores between the pre GAD level and the post GAD level with a mean pre GAD level of 1.0233 and a mean post GAD level of 0.4651. The mean pre PHQ level was 0.8140 with an improvement in the post PHQ level mean of 0.3488. (Appendix Q, Tables 1-3)

Paired t-tests and correlations were also performed with a sample size power of .8, alpha .05 with a medium effect. A paired samples correlation revealed pre and post PHQ scores were significantly positively correlated ( $r=.911$ ,  $p<.001$ ). The pre and post GAD scores also showed

significantly positive correlation ( $r=.907$ ,  $p<.001$ ). The pre-post score decrease was significant for both at  $p<.00$ . The means of pre to post PHQ9 scores differed significantly ( $t(42)=7.049$ ,  $p<.001$ ), and the means of pre to post GAD scores also showed a significant difference ( $t(42)=7.353$ ,  $p<.001$ ). Pearson correlation coefficient showed age and pre GAD and pre PHQ were not significantly correlated ( $r=.138$ ,  $p=.377$ , ) ( $r=.236$ ,  $p=.128$ ), with a correlation of both  $< .3$ , which is weak. However, pre GAD and pre PHQ scores showed a significant positive correlation ( $r=.857$ ,  $p<.001$ ), with each increasing and decreasing together showing no inverse relationship (Appendix P, Tables 1-5) (Appendix U, Graph 3).

A Wilcoxon–signed rank test was run which indicated that the mean rank for the pre-PHQ test was rated higher than the mean rank of the post-test in Q1- Q8 (range of  $p <.001 - .005$ ). The z and p values were also included in the table for individual questions on the PHQ.. Only one participant had an increase on 1 item on the PHQ-9, while two participants had an increase in score on two items on the GAD-7. A Wilcoxon Signed-ranks test ran on GAD scores indicated that the mean rank for the pre-GAD test was rated higher than the mean rank of the post- GAD test for each question Q2-Q7 (range of  $p <.001$ ). The z and p values were also included in the table for individual question on the GAD. Item 1 on the GAD showed an increase for three participants pre to post, yet all others decreased. Another Wilcoxon Signed-ranks test indicated that the mean rank for the pre-test was rated higher than the mean rank of the post-test for both the PHQ and GAD ( $p <.001$ ) (Appendix R, Tables 1-8).

A Chi-Square test revealed that female gender and higher pre GAD scores were moderately correlated ( $\eta=.451$ , pre GAD dependent variable). The Chi-Square test also showed a moderate correlation between female gender and higher pre PHQ scores ( $\eta=.4231$ , pre PHQ dependent variable) (Appendix S, Tables 1 and 2).

## **Missing Data**

There was a single participant that did not complete the post tests (Appendix T, Table 1). The only additional missing data was that which would provide identification of the participant.

## **Discussion**

### **Successes**

The project held many successes including the buy-in of the staff and support of the company overall. The major success, however, was the improvement of anxiety and depression through the implementation of screening. Treatment was initiated through counseling, medication, or both, with lowered GAD and PHQ scores after treatment compared with initial screening. The minimum sample size was exceeded lending increased validity to the results of the project. A greater awareness of mental health was brought to not only the staff, but the patient population as well. The positive results also promoted the need to implement screening company-wide to reach more of this vulnerable population.

### **Study Strengths**

The strengths of the study include the sample size of 44 participants, as a minimum of 30 were needed to produce valid results. The screening tools that were utilized in the project were also high valid with the PHQ-9 showing a Cronbach's alpha 0.89 in a primary care setting (Kroenke, et. Al., 2001) and the GAD-7 with a high sensitivity (89%) and specificity (82%), with the scale reliability being favorable ( $p = .85$ ; Rutter & Brown, 2016; Appendix K). The organizational culture was supportive of the intervention and leadership provided a means of disseminating the findings. All components of the intervention were successfully implemented by participating staff members.

## **Results Compared to Literature Evidence**

It was found that preventative interventions can be used to reduce symptoms of anxiety and depression including excessive worry and rumination (Topper et al. 2017). In the project, it was also found that as interventions were initiated in positively scoring patients, the post scores were significantly lower, revealing a reduction in the symptoms of anxiety and depression the participant was experiencing. The study published by the National Institute of Health by Bhatia (2018), revealed that girls have a higher prevalence of anxiety. This was also noted in the correlation tests showing a higher rate of positive scores in females than males (Appendix U, Graph 1).

## **Limitations**

### **Internal Validity**

A confounding factor was that the participant responses were subjective, so results were limited by the assumption that the participant was truthful in their responses. The participant could also have had a biased response if they felt a stigma would be attached to a positive answer, or if someone else was in the room with them while filling out the questionnaire.

### **External Validity**

There were multiple factors that could affect the generalizability of the intervention. The sample size was small and selection of participants was based on the previously scheduled patients on the project leader's patient schedule. The diversity of the population is also limited given the rural, Midwest setting. Data was gathered over a relatively short period of time and no long term follow-up was performed.

## **Sustainability**

Completion of the EBQI project with little cost and exceptional buy-in by the staff and participants supports the sustainability of the screening process. This was also shown to be applicable across all clinics within the company. Improvement in patient outcomes with no increase in staff or budget supports the fiscal viability as well.

## **Efforts to Minimize Limitations**

Multiple efforts were taken to minimize limitations such as explaining to the participant that all answers were confidential and that they would be given privacy if uncomfortable with others being present while completing the form. Gender, race and ethnicity were not included in the inclusion criteria in an attempt to diversify the study participants as much as possible. The forms given were printed on the same type and color of paper, with the same font and formatting.

## **Interpretation**

### **Expected and Actual Outcomes**

The expectation was that there would be positive screenings within the identified age group, along with a significant improvement in anxiety and depression with initiation of treatment. The actual statistical analysis supported the expectation with a mean pre GAD level of 1.0233 and a mean post GAD level of 0.4651. The PHQ also showed statistically significant improvement with mean pre PHQ level of 0.8140 and the post PHQ level mean of 0.3488. One unexpected result was a missing posttest from a single participant that did not keep their follow-up appointment. The failure to follow-up could have been for a variety of reasons including transportation, forgetting the appointment or not completing treatment as prescribed. Also unexpected was the correlation between the female gender and higher PHQ and GAD scores (Appendix S, Tables 1 and 2), although reported in studies. One can speculate that this could be

due to societal gender bias or the comfort level of the participants to disclose such information. Upon initiation of the project, a sample size of 50 was expected, but the actual number fell short with only a total of 44 participants.

### **Effectiveness**

This project was very effective in identifying new cases of anxiety and depression in the target population with improvement in symptoms after treatment was initiated. The statistical analysis supports this as the mean pre GAD level was 1.0233 and the mean post GAD level was 0.4651. Also, the mean pre PHQ level was 0.8140 and the post PHQ level mean was 0.3488. (Appendix Q, Tables 1-3). These results show that if diagnosed and treated, there is a subsequent improvement in anxiety and depression. The support of staff and leadership at the clinic contributed to the overall success of the intervention, providing an increased perception of quality of life for the treated participants. The intervention could best be applied in a primary care setting, but also has applicability to a school nurse environment, as many students seek out the nurse for somatic symptoms that could be contributed to anxiety and depression. One intervention modification could be to offer the questionnaire to the participant in paper or electronic format.

### **Impact to Health Systems**

Healthcare was impacted by a decrease in the cost of office visits for somatic symptoms of untreated anxiety and depression. Early detection and treatment also put less strain on the healthcare system for inpatient treatment from suicide attempts due to untreated mental illness. A significant amount of evidence demonstrated the foundational need for early detection and intervention in this vulnerable age group. The possible outcomes of untreated anxiety and depression lend credence to the need for early intervention. The estimated cost remained

consistent with actual cost of the project. The project leader incurred a voluntary cost of \$215 for additional training for anxiety and depression via telehealth, amidst the COVID-19 pandemic since some visits were completed via telehealth. This was not needed for project implementation or completion, but provided additional training to the project leader to further increase quality of care throughout the practice. The project is economically sustainable as it incurred very minimal cost for implementation with no additional funding needed for staffing or materials.

### **Conclusions**

The EBQI project was an intervention that could be implemented easily for very little cost. The amount of preparatory work to begin this change was minimal and required little additional work for the staff. This intervention could be utilized within any primary care setting, regardless of demographics. As anxiety and depression in adolescents is not only a local issue, this could also be applied to any area, urban or rural. As the outcome of the project was favorable, implementation in the other clinics throughout the company will be initiated. The project serves as a basis for future research that could follow participants for an extended period of time to determine outcomes into early adulthood.

Dissemination of the project results were done in a variety of ways. Since the setting is in a rural area, results were presented to local community groups and stakeholders. Given the population studied, school administration was also addressed to provide relevant information about the students that could be used within school counseling as well. The results were also relayed to the school nurses at the middle school and high school levels so they can be aware of symptoms in which they might need to refer to the students' primary care provider. The project was also presented, in poster form, at a conference provided by the Nurse Practitioner Associates

for Continuing Education. Furthermore, results were shared with the providers from the company at which the project took place.

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## **Appendix A**

### Definition of Terms

Adolescent – ages 12 to 18

Family influence – interpersonal relationships among family members, including family structure, complexity, economic well-being, parental educational and behaviors

Stressful environment – an environment in which there are multiple demand with a degree of loss of control that promotes anxiety

Internal factors – the way one feels about themselves or a situation

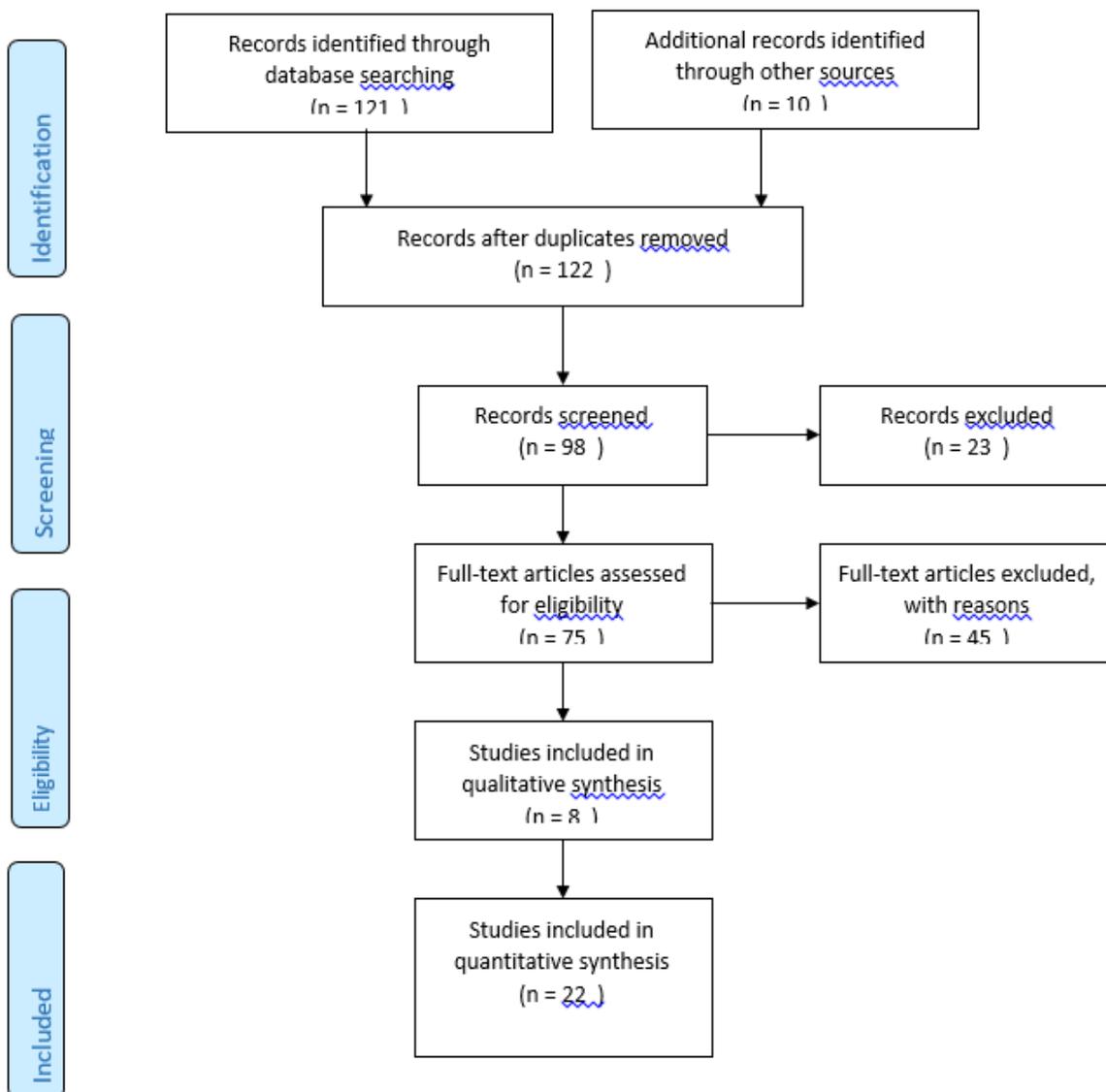
High risk – family history of mental illness, low socioeconomic status, dysfunctional family unit lack of social support, use of drugs or alcohol

Federally Qualified Health Center (FQHC) – a community primary care health facility, that serves rural areas that are underserved, caring for patients that have no insurance or are underinsured with grant money that is funded by the government

## **Appendix B**

### **PRISMA Diagram**

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(7): e1000097. doi:10.1371/journal.pmed1000097



## Appendix C



First author, Year, Title, Journal	Purpose	Research Design <sup>1</sup> , Evidence Level <sup>2</sup> & Variables	Sample & Sampling, Setting	Measures & Reliability (if reported)	Results & Analysis Used	Limitations & Usefulness
<b>Subtopic: Symptoms of anxiety and depression in adolescents</b>						
Thurel (2018). The regulation of emotions in adolescents: age differences and emotion-specific patterns. <i>PLoS One</i> .	Most effective strategy in decreasing negative affect. Determine if daily use increases during adolescence . .	Quantitative . RCT. Level 2. Dependent variable: emotional regulation. Independent variable: implemented strategy	50 adolescents (20 girls, 30 boys) ages 13 yrs, 8 mo to 14 years, 6 mo., 8 <sup>th</sup> grade, middle school in France  156 participants 8 <sup>th</sup> through 10 <sup>th</sup> grade in France	Button responses following stimulus collected using E-Prime 2.0 software. 5-point Likert scale.  Pictures obtained from GAPED and IAPS. Emotion regulation assessed using the CERQ questionnaire. 5-point Likert scale	Social pictures negatively higher than moral violation pictures. No significant between emotional and social content. $p=.72$ ANOVA  ANOVA revealed negative affect was lower when participants used regulation strategies. MANOVA and univariate <i>F</i> -tests significant age differences in the use of positive refocusing.	Absence of manipulation check during implementations. Information lacks exact emotion elicited by the stimuli. Fills literature gap on emotion regulation and provides new information regarding age differences.
Pailing (2018). Depressive and socially anxious symptoms, psychosocial maturity, and	Evaluate interconnect edness of domains in adolescents	Cohort study. Level 4. Dependent variable: risk taking	Word of mouth, online advertisement recruitment.	Patient Reported Outcome Measurement Information System- Depression with	Symptoms and maturity were predictive of less risk	BRET questionnaire not used as a repeated measure. No financial

<p>risk perception: associations with risk-taking behavior. Plos One.</p>	<p>and young adults.</p>	<p>behavior. Independent variable: symptoms, psychosocial maturity.</p>	<p>306 participants (201 female, 103 male) 16 to 35 years of age</p>	<p>Likert scale. Reliability (Cronbach's alpha .95). Social Interactions Anxiety Scale and Social Phobia Scale with a Likert scale. Reliability (Cronbach's alpha .92) Weinberger Adjustment Inventory with Likert scale. Reliability (Cronbach's alpha .85) Bentin Risk Perception Scale with Likert scale. Reliability (Cronbach's alpha .78) Bomb Risk Elicitation Task (BRET) and RT-18 Reliability (Cronbach's alpha .80)</p>	<p>taking behavior. Descriptive statistics and path analysis. Correlation between symptoms and maturity.</p>	<p>compensation Limited real-life behavior.</p>
<p>Rosenbaum (2017). Reconsidering the definition of major depression based on collaborative psychiatric epidemiology surveys. Journal of Affective Disorders.</p>	<p>Determine recommendation for a definition for Major Depression.</p>	<p>Systematic review of literature. Level 5.</p>	<p>3 multi-stage area probability samples from CPES data. "pseudo" primary sampling and strata information</p>	<p>Composite International Diagnostic Interview, DSM-IV</p>	<p>Sensitivity analysis, Taylor Series Linearization, Exploratory Factor Analysis, quasi-Poisson regression coefficients  82% who suffer from sadness or anhedonia, suffer from both and is a central part of the core of "depressed"</p>	<p>Limited generalizability. Analysis restricted to lifetime diagnoses, limited to variables relevant for DSM-IV. Further research is needed</p>

					mood". A definition without the sadness-including symptoms better captures clinically relevant cases of depression.	
Gates (2016). You can't treat what you don't diagnose: an analysis of the recognition of somatic presentations of depression and anxiety in primary care. Families, Systems, & Health.	Quantify and compare the frequency of depression and anxiety in somatic visits among primary care physicians.	Controlled trial. Level 3. Independent variable: somatic symptoms. Dependent variables: symptoms reported on questionnaire	Nationwide convenience sample of 110, 125 patients in Family practice, Internal med, Pediatrician, or OB-GYN offices that had a somatoform reason for visit between 2002-2010.	Patient Health Questionnaire – 15 (PHQ-15), Somatic Symptom Scale, Child Behavior Checklist for ages 6-18.	Significance tests Wald's chi-square tests with Stats 14.0. Low diagnosis of depression and anxiety with somatoform reasons for visit. Fewer than 4% diagnosed depression or anxiety. Less than 2% were screened.	Recognition of depression and anxiety by through ICD-9 code No way to evaluate patients long term. Wellness exams not included. Need for increased screening in primary care visits.
Midgley (2015). Beyond a diagnosis: the experience of depression among clinically-referred adolescents. Journal of Adolescence.	Experience of depression in adolescents.	RCT. Level 2. Independent variable clinically referred for moderate to severe depression. Dependent variable experience of depression.	Randomly selected 77 adolescents ages 11 to 17 with moderate to severe depression.	Mood and Feelings Questionnaire, Framework Analysis.	Framework Analysis. Five main aspects identified: misery, despair and tears, anger and violence towards self and others, a bleak view of everything, isolation and cutting off from the work, and impact	Experiences restricted by age population not representative of depressed adolescents who do not seek care. Not generalizable. Need for a better understanding adolescent experience.

					on education.	
<b>Subtopic: Screenings in adolescents</b>						
Bernaras (2019). Child and adolescent depression: a review of theories, evaluation instruments, prevention programs, and treatments. <i>Frontiers in Psychology</i> .	Analyze theories of depression and provide an overview of programs or the school and types of treatment provided.	Literature review. Level 5.	Utilized PubMed, PsycINFO, Web of Science, Scopus, Science Direct and Google Scholar. Limited to articles published between 1970 and 2017.	Utilized DSM-5 and ICD-10 to classify depression. Evaluation instruments with high validity and reliability.	Biological factors influence depression. Interpersonal relations, environment, social-cultural changes are observed in the prevalence of depression. Prevent at early age. <u>Treatments more effective.</u>	<u>Inconclusive.</u> <u>Lacks long-term efficacy.</u> Further research is needed.
Bhatia (2018). Anxiety disorders in children and adolescents: need for early detection. <i>National Institute of Health</i> .	Determine prevalence of anxiety disorders among school aged children and adolescents.	Longitudinal study. Level 4. Dependent variable is anxiety symptoms. Independent variable is screenings.	Cohort of school age children, boys and girls from India.	SCARED, Spence Children's Anxiety Scale (SCAS), Pediatric Anxiety Rating Scale, Preschool Anxiety Scale-parent report.	Girls, middle and upper class children <u>have</u> higher prevalence of anxiety. Need early recognition and <u>treatment.</u>	Lack of sufficient longitudinal studies and need more to increase knowledge.
Topper (2017). Prevention of anxiety disorders and depression by targeting excessive worry and rumination in adolescents and young adults: A randomized controlled trial. <i>Behavior and Research Journal</i> .	<u>Test feasibility</u> and efficacy of preventive intervention targeting RNT in adolescents and young adults. Investigate mechanisms of preventive intervention	Quantitative. Randomized controlled trial. Level 2. Dependent variable is the interaction effect with rumination and symptom severity levels. Independent variable is	5,481 students from 23 schools and two universities, Actively recruited	Penn State Worry Questionnaire, Ruminative Response Scale, Perseverative Thinking Questionnaire, Beck Depression Inventory, Mood and Anxiety Symptom Questionnaire, Eating Disorder Inventory, Quick Drinking Screen, Patient	Intervention reduced tendency to engage in RNT. Reduced symptom levels. <u>minimal</u> change in control group. Multilevel regression analyses, Cox regression analyses	Actively recruited, past psychological history not assessed, not all included symptom groups, majority were female, no diagnostic interviews, used a waitlist control condition, only one year of follow up.

		the prevention intervention.		Health Questionnaire-9, Generalized Anxiety Disorder Questionnaire – IV, Life Events Checklist, Treatment/Medication, Treatment Satisfaction Evaluation Form. Cronbach alpha .84-.89.		Limited generalizability.
Rice (2017). Antecedents of new-onset major depressive disorder in children and adolescents at high familial risk. JAMA Psychiatry.	Examine developmental pathways in first-episode adolescent-MDD in high familial risk. Simultaneous testing of different pathways composed of different risk factors.	Prospective longitudinal study. Level 4. Dependent variable is diagnosis of MDD. Independent variables are mood, anxiety, irritability and disruptive behavior, familial risk, and social adversity.	Cohort of 337 families from the UK with children between 9 and 17 years of age.	Semi structured diagnostic interviews and questionnaires. Child and Adolescent Psychiatric Assessment (CAPA), Mood and Feelings Questionnaire, Screen for Child Anxiety Related Emotional Disorders Questionnaire, Life history calendar.	Statistical analysis using standardized beta coefficients. <u>Polyserial</u> covariance matrix. Adolescents mean of 1.85 symptoms of MDD at follow up, twenty with new onset MDD. <u>mean</u> onset of age 14. Irritability associated with MDD. Familial depression had higher numbers of positive children	Sample not at peak risk period. Clinical indicators based on empirical evidence. Measurement differences between constructs. Possible personal effects on the environment. Few boys in sample.
Mossman (2017). The generalized anxiety disorder 7-item (GAD-7) scale in adolescents with generalized anxiety disorder: signal detection	Evaluate GAD-7 and PARS, Clinical Global Impression-Severity (CGI-S) scores.	Quantitative cohort study. Level 4. Independent variable is PARS and GAD-7. Dependent variables are	40 outpatient youth ages 12 through 17 meeting DSM-IV criteria for GAD.	Pediatric Anxiety Rating Scale (PARS) Generalized Anxiety Disorder (GAD-7)	Statistical analysis using Spearman correlation coefficients. ANOVA. Anxiety symptoms positive	Small sample size with no comparison. All individuals were “treatment seeking”.

and validation. Pub Med.		the symptoms.			with a mean age of 14. PARS scores highly correlated with GAD-7 scores.	GAD-7 useful in screening youth
Khubchandani (2016). The psychometric properties of PHQ-4 depression and anxiety screening scale among college students. Archives of Psychiatric Nursing.	Assess psychometric properties of PHQ-4.	Quantitative survey method. Level 4. Independent variable is the screening tool used. Dependent variable is the symptoms experienced.	Convenience sample of 934 students recruited from general education classes at a Midwestern University.	Four page booklet style questionnaire including PHQ-4 (Cronbach's alpha .81) and GAD-2 (Cronbach's alpha .82).	Descriptive statistics (frequencies, range of scores, means, and standard deviations). Mean scores of individual items on PHQ-4 ranged from 0.49 to 1.04, GAD 1.91. Depression and anxiety prevalent in college students, frequently undiagnosed and untreated.	Self-reported data, selection bias, recall bias, inability to establish cause and effect relationships. Generalizable due to large sample size.
Ruger (2016). A meta-analytic review of the association between perceived social support and depression in childhood and adolescence. Psychological Bulletin.	Review child and adolescent social support literature as it relates to depression. Provide effect size estimates of the relation between social support and depression in youth	Meta-analytic review. Level 2. Dependent variable: findings of the multiple studies (r values). Independent variables: characteristics of individual studies.	517 studies using inclusionary and exclusionary criteria. Databases used were PsycINFO, PsycARTICLES, ERIC, and ProQuest.	Coding of studies using effect size and moderators. Reliability using kappa .81 to .99.	Social support has benefits in different support sources. Descriptive analysis, Methodological moderator analyses.	Excluded non English articles, small sample sizes, self-report measure Generalizable findings.
U.S. Preventive Services Task Force (2016)	Recommendations for screening for MDD in	Evidence Based Practice Guideline.	Systematic Review of evidence that	Patient Health Questionnaire for Adolescents (PHQ-A), 94%,	Need for screening for MDD in	Limited large, good-quality RCT. Further research to

Depression in Children and Adolescents: screening. USPSTF.	adolescents ages 12 to 18 years to increase early detection.	Level 1. Independent variable is screening. Dependent variable is children ages 12 to 18.	excluded studies with participants who had comorbid disorders.	Beck Depression, Inventory (BDI) 84%-90%.	adolescents ages 12 to 18 years. Should be ready to provide treatment and follow up for positive findings.	study combined treatments. Benefits and harms of other treatments.
Allison (2013). Identifying symptoms of depression and anxiety in student in the school setting. The Journal of School Nursing.	How school nurses, can detect anxiety and depression in students.	Cohort study. Level 4. Dependent variable is depression and anxiety symptoms. Independent variable is the screening tools used.	Six urban schools with on-site mental health care. 182 students.	PHQ-9 Questionnaire. SCARED screening tool.	Descriptive statistics with correlation coefficient = .39224, <i>p</i> value < .0001. 57 positive screens, 14 students were positive on PHQ-9 and SCARED. Increased positive screens in females. No difference in race, age, or grade level.	Nurses aware of student undergoing treatment after screening was done. Lack of communication between school and mental health coordinator. Need for effective screening in public school setting.
Siegel (2012). Anxiety and adolescents: update on its diagnosis and treatment for primary care providers. Adolescent Health, Medicine, and Therapeutics.	Current review of diagnosis and treatment of anxiety disorders in primary care settings.	Literature review. Level 5.	Utilized DSM-IV, American Academy of Child and Adolescent Psychiatry to review best practice. One RCT was referenced.	Utilized DSM-IV and ICD-10 to classify diagnosis.	Undertreated anxiety disorders in adolescents.	More research needed for adolescents only.
<b>Subtopic: School performance in adolescents with anxiety and depression</b>						
Finning (2019).	Study relationship	Controlled trial, no	Representative sample of	Development and Wellbeing	Multivariable	Bias of teacher

Emotional disorder and absence from school: findings from the 2004 British Child and Adolescent Mental Health Survey. <u>European Child &amp; Adolescent Psychiatry</u> .	between anxiety, depression, and school absences.	randomization. Level 3. Cross sectional community survey. Dependent variable is absence from school. Independent variable is reason for absence.	children ages 5 to 16 living in private households. 7797 children in sample.	Assessment (a=.98), Strengths and Difficulties Questionnaire (a=.73)	negative binomial regression. Absences correlate with anxiety, depression, and emotional issue. Strongest correlation with depression.	reported absences. Cross sectional nature of the data. Longitudinal data needed.
Vulpen (2018). Rural School-Based Mental Health Services: Parent Perceptions of Needs and Barriers. Children and Schools.	Explore parent perceptions of needs and barriers to school-based mental health services	Qualitative survey, exploratory research. Level 6.	Random sample of 607 parents or guardians across the Eastern shore of Maryland.	5 point Likert scale in survey with questions on mental health concerns, roles of schools in addressing mental health needs, and resources for information on mental health concerns and services.	Survey using Likert scale with results coded into themes. Parents support schools being involved. Prevalent behavioral issues were anxiety, depression and bullying. Risk factors included lack of parent support, support programs and mental health understanding.	Sample not diversified, length of the survey were limitations. More research on parent perceptions of mental health need.
Van Ameringen (2003) The impact of anxiety disorders on educational achievement. Journal of Anxiety Disorders.	Determine if data would support the epidemiological evidence of anxiety and depression.	Retrospective study. Level 3. Dependent variable is premature withdrawal from school and decreased	Sample of 201 patients with 65 males and 136 females with a mean age of 34, with diagnosis of panic, GSP,	The School Questionnaire, Beck Depression Inventory, <del>Stait</del> Trait Anxiety Inventory, Fear Questionnaire, Social Adjustment	Statistical significance determined by using x2 analyses for dichotomous variables	Retrospective design, sample drawn from mental health clinic. Identifying and treating in childhood important to

		school functioning. Independent variable is the anxiety disorder.	OCD, PTSD, MDD.	Scale, Sheehan Disability Scale.	and Student's t-test for continuous variables. Panic disorder onset age was 11, social phobia was 14, OCD 14. 48% left school prematurely. 22% felt nervous in school, 20% difficult getting a job, 20% uninterested in school, 16% trouble speaking in class.	prevent adult disorders.
<b>Subtopic: Outcomes of untreated anxiety and depression</b>						
Heres (2019). Differences in Suicide Risk Severity Among Suicidal Youth With Anxiety Disorders. American Psychological Association.	Examine prevalence of anxiety disorders in adolescents with depression and suicidal ideation. Find associations between anxiety disorders and suicide ideation severity along with attempt history.	RCT. Level 2. Dependent variable is suicide risk. Independent variable severity of depressive symptoms.	Random sample of 115 adolescents with a mean age of 14.96, gathered from primary care, ER, outpatient and inpatient facilities, schools, churches, and general community.	Computerized Diagnostic Interview Schedule for Children ( $\alpha=0.6$ ), Suicidal Ideation Questionnaire ( $\alpha=.86$ ), Columbia Suicide Severity Rating Scale.	ANCOVA and logistic regression. 48% met criteria for anxiety disorder, 22% for social anxiety disorder, and 40% for major depressive disorder. Social Anxiety Disorder associated with more suicidal ideation.	Cross-sectional study. Focused only on anxiety disorders. Further research needed to determine if SAD patients had a lack of response to treatment.

Moukaddam (2019). Depression and its impact on adolescents. Psychiatric Annals.	Behaviors and factors that promote health risk behaviors in an attempt to lower contributors to death in the adolescent.	Expert opinion. Level 7	References a study of 9,000 adolescents between grades 6 and 10.	Youth Risk Behavior Surveillance System	Depression is chronic but responds to various treatments.	Expert opinion that only references 2 studies, without specifics of those studies.
State (2017). Life Satisfaction Among High School Students With Social, Emotional, and Behavioral Problems. Journal of Positive Behavior Interventions.	Examine self-reported life satisfaction in high school students with social, emotional, and behavioral problems.	RCT. Level 2. Dependent variable is the social, emotional, or behavioral problem. Independent variable is their life satisfaction.	532 participants randomly recruited from 54 high schools across five states	Brief Multidimensional Students' Life Satisfaction Scale ( $\alpha=.91$ ), BASC-2 ( $\alpha=.69$ ), RADS-2 ( $\alpha=.89$ ), MASC-2 ( $\alpha=.72-.89$ ), Woodcock Johnson Tests of Achievement.	Descriptive statistics, Pearson correlation coefficient, independent and paired samples t-test. Less symptoms with higher life satisfaction. Lower satisfaction overall in female and Hispanics.	Educators' ability to recognize students with issues which they referred. Limited generalizability. Only self-reported measures. Validity of assessment tools. Educators need instruction on recognizing at risk students.
Schleider (2016) Reducing risk of anxiety and depression in adolescents: effects of a single session intervention teaching that personality can change. Behavior Restorative Therapy.	Does a single-session intervention reduce risk factors for anxiety and depression in adolescents.	RCT. Level 2. Dependent variable is internalization of problems. Independent variable diagnosis of anxiety and depression.	Random sample of 96 adolescents between the age of 12 and 15, gathered from public schools, private schools, or homeschooled.	Children's Depression Inventory (Cronbach's $\alpha .88$ ), Trier Social Stressor task, SCARED-C ( $\alpha .93$ ), Perceived Control Scale for Children ( $\alpha .91$ and $.89$ ), Secondary Control Scale for Children ( $\alpha .82$ and $.81$ ), Implicit Personality Theory Questionnaire	Correlations and descriptive statistics with means, SD, and correlations. Lower perceived control led to increased symptoms. No differences in age, ethnicity, or family income. Girls with more anxiety	Long term effects on physiological stress recovery and control unknown. Unable to track course of symptoms. Protocol can reduce the risk factors for those already experiencing psychopathology.

				(alphas .82 and .81)	symptoms than boys. Post Hoc analyses showed improved stress recovery, lower risk factors and increased resilience.	
Hovens (2015). Impact of childhood life events and childhood trauma on the onset and recurrence of depressive and anxiety disorders. The Journal of Clinical Psychiatry.	Effect of childhood life events and trauma on depressive and anxiety disorders.	Longitudinal prospective cohort study. Level 4. Dependent variable onset of anxiety or depression. Independent variable even or trauma.	2,981 participants ages 18 to 65 from the Netherlands Study of Depression and Anxiety (NESDA). Recruited from general population, primary care, mental health organizations. Sample narrowed to N=598.	NEMESIS Childhood Trauma Interview. Childhood life events questionnaire, Childhood Trauma questionnaire. Depressive Symptomatology-Self Rated, Fear Questionnaire, Beck Anxiety Inventory.	Multinomial logistic regression analysis with 95% confidence intervals. Chi square tests for linear by linear association. A higher life-event score associated with a lower education and more severe anxiety and depressive symptoms. Higher in females. Neglect and abuse had higher recurrence of symptoms.	Trauma assessment at baseline. Findings not generalizable disorders not assessed  Short follow up timespan.
<b>Subtopic: Depression and anxiety in adolescents</b>						
Bai (2018). Reducing Health Risk Behaviors and Improving Depression	Determine if reduction in risky behaviors lowers symptoms, Behaviors	RCT. Level 2. Dependent variable is the depression symptoms.	Random sample of 187 adolescents ages 13-18 with past-year	Health Risk Behavior Index (HRBI) and HRBI-S, Depressive symptoms (CES-D)	t-tests, x2 tests, ordinal logistic regressions, and 2	Sample from urban city in Southern California, majority of participants were

in Adolescents: A Randomized Controlled Trial in Primary Care Clinics Journal of Pediatric Psychology.	and depression addressed together in a primary care setting.	Independent variable is the risk taking behavior, counseling sessions.	depression recruited from primary care clinics.		level regression. Similar outcomes at 6 and 12 months (88% to 89%), no difference between groups, symptoms decreased, mental health satisfaction increased, HRBI and HRBI-S predicted later severe depression	Hispanic, so limited generalizability. Adds to existing research.
Graham (2015). Ethical research involving children: encouraging reflexive engagement in research with children and young people.	Ethics of research involving children and gathering evidence to be useful in methodological and disciplinary contexts.	Quantitative systematic review. Level 5.	257 researchers across 46 countries	International Charter for Ethical Research Involving Children, evidence-based ethical Guidance in relation to key ethical issues, collection of Case Studies around ethical challenges and dilemmas, structured questions, Getting Started, online Resources library, monitored Forum, ERIC resources	Framework for ethical research with children. Stimulates collaboration to improve childhood research.	Relevance of project referenced for each settings. Decreased response for translation in languages.
Leung (2015). Validity, reliability, and generalizability in qualitative research. Journal of Family Medicine and Primary Care.	Show how qualitative research impacts primary care.	Research appraisal. Level 5.	Three criteria were used, validity, reliability generalizability. 8 individual studies were reviewed.	No measures or reliability were reported.	Provides important information in primary care. Differs based on the nature, ontology,	Small sample size. Exclusion of quantitative articles. Limited generalizability.

					and epistemology.	
<a href="#">Galdersi (2015)</a> . Toward a new definition of mental health. World Psychiatry.	Overcome perspectives based on ideal traditions in favor of an inclusive approach, free of restrictive statements.	Expert opinion. Level 7.	References 15 studies that relate to the definition.	No measures or reliability.	Definition compatible with the recovery movement perspective	Opinion based on review of studies.
Green (2014). Use of theoretical and conceptual frameworks in qualitative research. Nurse Researcher.	Debate definition and conceptual frameworks in qualitative research.	Literature review. Level 5.	Concepts from 2 authors involving 2 case studies used to determine research questions and give direction to focus research.	No measures or reliability were reported.	Methods are varied throughout research projects.	Small sample size. No exclusion criteria were set. No generalizability.
<a href="#">van der Zanden (2012)</a> . Effectiveness of an Online Group Course for depression in adolescents and young adults: a randomized trial. Journal of Medical Internet Research.	Evaluate effectiveness of a guided web-based group course in those with depression.	RCT. Level 2. Dependent variable is depressive symptoms. Independent variable is the course.	Random recruitment of 244 youth from 16 to 25 years old from general population through promotional materials.	CES-D with 4 point Likert Scale ( $\alpha=.93$ ), Hospital Anxiety and Depression Scale ( $\alpha=.74$ ), 5-Item Mastery Scale ( $\alpha=.77$ ).	t-tests, chi-square, logistic regression, effect size using Cohen-d. Significantly greater improvement in depressive symptoms ( $p<.001$ ) with a group effect size of $d=.94$ , improvement in anxiety symptoms ( $p<.001$ )	Cannot compare 6 month outcomes due to access of the surveys after ending the study. Promising results in another treatment to decrease adolescent symptoms.
<a href="#">Crask (2011)</a> . What is an anxiety disorder? Psychiatry Online.	Evaluate if anxiety disorders share features that make it	Literature Review. Level 5.	Databases used Pub Med, PSYCHINFO, articles from 1994	No measures or reliability	Anxiety symptoms similar and distinct from depression	Limited data on function and pathophysiology of anxiety across

	distinct from depressive disorders.		to 2009. Review and references lists from preparatory conference series for DSM-V, particularly Stress Induced and Fear Circuitry Disorders		symptoms. Anxiety associated with elevated fear and anxiety, with an response to stressors elevated.	development, increased comorbidity and overlap of symptoms. Additional research needed for both disorders together and separate.
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## Appendix D

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	Depression and Anxiety in Adolescents	Symptoms of Anxiety and Depression in Adolescents	School Performance in Adolescents with Anxiety and Depression	Outcomes of Anxiety and Depression in Adolescents	Screenings in Adolescents
<b>Article</b>					
Siegel & Dickstein (2012)		X			X
<u>Rueger, Malecki, Pyun, Aycock, &amp; Coyle (2016)</u>		X			X
<u>Ameringen, Mancini, &amp; Farvolden (2003)</u>		X	X		X
Graham, Powell & Taylor (2015)	X				X
<u>Galderisi, Heinz, Kastrup, Beezhold, &amp; Sartorius (2015)</u>	X	X	X		
<u>Craske, Scott, Rauch, Ursano, Prenoveau, Pine, &amp; Zinbarg (2011)</u>	X	X			

U.S. Preventive Services Task Force (2016)					X
<del>Bernaras, Jaureguizar, &amp; Garaigordobi</del> (2019)	X				X
Allison, <del>Nativio, Mitchell, &amp; Yuhasz</del> (2014)		X	X		X
Topper, <del>Emmelkamp, Watkins, &amp; Ehring</del> (2017)		X			X
<del>Khubchandi, Brey, Kotecki, Kleinfelder, &amp; Anderson</del> (2016)		X			X
Bhatia & Goyal (2018)		X	X		X
<del>Schleider &amp; Weisz</del> (2016)		X		X	
World Health Organization (2017)		X		X	
National Institute of Health (2017)		X		X	
<del>Hovens, Giltay, Spinhoven,</del>					

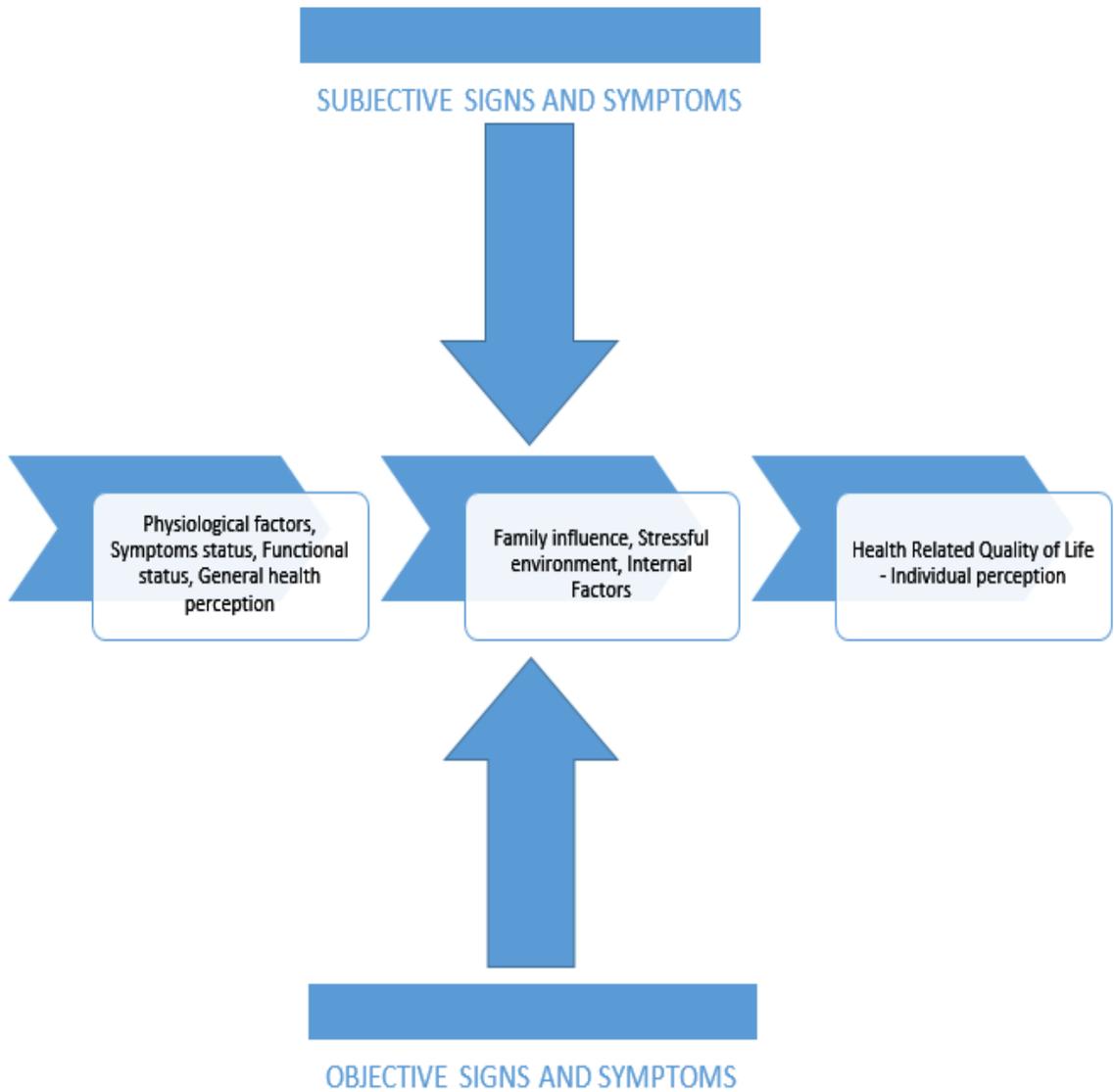
<u>Hemert &amp; Pennix</u> (2015)		X		X	X
<u>Rice Sellers, Hammerton, Eyre, Bevan-Jones, Thapar, Thapar.</u> (2017)		X		X	X
<u>Theurel &amp; Gentaz</u> (2018)		X			X
<u>Mossman, Luft, &amp; Strawn</u> (2017)		X			X
<u>Pailing &amp; Reniers</u> (2018)		X			X
<u>Midgley, Parkinson, Holmes, Stapley, Eatough, &amp; Target</u> (2015)		X		X	X
<u>Lader</u> (2015)	X	X			X
<u>Gates, Miller, Petterson, Wingrove, &amp; Klink</u> (2016)		X			X
Centers for Disease Control & Prevention (2019)	X	X			

<u>Rosenström, &amp; Jokela</u> (2017)		X			
Leung (2015)	X				
Green (2014)	X				
Centers for Disease Control and Prevention (2019)	X	X			
Finning, Ford, Moore & <u>Ukumunne</u> (2019)		X	X		
<u>Vulpen, Habegar, &amp; Simmons</u> (2018)		X	X		
<u>Herres, Shearer, Kodish, Wang, &amp; Diamond</u> (2019)		X		X	X
<u>Moukaddam, Cavazos, Nazario, Murtaza, &amp; Shah</u> (2019)		X		X	X
State & Kern (2017)		X	X		X
van der <u>Zanden, Kramer, Gerrits, &amp; Cuijpers</u> (2012)		X		X	X

Bai, Zeledon, D'Amico, Shoptaw, Avina, LaBorde, & Asarnow (2018)		X		X	X
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## Appendix E

### Theory Diagram



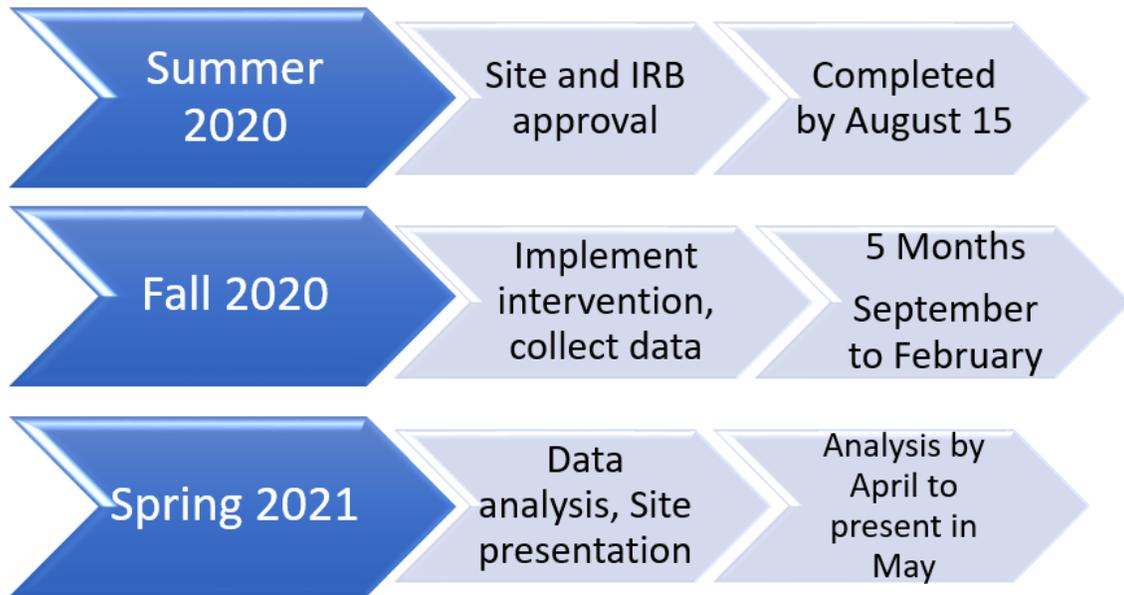
## Appendix F

### Budget Table

Item	Item Description	Quantity	Unit Cost	Anticipated Cost
Print materials	Packet will be made up of study description, participant rights, consent form, PHQ-9 and GAD-7.	50 packets	\$6.00 per ream x 2	\$12.00
Equipment	<p>Pens to fill out paperwork.</p> <p>Folders to compile all needed paperwork so each participant is provided with exactly the same things.</p> <p>Laptop/EHR to look up their past medical, surgical, family, social history.</p>	<p>1 box</p> <p>5 packs</p> <p>1 computer</p>	<p>\$5.00 per box of 60</p> <p>\$4.79 per pack of 10</p> <p>\$0 – Provided by company free of cost</p>	Total cost: \$28.95
Miscellaneous	SSPS statistical software for data analysis.	1 program	\$0 – This software was previously purchased for \$50. No additional cost will be incurred during the project.	\$0
Student Time	Student investigator wage	600 hours	\$50 per hour x 600 hours = \$30,000	No additional cost, as this is regular wage and any time outside the normal work schedule needed for the project is uncompensated.
<b>Total</b>				\$40.95

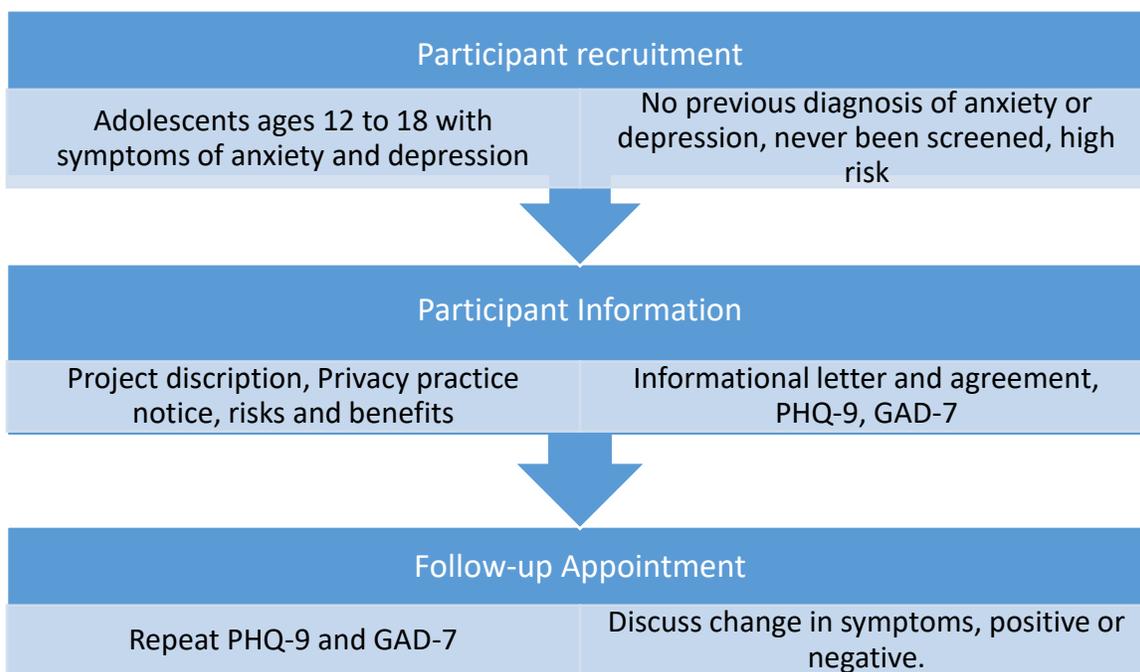
## Appendix G

### Timeline



## Appendix H

### Intervention Diagram

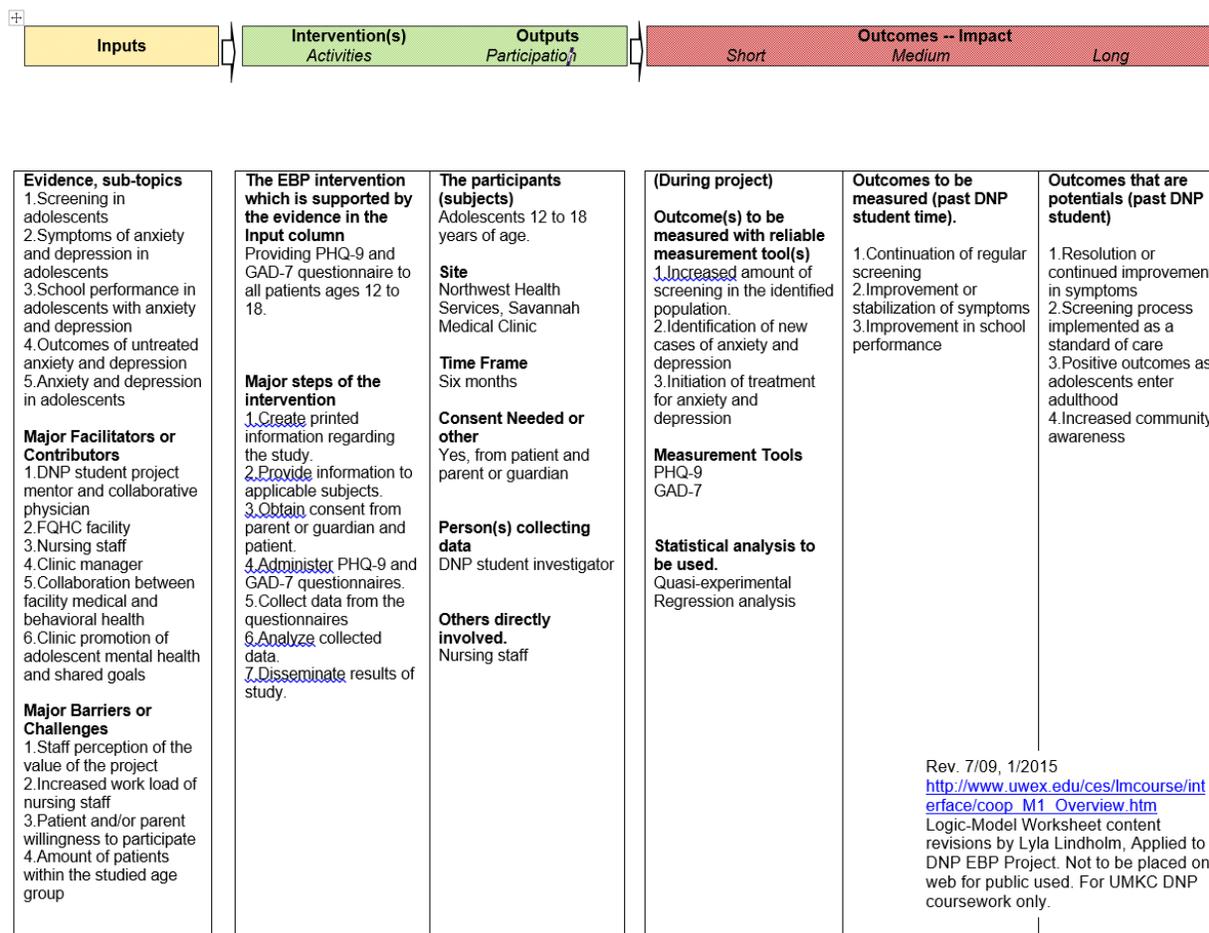


## Appendix I

### Logic Model

Student: Darci Feiden

**PICOT Question:** In adolescents ages 12 to 18, does regular screening increase detection of anxiety and depression, during adolescence, in the primary care setting?



## Appendix J

**PATIENT HEALTH QUESTIONNAIRE (PHQ-9)**

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Over the last 2 weeks, how often have you been bothered by any of the following problems?  
(use “✓” to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3

add columns     +  +

(Healthcare professional: For interpretation of TOTAL, TOTAL:   
please refer to accompanying scoring card).

10. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?	Not difficult at all	_____
	Somewhat difficult	_____
	Very difficult	_____
	Extremely difficult	_____

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**Scoring—add up all checked boxes on PHQ-9**

<b>Total Score</b>	<b>Depression Severity</b>
0-4	None
5-9	Mild
10-14	Moderate
15-19	Moderately severe
20-27	Severe

## Appendix K

**Generalized Anxiety Disorder 7-item (GAD-7) scale**

Over the last 2 weeks, how often have you been bothered by the following problems?	Not at all sure	Several days	Over half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it's hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3
<i>Add the score for each column</i>	+	+	+	
<b>Total Score (add your column scores) =</b>				

If you checked off any problems, how difficult have these made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all \_\_\_\_\_  
 Somewhat difficult \_\_\_\_\_  
 Very difficult \_\_\_\_\_  
 Extremely difficult \_\_\_\_\_

Source: Spitzer RL, Kroenke K, Williams JBW, Lowe B. A brief measure for assessing generalized anxiety disorder. *Arch Intern Med.* 2006;166:1092-1097.

Total Score	Interpretation
≥10	Probable diagnosis of GAD; confirm by further evaluation
5	Mild anxiety
10	Moderate anxiety
15	Severe anxiety



## Appendix M

### Statistical Analysis Table

Inquiry: In adolescents, ages 12 to 18, does routine screening of anxiety and depression increase identification and treatment and improve anxiety and depression in a primary care setting? Single cohort study. Independent variable is the questionnaire and the dependent variable is the primary outcome.

Single cohort n=43  Variable	P Value	Pre- test Score Mean	Post- test Score Mean	Pre- test Level Mean	Post- test Level Mean	Standard Deviation Pre-Test Score	Standard Deviation Post-Test Score	Number Of Observations
<b>PHQ-9</b>	<.001	5.9767	2.3721	6.50	0	6.09640	3.33826	43
<b>GAD-7</b>	<.001	6.4884	2.9070	8	0	6.01337	3.50383	43

## **Appendix N**

### Project Information Letter

The purpose of this project is to increase detection of anxiety and depression in adolescents, in order to provide early identification and treatment of the problems. The project is aimed at adolescents ages 12 to 18. The information gathered will be non-identifiable, and include gender, age, and total scores of PHQ-9 and GAD-7 questionnaires. If you agree to participate, all information will be kept confidential and anonymous. Should you decide you no longer wish to participate, you may withdraw at any time with no repercussions. You will also have access to the results of the project upon completion.

## Appendix O

### SSPS Variable Flow Sheet

	Name	Type	Width	D...	Label	Values	Miss...	Col...	Align	Measure	Role
1	Gender	Numeric	8	2		{1.00, Male}...	None	8	≡ Right	Nominal	↘ Input
2	Age	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
3	Pre_Anxiety_Dx	Numeric	8	2		{1.00, Yes}...	None	8	≡ Right	Nominal	↘ Input
4	Pre_Depression_Dx	Numeric	8	2		{1.00, Yes}...	None	8	≡ Right	Nominal	↘ Input
5	Pre_Anxiety_Tx	Numeric	8	2		{1.00, yes}...	None	8	≡ Right	Nominal	↘ Input
6	Pre_Depression_Tx	Numeric	8	2		{1.00, yes}...	None	8	≡ Right	Nominal	↘ Input
7	Pre_GAD_score	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
8	Pre_PHQ_score	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
9	Post_GAD_score	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
10	Post_PHQ_score	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
11	Pre_GAD_level	Numeric	8	2		None	None	8	≡ Right	Ordinal	↘ Input
12	Post_GAD_level	Numeric	8	2		None	None	8	≡ Right	Ordinal	↘ Input
13	Pre_PHQ_level	Numeric	8	2		None	None	8	≡ Right	Ordinal	↘ Input
14	Post_PHQ_level	Numeric	8	2		None	None	8	≡ Right	Ordinal	↘ Input
15	Pre_PHQ_Item1	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
16	Pre_PHQ_Item2	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
17	Pre_PHQ_Item3	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
18	Pre_PHQ_Item4	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
19	Pre_PHQ_Item5	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
20	Pre_PHQ_Item6	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
21	Pre_PHQ_Item7	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
22	Pre_PHQ_Item8	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
23	Pre_PHQ_Item9	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
24	Pre_GAD_Item1	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
25	Pre_GAD_Item2	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
26	Pre_GAD_Item3	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
27	Pre_GAD_Item4	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
28	Pre_GAD_Item5	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
29	Pre_GAD_Item6	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
30	Pre_GAD_Item7	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
31	Post_PHQ_Item1	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
32	Post_PHQ_Item2	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
33	Post_PHQ_Item3	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
34	Post_PHQ_Item4	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
35	Post_PHQ_Item5	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
36	Post_PHQ_Item6	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
37	Post_PHQ_Item7	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
38	Post_PHQ_Item8	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
39	Post_PHQ_Item9	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
40	Post_GAD_Item1	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
41	Post_GAD_Item2	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
42	Post_GAD_Item3	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
43	Post_GAD_Item4	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
44	Post_GAD_Item5	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
45	Post_GAD_Item6	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input
46	Post_GAD_Item7	Numeric	8	2		None	None	8	≡ Right	Scale	↘ Input

## Appendix P

### Paired Sample Statistics and Correlations

Table 1

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_PHQ_score	5.9767	43	6.09640	.92969
	Post_PHQ_score	2.3721	43	3.33826	.50908
Pair 2	Pre_GAD_score	6.4884	43	6.01337	.91703
	Post_GAD_score	2.9070	43	3.50383	.53433

Table 2

		N	Correlation	Sig.
Pair 1	Pre_PHQ_score & Post_PHQ_score	43	.911	.000
Pair 2	Pre_GAD_score & Post_GAD_score	43	.907	.000

Table 3

		Paired Samples Test								
		Paired Differences					t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
Pair 1	Pre_PHQ_score - Post_PHQ_score	3.60465	3.35332	.51138	2.57265	4.63665	7.049	42	.000	
Pair 2	Pre_GAD_score - Post_GAD_score	3.58140	3.19399	.48708	2.59843	4.56436	7.353	42	.000	

Table 4

		N	Correlation	Sig.
Pair 1	Age & Pre_GAD_level	43	.138	.377
Pair 2	Age & Pre_PHQ_level	43	.236	.128

Table 5

**Correlations<sup>b</sup>**

		Age	Pre_GAD_score	Pre_PHQ_score
Age	Pearson Correlation	1	.137	.243
	Sig. (2-tailed)		.383	.117
Pre_GAD_score	Pearson Correlation	.137	1	.857**
	Sig. (2-tailed)	.383		.000
Pre_PHQ_score	Pearson Correlation	.243	.857**	1
	Sig. (2-tailed)	.117	.000	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

b. Listwise N=43

## Appendix Q

### Descriptive Statistics

Table 1

<b>Descriptive Statistics</b>					
	N	Mean	Std. Deviation	Minimum	Maximum
Pre_GAD_level	43	1.0233	1.35380	.00	4.00
Post_GAD_level	43	.4651	.54984	.00	2.00

Table 2

<b>Descriptive Statistics</b>					
	N	Mean	Std. Deviation	Minimum	Maximum
Pre_PHQ_level	43	.8140	1.23935	.00	4.00
Post_PHQ_level	43	.3488	.57253	.00	2.00

Table 3

<b>Descriptive Statistics</b>					
	N	Minimum	Maximum	Mean	Std. Deviation
Gender	43	1.00	2.00	1.6047	.49471
Age	43	12.00	18.00	15.0930	1.77031
Valid N (listwise)	43				

## Appendix R

### Wilcoxon-Signed Rank Tests

Table 1

		<b>Ranks</b>		
		N	Mean Rank	Sum of Ranks
Post_PHQ_Item1 – Pre_PHQ_Item1	Negative Ranks	22 <sup>a</sup>	11.50	253.00
	Positive Ranks	0 <sup>b</sup>	.00	.00
	Ties	21 <sup>c</sup>		
	Total	43		
Post_PHQ_Item2 – Pre_PHQ_Item2	Negative Ranks	17 <sup>d</sup>	9.00	153.00
	Positive Ranks	0 <sup>e</sup>	.00	.00
	Ties	26 <sup>f</sup>		
	Total	43		
Post_PHQ_Item3 – Pre_PHQ_Item3	Negative Ranks	21 <sup>g</sup>	11.00	231.00
	Positive Ranks	0 <sup>h</sup>	.00	.00
	Ties	22 <sup>i</sup>		
	Total	43		
Post_PHQ_Item4 – Pre_PHQ_Item4	Negative Ranks	19 <sup>j</sup>	10.00	190.00
	Positive Ranks	0 <sup>k</sup>	.00	.00
	Ties	24 <sup>l</sup>		
	Total	43		
Post_PHQ_Item5 – Pre_PHQ_Item5	Negative Ranks	13 <sup>m</sup>	8.08	105.00
	Positive Ranks	2 <sup>n</sup>	7.50	15.00
	Ties	28 <sup>o</sup>		
	Total	43		
Post_PHQ_Item6 – Pre_PHQ_Item6	Negative Ranks	13 <sup>p</sup>	7.00	91.00
	Positive Ranks	0 <sup>q</sup>	.00	.00
	Ties	30 <sup>r</sup>		
	Total	43		
Post_PHQ_Item7 – Pre_PHQ_Item7	Negative Ranks	16 <sup>s</sup>	9.13	146.00
	Positive Ranks	1 <sup>t</sup>	7.00	7.00
	Ties	26 <sup>u</sup>		
	Total	43		
Post_PHQ_Item8 – Pre_PHQ_Item8	Negative Ranks	15 <sup>v</sup>	8.63	129.50
	Positive Ranks	1 <sup>w</sup>	6.50	6.50
	Ties	27 <sup>x</sup>		
	Total	43		

Post_PHQ_Item9 –	Negative Ranks	3 <sup>y</sup>	2.00	6.00
Pre_PHQ_Item9	Positive Ranks	0 <sup>z</sup>	.00	.00
	Ties	40 <sup>aa</sup>		
	Total	43		

- a. Post\_PHQ\_Item1 < Pre\_PHQ\_Item1
- b. Post\_PHQ\_Item1 > Pre\_PHQ\_Item1
- c. Post\_PHQ\_Item1 = Pre\_PHQ\_Item1
- d. Post\_PHQ\_Item2 < Pre\_PHQ\_Item2
- e. Post\_PHQ\_Item2 > Pre\_PHQ\_Item2
- f. Post\_PHQ\_Item2 = Pre\_PHQ\_Item2
- g. Post\_PHQ\_Item3 < Pre\_PHQ\_Item3
- h. Post\_PHQ\_Item3 > Pre\_PHQ\_Item3
- i. Post\_PHQ\_Item3 = Pre\_PHQ\_Item3
- j. Post\_PHQ\_Item4 < Pre\_PHQ\_Item4
- k. Post\_PHQ\_Item4 > Pre\_PHQ\_Item4
- l. Post\_PHQ\_Item4 = Pre\_PHQ\_Item4
- m. Post\_PHQ\_Item5 < Pre\_PHQ\_Item5
- n. Post\_PHQ\_Item5 > Pre\_PHQ\_Item5
- o. Post\_PHQ\_Item5 = Pre\_PHQ\_Item5
- p. Post\_PHQ\_Item6 < Pre\_PHQ\_Item6
- q. Post\_PHQ\_Item6 > Pre\_PHQ\_Item6
- r. Post\_PHQ\_Item6 = Pre\_PHQ\_Item6
- s. Post\_PHQ\_Item7 < Pre\_PHQ\_Item7
- t. Post\_PHQ\_Item7 > Pre\_PHQ\_Item7
- u. Post\_PHQ\_Item7 = Pre\_PHQ\_Item7
- v. Post\_PHQ\_Item8 < Pre\_PHQ\_Item8
- w. Post\_PHQ\_Item8 > Pre\_PHQ\_Item8
- x. Post\_PHQ\_Item8 = Pre\_PHQ\_Item8
- y. Post\_PHQ\_Item9 < Pre\_PHQ\_Item9
- z. Post\_PHQ\_Item9 > Pre\_PHQ\_Item9
- aa. Post\_PHQ\_Item9 = Pre\_PHQ\_Item9

Table 2

Test Statistics <sup>a</sup>									
	Post_PHQ_It em1 - Pre_PHQ_It m1	Post_PHQ_It em2 - Pre_PHQ_It m2	Post_PHQ_It em3 - Pre_PHQ_It m3	Post_PHQ_It em4 - Pre_PHQ_It m4	Post_PHQ_It em5 - Pre_PHQ_It m5	Post_PHQ_It em6 - Pre_PHQ_It m6	Post_PHQ_It em7 - Pre_PHQ_It m7	Post_PHQ_It em8 - Pre_PHQ_It m8	Post_PHQ_It em9 - Pre_PHQ_It m9
Z	-4.690 <sup>b</sup>	-4.025 <sup>b</sup>	-4.208 <sup>b</sup>	-4.264 <sup>b</sup>	-2.828 <sup>b</sup>	-3.358 <sup>b</sup>	-3.477 <sup>b</sup>	-3.350 <sup>b</sup>	-1.633 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.005	.001	.001	.001	.102

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 3

		Ranks		
		N	Mean Rank	Sum of Ranks
Post_GAD_Item1 – Pre_GAD_Item1	Negative Ranks	23 <sup>a</sup>	13.63	313.50
	Positive Ranks	3 <sup>b</sup>	12.50	37.50
	Ties	17 <sup>c</sup>		
	Total	43		
Post_GAD_Item2 – Pre_GAD_Item2	Negative Ranks	17 <sup>d</sup>	9.00	153.00
	Positive Ranks	0 <sup>e</sup>	.00	.00
	Ties	26 <sup>f</sup>		
	Total	43		
Post_GAD_Item3 – Pre_GAD_Item3	Negative Ranks	18 <sup>g</sup>	9.50	171.00
	Positive Ranks	0 <sup>h</sup>	.00	.00
	Ties	25 <sup>i</sup>		
	Total	43		
Post_GAD_Item4 – Pre_GAD_Item4	Negative Ranks	17 <sup>j</sup>	9.00	153.00
	Positive Ranks	0 <sup>k</sup>	.00	.00
	Ties	26 <sup>l</sup>		
	Total	43		
Post_GAD_Item5 – Pre_GAD_Item5	Negative Ranks	14 <sup>m</sup>	7.50	105.00
	Positive Ranks	0 <sup>n</sup>	.00	.00
	Ties	29 <sup>o</sup>		
	Total	43		
Post_GAD_Item6 – Pre_GAD_Item6	Negative Ranks	22 <sup>p</sup>	11.50	253.00
	Positive Ranks	0 <sup>q</sup>	.00	.00
	Ties	21 <sup>r</sup>		
	Total	43		
Post_GAD_Item7 – Pre_Gad_Item7	Negative Ranks	13 <sup>s</sup>	7.00	91.00
	Positive Ranks	0 <sup>t</sup>	.00	.00

Ties	30 <sup>u</sup>		
Total	43		

- a. Post\_GAD\_Item1 < Pre\_GAD\_Item1
- b. Post\_GAD\_Item1 > Pre\_GAD\_Item1
- c. Post\_GAD\_Item1 = Pre\_GAD\_Item1
- d. Post\_GAD\_Item2 < Pre\_GAD\_Item2
- e. Post\_GAD\_Item2 > Pre\_GAD\_Item2
- f. Post\_GAD\_Item2 = Pre\_GAD\_Item2
- g. Post\_GAD\_Item3 < Pre\_GAD\_Item3
- h. Post\_GAD\_Item3 > Pre\_GAD\_Item3
- i. Post\_GAD\_Item3 = Pre\_GAD\_Item3
- j. Post\_GAD\_Item4 < Pre\_GAD\_Item4
- k. Post\_GAD\_Item4 > Pre\_GAD\_Item4
- l. Post\_GAD\_Item4 = Pre\_GAD\_Item4
- m. Post\_GAD\_Item5 < Pre\_GAD\_Item5
- n. Post\_GAD\_Item5 > Pre\_GAD\_Item5
- o. Post\_GAD\_Item5 = Pre\_GAD\_Item5
- p. Post\_GAD\_Item6 < Pre\_GAD\_Item6
- q. Post\_GAD\_Item6 > Pre\_GAD\_Item6
- r. Post\_GAD\_Item6 = Pre\_GAD\_Item6
- s. Post\_GAD\_Item7 < Pre\_Gad\_Item7
- t. Post\_GAD\_Item7 > Pre\_Gad\_Item7
- u. Post\_GAD\_Item7 = Pre\_Gad\_Item7

Table 4

	Post_GAD_It m1 - Pre_GAD_It m1	Post_GAD_It m2 - Pre_GAD_It m2	Post_GAD_It m3 - Pre_GAD_It m3	Post_GAD_It m4 - Pre_GAD_It m4	Post_GAD_It m5 - Pre_GAD_It m5	Post_GAD_It m6 - Pre_GAD_It m6	Post_GAD_It m7 - Pre_GAD_It m7
Z	-3.884 <sup>b</sup>	-3.879 <sup>b</sup>	-3.947 <sup>b</sup>	-3.787 <sup>b</sup>	-3.442 <sup>b</sup>	-4.350 <sup>b</sup>	-3.314 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.001	.000	.001

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 5

		Ranks		
		N	Mean Rank	Sum of Ranks
Post_GAD_level –	Negative Ranks	15 <sup>a</sup>	8.00	120.00
Pre_GAD_level	Positive Ranks	0 <sup>b</sup>	.00	.00
	Ties	28 <sup>c</sup>		
	Total	43		

a. Post\_GAD\_level < Pre\_GAD\_level

b. Post\_GAD\_level > Pre\_GAD\_level

c. Post\_GAD\_level = Pre\_GAD\_level

Table 6

Test Statistics <sup>a</sup>	
	Post_GAD_level – Pre_GAD_level
Z	-3.535 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 7

		Ranks		
		N	Mean Rank	Sum of Ranks
Post_PHQ_level –	Negative Ranks	12 <sup>a</sup>	6.50	78.00
Pre_PHQ_level	Positive Ranks	0 <sup>b</sup>	.00	.00
	Ties	31 <sup>c</sup>		
	Total	43		

a. Post\_PHQ\_level < Pre\_PHQ\_level

b. Post\_PHQ\_level > Pre\_PHQ\_level

c. Post\_PHQ\_level = Pre\_PHQ\_level

Table 8

**Test Statistics<sup>a</sup>**

	Post_PHQ_level
	Pre_PHQ_level
Z	-3.176 <sup>b</sup>
Asymp. Sig. (2-tailed)	.001

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

## Appendix S

### Chi-Squared Test with Directional Measures Tables

Table 1

<b>Chi-Square Tests</b>			
	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	17.153 <sup>a</sup>	13	.192
Likelihood Ratio	22.636	13	.046
Linear-by-Linear Association	8.528	1	.003
N of Valid Cases	43		

a. 28 cells (100.0%) have expected count less than 5. The minimum expected count is .40.

### Directional Measures

			Value
Nominal by Interval	Eta	Gender Dependent	.632
		Pre_GAD_score Dependent	.451

Table 2

<b>Chi-Square Tests</b>			
	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	13.727 <sup>a</sup>	15	.546
Likelihood Ratio	18.195	15	.253
Linear-by-Linear Association	7.521	1	.006
N of Valid Cases	43		

a. 32 cells (100.0%) have expected count less than 5. The minimum expected count is .40.

**Directional Measures**

			Value
Nominal by Interval	Eta	Gender Dependent	.565
		Pre_PHQ_score Dependent	.423

**Appendix T**  
Frequency Tables

Table 1

**Frequencies**

		<b>Statistics</b>	
		Gender	Age
N	Valid	43	43
	Missing	1	1

Table 2

		<b>Gender</b>			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	Male	17	38.6	39.5	39.5
	Female	26	59.1	60.5	100.0
	Total	43	97.7	100.0	
Missing	System	1	2.3		
Total		44	100.0		

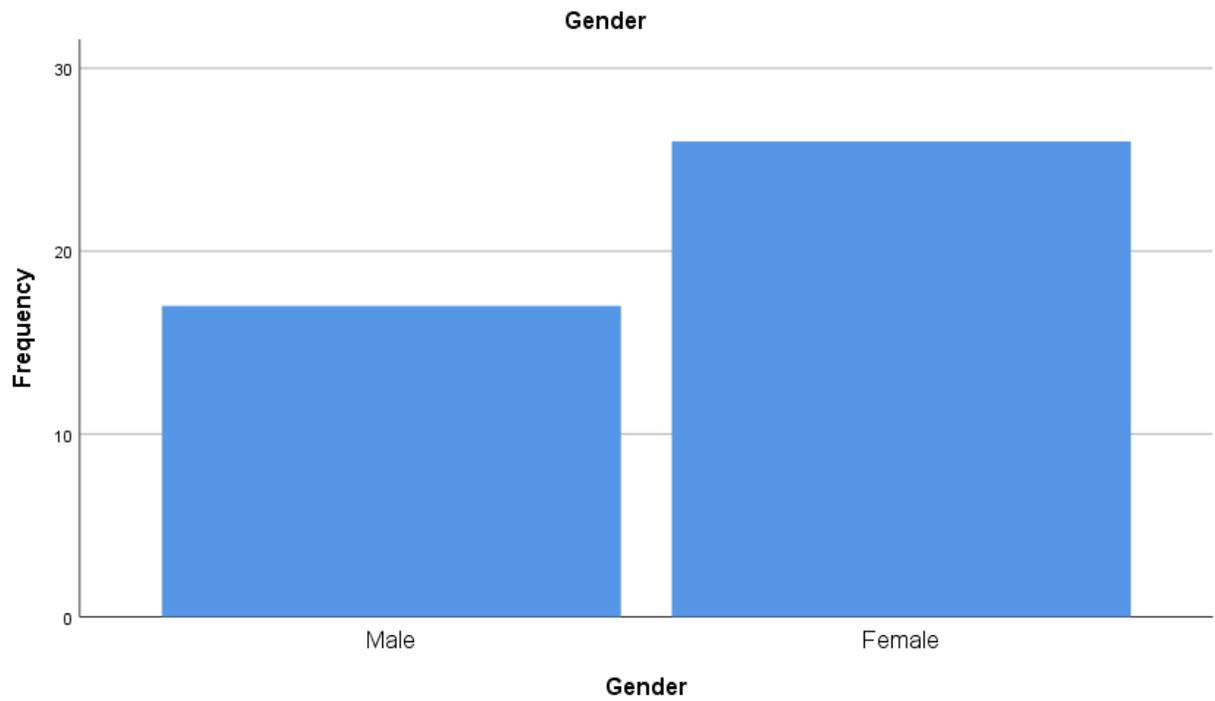
Table 3

		<b>Age</b>			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	12.00	3	6.8	7.0	7.0
	13.00	7	15.9	16.3	23.3
	14.00	7	15.9	16.3	39.5
	15.00	6	13.6	14.0	53.5
	16.00	10	22.7	23.3	76.7
	17.00	6	13.6	14.0	90.7
	18.00	4	9.1	9.3	100.0
	Total	43	97.7	100.0	
Missing	System	1	2.3		
Total		44	100.0		

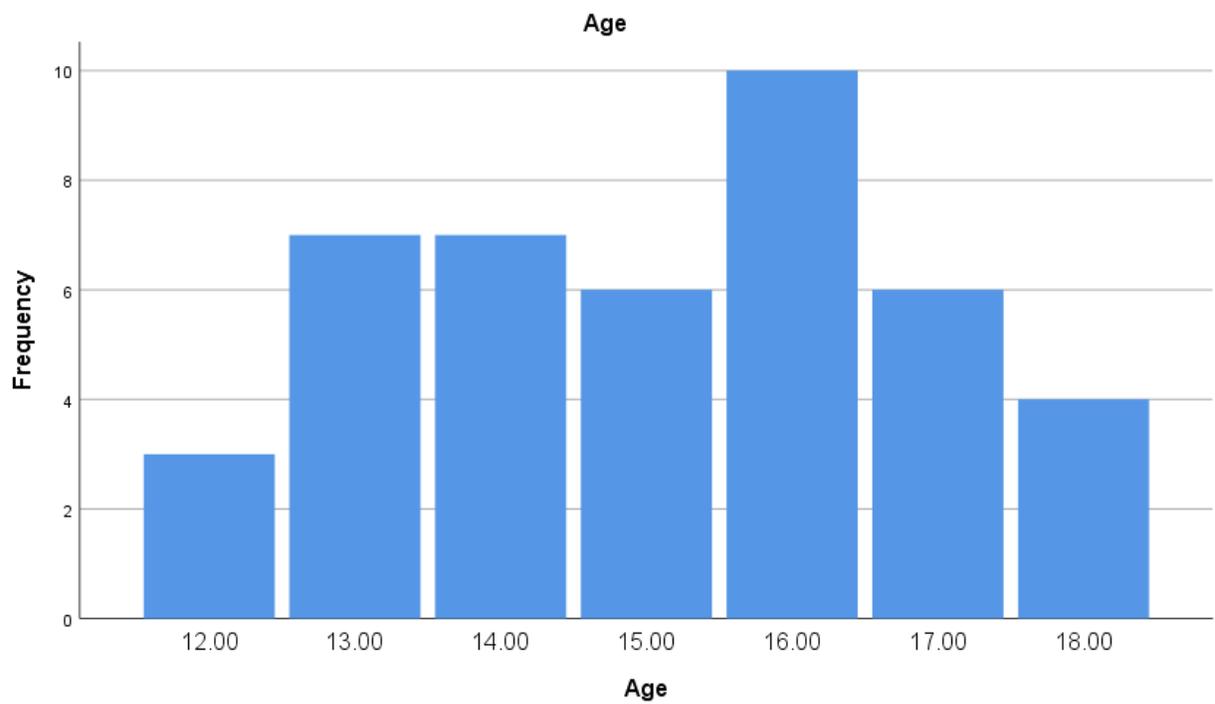
## Appendix U

### Bar Graphs

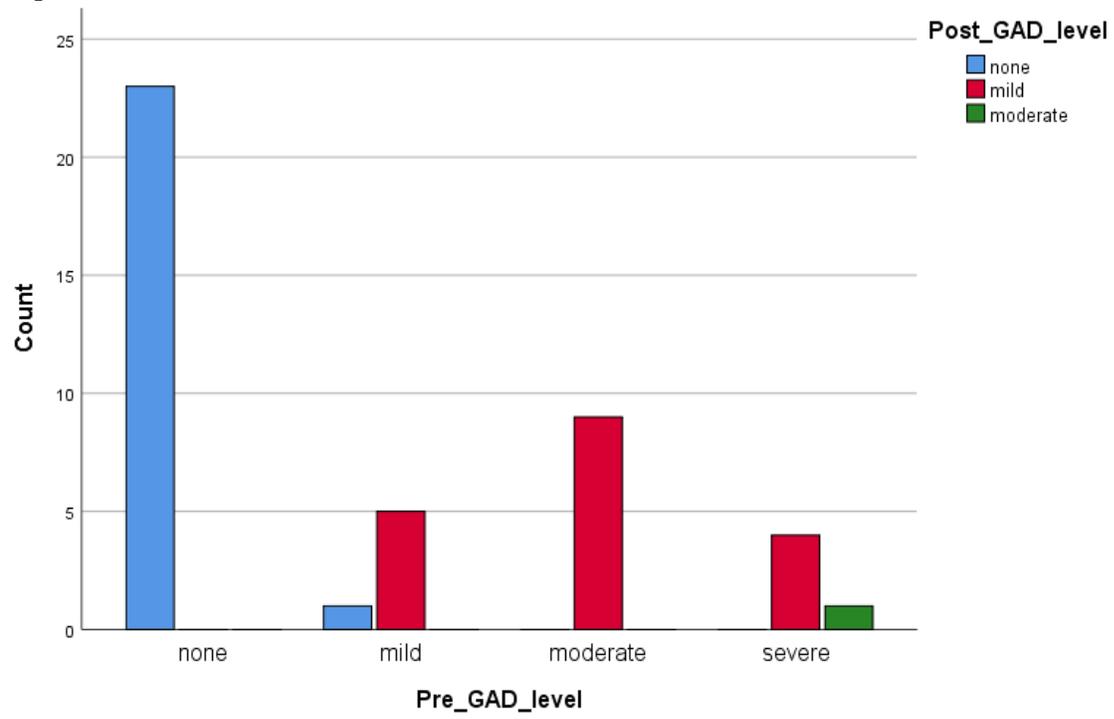
Graph 1



Graph 2



Graph 3



## Appendix V



July 8, 2020

UMKC DNP Student, Darci Feiden

Congratulations. The UMKC Doctor of Nursing Practice (DNP) faculty has approved your DNP project proposal, *Identification of Anxiety and Depression in Adolescents through Screening in Primary Care*.

You may proceed with IRB application

Sincerely,

A handwritten signature in purple ink that reads "Lyla Lindholm".

Lyla Lindholm, DNP, RN, ACNS-BC  
Clinical Assistant Professor, DNP Faculty  
MSN-DNP Program Coordinator  
UMKC School of Nursing and Health Studies  
[lindholm1@umkc.edu](mailto:lindholm1@umkc.edu)

A handwritten signature in black ink that reads "Cheri Barber".

Cheri Barber, DNP, RN, PPCNP-BC, FAANP  
Clinical Assistant Professor  
DNP Program Director  
UMKC School of Nursing and Health Studies  
[barberch@umkc.edu](mailto:barberch@umkc.edu)

DNP Faculty Mentors Dr. Barber and Dr. Lindholm  
UMKC School of Nursing and Health Studies

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an equal opportunity/affirmative action institution

## Appendix W



**Institutional Review Board**  
University of Missouri-Kansas City

5319 Rockhill Road  
Kansas City, MO 64110  
816-235-5927  
umkcirb@umkc.edu

Dear Lyla Jo Lindholm,

A member of the UMKC Research Compliance Office screened your QI project #2026194-QI entitled "Identification of Anxiety and Depression in Adolescents through Screening in Primary Care" and made the following determination:

**QI Determination: The project has been determined to be a quality improvement activity not requiring IRB review.**

If you have any questions regarding this determination, please feel free to contact our office at 816-235-5927, umkcirb@umkc.edu, or by replying to this notification.

**Note Regarding Publications:** It is appropriate to disseminate and replicate QI/program evaluation successes, including sharing the information external to an organization. This may include presentations and publications. The mere intent to publish the findings does not require IRB review as long as the publication does not refer to the activity as research.

Thank you,  
UMKC Institutional Review Board