ADOLESCENT DEPRESSION SCREENING IN PRIMARY CARE PRACTICE

by

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As members of the DNP Project Committee, we certify that we have read the DNP project prepared by *Meagan Chase Davis*, titled *Adolescent Depression Screening in Primary Care Practice* and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.

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Final approval and acceptance of this DNP project is contingent upon the candidate's submission of the final copies of the DNP project to the Graduate College.

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DEDICATION

For my children: Phoenix, Elliott, and Charlotte.

Remember, no one gets to tell you how big your dreams can be.

May you always have the confidence to know your self-worth,

the strength to chase your dreams,

and the ability to know how deeply loved you are.

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ABSTRACT

Purpose: The purpose of this DNP quality improvement project was to increase primary care provider knowledge about indications for adolescent depression screening.

Background: Approximately 13.3% of adolescents experienced depression in the past year. In Oklahoma alone, rates are increasing, with depression totaling 60% of all mental health illness among adolescents. Primary care providers see approximately 75% of adolescents; however, mental health conditions are missed 84% of the time. Current clinical guidelines recommend screening for adolescent depression during wellness visits or when risk factors are present.

Methods: The providers of interest were nurse practitioners, physicians, and physician assistants providing primary care to children between the ages of 12 and 17 in a private pediatric practice group consisting of three clinics. The Model for Improvement guided the process of developing, implementing, and evaluating an educational intervention through use of a pre-test/post-test quantitative design. An email invited participants to complete an anonymous pre-test survey to evaluate knowledge and beliefs surrounding adolescent depression, then view an educational presentation on adolescent depression and screening guidelines, then complete a post-survey to evaluate any changes in knowledge and intention to screen. Results were shared with clinic representatives to help refine the education for future testing cycles and other clinic sites.

Results: Data collection took place over one week. Five providers completed both the pre-test and post-test surveys. Provider knowledge scores significantly increased 29% after participating in the education and self-reported knowledge on screening increased.

Conclusions: DNP quality improvement projects like this help develop strategies to increase best practices, leading to improved patient outcomes. Nurse-led improvement programs like this

contribute to healthcare literature and the advancement of the nursing profession by developing patient-centered interventions applicable to a wide variety of providers. Results may be used to develop strategies to increase and align provider practices with best standards to help promote early identification and treatment of adolescents with depression.

INTRODUCTION

Depression has become a pervasive part of America and, when left untreated, can lead to life threatening consequences. Over half of adults with Major Depressive Disorder (MDD) identified that their depression began before the age of 18, displaying an increased need for early identification and treatment (Fleisher & Katz, 2001). Given the current mental health crisis facing America, it is important that primary care providers (PCPs) become comfortable identifying and screening patients for depression, especially during adolescence when the disorder peaks in prevalence (Substance Abuse and Mental Health Services Administration [SAMHSA], 2016).

Background Knowledge

The Centers for Disease Control and Prevention (CDC) (CDC, 2018a), National Institute of Mental Health (NIMH) (NIMH, 2018), and the American Psychiatric Association (APA) (APA, 2017) all describe depression as a mental health disorder characterized by overwhelming sadness, pervasive hopelessness and guilt, feelings of worthlessness; additionally depressive symptoms may include physical ones such as decreased energy, difficulty concentrating, sleep changes, appetite changes, and sometimes observable changes in movement. Depression has no single exact cause, but risk factors include a combination of genetic and biological factors, as well as environmental and psychological factors such as traumatic events, relatives with depression, substance abuse, personal biochemistry, low self-esteem, or even illness such as cancer (APA, 2017; CDC, 2018a; NIMH, 2018). Approximately 1 in 6 adults, or 16 million adults, age 18 or older had a major depressive episode, of which 10.3 million developed a severe impairment (SAMHSA, 2016).

In 2016 the U.S. Preventive Services Task Force (USPSTF) updated their guideline for depression screening for both adults and adolescents and recommended screening both demographics for depression either as indicated or annually at wellness visits (Siu, 2016a; Siu, 2016b). Use of a validated tool like the Patient Health Questionnaire-9 (PHQ-9) for both adults and adolescents is appropriate and can help indicate those that meet qualification for a diagnosis under the APA (2013) Diagnostic and Statistical Manual 5th edition (DSM-5) for depression. Once diagnosed, treatment can begin and typically uses pharmacologic therapy, psychotherapy or counseling, or a combination of both medication and counseling (NIMH, 2018). Adolescents are at especially high risk for depression and may present with different depressive symptoms based on their developmental and life stage (NIMH, 2018). Depressive symptoms may include irritability, neglected appearance, crying spells with no apparent cause, low self-esteem, extreme sensitivity or fear of rejection and failure, self-harm, frequent somatic complaints, or slowed thinking and speech (Mayo Clinic, 2018).

Adolescence is a developmental age faced with many physical, emotional, and hormonal changes that present unique healthcare challenges. Primary care providers are often the first contact for many adolescents, seeing an estimated 75% of all adolescents, placing them in a favorable position to help screen, identify, and treat adolescent depression (Dihigo, 2014; Haefner, 2016; NIMH, 2015). Often the mood swings caused by adolescent hormone changes can cause providers and parents to dismiss signs and symptoms of depression as simply a "phase," with diagnosis missed 62% to 84% of the time (Dihigo, 2014; NIMH, 2017; SAMHSA, 2017). Untreated mental health conditions cause debilitating and potentially life-long consequences. Substance use disorder is significantly higher at 18-years-old if chronic or severe

depression occurs during early adolescence (Rhew et al., 2017). Adolescent depression also correlates with multiple other psychiatric disorders later in life, educational impairments, increased risk of unplanned pregnancy, increased self-injuring behaviors, and increased risk of suicide (De Jonge-Heesen et al., 2016). Many times, rather than seek help from school professionals or parents, adolescents will begin to self-medicate with drugs and alcohol (Dihigo, 2014). Even with proper diagnosis, only 40% of adolescents receive treatment due to barriers such as cost, concerns about mental health stigma, and lack of access to resources. Figure 1 shows the percentages of types of treatment adolescents with major depression receive, and an overwhelming majority receive none at all (NIMH, 2017; Richardson et al., 2014).

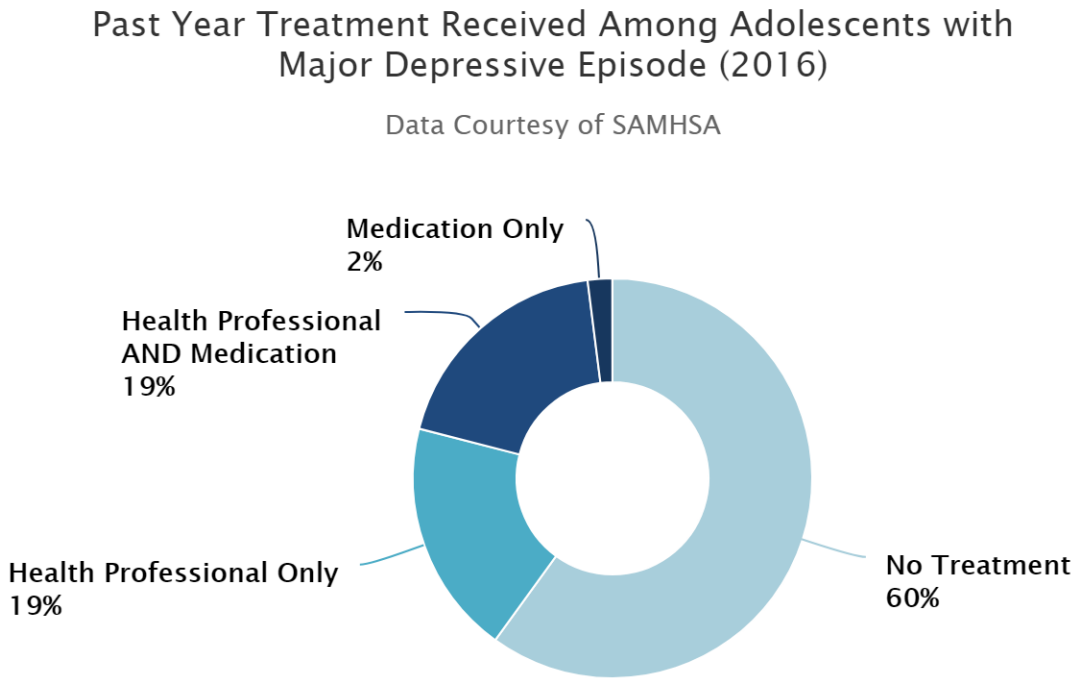

FIGURE 1. Treatment rates for adolescents with major depressive episodes from SAMHSA.

Despite this knowledge and endorsement from the U.S. Preventative Services Task Force to perform screening, the prevalence and rates of adolescent depression in America have been increasing since 2011, as reflected in Figure 2 (SAMHSA, 2018; Siu, 2016b).

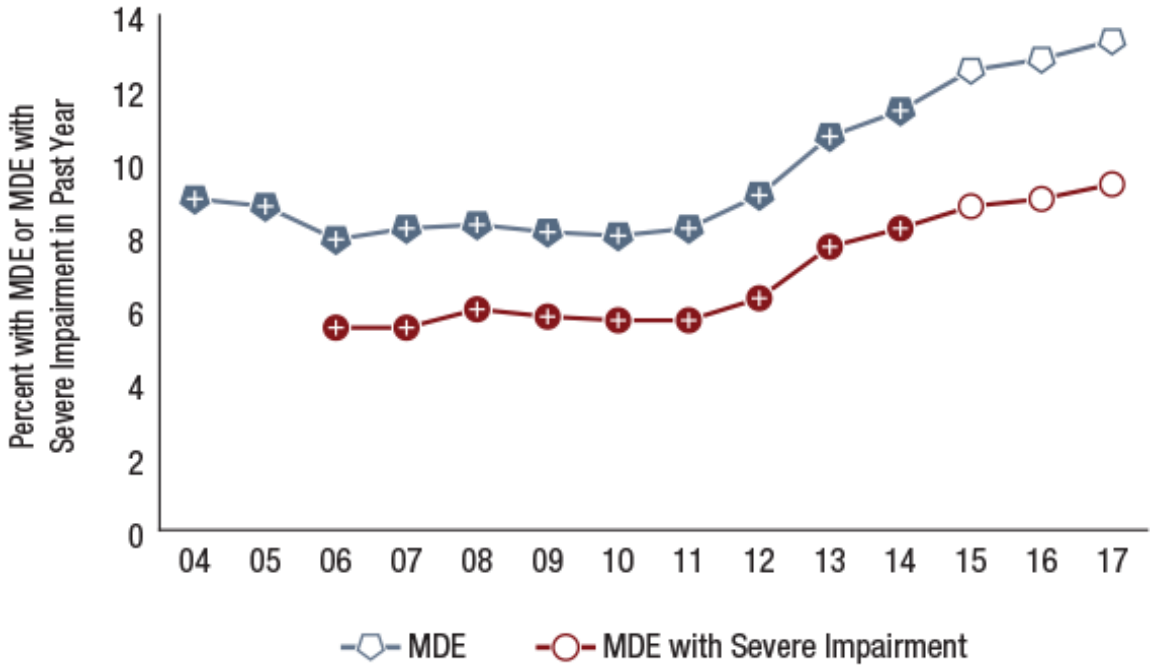

FIGURE 2. Percentages of major depressive episode (MDE) and MDE with severe impairment among adolescents aged 12 to 17 from 2004-2017 from SAMHSA.

Significance

An estimated 3.1 million U.S. adolescents ages 12 to 17 years old experience a major depressive episode (MDE), therefore it is important for PCPs to understand and know the hallmarks of the disorder (SAMHSA, 2017a). A major depressive episode is defined by the fifth edition Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a period of two weeks or more of daily or nearly every day presence of depressive symptoms (APA, 2013). Depressive symptoms include: feelings of guilt, worthlessness, fatigue, restlessness, decreased energy, loss of interest in hobbies, concentration problems, sleep disturbances (either too much or too little),

appetite or weight changes (either weight gain or loss), and thoughts of death or suicide (SAMHSA, 2017a).

The 2017 National Survey on Drug Use and Health found that 13.3% of U.S. adolescents had at least one MDE and 70% of those cases experienced severe impairment (Figure 3); unfortunately, those numbers are projected to grow. Currently, suicide is the second leading cause of death among adolescents (SAMHSA, 2017). Left untreated depression continues into adulthood and is linked to co-occurring substance use disorders and increased number of chronic physical conditions including smoking, heart disease, diabetes, obesity, and asthma (Jolles, Haynes-Maslow, Roberts, & Dusetzina, 2015). Depression, no matter what the age, is immeasurably costly, and prompt identification and early treatment in adolescence can lead to healthier adults, fewer Emergency Department visits, less addiction, and improved lives (Oklahoma Healthcare Authority [OHCA], 2017a).

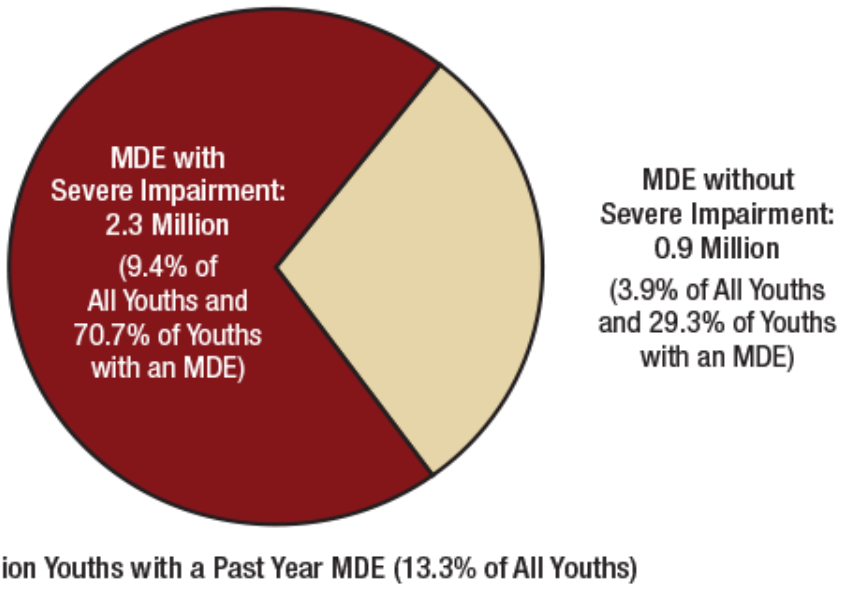

FIGURE 3. Major depressive episode (MDE) and MDE with severe impairment in the past year among youths aged 12 to 17 from SAMHSA.

Advanced Practice Registered Nurses (APRNs) have a significant role in addressing adolescent depression nationwide as APRNs critically appraise, implement, and evaluate evidence for practice that promotes improves healthcare outcomes and patient-centered care (American Association of Colleges of Nursing [AACN], 2006). Furthermore, APRN collaboration with other primary healthcare clinicians such as physicians, physician's assistants, and mental health specialists facilitates interprofessional cooperation to produce unique dialogue and solutions to complex challenges encountered in different healthcare environments, like the challenges of addressing the mental health needs of adolescents in a primary care practice (AACN, 2006; Interprofessional Education Collaborative Expert Panel, 2011). Taliaferro et al., (2013) found that APRN care remains consistent with best practices for screening and managing depressed adolescents when compared to care provided by family and pediatric physicians. These findings demonstrate the significant APRN ability to improve healthcare outcomes for depressed adolescents while simultaneously easing the primary care burden and closing the gap between affordable, accessible, quality healthcare.

Local Problem

Oklahoma faces many different social issues: Mainly increasing poverty, unemployment, state budget issues, education cuts, healthcare access, and continued economic downturn (OHCA, 2017b). Due to the increasing national budget deficit, the Congressional Budget Office (CBO) has reduced its Federal Medical Assistance Percentage to Oklahoma, which is typically used to offset costs of increasing health insurance premiums and health care costs for beneficiaries (OHCA, 2017b). This reduction of assistance, compounded by the projected increase in state budget deficit to $878 million for fiscal year 2018, and continued refusal to

expand Medicaid, has led to funding issues and cuts for multiple state agencies, including the healthcare authority and Medicaid, which provide healthcare access and resources to impoverished children, pregnant women, and disabled persons (OHCA, 2017b; Fallin, 2017).

Most recent findings show children under 18 years old comprise 24.6% of the population (an estimated 954,000 children), and 23.8% of those children are currently living in poverty (OHCA, 2017b). While many of these children qualify for state Medicaid known as Soonercare, Oklahoma has continuously ranked lowest in the nation for overall health for the past decade and is currently 43rd. This led to the Oklahoma State Department of Health issuing health improvement plans that prioritize children's health and behavioral health interventions to improve health outcomes statewide (America's Health Rankings, 2017; Children's Health Workgroup, 2010; Oklahoma Health Improvement Plan, 2015).

Adolescent mental health faces challenges in both Oklahoma and nationwide. Oklahoma's rates of MDE among adolescents ages 12 to 17 years old surpassed national rates for the first time from 2014-2015 with an average of 12.6% in Oklahoma compared to a national average of 11.9% (SAMHSA, 2017b). Figure 4 shows an increase of 2.6% in Oklahoma depression rates during 2014-2015 compared to the previous year (SAMHSA, 2017b).

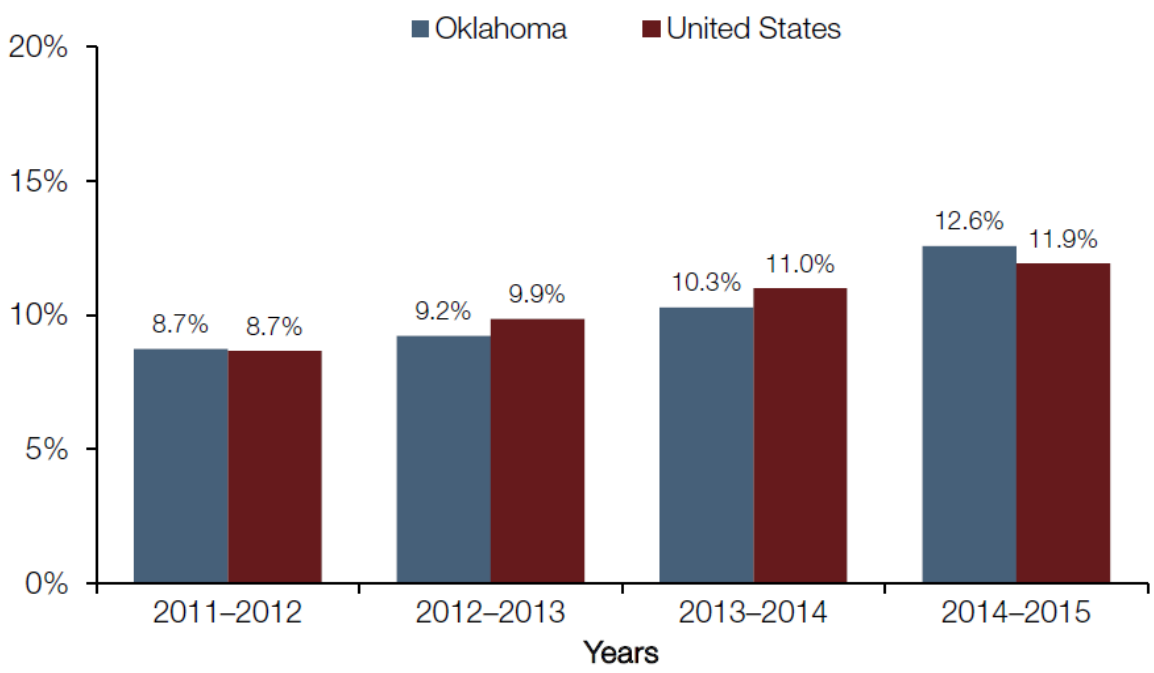

FIGURE 4. Past year major depressive episode (MDE) among adolescents aged 12 to 17 in Oklahoma and the United States (annual averages, 2011-2012 to 2014-2015) from SAMHSA.

The most recent data from the Youth Risk Behavior Surveillance System shows approximately 31.8% of Oklahoma students in grades 9-12 reported symptoms consistent with an MDE without a previous diagnosis (CDC, 2018b). Soonercare currently rewards integrated primary care and behavioral health by policy implementation affecting reimbursement for wellness visits where patients age five to 16 years old receive behavioral health screening (Oklahoma Healthcare Authority, 2017a). Currently endorsed by the American Academy of Pediatrics and Oklahoma Healthcare Authority is the Pediatric Symptom Checklist-17 (PSC-17). The PSC-17 is a 17-item screening tool that has well documented validity and reliability for screening for internalizing disorders (i.e., depression and anxiety, Attention Deficit Hyperactivity Disorder [ADHD]), and externalizing disorders (i.e., physical aggression and disobeying rules)

(Bright Futures, 2018; Kolko & Perrin, 2014). Despite this reimbursement incentive, many barriers exist to effective screening of adolescents at wellness visits.

Needs Assessment

Despite state-backed integrated mental health screenings in primary care settings, Oklahoma continues to see rates of adolescent depression rise. As previously illustrated in Figure 4, Oklahoma saw MDE rates more than double the increase from previous years between 2014-2015 (SAMHSA, 2017b). With the $898 million budgetary shortfall, mental health services face some of the most devastating funding cuts in already underfunded state health systems (Fallin, 2017). Out of a total of 77 counties in the state of Oklahoma, 72 counties are designated as Mental Health Professional Shortage Areas (Office of Primary Care & Rural Health Development, 2017). Patients experience better and more cost-effective outcomes when primary care providers are familiar with depression and comfortable with its diagnosis and management (Cheung, Kozloff, & Sacks, 2013; Gruttadaro & Markey, 2011).

Purpose and PICO Question

The purpose of this DNP quality improvement project was to increase primary care provider knowledge about indications for adolescent depression screening. The primary aim of this DNP project is to increase primary care provider knowledge within a one-week timeframe by 15%. The goal of this DNP project is to increase primary care provider knowledge about indications for screening.

A PICO question directs a DNP project by helping to refine and focus the evidence in a literature review and development of an evidence-based intervention. PICO questions are used in evidence-based models to help frame the question in a systematic way, focusing on the problem,

intervention, comparison, and outcome of interest (Polit & Beck, 2017). This DNP project posed the following PICO question:

"Does an evidence-based educational presentation on current screening guidelines increase primary care providers' knowledge on screening for adolescent depression?"

Stakeholders

Stakeholders are critical to any project's success and early recruitment. Input from stakeholders is essential to ensure a well-developed, realistic, and site-specific project of value. For this DNP project, stakeholders include the providers, medical staff, and operational managers. Increasing buy-in for this DNP project utilized a needs assessment, frequent communication, and feedback from members at the practice. By using an interdisciplinary collaborative quality improvement team, the likelihood for a useful and successful educational intervention is increased (Institute for Healthcare Improvement, 2017).

Among the various stakeholders, champions and supporters of the project include Sarah Palm, an MD, whose special interests include behavioral health and adolescents, and Amy McClendon, the office manager and main administrator for the three clinics. Just Kids Pediatrics is a primary care group comprising three clinics in the Greater Oklahoma City Area (Just Kids Pediatrics [JKP], n.d.). The providers consist of six Doctors of Medicine, one Doctor of Osteopathy, six Master's Prepared Nurse Practitioners (NP), and one Physician's Assistant (JKP, n.d.). The variety of training backgrounds, Oklahoma Healthcare Authority's Strategic Plan stressing behavioral health screening in primary care, and funding cuts to mental health resources and Medicaid have triggered the decision to evaluate the success of current screening practices, provider knowledge, and consistency with guidelines and recommendations.

FRAMEWORK

Theoretical perspectives from multiple disciplines can be used to help organize and guide an intended Doctor of Nursing Practice (DNP) project. A theoretical framework leads to understanding the multiple factors that interact to influence quality-improvement including barriers and facilitators (Eldridge, 2011; Groll et al., 1997). Motivational theories focus primarily on an individual's motivation or willingness to change by focusing on the way they make decisions, personal knowledge and skills, attitudes towards a behavior or practice, and routines or structures in daily professional practice (Ajzen, 1991; Grol et al., 2007). While examining the purpose and developing this DNP project, application of Ajzen's Theory of Planned Behavior will guide and shape the framework and methods.

Theoretical Framework

Icek Ajzen, a highly distinguished social psychologist, researches the relationships between attitudes and intentions on the likelihood or predictability of behaviors (Fishbein & Ajzen, 2010). Ajzen's original *Theory of Planned Behavior* (TPB) was a refinement and extension of the *Theory of Reasoned Action* (Ajzen, 1991; Fishbein & Ajzen, 1972; Madden, Ellen, & Ajzen, 1992). Ajzen's theories have successfully been applied to multiple fields including entrepreneurship, education, health promotion behaviors, and advertising because of its predictive power strength and understanding of the link between cognitive self-regulation and human behaviors (Ajzen & Sheikh, 2013; Burgess et al., 2016; de Leeuw, Valois, Ajzen, & Schmidt, 2015). Ultimately, Ajzen's Theory of Planned Behavior (Figure 5) helps to predict intentions to perform a certain behavior based on three general beliefs and considerations held by an individual (Burgess et al., 2016; Ajzen, 2011). The basis for these three general beliefs is

comprised of background factors in individual, social, and information domains (Ajzen, 2017). The theory's versatility and predictive strength allows for the application of the Theory of Planned Behavior to guide the DNP quality improvement project as it aims to understand, predict, and change health professionals' behaviors surrounding adolescent depression screening.

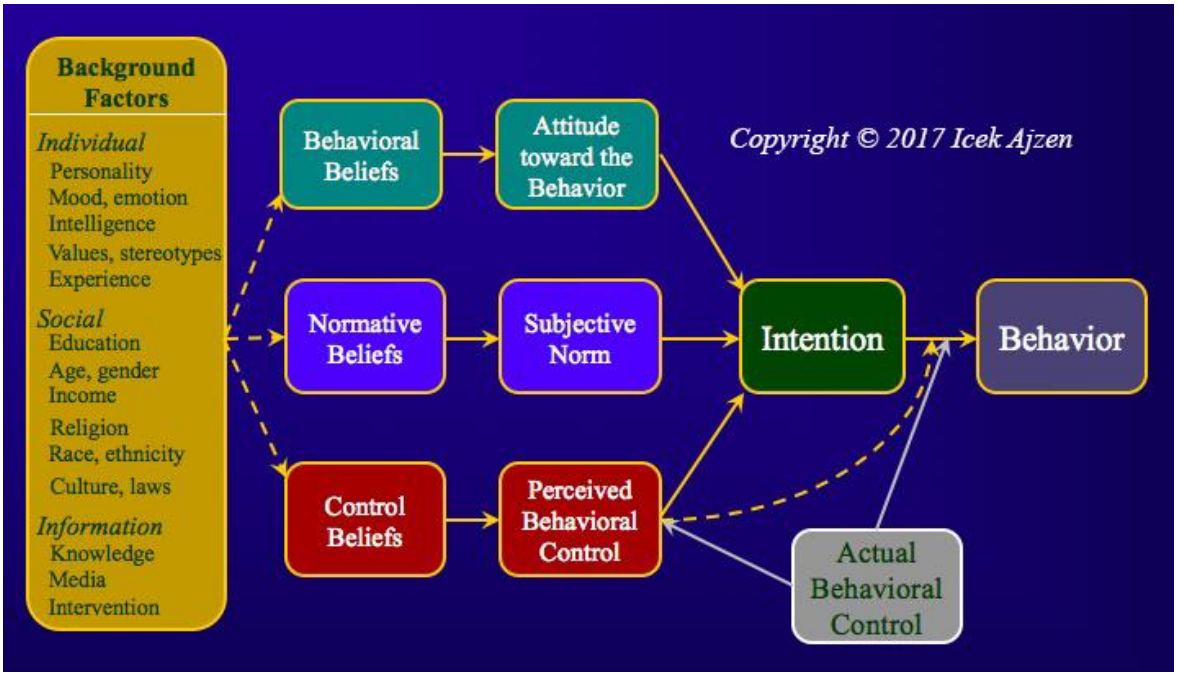

FIGURE 5. The theory of planned behavior (Ajzen, 2017).

The Theory of Planned Behavior explains that a person's behavior is determined by three subjective beliefs: behavioral, normative, and control beliefs (Madden et al., 1992; Perkins et al., 2007) (Figure 5). Behavioral beliefs are personal beliefs held about a behavior that help determine the individual's attitude toward the behavior, either positive or negative, and based on beliefs about the consequences of performing or not performing a behavior (Ajzen, 1991; Ajzen, 2011; Perkins et al., 2007). An attitude towards a behavior then forms from the value placed onto it, for example, if a healthcare provider does not personally believe that adolescent depression

screening is beneficial or predictive, this belief directly impacts the provider's attitude towards depression screening (Ajzen, 2011; Burgess et al., 2016).

Normative beliefs stem from an individual's perception of external behavioral expectations placed on them by others: supervisors, co-workers, friends, family members, and patients (Ajzen, 2011; Burgess et al., 2016; Fishbein & Ajzen, 2010). A person's normative beliefs contribute to the subjective norm, or perceived social pressure to either exhibit or not exhibit a behavior; this directly influences a person's motivation to comply with external expectations to belong and adhere to situational norms within a setting (University of Massachusetts, n.d.; Ajzen, 1991; Perkins et al., 2007). A healthcare provider may have increased motivation to screen adolescents for depression if they believe it is an expectation at the clinic and a routine part of other providers' actions.

The third belief in the Theory of Planned Behavior is control belief, or an individual's perceived power of surrounding factors or resources that may facilitate or prohibit conducting a behavior (Ajzen, 1991; Burgess et al., 2016; Fishbein & Ajzen, 2010). The control belief determines the level of perceived behavioral control a person believes they possess which can increase or decrease the intention to perform a behavior (Burgess et al., 2016). If providers in a setting believe they lack the potential to influence a setting, because of barriers like staffing, time per patient, or lack of opportunities to screen, it directly impacts their motivation and behavioral intentions.

Underneath each belief, interacting in complex synthesis and associations are a person's background factors in the individual, social, and information domains. A person's individual background factors include their personality, emotions, intelligence, experiences, and values,

while social background factors would include things like gender, age, education, religion, race, and culture (Ajzen, 2017). Information beliefs are those driven by the individual's knowledge, interventions, and media, and it is this domain of background factors which evidence-based educational interventions aim to influence (Ajzen, 2011; Ajzen, 2017).

The Theory of Planned Behavior predicts that together, a person's attitudes, subjective norms, and perceived behavioral controls all contribute and merge to determine a person's intention to perform a behavior (Ajzen 1991; Fishbein & Ajzen, 2010; Burgess et al., 2016; Perkins et al., 2007). When using TPB to guide a DNP quality improvement intervention, it is important to note the limitations of the theory. Subjective norms or perceived collective beliefs can become unequally weighted in importance when determining intention and motivation, likewise individual differences and personal backgrounds can alter the behavioral prediction ability, and there is always an external control factor, even when it is not perceived by the individual (Ajzen, 2011; Ajzen & Sheikh, 2013)

Using the Theory of Planned Behavior as a foundational guide will allow for an increased understanding of how knowledge, through information and intervention, impacts providers' current attitudes, subjective norms, and perceived behavioral controls. Perkins et al. (2007) demonstrated that understanding alone was not enough to modify a provider's behavior. Utilizing the knowledge of commonly cited provider biases, beliefs, attitudes, and perceptions from the literature during the development of the educational intervention will increase the success of adoption and practice of a behavior by providers. By addressing frequent provider beliefs, biases, attitudes, and perceptions, the DNP project's educational intervention will maximize its impact on increasing provider's knowledge, perceived behavioral control, positive

attitudes towards adolescent depression screening, and subjective norms of the practice directly influencing providers' intentions to effectively incorporate adolescent depression screening into their practices.

Definitions and Concepts

Primary Care Providers

The definition of primary care and health care providers have evolved over time. In 1996, the Institute of Medicine (IOM) formalized the definition of primary care clarifying it as "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community" (IOM, 1996, p. 31). Around this time the Social Security Act (SSA) of 1996 outlined the definition of health care providers, as the Health Insurance Portability and Accountability Act (HIPAA) was enacted and consensus was needed to determine who was considered a covered entity as a health care provider and subject to the new laws. This paved the way for multiple professionally trained clinicians to change the accessibility of primary care, billing for health care and services provided to individuals (SSA, Section 1861(u) & Section 1861(s), 1997; HIPAA, Sections 261-264, 1996). Guided by these definitions and consensus, primary care providers are health care clinicians who provide billable and reimbursable services to help improve the overall health of a population through implementation of primary, secondary, and tertiary prevention strategies. These services and prevention strategies integrate within practices and aim to decrease morbidity and mortality rates in the population.

Evidence-Based Screening

Evidence-based screenings are secondary prevention strategies that detect illnesses for early intervention and improved outcomes. The accessibility of primary care providers to patients and communities places them in a singular position to implement screenings for physical and mental health across a wide age range in their patient populations. With the current shortage of mental health providers and multiple medically underserved areas, primary care providers help identify and manage a broad array of mental health conditions at increasing rates, while integrated medical and behavioral health care models have growing evidence in improving access and outcomes for patients, even for pediatric patients (Olfson, 2016; Hobbs Knutson, Meyer, Thakrar, & Stein, 2018).

Adolescence

Recent studies have examined how crude and simplistic divisions and definitions of ages can potentially limit the progress and application of medicine and scientific knowledge, increasing the difficulty in defining adolescence (Geifman, Cohen, & Rubin, 2013). While the National Library of Medicine defines adolescent between the ages of 13 to 18 years old for Medical Subject Headings (MeSH), the U.S. Preventative Services Task Force (USPSTF) applies the ages 12 to 18 years of age in their guideline recommendations for adolescent depression screenings (National Center for Biotechnology Information [NCBI], n.d.; Siu, 2016). Given the complex hormonal, neurochemical, developmental, and physical changes occurring during puberty, this DNP quality improvement project will define adolescence as the time between the onset of physiologic puberty and the legal age of adulthood, with respect to the age constraints recommended by the USPSTF (Siu, 2016; WHO, 1980). A major mental health illness occurring

during adolescence is depression, which can be screened for and quantified through use of a validated screening tool in primary care to help identify adolescents with depression (Johnson, Harris, Spitzer, & Williams, 2002).

Depression

Depression is a mood disorder and recognized medical illness that causes both physical and emotional symptoms like changes in neurotransmitter levels, decreased brain activity, smaller hypothalamus size, hopelessness, fatigue, feelings of guilt, difficulty concentrating, and even thoughts of death or suicide (Philip, Barredo, Aiken, & Carpenter, 2018; APA, 2013). This differs from the natural and appropriate process of sadness or grief from a loss, in that during grief or sadness an individual's self-esteem is maintained, and the sadness or painful feelings come in waves with positive memories interspersed (APA, 2013). Depression manifests commonly with feelings of worthlessness and self-loathing and can even cause noticeable changes to a person's speed of speech or movement (APA, 2013). There are other medical conditions that can mimic depressive symptoms like thyroid disorders, brain tumors, and a vitamin deficiency, which is why it is important for providers to completely and comprehensively evaluate patients who screen positive for depression (Cheung et al., 2018; Zuckerbrot et al., 2018).

Barriers to Screening

For primary care providers to effectively initiate and screen for depression, their attitudes, values, perceptions, and motivators need to be examined in the context of their current professional practices and practice settings. Understanding major perceived barriers to depression screening among providers in the practice will allow for the TPB to guide the

intervention and aims, improving the likelihood, or predictive power, for adoption of an improvement intervention (Perkins et al., 2007; O'Brien, Harvey, Howse, Reardon, & Creswell, 2016; Hobbs Knutson et al., 2018).

Literature Review

A current review of evidence from the literature is necessary to provide a comprehensive and well-developed DNP quality improvement project, especially one that focuses on utilizing a tailored educational program to increase provider knowledge regarding the adolescent depression screening.

The literature searches utilized PubMed. The first search used the key terms "adolescent depression screening primary care" yielded 1714 results. Inclusion criteria were refined to include: publications between January 1, 2013, and March 30, 2018, availability in English, and Human Species. This inclusion criterion yielded 502 articles of which 12 were found to be relevant to the specific nature of this DNP project's study purpose and question. Research studies were excluded if they were specific to one ethnicity, racial group, or chronic disease, did not apply to adolescents, took place in a country other than North America or Europe, were not peer-reviewed research, were not considered level 2c or higher evidence from the Arizona Health Sciences Library pyramid (Arizona Health Sciences Library [AHSL], 2018), or focused on tool validation or an intervention for adolescent depression. Clinical practice guidelines were excluded if they were apart of older guideline recommendations or if they were not a United States based clinical practice guideline. A second search of PubMed using the key terms: "educational intervention depression primary care providers" with the filters of publication date between January 1, 2013 to March 30, 2018, human species, and English language applied

resulted in 22 articles of which three were relevant to an educational intervention on depression screening for primary care providers. One study was excluded due to its focus on provider education specific to Latin America and the Caribbean. Due to the low return of results, a third search of PubMed using the search "practitioner education intervention depression primary care" which resulted in 72 articles initially with the filters of publication date between January 1, 2013 to March 30, 2018, human species, and English language applied. Additional filters restricting articles to meta-analysis, practice guideline, randomized controlled trial, and systematic review were then applied resulting in 27 results of which two were relevant, but one was excluded due to its focus only on geriatric depression rather than depression in general. This extensive search of the literature resulted in 16 articles pertinent to the proposed project purpose and study question are summarized in an evidence appraisal table (Appendix A).

Synthesis of Evidence

Secondary prevention in healthcare is aimed at screening for the early detection of diseases, disorders, illnesses, or conditions. When performed correctly, screening can lead to earlier initiation of treatment and improved outcomes for patients. When screening is indicated and does not happen a missed opportunity for diagnosis (MOD) occurs, which is a type of diagnostic error (DE) in that the possibility of failing to "establish an accurate and timely explanation of the patient's health problem(s) or communicate that explanation to the patient" occurred (IOM, 2015, p. 83). Studies include the following: five quantitative systematic reviews, two retrospective chart reviews, one randomized controlled trial, one qualitative descriptive study, one cross-sectional quasi-experimental study, one non-experimental quantitative study, three pre-test/post-test nonexperimental studies, and two quasi-experimental quantitative studies.

The emerging themes of the studies are: screening recommendations, perceived barriers to effective screening, and successfulness of evidence-based educational intervention programs.

Screening Recommendations

Screening for adolescent depression has been endorsed in several evidence-based practice guidelines because of its prevalence, associated costs, and the fact that early treatment and identification help reduce poor outcomes (Cheung et al., 2018; Formann-Hoffman et al., 2016; Haefner, 2016; NIMH, 2017; Rhew et al., 2016; Siu, 2016; Zuckerbrot et al., 2018). As primary care providers are often the first point of contact for many adolescents, they can help bridge treatment gaps in mental health for adolescent youth (Horwitz et al., 2015). Despite clinical practice guidelines recommending adolescent depression screening in a primary care setting, screening rates vary widely throughout the country and different practice settings leading to a missed opportunity for adolescent depression screening approximately 62% of the time (Rinke et al., 2017; Zenlea et al., 2014).

Primary Care Provider Barriers

Many primary care providers cite multiple barriers as reasons for not screening, diagnosing, or treating adolescent mental health problems (Horwitz et al., 2015; O'Brien, Harvey, Howse, Reardon, & Creswell, 2016; Radovic et al., 2015; Richardson et al., 2014). Primary care providers continue to cite inadequate training in treating mental health issues for adolescents, a lack of knowledge on adolescent depression, and limited time as reasons screening and identification remain inconsistent (Horwitz et al., 2015). Other providers cite the lack of mental health resources and providers for referral as a barrier to screening (Horwitz et al., 2015;

O'Brien et al., 2016). Also, many providers perceive parental and patient barriers to depression screening in adolescents (Richardson et al., 2014; Radovic et al., 2015).

Success of Educational Programs

Many factors, including barriers, have been examined to determine what correlates with best practices and increased adherence to adolescent depression screening (Lewandowski et al., 2016; O'Brien et al., 2016; Sinnema et al., 2015). Since inadequate training in adolescent mental health issues and a lack of knowledge are commonly cited reasons for inadequate and inconsistent screening, a targeted educational intervention specific screening for to adolescent depression can address and mitigate that barrier, (Cheung et al., 2018; Zuckerbrot et al., 2018). An evidence-based educational presentation on current recommendations for screening for adolescent depression should increase provider knowledge on screening. Use of financial incentives, quality measures, large organizational support and policies, protocols, and educational in-services and interventions have shown to help increase screening adherence (Burka, Van Cleve, Shafer, & Barkin, 2016; Lewandowski et al., 2016; Starkey, Wiest, & Amir, 2016; Taliferro et al., 2013; Zenlea et al., 2014). Educational reviews of policies and guidelines help providers build knowledge to be able to screen for adolescent depression (Burka et al., 2016; Falluco et al., 2015; Lewandowski et al., 2016; Starkey et al., 2016; Taliferro et al., 2013; Zenlea et al., 2014).

Both Falluco et al., (2015) and Sinnema et al., (2015) demonstrated that survey utilization could help understand providers' perceptions of barriers to adolescent depression screening. Furthermore, educational intervention programs designed to address commonly perceived barriers are effective in improving adherence to adolescent depression screening (Falluco et al.,

2015; Sinnema et al., 2015). Educational interventions and programs address barriers and equip providers with the knowledge, support, and resources needed to competently and consistently address adolescent depression needs (Burka et al., 2016; Bhatta, Champion, Young, & Loika, 2018; Falluco et al., 2015; Sinnema et al., 2015).

Strengths

The literature provides diverse insight and perspectives into the problem of adolescent depression including inconsistent screening practices, perceived barriers, and various methods to improve screening through training. The U.S. Preventative Services Task Force (USPSTF) provided a rigorously researched and evidence-based updated guideline in 2016 recommending the use of the Patient Health Questionnaire for Adolescents (PHQ-A) for screening all adolescents in primary care for MDD (Forman-Hoffmann et al., 2016; Siu, 2016). The American Academy of Pediatrics (AAP) updated their evidence-based guideline for adolescent depression in primary care (GLAD-PC) in 2018, reinforcing previous recommendations for annual screening for MDD in adolescents, as well as the need for comprehensive provider understanding of MDD (Cheung et al., 2018; Zuckerbrot et al., 2018). Having the consistency throughout the literature and recommendation from healthcare authorities like the USPSTF and AAP, educational interventions can help to increase provider knowledge, thereby increasing screening rates and reinforcing best practices.

Weaknesses, Gaps and Limitations

Despite research showing that screening leads to earlier detection, adolescent depression screening rates remain low due to a variety of barriers (Zenlea et al., 2014; Siu, 2016). While clinical practice guidelines from the USPSTF and AAP are helpful, there still exists a gap from

evidence to implementation in practice (Sinnema et al., 2015; Lewandowski et al., 2016). While some studies show promise for educational interventions of screening guidelines to help improve provider knowledge of guidelines and intention to screen, long-term evidence and of full adoption and complete integration into practice has not been studied (Sinnema et al., 2015; Burka et al., 2016; Lewandowski et al., 2016). Finally, further evaluation is necessary to determine if increased identification of depression leads to improved outcomes among adolescents into adulthood.

METHODS

Design

To best address the purpose of this DNP quality improvement project a one-group pretest-posttest quantitative design was used. An evidence-based educational intervention on the current recommendations for screening for depression in adolescents was developed and presented to primary care providers. This pretest, educational intervention, and posttest design measured changes after intervention on provider knowledge and intention (Moran, Burson, & Conrad, 2017). The Model for Improvement framework guided the intervention implementation and data analysis (Langley et al., 2009). Because this project is measuring the effect of an educational intervention on provider knowledge, the use of a pretest-posttest design allowed for examination of the effectiveness of the intervention (Polit & Beck, 2017).

Model for Improvement

The Theory of Planned behavior informed the methods and development of the DNP quality improvement project, while the Model for Improvement framework endorsed by the Institute for Healthcare Improvement (IHI) and developed by the Langley et al., (2009) and the

Associates in Process Improvement (API) guided the DNP quality improvement design itself, prior to the project entering the implementation phase. The Model for Improvement allowed the DNP quality improvement team to set clear aims that illustrated the intended accomplishment, measures that recognized a change as an improvement, and selected the change or intervention to test that resulted in improvement (Langley et al., 2009). See the framework illustrated below in Figure 6.

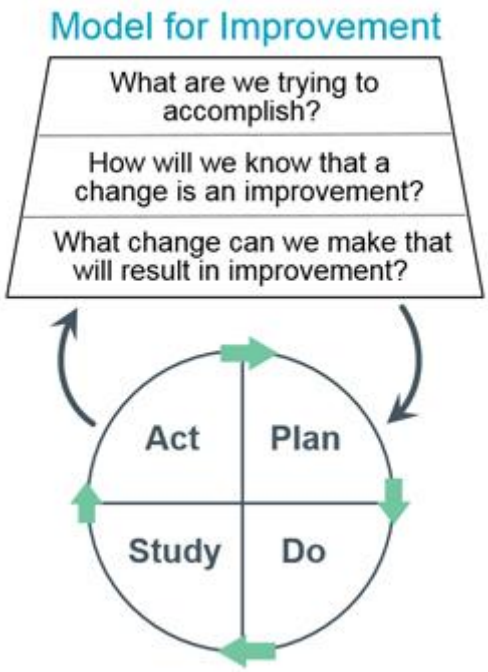

FIGURE 6. Model for Improvement and PDSA Cycle (Wiley, 2009).

The Model for Improvement, developed by Langley et al., (2009) and strongly endorsed by IHI is comprised of seven steps, four of which encompass what is known as the PDSA cycle (Plan-Do-Study-Act). The Model for Improvement is utilized in improvement science and stems from the work of W. Edwards Deming, which focused on management principles to help

increase quality while reducing costs (IHI, 2018). When applied in a healthcare setting for a DNP quality improvement project, it can also focus on improving patient healthcare outcomes.

The Model for Improvement has seven steps, separated by two distinct parts. The first three steps are questions and can be completed in any order. Primarily, the first step is defining the aim of the project or establishing and specifying what the project will try to accomplish (Langley et al., 2009). This project aimed to increase provider knowledge of adolescent depression, including risk factors, screening, and the new AAP guidelines, while also increasing provider intention to screen in their personal practice. The next step was to establish measures and confirm objectively that a change occurred and whether it was an improvement (Langley et al., 2009). This DNP quality improvement project utilized a pretest-posttest method to measure both objective knowledge before and after the intervention; Also, survey questions based on the theory of planned behavior were administered in conjunction with objective knowledge measurement to determine changes in attitude, perceived behavioral controls, subjective norms surrounding adolescent depression screening occurred. The third step in the first part was selecting something to change or addressing what change could be made to make an improvement (Langley et al., 2009). Many times, team members who work within the clinic or who have experience with similar DNP quality improvement processes can provide insight, ideas, and feedback to help guide what should be changed (IHI, 2018). In this case, an educational intervention was implemented. Key stakeholders involved in project implementation included the various providers and office manager from Just Kids Pediatrics, however the provider left the practice just prior to project implementation.

The second part of the Model for Improvement is what is commonly called the PDSA cycle, or Plan-Do-Study-Act (Langley et al., 2009). This portion must be completed in the exact order, but after each cycle can be refined and changed. The PDSA cycle was used to test the change before, during, and after implementation. The first portion planed the change including when it would occur, how many would be involved in the first test cycle, and who would be involved. This project outlined the plan for testing the change, and the implementation, or do, the planned change. With implementation, or the second step of the PDSA cycle comes studying or observing the results of the change; what worked well, what barriers were encountered, etc. (Langley et al., 2009). Finally, after studying the results, the last portion of the cycle was to act on what was learned, or to refine the plan. Due to time constraints, this DNP quality improvement project only completed one test cycle; however, it was sustainable and feasible for the practice to continue the project by taking the results and continuing to refine and improve the knowledge of adolescent depression and rates of screening. Because the education intervention and survey was delivered via online technology, dissemination after refinement is potentially more attainable and more practices may benefit from the evidence-based educational intervention.

Setting

The setting was a private pediatric group, Just Kids Pediatrics, consisting of three clinics in the greater Oklahoma City area. One clinic resides in the northwest area of Oklahoma City, an area regarded as more affluent and economically advantaged. Another clinic was located on the southwest side of Oklahoma City in an area associated with more socio-economic problems. And, the third clinic served children in the city of Moore, Oklahoma, which is a suburb of

Oklahoma City, and is in an area associated with a mixture of diverse socio-economic factors (Just Kids Pediatrics, n.d.). Written authorization was obtained and can be found in Appendix B.

Participants

Participants were recruited from a convenience sample of the providers from the Just Kids Pediatrics practice group at each of the three clinics. Criteria for participation included: (a) being employed by Just Kids Pediatrics; (b) having an advanced practice degree as defined by the Social Security Act of 1996; and, (c) providing primary care to adolescents between the ages of 11 and 18 years old. This inclusion criteria was chosen because they align with the project aim of improving primary care provider knowledge of adolescent depression screening based on the recently updated clinical practice guideline. Currently the practice has 14 providers including one Doctor of Osteopathy (DO), one Physician Assistant (PA), six Nurse Practitioners (NP), and six Doctors of Medicine (MD), (Just Kids Pediatrics, n.d.). All providers were invited to participate in the project.

Intervention

The intervention for this DNP project was an evidence based educational presentation focusing on screening of adolescent depression in primary care, (Appendix G). The educational presentation included information from the current literature, American Academy of Pediatrics (AAP), and U.S. Preventive Services Task Force guidelines on adolescent depression screening in primary care. The educational intervention was developed using adult learning theory and professional development recommendations from the CDC's professional development and training series (Borgogna & Fahrunbruch, 2017). To practice adult learning principles, the educational intervention began with an overview of the presentation, focused on what the

providers need to know and have previous experience with, and engaged the learners utilizing self-check progress reflection and application questions (Borgogna & Fahrunbruch, 2017). The material focused on the importance of adolescent depression screening, indications for screening, screening tools endorsed by the AAP, and how to implement screening into provider practice. Slides were designed to remain simple and not overwhelm providers with details that were discussed in the voice overlay, allowing the bulleted information to help focus on the key points of the education (Borgogna & Fahrunbruch, 2017). Based on findings in the literature that educational training programs help improve provider knowledge and screening practices, the educational intervention addressed commonly cited provider barriers to adolescent depression screening (Taliaferro et al., 2013; Falluco et al., 2015; Sinnema et al., 2015). This included knowledge and understanding of risk factors, how depression manifests in adolescence, recommended screening methods, and how to implement screening in practice. Addressing barriers with possible solutions promoted feasibility and adoption of the information (Finkelman, 2018). The intervention used PowerPoint and addressed only a portion of the updated GLAD-PC guidelines from the AAP; however, further development to address more of the guideline updates and recommendations could be developed in the form of personal development modules in future PDSA cycles at the practice sites.

Ethical Considerations

Approval for this project was obtained from the University of Arizona College of Nursing Departmental Review Committee. Institutional Review Board (IRB) exemption was obtained stating that the project does not require oversight by the University of Arizona, along with all necessary IRB forms and documents (Appendix C).

Respect for Persons

The project did not involve working with any vulnerable groups such as incarcerated persons, children under the age of 18, pregnant women, nor the mentally, educationally, or economically disadvantaged persons. Sensitive information from electronic health records was not used, and questioning did not include the identity of provider or patients. Participants' anonymity was ensured with the electronic platform, Qualtrics (2018), which allowed for anonymous survey responses. Participation and response to the survey were voluntary, an important principle of autonomy, and providers were given full disclosure about the project and information to participate (Polit & Beck, 2017). Additional participant anonymity protections included allowing project participation without disclosing demographic information if desired.

Justice

Justice was ensured by recruiting providers who benefited from the educational intervention and who had direct contact in their practice with the targeted population group. The project did not recruit or unfairly target a population, ensuring justice through the equitable selection of participants from the project site. Furthermore, the project utilized inclusion and exclusion criteria that were both fair and integral to the design of the DNP quality improvement process, helping to maintain the ethical principle of justice. As this project aimed to increase provider knowledge, all providers meeting the project criteria received an invitation to participate and were not unfairly coerced or forced into participating (Polit & Beck, 2017).

Beneficence

Beneficence refers to the proper attention to maximize benefits and minimize harm to participants of this DNP quality improvement project, which this project design accomplished.

Projected benefits to the project included increased awareness and knowledge of the updated AAP GLAD-PC to screen, treat, and diagnose adolescent depression, and potential strategies to overcome barriers to effective screening and treatment of adolescent depression not previously considered. Potential risks included discomfort in self-reporting attitudes about support and personal professional practice and inconvenience to schedules as surveys and webinars take time. The project was designed to ensure safety and accomplish the project purpose to increase primary care providers knowledge of and intent to screen for adolescent depression based on the current guidelines.

Data Collection

Survey Design

The evidence-based educational intervention was framed by a pre-test and post-test survey for comparison of effectiveness. Both surveys collected five demographic questions such as gender, age, years in practice, and provider educational background; three Likert-based questions allowed providers to rate their knowledge level on adolescent depression screening; and five multiple choice questions tested material directly covered in the educational intervention (Appendix E & H). The questions used a Likert-scale for providers to rate their agreement or disagreement with a statement, allowing for dimension in responses (University of Wisconsin, 2010). This information allowed providers to self-rate their current knowledge level before and after the evidence-based educational intervention to determine if a change occurred in providers self-rated knowledge level on adolescent depression screening. Additionally, both surveys included multiple choice questions to measure provider knowledge of adolescent depression and national guideline recommendations. The knowledge questions were multiple choice with only

one correct answer to avoid confusion and an overly time-consuming survey (University of Wisconsin, 2010). The knowledge-based questions linked directly to the educational content discussed and remained consistent from the pre-test to the post-test. The post-test survey included two open ended question allowing for feedback on the presentation, since an open-ended question allows for valuable information that can guide the next planning phase for follow-up PDSA test cycles (University of Wisconsin, 2010).

Delivery of Content

The project utilized the online survey platform Qualtrics to deliver a link anonymously via email for the pre-test and post-test survey to providers in the practice. Email addresses for providers were obtained from the director of nursing, who approved the project's implementation. The office manager informed the providers of the incoming invitation to participate, before this author sent an email invitation containing the project disclosure, link to Qualtrics for the pre-test, educational intervention, and post-test. This email was sent through Qualtrics. The approximate time to complete the pre-test, educational intervention, and post-test was twenty minutes.

Email distribution through the Qualtrics mailer ensured respondent identifying information was not recorded, and an opt out link accompanied the emails. The email contained the disclosure form for participants (Appendix D), as well as a link to the pre-test survey (Appendix E), the educational PowerPoint (Appendix F), and the post-test survey (Appendix H). This initial email marked day 1 of the project. A survey reminder email was sent after four days and again 24 hours prior to the survey closing (Appendix G). Data collection occurred over seven days, with the reminder email sent at three days prior to the survey ending and again 24

hours prior to closing. Qualtrics survey platform design ensured that participants completed the pretest and intervention prior to allowing for a posttest. A second link after completion of the posttest allowed participants the option to provide a mailing address if they wanted to receive a $15 gift card for their time. This did not link to their surveys and gift cards were mailed after the survey has completely closed.

Data Analysis

Since the demographic information utilized nominal, ordinal, and ratio responses, simple percentages were used to help illustrate the parameters of the population of providers (Polit & Beck, 2017). The second portion of the survey used Likert-scale data allowing for quantitative statistical analysis (Polit & Beck, 2017). Proposal planned to use IBM statistical software platform SPSS to analyze the information for the project with the Wilcoxon matched pairs signed rank test (IBM Analytics, 2018). The Wilcoxon matched pairs signed rank test is a non-parametric statistical analysis that would have allowed for comparison of the participant group at two time points: before and after the educational intervention. However, given the small number of respondents and ability to illustrate the improvement and project utilizing more basic statistical methods, the author chose not to utilize the Wilcoxon matched pairs signed rank test. The five questions measuring objective knowledge of the guidelines in each survey were scored using traditional educational percentage of correct answers to determine if any increases in knowledge occurred with a goal of 15% increase in scores overall. Finally, the two open ended questions on the posttest survey employed content analysis to examine participant suggestions on how to improve the evidence-based educational intervention for the next PDSA-cycle.

Resources

DNP quality improvement projects require planning, funding, and various resources for implementation. There were several resources available to the author at no cost, which are reviewed subsequently. For the proposed project evidence-based information on adolescent depression from the U.S. Preventative Services Task Force clinical practice guideline, the American Academy of Pediatrics GLAD-PC guideline, and the AAP GLAD-PC toolkit were utilized for development of the educational intervention. Evidence-based educational information from ProjectTEACH NY, the AAP GLAD-PC guideline, and the AAP GLAD-PC toolkit were utilized to develop the pre-test and post-test knowledge measurement questions. Ajzen's (n.d.) guide for constructing a Theory of Planned Behavior questionnaire was utilized to develop the pre-test and post-test behavioral beliefs, normative beliefs, and control beliefs questions. The Qualtrics survey platform was used for data collection and intervention distribution and was available free of charge to students at the University of Arizona. PowerPoint software being utilized for the development of the educational intervention was also available at no cost to the author. The use of these free resources helped to decrease the project budget, allowing for a cost effective DNP quality improvement project.

RESULTS

Findings

Demographics

Out of the 15 providers invited to participate, six completed the pre-test survey (Appendix E) and only five completed the intervention and post-test survey (Appendix H). Demographic information (Table 1) depicts the characteristics of study participants who

completed both the pre-test and post-test. One participant was male (N=1, 20%), while four were female (N=4, 80%); two participants were between the ages of 20 to 35 years old (N=2, 40%), and three were between the ages of 36 to 50 years old (N=3, 60%). One participant was a Physician's Assistant (PA) (N=1, 20%), while the remaining four participants were Nurse Practitioners (NP) (N=4, 80%); no physicians participated. Three participants had less than five years of practice (N=3, 60%) and two had between 6 to 10 years of experience in practice (N=2, 40%). Two participants estimated seeing 11 to 15 adolescent patients per month (N=2, 40%), another one estimated seeing 16 to 20 adolescent patients per month (N=1, 20%), and two estimated seeing more than 20 adolescent patients per month (N=2, 40%).

TABLE 1. *Participant demographics.*

Gender	Female		Male		Other
Participants (N=5)	80% (N=4)		20% (N=1)		0% (N=0)
Age	20-35		36-50		>51
	40% (N=2)		60% (N=3)		0% (N=0)
Type of Provider	Physician's Assistant		Nurse Practitioner		Physician
	20% (N=1)		80% (N=4)		0% (N=0)
Years in	0-5		6-10		>10
Practice	60% (N=3)		40% (N=2)		0% (N=0)
Number of	0-5	6-10	11-15	16-20	>20
Adolescents/month	0% (N=0)	0% (N=0)	40% (N=2)	20% (N=1)	40% (N=2)

Self-Report of Knowledge

After entering demographic information providers were asked to rate their agreement with statements on: 1) knowledge of indications to screen for adolescent depression; 2) knowledge of common risk factors associated with adolescent depression; and, 3) knowledge of AAP recommended adolescent depression screening tools. Three questions were rated using a five-point Likert scale (5= strongly agree; 4= somewhat agree; 3= neither agree nor disagree; 2=somewhat disagree; 1= strongly disagree), and the results of those averages are displayed

below in Figure 7. Six providers completed the pre-test survey, but only five providers completed the post-test survey questions. Because this participant withdrew from the project prior to completion of the evidence-based educational intervention, their responses have been excluded from results.

The first question asked providers to rank their agreement with the statement, “I know how to identify indications to screen for adolescent depression.” Pre-test responses included four providers marking somewhat agree (N=4) and one provider marking somewhat disagree (N=1). After the intervention, three providers marked strongly agree (N=3), one provider marked somewhat agree (N=1), and one provider marked neither agree nor disagree (N=1). According to the individual responses, four of the five providers increased by one point of the Likert-scale from the pre-test to the post-test, and one provider responded the same after the educational intervention. The results comparing the pretest to posttest responses can be seen in Figure 7 below.

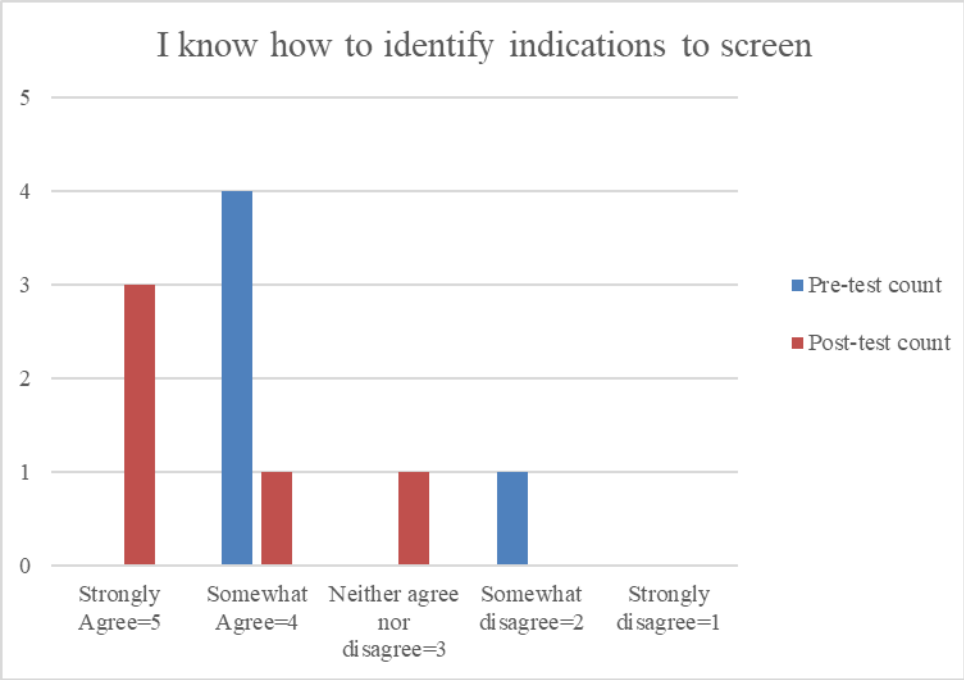

FIGURE 7. Indications to screen.

The second question asked providers to rank their agreement with the statement: "I know common risk factors associated with depression among adolescents ages 12 – 17." On the pre-test survey, one provider marked 'strongly agree' (N=1, 20%), three providers marked 'somewhat agree' (N=3, 60%), and one provider marked 'neither agree nor disagree' (N=1, 20%). For the post-test survey three providers stated they 'strongly agree' (N=3, 60%), one provider marked 'somewhat agree' (N=1, 20%), and one provider marked 'somewhat disagree' (N=1, 20%). Two of the providers remained the same after intervention while two providers increased in agreement by one point and one provider decreased in agreement by one point. The results comparing the pre-test to post-test responses can be seen in Figure 8 below.

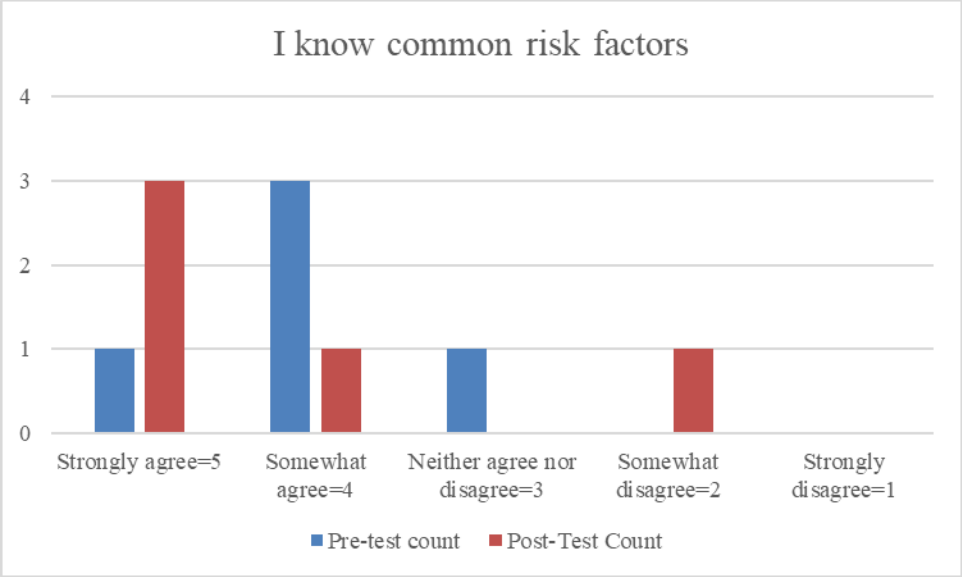

FIGURE 8. Risk factor knowledge.

The final five-point Likert-scale question providers were asked was, "I know what adolescent depression screening tools are currently recommended by the American Academy of Pediatrics." During the pre-test three providers selected 'strongly agree' (N=3, 60%), one selected 'somewhat agree' (N=1, 20%), and one selected 'somewhat disagree' (N=1, 20%). After the educational intervention, of the five providers that responded, three selected 'strongly agree' (N=3, 60%), one selected 'somewhat agree' (N=1, 20%), and one selected 'somewhat disagree' (N=1, 20%). Three of the providers remained the same after the educational intervention while one provider decreased in agreement with the statement by one point and another increased in agreement by one point. The results comparing the pre-test responses to the post-test responses can be seen below in Figure 9.

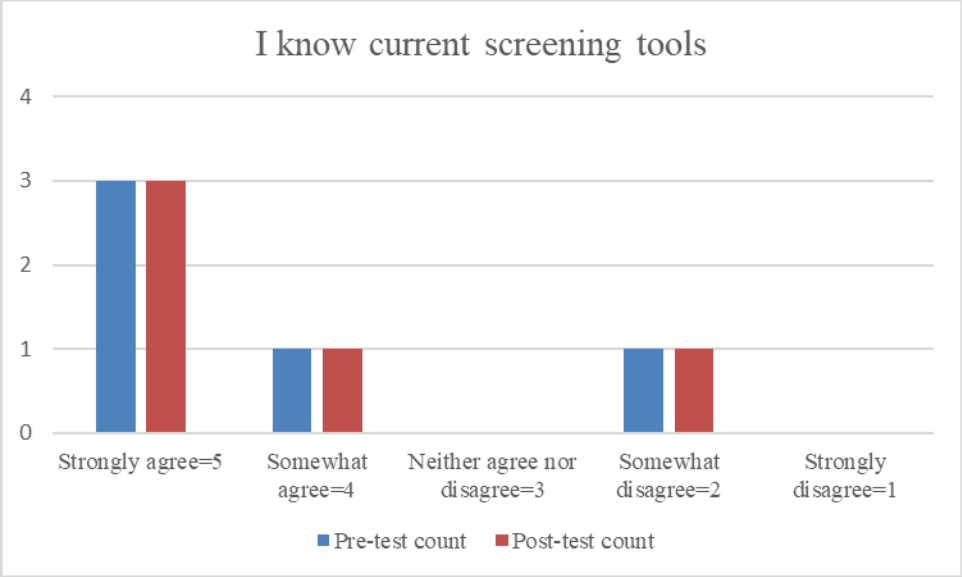

FIGURE 9. Screening tool knowledge.

Knowledge Based Quiz

After answering the Likert scale questions, participants filled out a five-question multiple choice quiz covering material directly reviewed during the evidence-based educational presentation. Participants completed the pre-test with an overall group average score of 57%, which increased to 80% after the educational intervention (Figure 10). This is a 23% increase in average test scores for all participants after the evidence-based educational intervention. However, when comparing individual scores, two participants received the same scores on the pre-test and post-test quiz, one participant's score decreased, and two participants' scores increased.

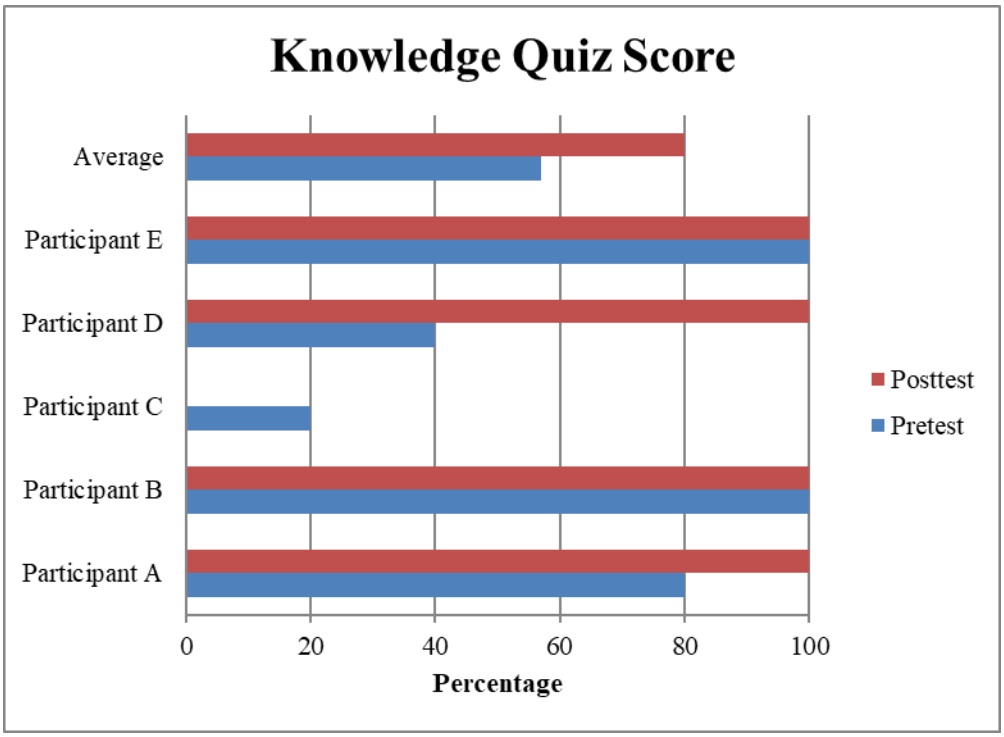

FIGURE 10. Knowledge quiz score.

Feedback

The project concluded with two open-ended questions allowing providers to give feedback. Three responded to the question, “what did you find beneficial about the presentation?” One provider stated the powerpoint presentation, another the PHQ-2 recommendation, and a third found the crisis text line recommendation beneficial. Only two participants gave feedback on how the project can be improved for future presentations. One participant suggested further next steps and other helpful ways to easily implement screening. The other participant recommended defining the GLAD-PC acronym, and providing more information or a folder with resources for families whose children are diagnosed with depression.

DISCUSSION

Summary

The purpose of this DNP quality improvement project was to increase primary care provider knowledge about indications for adolescent depression screening. The use of evidence-based educational interventions has been established as an effective method for delivery of information to adult learners (Lewandowski et al., 2016; O'Brien et al., 2016; Sinnema et al., 2015). The primary aim to increase knowledge within a one week time frame by 15% was successful. The project demonstrates that participation in evidence based educational interventions was associated with improvement in adolescent depression knowledge. Additionally, providers' self report on the Likert-scale question "I know how to identify indications to screen for adolescent depression," met the goal to increase primary care provider knowledge about indications for screening. Additionally, two providers improved their knowledge of common risk factors for adolescent depression, and one improved their knowledge of recommended screening tools. The findings are consistent with the effectiveness of QI projects and evidence-based educational interventions for providers, but show that more emphasis on risk factors and screening tools may be helpful in future PDSA test cycles.

According to the Theory of Planned Behavior (TPB), a person's attitudes, subjective norms, and perceived behavioral controls all contribute and merge together to determine a person's intention to perform a behavior (Ajzen 1991; Fishbein & Ajzen, 2010; Burgess et al., 2016; Perkins et al., 2007). Background factors such as providers' individual differences, knowledge, values, and personality help to form the behavioral, normative, and control beliefs that precede an individual's attitudes, subjective norms, and perceived behavioral control (Ajzen

& Sheikh, 2013; Ajzen, 2011). The project was designed to increase provider knowledge to positively impact providers' attitudes, subjective norms, and perceived behavioral controls leading to increased intention to screen for adolescent depression. Further questions assessing intention to screen or adopt changes learned in the evidence-based educational intervention would have provided more information on the impact of the project.

Limitations

Several project limitations are notable, including the lack of generalizability due to the specific nature of quality improvement projects and its tailored design specifically for the practice. Additionally, less than half of invited providers participated, none of which were physicians. This was discussed and potentially attributed the lack of face-to-face communication since this student lives in Houston, TX and the project site was in Oklahoma City, OK. Additionally, the physician member of the QI team left the practice for a new role with another clinic, which also may have impacted the physician buy-in of the project, as all other stakeholders in the QI team were from administration and nursing roles. A brief educational presentation during a staff-meeting might have increased engagement and exposure of providers to the educational intervention. Moreover, the knowledge measurements were based on self-report which may allow for overrepresentation of provider knowledge and skill. Furthermore, the knowledge quiz questions utilized "all of the above," and were the same on both the pre-test and post-test, potentially allowing for test-retest score increases. In addition, some providers scores did not improve in self-rating of knowledge and one quiz score declined after the evidence-based educational intervention. This can possibly be attributed to the speed at which material was covered during the evidence-based educational presentation, or due to a need for more clarity in

the educational content. Since feedback from the open-ended questions focused on project content (rather than the design of the powerpoint and delivery of information), the question allowing participants to give feedback was possibly unclear, resulting in only two responses. Future presentations may look at separating the question into specific feedback on project content versus design of the education (i.e., speed of education delivery, jargon, clarity of slides, etc.). Finally, the American Academy of Pediatrics was developing an accompanying GLAD-PC toolkit to accompany the guideline. It included screening tools, and resources to help implement the guideline into primary care practices. These limitations can be addressed and discussed during the development of future PDSA cycles at the practice site.

Future Implications

Project findings were shared with members of the QI team from the clinic with participants' demographic information withheld. Suggestions given from the open-ended questions were discussed. The QI team shared feedback that staff members appreciated the opportunity to participate in the education, but did not have any suggestions on reasons for the lack of physician participation. Adjustments of the project for the clinic's use of this evidence-based educational intervention for future PDSA cycles exceed the scope of this project, but strategies to increase physician buy-in and participation were reviewed. The educational intervention was intentionally kept to less than seven minutes to optimize attention and minimize the amount of time busy providers would need to spend reviewing information. Because the entire GLAD-PC guideline is much more comprehensive, several small educational interventions can potentially be developed covering the different topics and aspects of the complete guideline, including next-steps after screening. The evidence-based educational intervention gave providers

new resources and strategies they can utilize in their daily practices if desired. Further resources via the GLAD-PC toolkit were included to allow the clinic to explore other potential practice changes.

Conclusion

Quality improvement projects help develop strategies to increase best practices, leading to improvements in patient outcomes. Nurse-led improvement programs like this contribute to healthcare literature and the advancement of the nursing profession by developing patient-centered interventions applicable to a wide variety of providers. Given the increasing prevalence of adolescent depression coupled with the shortage of adequate mental health access, primary care providers must become knowledgable about screening and assessment of adolescent depression. Use of evidence-based educational interventions in electronic format allows for fast dissemination of information and flexibility for providers to complete learning when time allows. In light of the overwhelming need for adolescent mental health knowledge compared to number of providers, electronically distributed evidence-based educational interventions allow for many providers to receive education in areas where an in-person in-service is not feasible. The use of evidence-based educational interventions will promote early identification and treatment of adolescent depression leading to improvements in patients lives and better outcomes overall in a flexible, self-directed format.

APPENDIX A:

EVIDENCE APPRAISAL TABLE

Project Question: Are primary care providers of adolescents likely to change their practice after receiving education on adolescent depression and current screening guidelines?

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
Bhatta, S., Champion, J.D., Young, C., & Loika, E. (2018). Outcomes of depression screening among adolescents accessing school-based pediatric primary care clinic services.	Research questions: Will the implementation of a depression screening protocol in a school-based pediatric primary care clinic improve early detection and referral of adolescents aged 12-18 years?	The Donabedian model was used as a conceptual framework to assess outcomes through three factors: structure, processes, and outcomes. It integrated the Plan-Do-Study-Act to test changes.	Quasi-experimental retrospective chart review. An evidence based screening protocol and algorithm was developed, followed by a formal educational training to ensure understanding of the protocol, before initiation of the protocol at a primary care clinic.	(N)=256; All adolescents between the ages of 12 and 18 years old were screened with the protocol, excluding those presenting for a sport physical or vaccination. Gender was equally distributed (female, n=128; male, n=139); Age stratification was equally distributed (12-14 yr, n=133; 15-18, n=125). Ethnicity was predominantly Hispanic (n=227).	Socio-demographic variables including: age, gender, ethnicity, payer source, reason for clinic visit, if depression screening was performed using the PHQ-9, MDD screening result, MH related treatment plan, referral, referral source, MH history, symptoms of depression, and chronic medical problems.	After education and initiation of the protocol, only 56.3% of eligible patients (n=144) had been screened utilizing the PHQ-9. Staff compliance with screening was documented weekly for 16 weeks, and 100% compliance occurred during weeks 7 and 14, coinciding with new PDSA cycle implementation. Screening rates declined during week 16 due to the large number of sports physicals performed out of clinic. This study showed that despite barriers and initial costs of implementation, the educational intervention and

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						protocol did improve rates of screening and mental health referrals.
Burka, S.D., Van Cleave, S.N., Shaver, S., & Barkin (2013). Integration of pediatric mental health care: an evidence-based workshop for primary care providers.	Will an intensive workshop on pediatric mental health care increase pediatric primary care providers' knowledge, comfort and practice?	N/A	Pretest/posttest design was used to assess pediatric primary cares knowledge, comfort and practice in the evaluation and management of pediatric patients with attention deficit-hyperactivity disorder, depression, anxiety, and autism spectrum disorders before intervention. After intervention the knowledge test was administered, while the practice and comfort level survey was sent after 1 month	A convenience sample of participants was recruited from the Pennsylvania AAP Medical Home Initiative Practices, and from three Pennsylvania NP organizations. Thirty female pediatric primary care providers participated including physicians, nurse practitioners, physician's assistants, and registered nurses. The majority of participants worked full time (80%), and indicated pediatric patients	A 15-question multiple choice test was used to assess participants' level of knowledge, while a 19 question survey was used to assess level of comfort and current practices.	Knowledge test scores increased from 9.19 (SD=1.833) to 12.23 (SD=1.8333) after intervention (p<0.0001), while comfort and practice increased from 34.6 (SD=21.564) to 44.15 (SD=22.797) (p<0.0001) showing that educational intervention is an effective method of training primary care providers on mental health care.

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
			electronically.	comprised at least half of their practice (73.33%).		
Cheung et al., (2018). Guidelines for adolescent depression in primary care (GLAD-PC): Part II. Treatment and ongoing management.	To update guideline recommendations regarding treatment and ongoing management of adolescent depression in the primary care setting.	N/A	Systematic literature review.	A total of 8 relevant articles were utilized after excluding research conducted outside of primary care facilities or that using solely adult populations.	Evidence was graded using the University of Oxford's Centre for Evidence-Based Medicine system.	Mildly depressed youth require active monitoring, however treatment with evidence-based medication and psychotherapeutic approaches are indicated in moderate and/or severe depression. Close monitoring of side effects is necessary, and consultation or co-management of the adolescent's care with mental health specialists is imperative. Finally, ongoing efforts to track outcomes need to occur and specific steps are to be taken when partial or no improvement occurs after initial treatment initiation.

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
						The basis of these recommendations lay on integrative care or collaborative plans to facilitate contact with mental health providers.
Falluco et al., (2015). Primary care provider training in screening, assessment, and treatment of adolescent depression	Hypothesis: An enhanced training program for PCP's in the screening, assessment, and treatment of adolescent depression (SAT-D) will increase the frequency of PCP depression screenings as reported by adolescent patients at well visits and also improve PCP SAT-D confidence and knowledge.	N/A	A pre-test/post-test design was used to assess reports of depression screenings before intervention, and at 2-8 months, and 18-24 months. The study also measured PCP self-reported confidence and objectively tested knowledge on SAT-D immediately after education, and at 4-6 months afterward.	A complete number of participants was not given; however, 31 PCPs attended the enhanced training program (n=31). Twenty-five were pediatricians and 6 were Pediatric nurse practitioners. 68% were women. Only 21 participated at long term follow up due to data collection burden.	Data collection used the Adolescent Report of PCP Practices (AROP), an anonymous 19-item survey with yes or no questions. Secondary outcome measurements were measured with a 17-item Likert scale questions to determine provider self-rated confidence. Objective provider knowledge was based on an 8-question multiple choice quiz using clinical vignettes.	Findings showed that depression screening practices increased and remained increase at short and long term follow up. PCP confidence and knowledge rose immediately after training and was maintained at the 4-6 month follow up. These results indicated that training increased screening for adolescent depression, which was attributed to the improved confidence and knowledge. Because screening rates remained increased, it suggests

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						screening for adolescent had been adopted into PCP practice.
Forman-Hoffman, et al., (2016). Screening for major depressive disorder in children and adolescents: a systematic review for the U.S. Preventive Services Task Force.	Purpose: To update the 2009 USPSTF systematic review on screening for and treatment of MDD in children and adolescents in primary care.	N/A	Systematic literature review with data extraction and synthesis.	5 studies reviewed for screening tools accuracy in identifying MDD among adolescents in primary care. 6 trials evaluated treatments.	Use of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was utilized.	The PHQ-A and Beck Depression Inventory have reasonable accuracy and can be used to identify MDD among adolescents in primary care settings. Treatment with fluoxetine, combination fluoxetine and cognitive behavioral therapy, escitalopram, and collaborative care demonstrate benefits and are not associated with harm.
Horwitz, et al., (2015). Barriers to the Identification and Management of Psychosocial	Study Questions: Have perceived physician-child barriers changed between the 2004 American Academy of Pediatrics (AAP) periodic survey	N/A	This study is a quasi-experimental quantitative study using pre-existing data from two	In 2004 the population was the US non-retired members of the AAP (N=50,818),	Both surveys were pretested for clarity and approved by the AAP institutional review board (IRB). Questions included	Perceived barriers changed drastically from 2004 to 2013. Changed perceptions include an increase in physicians not

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/tools)	Findings
Problems: Changes from 2004 to 2013.	(PS) of perceived barriers for mental health (MH) and the 2013 survey? Have the physician, patient, and practice/organization characteristics associated with endorsing physician-child barriers changed over time?		separate random sample surveys. Both the 2004 and 2013 AAP PS questionnaires were available for 6 months and sent 7 times to selected members with an email reminder.	n=1600 were sent surveys, of which n=832 (52%) responded. In 2013 the number of US non-retired members of the AAP was 54,491 (N), n=1617 were sent surveys, and n=594 (36.7%) responded. Only pediatricians with completed residency training and who provided care were included in this study (687 in 2004; 510 in 2013).	sociodemographic characteristics, practice characteristics, lifespan MH questions, residency training and fellowship, interest in further education on diagnosing and treating MH problems, and community resources. 7 questions with a 5-point Likert scale assessed physician perceptions of barriers to identifying, treating or managing, and referring common MH problems in children and adolescents.	knowing about or not having children's MH services, a smaller number reported additional training or education for children's MH, and there was a decrease in interested learning about identifying or managing common pediatric MH disorders. Physicians reported barriers to treatment of lack of time to treat (which decreased, but was still the primary barrier identified), inadequate reimbursement, lack of confidence and perceived inadequate training to treat and manage pediatric MH diagnosis.
Lewandowski, et al., (2016). Screening for and diagnosis of	Hypothesis: Examination of large-scale, naturalistic data on screening and diagnosis will help to	Guided by the Centers for Medicare and Medicaid Services	Quasi-experimental design using retrospective	The number of unique adolescents ages 12 to 21, who	Measures came from depression diagnosis codes and Patient Health Questionnaie-	Across all departments (Pediatric primary care, adult primary

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depression among adolescents in a large health maintenance organization.	identify gaps in essential care practices related to identification of depression and provide an indication of the fit and possible value of depression quality measures in the context of current practice.	(CMS) Pediatric Quality Measures Program.	Electronic Health Record (EHR) data from a health maintenance organization.	had visits in primary and mental health care between 2010 and 2012. (N=44,342).	9-Modified (PHQ-9-M) scores. More specifically they identified adolescents with a PHQ-9-M score above the clinical cutoff with a subsequent new diagnosis of depression.	care, and mental health), the number of screenings increased 14-fold in pediatric primary care, 3 times in adult primary care, and decreased in the mental health department from 2010 to 2012. This also correlated to an increase in diagnosis of depression in both pediatric and adult primary care centers, and a decrease of new depression diagnosis in mental health departments. The study illustrates the potential for a mandated or policy backed quality measure to improve depression screening rates and timely diagnosis.
O'Brien, et al., (2016). Barriers to managing	The aim was to investigate and synthesize the available quantitative and	N/A	Systematic review. Exclusion criteria: not peer-	4,151 articles were identified (N), only 43 met	PRISMA guidelines were used. First the data extraction and	Common barriers were found in all three categories,

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child and adolescent mental health problems: a systematic review of primary care practitioners' perceptions	qualitative literature focusing on primary care practitioners' (PCP) experiences of barriers and facilitators to the effective management of child and adolescent mental health problems		reviewed, not in English, published after 1960, were themselves a review, case study, or meta-analysis, insufficient data, specific to psychotropic medications, discussed a specific intervention or training course, evaluated a specific tool, involved a population with a primary diagnosis not MH related, or looked at specific patient populations like ethnic groups.	criteria (quantitative, n=30; qualitative, n=13).	management were performed by two independent authors, methodological quality assessed, and then synthesized into categories of recognition and diagnosis, management, referral, and undifferentiated barriers. Both qualitative and quantitative data were synthesized to provide a comprehensive picture of findings.	including confidence, knowledge and skills, prioritization of mental health problems by PCP, resources, and family issues. Many providers lacked the tools needed, needed more support from other disciplines, lack of time to effective evaluation, and not enough visit times.
Radovic et al., (2015). Parents' role in adolescent depression care: primary care	Qualitative study examining the phenomena of primary care providers (PCP) perceptions of parental barriers to	Phenomenological theory	Using a qualitative descriptive design based on the Sandelowski	15 Primary care providers (n) were contacted from a larger cohort (N=58)	The semi structured interview scripts were used via telephone, and recorded transcripts were coded	PCP identified that integrated behavioral healthcare practice reduces the structural barrier of access to

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provider perspectives.	adequate adolescent depression treatment.		method, previous participants in another study, who expressed interest in providing additional comments were interviewed using semi structured scripts.	that had completed a previous study survey on adolescent depression treatment. They were all providers in a regional pediatric practice network utilizing an integrated behavioral healthcare model with over 46,000 adolescent patients.	using the Sandelowski qualitative description method and ATLAS.ti version 7 software.	mental healthcare services. This allowed investigators to focus on attitudinal barriers and differentiate between patient barriers and parental barriers. PCP perceptions of adolescent attitudinal barriers to care were teens perception of the disease and treatment. PCP perception of parental barriers were much different and themes of gatekeeping, or being the main factor between facilitation or denial treatment were prominent.
Rinke et al., (2017). Diagnostic errors in primary care pediatrics: Project RedDE.	Objective: to define diagnostic errors(DE) and missed opportunities for diagnosis (MOD) and estimate their frequency in a multisite cohort, both foundational steps for	N/A	A quasi-experimental quantitative study randomly assigned pediatric primary care practices to 3	25 practices (N) responded to recruitment through email mailing lists, quality improvement	Adolescent depression screening as a MOD only had recognition measures reported by the 8 clinics. 400 adolescent health supervision visits	Findings showed that out of 400 adolescents, 249 were not screened for depression (62%, with a range of 4% to 96% among the

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	reducing DE and MOD harm.		groups for data collection: DE of elevated blood pressure, DE abnormal laboratory values, or MOD of adolescent depression evaluation. After the practice received 1-hour educational instruction, slides, and written definitions describing the measures, a retrospective chart review was performed at baseline, 1 month, and 2 months.	newsletters, and direct referrals. 8 clinics were assigned to report data on adolescent depression (MOD, n=8).	were examined.	clinics). This suggests that a lack of adolescent depression screening occurs at a high rate, and due to the long-term morbidity associated with depression it is important to examine and implement quality improvement initiatives to reduce them.
Sinnema et al., (2015). Effectiveness of a tailored implementation program to	The effectiveness of an individually tailored implementation program in addition to standardized training and feedback on diagnosis and treatment of	N/A	Quantitative two group, general practice level clustered randomized control trial	46 providers from 23 practice groups (12 interventions, 11 control). 444 patients age 18	The extended Kessler 10 was the tool used in the study by both groups. Data from the four-dimensional symptom	Among the intervention group, the number of patients correctly diagnosed with anxiety or depression

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improve recognition, diagnosis and treatment of an anxiety, and depression in general practice: a cluster randomized controlled trial.	patients with anxiety or depression in general practice.		study. All practices received 1 day of standardized training and feedback prior to randomization. The practices were not blinded, but patients did not know if their practice was in the group receiving an additional tailored implementation program or not. The intervention group received an implementation strategy tailored to each clinic. The strategy was based on identified barriers by providers in the individual clinics.	years and older (control n=296; intervention n=198) were also included in a secondary outcome measurement. The intervention group was predominantly made up of rural practices, while the control group was predominantly urban.	questionnaire (4DSQ) was used in both groups to provide feedback to providers on appropriate diagnoses, treatment, and education. Patients functional status was measured by the World Health Organization's Disability Assessment Scale II (WHODAS II), while patients reported their experience of care for their mental health problems using the QUality of care Through the Eyes (QUOTE) of the patient scale.	was significantly higher than the control group (42% versus 31%). However, the secondary outcome measures showed no significant differences among the groups in the rates of antidepressant prescribing, referral to mental health services, or patient rated distress, anxiety, and somatization. Patients of the intervention group providers did receive significantly more frequent consultations, and showed a significant additional reduction in depressive symptoms 3 months afterwards. Intervention group patients also reported significantly more

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						positive experiences to accessibility of care and better education at the six months follow up than the control group.
Siu, A.L. (2016b). Screening for depression in children and adolescents: U.S. Preventive Services Task Force recommendation statement.	Key Question 1: Does screening for major depressive disorder (MDD) among children and adolescents in the primary care (or comparable) setting lead to improved health and other related outcomes overall and among subgroups defined by age, sex, or race/ethnicity? Key Question 2: Are depression screening instruments for children and adolescents accurate in identifying MDD in primary care settings overall and among subgroups defined by age, sex, race or race/ethnicity? Key Question 3: Does screening increase the proportion of children	N/A	Systematic evidence review	13 good or fair quality studies examining the accuracy of screening tests and effectiveness of treatment in children and adolescents with MDD in a primary care setting.	Evidence reviewed was weighted according to a rating scheme using predefined criteria. Data extraction, quality assessment, synthesis, and analysis was performed to determine recommendations.	Screening for MDD in adolescents is recommended when systems are in place to ensure accurate diagnosis, psychotherapy, and follow-up.

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	and adolescents identified with MDD overall and among subgroups defined by age, sex, race/ethnicity? Key Question 4: What are the harms of screening children and adolescents for MDD overall and among subgroups defined by age, sex, race/ethnicity? Key Question 5: Does treatment of MDD among children and adolescents identified in primary care improve health and other related outcomes overall and among subgroups defined by age, sex, race/ethnicity? Key Question 6: What are the harms of MDD treatment for children and adolescents overall and among subgroups defined by age, sex, race/ethnicity?					
Starkey, M., Wiest, D., & Qaseem, A. (2016). Improving depression care	Study goal was to examine the impact of the practice improvement online educational intervention and coaching conference calls on internal medicine	Study guided by the chronic care model developed by Wagner and colleagues.	Pretest/posttest design using a survey to measure what physicians believe they were	Participants were recruited from membership of the American College of Physicians	Data collection included a 38 question Likert-scale survey addressing practice patterns relating to screening for	587 charts were audited before intervention and 600 after intervention. Use of the PHQ-9 increased from

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through an online learning collaborative.	physicians' screening and management of patients with depression.		doing in practice and a chart auditing tool to document what was occurring in practice before and after intervention. The intervention consisted of an evidence-based educational module, online toolkit, and practice improvement coaching conference calls to promote group learning.	(ACP) using the ACP web site, annual meeting announcement, weekly newsletter announcement, and mass e-mail/mailings. A total of 39 physicians enrolled in the project, while 16 completed the study. Demographics were not disclosed in the article.	depression, patient education, knowledge of depression guidelines, duration and dose prescribing of antidepressants, assessment of adherence to treatment, use of a registry and case managers, and follow-up, consultation, or referral practices. The chart audit tool was designed to reflect current clinical guidelines and several performance measures developed by Physician Consortium for Performance Improvements.	17.6% to 60.8% after intervention, and antidepressants prescribing decreased from 84.2% to 79.8%. Follow-up of patients also increased from 68.7% to 83.2%. When the chart audit data was compared to physician beliefs about their practices the only overestimated beliefs focused on alcohol abuse screening, and substance abuse screening, both pre and post intervention. The study demonstrates improved depression screening practices for depression screening but shows that further work and investigation may need to be done for alcohol and substance abuse.

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Taliferro, et al. (2013). Depression screening and management among adolescents in primary care: factors associated with best practice.	Research Questions: (1) What similarities and differences exist across professions and disciplines related to factors associated with screening and managing adolescents experiencing depression? (2) What factors increase the likelihood of administering a standardized, written depression screening instrument to adolescents? (3) What factors increase the likelihood of asking about depressive symptoms when providing health supervision? And (4) What factors increase the likelihood of using best practices when managing adolescents experiencing depression?	N/A	Non-experimental quantitative study using an online survey. The survey consisted of 28 categories, with 92 potential response options including yes or no, multiple-choice, mark-all-that-apply, and 5-point Likert scales of agreement, level of preparation, and frequency of engaging in a behavior.	537 (N) primary care providers, including 260 family medicine physicians, 127 pediatricians, 96 family nurse practitioners, and 54 pediatric nurse practitioners were included in the study. Average years of licensure was 17 (SD =9.9), Predominantly practicing in a suburban setting (45%) versus an urban (29%) or rural (26%) area.	Bivariate tests and linear regressions were used to analyze data.	Across professions and disciplines the perceptions of feeling competent and prepared to address the assess concepts did not differ significantly. Most providers only screen high-risk patients after identifying warning signs (79%). 69% of PCPs reported usually/almost always asking about depressive symptoms when providing health supervision for adolescents, and most PCPs frequently used their clinical observation/overall impression to identify adolescents experiencing depression than other methods. Management practices were most likely to include a

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						follow-up, brief counseling, recommending lifestyle changes, and/or providing mental health referrals. Barriers reported include waiting times for referral to mental health providers, parent/or patient stigma concerns, lack of time, collaborative care, or available resources.
Zenlea, et al., (2014). Depression screening in adolescents in the United States: a national study of ambulatory office-based practices.	What is the frequency of depression screening for adolescents who did not already have a documented diagnosis of depression? What are patient-, provider-, and visit-level factors associated with depression screening during ambulatory visits to inform recommendations to promote screening?	N/A	Cross-sectional quasi-experimental qualitative study using data from the 2005 to 2010 National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Surveys	Office-based visits were the units of analysis, which was limited to adolescents ages 12 to 18 years of age who did not have a diagnosis of depression in pediatric or general medicine practices. A total of 143,280,182 weighted clinic	Documented depression screening only occurred in 0.2% of weighted clinic visits (95% CI 0.1-0.3). Hispanic adolescents were significantly less likely to be screened for depression (adjusted odds ratio [aOR] 0.2, 95% CI 0.1-0.7) compared to non-Hispanic white adolescents.	This study found that nationwide rates of adolescent depression screening are rare. Successful implementation strategies need to be developed including toolkits so that quality measures are met. The study also highlights regional and racial/ethnic disparities, showing a need for further

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			(NHAMCS).	visits were identified (N), and a total of 46,347 visits sampled	Regionally screening was highest in the northeast compared to the West (aOR 9.1, 95% CI 2.2-38.1). Screening was also 6.1 more times likely if there were no visits for the past 12 months versus 6 or more visits, and if stress management or mental health counseling was provided.	investigation into effective methods to address them.
Zuckerbrot et al., (2018). Guidelines for adolescent depression in primary care (GLAD-PC): part I. Practice preparation, identification, assessment, and initial management.	To update clinical practice guidelines to assist primary care providers in the identification, assessment, and management of adolescent depression.	N/A	Systematic literature review	A total of 8 relevant articles were utilized after excluding research conducted outside of primary care facilities or that using solely adult populations.	Evidence was graded using the University of Oxford's Centre for Evidence-Based Medicine system.	Annual universal screening for youth 12 and over at health maintenance visits is endorsed. Youth at high risk for depression should be screened and identified even outside of maintenance visits.

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						Utilization of PHQ-A should accompany patient and caregiver interviews and use of the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* criteria. Clinicians should educate and counsel families and patients about depression and their options, as well as develop a treatment plan. Safety plans within the home environment are strongly endorsed.

APPENDIX B:

SITE AUTHORIZATION LETTER

Just Kids Pediatrics
2921 SW 89TH STREET
OKLAHOMA CITY, OK 73159

April 18, 2018

University of Arizona Institutional Review Board
c/o Office of Human Subjects
1618 E Helen St
Tucson, AZ 85721

Please note that Ms. Meagan Davis, UA Doctor of Nursing Practice student, has permission of the Just Kids Pediatrics Clinic to conduct a quality improvement project at our facility for her project, "Adolescent depression screening in primary care."

Ms. Davis will conduct a survey of health care providers at Just Kids Pediatrics Clinic. She will recruit providers through email. The email will provide a description of the project, what they will be asked to do, the time involved, and a link to the online survey. Ms. Davis's activities will be completed by December 31, 2018.

Ms. Davis has agreed to provide to my office a copy of the University of Arizona Determination before she recruits participants. She will present aggregate results to the providers at their monthly staff meeting.

If there are any questions, please contact my office.

Signed,

Just Kids Pediatrics Clinic President

APPENDIX C:

THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL LETTER

THE UNIVERSITY OF ARIZONA
Research, Discovery & Innovation

Human Subjects Protection Program

1618 E. Helen St.
P.O.Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
http://rgw.arizona.edu/compliance/home

Date:	November 09, 2018
Principal Investigator:	Meagan Chase Davis
Protocol Number:	1811082192
Protocol Title:	Adolescent Depression Screening in Primary Care Practice
Determination:	Human Subjects Review not Required

Documents Reviewed Concurrently:

Data Collection Tools: *EDUCATIONAL INTERVENTION.DOCX*
Data Collection Tools: *Participant Posttest Survey.docx*
Data Collection Tools: *Participant Pretest Survey.docx*
Informed Consent/PHI Forms: *Recruitment email_Disclosure Form 11.8.docx*
Other Approvals and Authorizations: *Advisor Confirmation Email.pdf*
Other Approvals and Authorizations: *Site Authorization Letter.docx*
Regulatory Documentation: *Reminder Email.docx*

Regulatory Determinations/Comments:

- Not Human Subjects Research as defined by 45 CFR 46.102(f): as presented, the activities described above do not meet the definition of research involving human subjects as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention or interaction with the individual, or identifiable private information."

The project listed above does not require oversight by the University of Arizona.

If the nature of the project changes, submit a new determination form to the Human Subjects Protection Program (HSPP) for reassessment. Changes include addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the study activity. Please contact the HSPP to consult on whether the proposed changes need further review.

The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).

APPENDIX D:

DISCLOSURE

Adolescent Depression Screening in Primary Care

Meagan Chase Davis

My name is Meagan Davis, BSN, RN. I am a graduate student at The University of Arizona, in the Doctor of Nursing Practice program, focusing on Family Nursing Practice. I am conducting a quality improvement project using a pretest-posttest design with an educational intervention to identify knowledge and current practices that pediatric primary care providers have regarding adolescent depression screening. I am inviting you to participate because you are a pediatric primary care provider in a clinic that serves adolescents ages 12 to 18 years of age.

Participation in this project is voluntary; and you can withdraw from participating at any time. No foreseeable risks are associated with participating in this project. Survey responses are anonymous.

If you choose to participate take part in this project, you will be asked to complete the following steps:

- Step one: You will complete an anonymous online survey about adolescent depression screening then review an educational PowerPoint presentation, followed immediately by a posttest survey. Altogether, this initial phase will take no longer than approximately 20 minutes to complete.

- Step two: If you so choose, you may click on a second link that will not connect to the anonymous survey information and provide a mailing address for your gift card to be sent.

There are no foreseeable risks associated with participating in this project, but you will receive a $10 gift card for your time if you elect to do so. Again, all survey responses are anonymous.

All project participation is voluntary and refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. This information will be used only for project purposes and all responses are anonymous. By answering the questions, you are agreeing to allow me to use the information for completion of my DNP project. You may withdraw at any time from the project. In addition, you must complete all questions except demographic information, if you choose. By participating, you do not give up any personal legal rights you may have as a participant in this project.

For questions, concerns, or complaints about the quantitative descriptive project, you can reach me by email at meagandavis@email.arizona.edu, or by phone at (713) 591-2517.

Thank you for your time and consideration.
Respectfully,

Meagan C. Davis, DNP/FNP candidate

APPENDIX E:

PARTICIPANT PRE-TEST SURVEY

Participant Pre-test Survey

This survey is designed to assess provider knowledge regarding adolescent depression screening. Your opinions and/or individual responses are important. This survey is anonymous. Thank you for sharing your time in completing this survey.

Demographic Information:

1. Gender
   1=Female 2=Male 3=Other
2. Age
   1=20-35 2=36-50 3=>51
3. Years of Practice
   1= 0-5 2=6-10 3=>10
4. Type of Provider
   1=Physician 2=APRN 3=PA
5. Total number of adolescents (children between the ages of 12 and 18 years old) I see per month
   1= 0-5 2=6-10 3=11-15 4=16-20 5=>20

Please rank your agreement with the following statements.
Knowledge Questions:

6. I know how to identify indications to screen for adolescent depression.
   1=Strongly agree 2=Somewhat agree 3=Neither agree nor disagree 4=Somewhat disagree 5=Strongly Disagree
7. I know common risk factors associated with depression among adolescents ages 12-17.
   1=Strongly agree 2=Somewhat agree 3=Neither agree nor disagree 4=Somewhat disagree 5=Strongly Disagree
8. I know what adolescent depression screenings tools are currently recommended by the American Academy of Pediatrics.
   1=Strongly agree 2=Somewhat agree 3=Neither agree nor disagree 4=Somewhat disagree 5=Strongly Disagree

Please respond to the following questions with only one answer choice:

9. Which patient should be assessed for depression?
   a. 16-year-old Male, with a parent complaint of, “He yells at me, won’t talk to me, and has been missing school”
   b. A 14-year-old Female who tells you, “I think the world would be a better place if I had never been born”
   c. A 17 year old Female whose parent asks, “Can you test her for mono, she sleeps all the time and says she doesn’t have the energy to get out of bed”
   d. All of the above

    e. None of the above
10. Adolescents with depression can exhibit:
    a. Irritability
    b. Social isolation or withdrawing from activities
    c. Somatic complaints
    d. Self-harm or injury
    e. All of the above
    f. A, B, & D
11. Risk factors for Major Depressive Disorder are:
    a. Female sex
    b. Family history of depression
    c. Chronic medical illness
    d. BMI 25+
    e. All of the above
    f. A, B, & C
12. U.S. Preventative Service Task Force 2016 guideline recommends a screening interval of:
    a. Annually
    b. When it is the chief complaint
    c. When risk factors are present
    d. Opportunistically for adolescents with infrequent health care visits
    e. All of the above
    f. C, D, & E
13. Which of the following are screening tools endorsed by the American Academy of Pediatrics for adolescent depression?
    a. Pediatric Symptom Checklist -17 [PSC-17]
    b. Patient Health Questionnaire- 9 [PHQ-9]
    c. Patient Health Questionnaire- 2 [PHQ-2]
    d. Guidelines for Adolescent Preventive Services [GAPS]
    e. Columbia Depression Scale [CDS]
    f. All of the above

APPENDIX F:

EDUCATIONAL INTERVENTION

Adolescent Depression Screening in Primary Care

Meagan Chase Davis, BSN, RN
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College of Nursing
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THE UNIVERSITY OF ARIZONA
College of Nursing

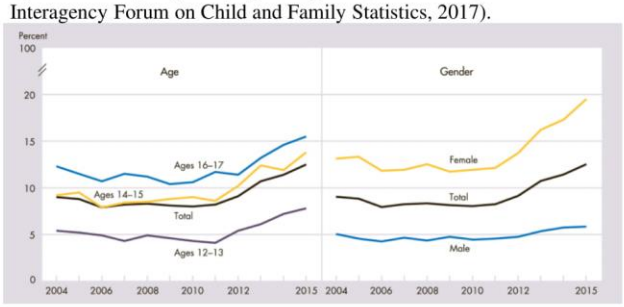
Summary

- Background and Significance
- Risk Factors
- Types of screening tools
- GLAD-PC guideline key points
- Conclusion
- References

Background

- 13.3% have had one MDE from 2016-2017
- Continued increase
- 50% adult depression began in adolescence

Percentage of youth ages 12-17 who experienced a Major Depression Episode in the past year by age and gender, 2004-2015 (Federal Interagency Forum on Child and Family Statistics, 2017).



3

Background

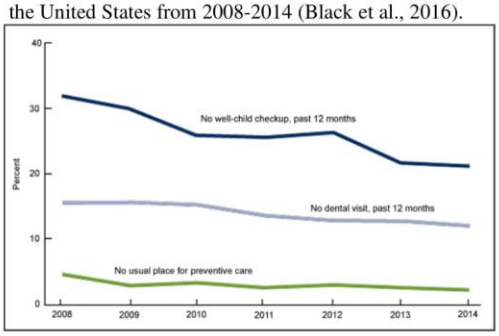
- 75% seen by PCP
- Depression v. Hormones
- Missed 84% of the time

4

Background

- Preventative care is decreasing
- Missed opportunities to screen
- Knowing risk factors can help

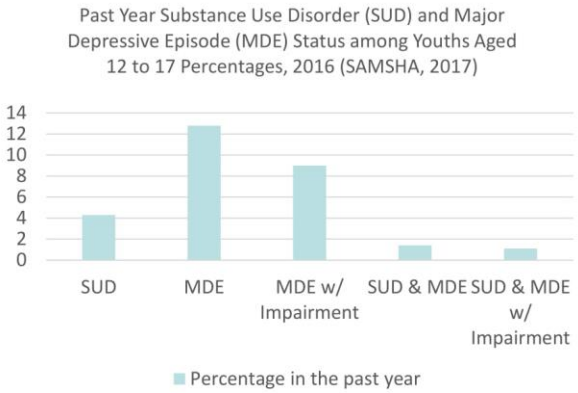
Percentage of adolescents aged 10-17 who did not have a usual place for preventative care, did not receive a well-child checkup, or did not have a dental visit, by year in the United States from 2008-2014 (Black et al., 2016).



5

Significance

- Risk behavior increases
- Lifetime co-morbidities
- Depression is treatable



6

Reflection

How many adolescents do you see in your own practice for Wellness Visits?

What barriers to effective screening do you feel you face?

7

Risk Factors

- Family history of depression
- Female
- Overweight
- Other psychiatric diagnosis
- Chronic health condition
- Substance use
- Trauma
- Psychosocial adversity
- Frequent somatic complaints
- Foster care or adoption
- LGBTQ

8

Types of Screening Tools

- Depression Specific
  - PHQ-2
  - PHQ-9
  - Columbia Depression Scale
- Tools combining mental health screenings
  - Pediatric Symptom Checklist
  - Guidelines for Adolescent Preventive Services

Pediatric Symptom Checklist

- PSC-Y
- PSC
- PSC-17
- PSC-A
- Attentional
- Externalizing
- Internalizing

Patient Health Questionnaire 2

- 2 Questions

- Easy to implement
- Just a quick check
- First step

11

Patient Health Questionnaire-9

- 9 questions
- Assesses depression severity and suicidality
- There is a modified version for adolescents

- Self-report
- Endorsed by USPSTF for ages 12+
- Great for further evaluation after positive PHQ-2 or PSC

12

Reflection

In your practice, what tools are you most familiar with?

Can you think of different situations to utilize different screening tools?

13

Opportunities to screen

- Frequent somatic complaints
- A parent voices concern
- Risk factors are present
- A positive screen on the PSC-Y at a well-child checkup

14

When should we screen?

- Recommended screening intervals

15

GLAD-PC Guidelines

- Universal depression screening

- Implement targeted screenings
- Interview adolescents alone

16

Glad PC Guidelines

- Family Involvement
- Use DSM-V criteria to make a formal diagnosis
- Safety Plan
- Track outcomes

17

Consider

- A 17 year old female presents to your practice for a sports physical. She does not have a medical home and does not do wellness visits.
  - Would you screen her?
  - What tool would you use?
- A 14 year old male with Type 1 DM is at your office for follow up after his 3rd hospitalization for DKA. He voices frustration with his chronic condition and how it makes him feel different at school.
  - Would you consider a brief screening?

18

Conclusion

- Adolescent Depression is highly prevalent and links to poor outcomes that continue to adulthood.
- Many adolescents are not accessing preventive health service visits.
- Knowing risk factors, and being able to identify indications for screening can help increase detection and treatment.

19

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APPENDIX G:

SURVEY REMINDER EMAIL

Survey Reminder Email

This is a reminder that the survey and educational intervention link closes within the next three days. If you would like to participate in the quality improvement project on adolescent depression screening in primary care, please click on the following link to complete the anonymous survey and educational presentation within the next three days.

In this survey knowledge of adolescent depression and recommended screening practices are based on current practice guidelines for adolescent depression screening.

This information will be used only for project purposes and all responses are anonymous. By answering the questions, you are agreeing to allow me to use the information for completion of my DNP project.

Survey link: https://uarizona.co1.qualtrics.com/jfe/form/SV_8f9vmf6pXqxSTD7

For questions, concerns, or complaints about the quantitative descriptive project, you can reach me by email at meagandavis@email.arizona.edu, or by phone at (713)591-2517.

Thank you for your time and consideration.
Respectfully,

Meagan C. Davis, DNP/FNP candidate

APPENDIX H:

PARTICIPANT POST-TEST SURVEY

Participant Post-test Survey

This survey is designed to assess any changes in provider knowledge and practices regarding adolescent depression screening after educational intervention. Your opinions and/or individual responses are important. This survey is anonymous. Thank you for sharing your time in completing this survey.

Demographic Information:

1. Gender
   1=Female 2=Male 3=Other
2. Age
   1=20-35 2=36-50 3=>51
3. Years of Practice
   1= 0-5 2=6-10 3=>10
4. Type of Provider
   1=Physician 2=APRN 3=PA
5. Total number of adolescents (children between the ages of 11 and 18 years old) I see per month
   1= 0-5 2=6-10 3=11-15 4=16-20 5=>20

Please rank your agreement with the following statements.
Knowledge Questions:

6. I know how to identify indications to screen for adolescent depression.
   1=Strongly agree 2=Somewhat agree 3=Neither agree nor disagree 4=Somewhat disagree 5=Strongly Disagree
7. I know common risk factors associated with depression among adolescents ages 12-17.
   1=Strongly agree 2=Somewhat agree 3=Neither agree nor disagree 4=Somewhat disagree 5=Strongly Disagree
8. I know what adolescent depression screenings tools are currently recommended by the American Academy of Pediatrics.
   1=Strongly agree 2=Somewhat agree 3=Neither agree nor disagree 4=Somewhat disagree 5=Strongly Disagree

Please respond to the following questions with only one answer choice:

9. Which patient should be assessed for depression?
   a. 16-year-old Male, with a parent complaint of, “He yells at me, won’t talk to me, and has been missing school”
   b. A 14-year-old Female who tells you, “I think the world would be a better place if I had never been born”

c. A 17 year old Female whose parent asks, “Can you test her for mono, she sleeps all the time and says she doesn’t have the energy to get out of bed”
d. All of the above
e. None of the above

10. Adolescents with depression can exhibit:
    a. Irritability
    b. Social isolation or withdrawing from activities
    c. Somatic complaints
    d. Self-harm or injury
    e. All of the above
    f. A, B, & D
11. Risk factors for Major Depressive Disorder are:
    a. Female sex
    b. Family history of depression
    c. Chronic medical illness
    d. BMI 25+
    e. All of the above
    f. A, B, & C
12. U.S. Preventative Service Task Force 2016 guideline recommends a screening interval of:
    a. Annually
    b. When it is the chief complaint
    c. When risk factors are present
    d. Opportunistically for adolescents with infrequent health care visits
    e. C, D, & E
    f. All of the above
13. Which of the following are screening tools endorsed by the American Academy of Pediatrics for adolescent depression?
    a. Pediatric Symptom Checklist -17 [PSC-17]
    b. Patient Health Questionnaire- 9 [PHQ-9]
    c. Patient Health Questionnaire- 2 [PHQ-2]
    d. Guidelines for Adolescent Preventive Services [GAPS]
    e. Columbia Depression Scale [CDS]
    f. All of the above

Presentation Evaluation.

14. What did you find beneficial about the presentation?
15. What can be refined and improved for future presentations?

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