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### IMPROVING PROVIDER KNOWLEDGE IN THE EVALUATION, DIAGNOSIS, AND TREATMENT OF ADHD

Amanda L. Swink

*Pittsburg State University*, [mandyswink@hotmail.com](mailto:mandyswink@hotmail.com)

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IMPROVING PROVIDER KNOWLEDGE IN THE EVALUATION, DIAGNOSIS,  
AND TREATMENT OF ADHD

A Project Submitted to the Graduate School  
In Partial Fulfillment of the Requirements  
for the Degree of  
Doctor of Nursing Practice

Amanda Swink, MSN, FNP-C

Pittsburg State University

Pittsburg, Kansas

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IMPROVING PROVIDER KNOWLEDGE IN THE EVALUATION, DIAGNOSIS,  
AND TREATMENT OF ADHD

Amanda Swink, MSN, FNP-C

APPROVED:

DNP Scholarly Project Advisor\_\_\_\_\_

Dr. Jennifer Harris, School of Nursing

DNP Scholarly Project Committee Member\_\_\_\_\_

Dr. Janis Schiefelbein, School of Nursing

DNP Scholarly Project Committee Member\_\_\_\_\_

Dr. Barbara McClaskey, School of Nursing

DNP Scholarly Project Committee Member\_\_\_\_\_

Dr. Timothy Flood, Department of Math

# IMPROVING PROVIDER KNOWLEDGE IN THE EVALUATION, DIAGNOSIS, AND TREATMENT OF ADHD

An Abstract of the Project by  
Amanda Swink, MSN, FNP-C

Pediatric diagnosis of attention deficit hyperactivity disorder (ADHD) is on the rise with an increasing financial burden to the healthcare system and the patient (Center for Disease Control, 2015). This study sought to determine if an educational intervention would increase the knowledge of primary care providers in respect to ADHD clinical practice guidelines and the diagnosis and treatment of pediatric patients. An initial online survey was administered to primary care nurse practitioners in an attempt to determine their knowledge level, provider feelings and current practices in regards to pediatric ADHD in this region. Approximately four weeks after the online survey, an educational intervention based on the American Academy of Pediatrics (AAP) Clinical Practice Guideline (CPG) for ADHD was provided to primary care nurse practitioners. A pretest was given to participants followed by a PowerPoint presentation and then a posttest. A *t*-test was conducted on the pretest and posttest results. The study concluded with substantial statistical significance ( $p < 0.001$ ) that the educational intervention increased knowledge of the AAP CPG for ADHD. All participants ( $n=21$ ) had an increase in posttest scores after the educational intervention. This study supports a need for continued educational programs for primary care providers in pediatric ADHD.

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## **Chapter I**

### **Introduction**

Attention Deficit Hyperactivity Disorder (ADHD) is a significant health care issue in the United States that effects millions (CDC, 2015). According to *the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders/DSM-5*(2013), ADHD is "a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development" (p. 59-65). According to the Centers for Disease Control (2015), "The percentage of children with an ADHD diagnosis continues to increase, from 7.8% in 2003 to 9.5% in 2007 and to 11.0% in 2011" (In the United States section, para. 4).

The U.S. National Library of Medicine (2014) defines ADHD as, "a problem of not being able to focus, being overactive, not being able to control behavior, or a combination of these. For these problems to be diagnosed as ADHD, they must be out of the normal range for a person's age and development" (para. 1.). Secondary sources were also reviewed. The references reported very similar definitions of ADHD. There were no notable differences that would influence the research (CDC, 2015; NIH, 2015; APA, 2013).



The rates of ADHD have been steadily increasing and the financial burden is significant. “The total excess cost of ADHD in the US in 2000 was \$31.6 billion. Of this total, \$1.6 billion was for the treatment of patients, \$12.1 billion was for all other health care costs of persons with ADHD, \$14.2 billion was for all other health care costs of family members with ADHD, and \$3.7 billion was for the work loss cost of adults with ADHD and adult family members of persons with ADHD” (CDC, 2015 Economic Cost section, bullet 3). The effects of this diagnosis are widespread, including psychosocial, educational, financial, and within the workforce. For this reason, it is vital that patients have access to effective diagnosis and treatment.

ADHD is a chronic disorder, the effects of which begin in childhood. Management of a condition with emotional, physical, intellectual and environmental components is taxing and requires understanding of many areas of specialization, particularly when addressing pediatric patients. The Clinical Practice Guideline that is currently recommended for use was created specifically for primary care providers to meet the ever-growing need for ADHD management (AAP, 2011). Education on the American Academy of Pediatrics (AAP) Clinical Practice Guideline (CPG) can help providers with diagnosis and treatment of ADHD.

### **Statement of Problem**

Treatment and management of ADHD in the primary care setting can be a difficult and lengthy task. Because treatment requires information from the patient, caregivers, and teachers, this is time-consuming and involves communication with many individuals (AAP, 2000 and AAP, 2011). As this is a psychiatric diagnosis, there is no

definitive test to confirm ADHD. Providers report that they are uncomfortable treating a condition that involves pediatric patients and a psychiatric diagnosis (Wright, 2014).

The AAP acknowledges that some primary care clinicians might not be confident of their ability to successfully diagnose and treat ADHD in a child because of the child's age, coexisting conditions, or other concerns. At any point at which a clinician feels that he or she is not adequately trained or is uncertain about making a diagnosis or continuing with treatment, a referral to a pediatric or mental health subspecialist should be made (AAP, 2011, p.5).

Wright noted, "many primary care providers are uncomfortable with the treatment of mental health issues, particularly ADD (Attention Deficit Disorder)/ADHD" (Wright, 2014 slide 3).

A number of specialists are qualified to conduct ADHD diagnostic evaluations such as psychologists, psychiatrists, educational specialists, neurologists and pediatricians. Owing to the high prevalence of ADHD, the limited number of specialists (e.g., developmental-behavioral pediatricians, child psychiatrists) and common insurance reimbursement restrictions on ADHD diagnostic evaluations, many children present to and are evaluated by primary care providers (Langberg, Froehlich, Loren, Martin, & Epstein, 2008). Physician demand is expected to increase seventeen percent, demand will then exceed supply by a range of 46,000 to 90,000 by the year 2025; which correlates to a shortage of between 12,500 and 31,100 primary care physicians (AAMC, 2015). This shortage of primary care physicians may affect access and treatment including referrals to specialty cares for all age populations. Nurse practitioners can assist in filling this gap

and address the health care shortage. Primary care providers are called to treat the whole patient and patients of all ages which includes pediatric patients with ADHD.

Primary care providers (PCPs) include primary care physicians, nurse practitioners, and physician assistants. PCPs must now act beyond the role of gatekeepers for mental health and treat psychiatric conditions. “Children with ADHD are frequently encountered in the primary care setting. It is important that the diagnosis of this condition by primary care providers be based on procedures supported by evidence from empirical investigations” (AAP, 2001, p. 9). The need for mental health care services including the treatment of ADHD is even more prevalent in rural health care shortage areas where access to a specialist is limited both in number and by factors such as travel time and cost to the patient (HRSA, 2015; Palmer, Myers, Stoep, McCarty, Geyer, & DeSalvo, 2010). Primary care providers need to be well versed and comfortable in evaluating, diagnosing and treating ADHD as it affects 11% of pediatric patients in the United States (CDC, 2015). Current clinical practice guidelines show that ADHD can be treated at the primary care level (AAP, 2011).

Dr. Amanda Itzkoff, Assistant Professor, Department of Psychiatry at Mount Sinai Hospital in New York City reports, “What many primary care physicians truly need is good mental health training, an established link to a skilled child psychiatrist for slightly complicated cases, and the knowledge of when to appropriately refer patients” (Forbes, 2015, para. 15). The component that can be most readily addressed is good mental health training. Palmer et al. (2010), report, one of the most prevalent psychiatric disorders diagnosed in children and adolescents is ADHD. This disorder is equally distributed geographically, however psychiatric services are not. Access to expert

management of ADHD is limited for patients of ethnic and racial minorities and those living in rural areas.

### **Significance to Nursing**

The rates of ADHD are continuing to rise (CDC, 2015). Primary care physicians and nurse practitioners have the opportunity to help meet the need of patients in areas with limited access to psychiatric and pediatric providers. Early diagnosis of ADHD and effective treatments (behavior and/or pharmacological) show improved classroom performance, improved self-esteem of patients, and decreased family stress (AAP, 2011; Palmer et al, 2010). Providers need to consider evaluating for this chronic condition during wellness exams and as indicated by caregiver or teacher concerns. Primary care providers must become informed about ADHD in order to recognize what does and does not constitute diagnosis, when behavioral therapy alone is acceptable, and when pharmacological treatment is indicated to achieve quality outcomes. According to Leslie (2002), “It is critical for primary care clinicians to develop competency in the early recognition, identification, and treatment of this condition” (Pediatric Annals, 2002 para. 3).

Access to interventions for ADHD is an important public health concern. ADHD affects many areas that may prevent a person from achieving their maximum potential. Access to diagnosis and treatment is needed to improve patient outcomes (CDC, 2015). Leslie (2002) reported, clinicians stress the challenges of ADHD management and the use of CPGs in their practices along with reporting unique barriers to ADHD management. These multiple barriers that prevent patients from receiving services for ADHD included: lack of insurance coverage for mental health problems, exclusion of

behavior disorders, lack of access to providers accepting psychiatric patients, and under-identification or misidentification of the disorder. Current practices in the diagnosis and treatment of ADHD are not uniform. The CDC (2015) also reports, “Nationally, we must begin to look at a wide variety of intervention issues surrounding ADHD, including how current interventions impact individuals and systems over time, as well as problems with access to appropriate services” (Interventions for ADHD section, para. 4). They go on to recommend action to address public health needs. One of the actions recommended is, “Disseminate educational materials relating to the diagnosis of and intervention opportunities for ADHD” (CDC, 2015, Interventions for ADHD section, para.4). According to the CDC (2015) those receiving education should include primary care physicians, physician extenders (NP's and PA's), mental health professionals, and educators.

### **Purpose**

This project plans to educate nurse practitioners on the evaluation, diagnosis, and treatment of ADHD through increased knowledge of the clinical practice guidelines. The goal of the education is to increase providers’ knowledge base to better treat the growing population of pediatric ADHD patients. The purpose of this evidence-based research project is to 1) provide data related to rural primary care providers’ knowledge of treating pediatric patients with ADHD; 2) increase awareness of the current Clinical Practice Guidelines (CPG) and algorithms; and 3) improve knowledge of pediatric ADHD management in primary care providers. It is important to understand what is currently taking place at the clinical level to develop effective mechanisms to improve quality and health care outcomes.

The ever-increasing incidence of ADHD, financial burden of this condition, and the shortage of psychiatric and pediatric health care providers indicate the need for education of primary care providers on the current clinical practice guidelines (CDC, 2015).

Education that focuses on increasing providers' knowledge and comfort level are needed to help address this chronic disorder.

### **Conceptual Framework**

The conceptual framework chosen for this project was Nola Pender's Health Promotion Model. This model addresses health promotion and well-being as a whole as opposed to simply the absence of illness. Pender's theory notes, each person has unique personal characteristics which effect the person's actions. The set of variables for behavior specific knowledge and its affects are important to determine motivational methods. The variables can be changed through nursing actions. The desired outcome of the model is health promoting behavior (Health Promotion Model, 2016, para. 3).

The Health Promotion Model makes four assumptions:

1. Individuals seek to actively regulate their own behavior.
2. Individuals, in all their biopsychosocial complexity, interact with the environment, progressively transforming the environment as well as being transformed over time.
3. Health professionals, such as nurses, constitute a part of the interpersonal environment, which exerts influence on people through their life span.
4. Self-initiated reconfiguration of the person-environment interactive patterns is essential to changing behavior. (Pender, 2011, HPM Assumptions section)

There are thirteen theoretical statements that come from the model. They provide a basis for investigative work on health behaviors. The statements are:

1. Prior behavior and inherited and acquired characteristics influence beliefs, affect, and enactment of health-promoting behavior.
2. Persons commit to engaging in behaviors from which they anticipate deriving personally valued benefits.
3. Perceived barriers can constrain commitment to action, a mediator of behavior as well as actual behavior.
4. Perceived competence or self-efficacy to execute a given behavior increases the likelihood of commitment to action and actual performance of the behavior.
5. Greater perceived self-efficacy results in fewer perceived barriers to a specific health behavior.
6. Positive affect toward a behavior results in greater perceived self-efficacy, which can in turn, result in increased positive affect.
7. When positive emotions or affect are associated with a behavior, the probability of commitment and action is increased.
8. Persons are more likely to commit to and engage in health-promoting behaviors when significant others model the behavior, expect the behavior to occur, and provide assistance and support to enable the behavior.
9. Families, peers, and health care providers are important sources of interpersonal influence that can increase or decrease commitment to and engagement in health-promoting behavior.

10. Situational influences in the external environment can increase or decrease commitment to or participation in health-promoting behavior.
11. The greater the commitments to a specific plan of action, the more likely health-promoting behaviors are to be maintained over time.
12. Commitment to a plan of action is less likely to result in the desired behavior when competing demands over which persons have little control require immediate attention.
13. Persons can modify cognitions, affect, and the interpersonal and physical environment to create incentives for health actions (Pender, 2011, pp. 5-6). This model acknowledges the many factors that can affect outcomes of this project.

The overall focus will be on number eight, by modeling the expectations for ADHD evaluation and treatment while providing assistance through education to enable the behavior. The implementation of this project is to provide assistance through education to increase knowledge of providers in the treatment of ADHD through the use of CPGs. Information on ADHD will hopefully improve the self-efficacy of healthcare providers in the treatment of ADHD. The CPG from the AAP will serve as the plan of action to provide assistance to providers. Through the provided education these components will be combined to positively affect providers' knowledge with the management of ADHD.

Pender's Health Promotion Model provides the theoretical bases for this evidence-based project and serves as a guide for nurses and practitioners in clinical practice who work with children with ADHD.



## **Research Questions**

The research questions for this study are:

1. Will an educational intervention increase the knowledge of primary care providers when identifying diagnostic criteria that is based on current practice guidelines for pediatric ADHD?
2. Will an educational intervention increase the knowledge of primary care providers when selecting appropriate treatment for children based on current practice guidelines for pediatric ADHD?
3. Will an educational intervention increase the primary care providers' knowledge of the AAP algorithm and its components?

## **Definition of Key Terms**

The following definitions are provided for the purpose of this study.

- Attention Deficit Hyperactivity Disorder-- a problem of not being able to focus, being overactive, not being able to control behavior, or a combination of these. For these problems to be diagnosed as ADHD, they must be out of the normal range for a person's age and development (Medline Plus, 2014).
- Clinical Practice Guideline-- Statements that include recommendations intended to optimize patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options (National Guideline Clearinghouse, 2011).
- Education-- the knowledge and development resulting from an educational process (Merriam-Webster Dictionary, n.d).

- Nurse Practitioner-- licensed, independent practitioners who practice in ambulatory, acute and long-term care as primary and/or specialty care providers. Nurse practitioners assess, diagnose, treat, and manage acute episodic and chronic illnesses. NPs are experts in health promotion and disease prevention. They order, conduct, supervise, and interpret diagnostic and laboratory tests, prescribe pharmacological agents and non-pharmacologic therapies, as well as teach and counsel patients, among other services (AANP, 2015).
- Pediatric(s)-- the specialty of medical science concerned with the physical, mental, and social health of children from birth to young adulthood. Pediatric care encompasses a broad spectrum of health services ranging from preventive health care to the diagnosis and treatment of acute and chronic diseases (AAP, 2015).
- Primary Care Provider-- A primary care provider (PCP) is a health care practitioner who sees people that have common medical problems. This person is usually a doctor, but may be a physician assistant or a nurse practitioner (Medline Plus, 2014).
- Provider—A term used by managed care organizations, referring to anyone rendering medical care, including physicians, nurse practitioners, physician assistants, and others (Farlex Partner Medical Dictionary, 2012).
- Rural-- encompasses all population, housing, and territory not included within an urban area. Urban Areas have more than 50,000 persons (U.S. Census Bureau, 2010).

## **Assumptions**

In this study, the researcher assumed that the pre- and post-test questions were answered honestly (both academically and personally). These questions were to be an accurate assessment of current recommendations for practice with the nurse practitioner providers having a basic knowledge of ADHD and able to understand the material without difficulty. In addition, both tests will accurately reflect the population studied.

## **Summary**

ADHD is a chronic health disorder noted to have a significant impact on the United States. Rates of ADHD continue to increase across the nation; at the same time, there is a shortage of psychiatric and pediatric health care providers (AAMC, 2015; CDC, 2015). Primary care providers have the opportunity to fill this gap and meet the needs of this pediatric population. Guidelines were implemented by the AAP in 2011 that acknowledge the ability of a PCP to evaluate, diagnosis, and treat ADHD. Yet, there is still a noted lack of knowledge and comfort level possessed by many PCPs which inhibits clinical management (Leslie, 2002).

Due to the fact that, “ADHD is the most common neurobehavioral disorder of childhood and can profoundly affect the academic achievement, well-being, and social interactions of children” (AAP, 2011, abstract) it is imperative that providers provide effective care and follow current guidelines. Most general practitioners and nurses will have undergone no or very little training in child and adolescent psychiatry. Ball (2002) reported, many general practitioners do not feel confident about their skills in recognizing and undertaking follow-up management of ADHD and feel that education is essential. References indicate a need for educational programs which review current clinical

practice guidelines and tools (algorithms, hand-outs and websites) to assist providers in following guidelines in an accurate and timely manner.

## **Chapter II**

### **Review of Literature**

This review summarizes important findings, interventions, and limitations previously studied in the articles selected for this project. The literature indicates why ADHD is an important healthcare issue in the United States. The review examined important data in regards to patient's access to care for mental health throughout the nation, but most notably in rural areas with consideration given to variables that are barriers to improving access to ADHD diagnosis and management including: provider shortage and lack of provider education. Finally, a review of current practice guidelines was completed to fully understand what provider education is readily available.

A literature search was conducted using relevant databases, including CINAHL, ProMed, and several others provided by Pittsburg State University's library services. Initial searches used to retrieve articles included ADHD, providers' knowledge of ADHD, providers' comfort treating ADHD, knowledge of current clinical practice guidelines on ADHD, primary care providers treating ADHD, health care shortages, and tools to assist in ADHD treatment. Secondary sources were utilized including the American Academy of Pediatrics and American Psychiatric Association's DSM-V in addition to the National Institutes of Health. Information and current statistics were obtained from reliable websites, including the Centers for Disease Control, National

Network of Libraries of Medicine, and MedlinePlus. There have been many articles published in the last twenty years about ADHD. These articles attempt to determine a causation, effective diagnosis, and effective treatment of ADHD in the United States.

After review of initial search results the following keywords were noted:

- Attention Deficit Hyperactivity Disorder
- Primary Care
- Clinical Practice Guidelines
- Knowledge
- Accuracy
- Pediatrics

The identified key words, were used to search for articles. Thirty-two articles were identified as possible articles for analysis. From the obtained articles, the following criteria were used:

- Published in the last ten years
- Children age 4-18
- Interventions: Provider focused

Fifty-two studies/meta-analyses met the inclusion criteria for analysis.

### **Financial Impact of ADHD**

ADHD has a financial impact on patients and their family members. According to the CDC (2015), the total excess cost of ADHD in the US in 2000 was \$31.6 billion. This cost was calculated by determining costs of healthcare and work loss for those with ADHD and their family members. Of these monies, \$14.2 billion healthcare costs of family members of persons with ADHD, and \$3.7 billion was for the work loss cost of

adults with ADHD and adult family members of persons with ADHD. As these numbers illustrate the annual cost of ADHD in the US is significant. Patients with treated and untreated ADHD can create an economic burden on the healthcare system. Comparisons of medical costs for those with and without ADHD consistently show higher annual costs for patients with ADHD. A study completed by Swensen et al. (2003), suggests that childhood ADHD places an economic burden on the child's family members. The study analysis utilized data from 1996–1998 with a sample of 100,000 beneficiaries showing that family members of children with ADHD had 1.6 times as many medical claims as the control group. The larger number of claims resulted in higher costs overall for these individuals. According to the authors, annual direct medical costs were double for family members of ADHD patients (\$2,740) compared to control patients (\$1,365). Indirect costs related to disability and absenteeism was also noted. These losses also showed increased financial costs for family members of ADHD patients (family members of ADHD patients, \$888; family members of controls, \$551).

In a survey of over 7000 individuals across ten different countries, De Graaf et al. (2008) found that adult ADHD is associated with substantial loss in role performance and an estimated 143.8 million days of lost productivity worldwide per year. Disaggregation of their results revealed that unemployed respondents had a higher prevalence of ADHD (5.5%) than working people (3.5%). ADHD rates were associated with lower incomes and more blue-collar jobs than professional designations, along with appearing to be somewhat more prevalent in developed than developing countries. The authors speculated the data could reflect the fact that a deficit is defined in relation to the level of environmental demands on attention. This deficit may only exist when demands are in

excess of the person's abilities. High environmental demands for attentiveness are more common in the workplaces of developed countries, leading to the higher recognition of adult ADHD in those countries (De Graaf et al, 2008). ADHD is associated with a significant decrease in role performance. Much of the decrease in role performance was noted in the areas of quality and/or quantity of work as opposed to an individual not being at work. Adverse effects of ADHD were noted to be widespread, rather than concentrated among workers in jobs where high concentration is critical for success. The decreased quality and/or quantity of work for those with ADHD was noted to be an area for further research. Decreased work-performance may increase workplace screening for ADHD.

### **Effects of ADHD on the Family**

Evidence obtained by Johnston and Mash (2001) suggests that ADHD in children is associated with disturbances in family and marital functioning, disrupted parent-child relationships, and specific patterns of parental cognitions about child behavior and reduced parenting self-efficacy, along with increased levels of parenting stress and parental psychopathology. The authors found that the rates of these issues increased when ADHD is present in addition to conduct disorders. Currently, there is little scientific data about the developmental mechanisms through which child and family characteristics develop in association with this diagnosis (Johnston and Mas, 2001).

Szatmari et al. (1989) completed the Ontario Child Health Study of prevalence of attention deficit disorder with hyperactivity, which showed that siblings of children with ADHD have increased risk for emotional disorders. Kendall (1999) reported that siblings note the disruptions caused in a household by ADHD and experience this disruption in



three primary ways: victimization, caretaking, sorrow and loss. Siblings reported aggressive acts including verbal aggression, physical violence, manipulation and control from the child with ADHD (Kendall, 1999). Researchers also found that siblings of children with ADHD felt anxious, worried, and sad because of household disruptions and the feeling that they had to care for and protect their sibling. Siblings in Kendall's study described their family life as "chaotic", "exhausting", and "focused on their sibling". Siblings described "never knowing what to expect next" and that they did not expect an end point to the impact of ADHD on their lives. Many siblings reported feeling unprotected by their parents because they were perceived as too exhausted or overwhelmed to intervene.

As previously stated, ADHD imposes a significant financial burden regarding the cost of medical care and work loss for patients and family members. The increased use of health services is noted in relatives of individuals with ADHD resulting in direct and indirect medical costs that are twice as high as those of family members of a control group (Swensen, Birnbaum, and Secnik, et al. 2003). Another issue noted in the literature was children with established ADHD are more likely to be injured as pedestrians or on a bicycle than children without ADHD and are more likely than other children to have severe injuries resulting from the accidents (Sullivan and Rudnik-Levin, 2001). Despite the increased rates of physical injury, Hankin (2001) found the major difference in costs was primarily noted to be due to a higher rate of mental health problems in family members of ADHD patients. This increase reflects the increased stressors of living with an ADHD adult or child. These stressors have also been linked to

increased risk of parental depression and alcohol disorders (Brown and Pacini, 1989 & Hankin, 2001).

### **Lack of Knowledge/Comfort with ADHD**

Lack of knowledge and comfort are reported barriers to patient access for management of ADHD. “The American Academy of Pediatrics (AAP) acknowledges that some primary care clinicians might not be confident of their ability to successfully diagnose and treat ADHD in a child because of the child’s age, coexisting conditions, or other concerns” (AAP, 2011, About This Guideline, note). They go on to recommend that if a provider feels inadequate in providing care that a referral to a specialist is recommended.

The statement that providers who feel inadequate providing care for ADHD should refer to a specialist, is made as part of the CPG put forth by the AAP. The statement summarizes the lack of comfort many PCPs report with the management of ADHD. “The expanding role of PCPs in this new era of mental health treatment has prompted researchers to explore ways of improving PCPs' training in diagnosing and treating psychiatric disorders” (Faghri et al. 2010, para 6). Education for PCPs is indicated in this ever-growing area of healthcare. Marciano et al. (2012), completed a targeted educational program directed with the goal of improving physicians comfort levels when treating psychiatric patients in the emergency department. Providers participated in a short educational program after which there was a highly significant improvement of comfort level noted (Marciano, 2012). This data shows the positive impact education can have in improving provider comfort among a specific patient population.

A study by Pidano (2007) of primary care providers in British Columbia noted, “Physicians’ reported comfort and skill levels with evaluation and management were highest for mood disorders and lowest for behavior disorders. Comfort and skill levels were related to factors such as recent participation in continuing medical education regarding psychosocial issues and numbers of children with the conditions who were seen each month” (Pidano, 2007, p. 3). According to Charach, & Fernandez (2013), “Children diagnosed by psychiatrists are less likely to receive a prescription within the initial six months after diagnosis than those identified by primary care physicians, even after adjustment for comorbid conditions. Psychiatrists are more likely to provide titration of stimulant doses with a lower initial dose, a higher maximal dose, and three or more visits in the first 90 days, suggesting increased monitoring” (Patterns of Medication Use, para. 2).

This variance in care needs to be addressed to ensure patients are receiving the best care possible. “Treating mental health patients in an already busy and stressful healthcare industry presents additional time management and treatment challenges for PCPs. To help improve the assessment of psychiatric conditions, physicians need a tool that is sufficiently uncomplicated and comfortable for their patients to complete, while still being easy and quick to interpret” (Faghri et al. 2010, para. 21). There are algorithms in place to help streamline the process for diagnosis and management of ADHD. Providers and parents must both understand that while methods to ensure a timely diagnosis are needed, this is not a diagnosis that can be made in a quick fifteen minute visit. Informing patients and their caregivers of the process of diagnosis is one of the most important aspects of patient/provider communication. The time needed to make an

accurate diagnosis of ADHD is cited by many providers as a barrier to care along with lack of reimbursement (Leslie, 2002).

### **Shortage of Providers**

There is a notable healthcare shortage in the United States. According to HRSA (2015), this shortage is even more notable in rural communities and in specialty areas such as pediatrics and psychiatrics. According to Rainer (2014), “Sixteen percent of the United States' population lives in rural communities. Congressional reports find that these rural areas have less than one-half as many physicians per capita as urban areas” (Rainer, 2014, para 4). The US Department of Health and Human Services (HHS) and its Health Resources and Services Administration (HRSA) state that ninety million residents live in designated Mental Health Professional Shortage Areas (MHPSAs) (2015).

Shortage areas are identified more frequently in rural and non-metropolitan areas. Mental health is an area of need across the United States and is more notable in rural areas due to the aforementioned shortage of all providers. Mental health services are needed for all age populations but most notably for pediatric patients in relation to ADHD. “Physician demand is expected to increase seventeen percent and demand for physicians will exceed supply by a range of 46,000 to 90,000 by the year 2025” (AAMC, 2015, para. 4). According to the Bureau of Labor and Statistics (2015), there were 122,050 nurse practitioners in 2014. This portion of the health care team has the opportunity to positively affect health care in many ways. Many sources, including the National Institute for Healthcare (2013) reform, cite nurse practitioners as one of the methods to solve the health care shortage.

## **Stimulant Medications**

Stimulant medications are the first line of treatment for pediatric patients ages 12-18 and the strongest rated pharmacological treatment in all pediatric age groups (AAP, 2011). Stimulants work by increasing the dopamine hormone levels in the brain. The neurotransmitter dopamine is associated with pleasure, movement, and attention. Therapeutic effects of stimulant medications happen because of the slow and steady release of dopamine. This mimics the way that dopamine is naturally produced and released into the brain (NIDA, 2014). When stimulant medications are taken in doses other than that prescribed and/or by routes other than orally, prescription stimulants can increase brain dopamine in a rapid and highly amplified manner. This results in euphoria and increases the risk for addiction (NIDA, 2014). Stimulant medications may be abused for the purpose of obtaining that feeling of euphoria.

In a survey of more than 40,000 individuals nationwide, Johnston et al. (2015) found no gender differences in the overall associations between stimulant medication therapy for ADHD and risk of substance use. The study also identified these data points: approximately one in eight high school seniors have used stimulant or non-stimulant medication therapy for ADHD and stimulant medication is more likely to be used for males to treat ADHD; while no gender differences were found for non-stimulant medications (Johnston, et al., 2015).

Because higher substance-use behaviors being associated with later initiation of stimulant medications monitoring new teen and adult patients carefully for pre-existing risk factors or the onset of substance use behaviors is very important (McCabe, Veliz, & Boyd, 2016, p. 55-63). Recent investigations have found that up to 50% of individuals

with continuing ADHD symptoms have a substance-use disorder (McCabe et al., 2016). ADHD appears to represent an independent risk factor for substance abuse. McCabe et al. (2016) found that the presence of ADHD may affect the course of adolescent substance abuse in several ways: predicting earlier age of onset, longer duration of substance-use disorder, and progression of alcohol abuse to another drug-use disorder. Sullivan and Rudnik-Levin (2001) found that individuals with ADHD have been noted to have a shorter interval between the onsets of drug abuse and drug dependence. Such individuals are also at greater risk for treatment failure, as their disruptive behaviors interfere with treatment access and response (Sullivan and Rudnik-Levin, 2001).

Prescription drug abuse is the nation's fastest growing drug problem with more deaths occurring in the US last year due to drug overdoses than car accidents (CDC, 2015). Opiate addiction is driving this epidemic but diversion of any prescription medication helps pave the way to use of other drugs (CDC, 2015). The Clinton Foundation (2014) reports that the prescription drug use epidemic is widespread on college campuses with the proportion of college students using prescription drugs going up dramatically from 1993-2005. The use of opioids such as Vicodin, OxyContin, and Percocet increased by 343 percent, and use of stimulants like Ritalin or Adderall increased by 93 percent (Clinton Foundation, 2014).

Garnier, et al. (2010) completed a study of college students with ADHD, which was published in the Journal of Addictive Diseases and revealed that an alarming 62 percent diverted their medication to someone without a prescription. According to the authors, most college students who use prescription medications non-medically reportedly received medications from friends. Research is needed to examine perceptions

regarding legal and medical consequences of diversion and how these perceptions influence behavior (Garnier, et al. 2010). The authors found that almost two-thirds (61.8%) of college students were offered prescription stimulants for nonmedical use by their fourth year in college. Again, the most common source was a friend with a prescription. Lower GPA and alcohol/cannabis use disorders were consistently associated with non-prescription stimulant use (Garnier, et al. 2010).

An ongoing study at the University of Maryland has reported that, 10.8 percent of students nationwide have used prescription stimulants in nonmedical situations over the past year and 35.6 percent of students surveyed have used them at least once in their lifetime (Garnier-Dykstra, et al., 2012). The Drug Abuse Warning Network (DAWN) is a public health surveillance system that monitors drug-related emergency department visits in the United States. The report involving ADHD stimulant medications, includes: methylphenidate (e.g., Ritalin, Concerta), amphetamine-dextroamphetamine (e.g., Adderall), dextmethylphenidate (e.g., Focalin), and dextroamphetamine (e.g., Dexedrine). The estimated number of emergency department visits involving the use of prescription stimulants to treat ADHD has increased among those aged 18 and older from 13,379 ED visits in 2005 to 31,244 visits in 2010. Emergency department visits for nonmedical use has not increased among children and adolescents; however there has been an increase for adults aged 18 or older. These findings indicate a need for increased prevention of diversion and misuse among adults (Dawn Report, 2013).

## **Practice Change Guidelines**

### **Best Practice Guideline**

The AAP's CPG provides the foundation for the educational program, as well as the questions for the pretest and posttest. The Patient-Intervention-Comparison-Outcome-Timeframe (PICOT) format recommended by Fineout-Overholt and Johnston (2005) was used to develop the following questions for searching the literature for an applicable CPG: What are the best methods for ADHD diagnosis? What are the best methods for evaluation of ADHD? What are the recommendations for treatment after diagnosis? A search of the National Guidelines Clearinghouse (NGC), Registered Nurse Association of Ontario (RNAO), Agency for Healthcare Research and Quality (AHRQ) and Institute for Healthcare Improvement (IHI) websites was conducted searching for utilized and recommended practice guidelines for ADHD. Through this search the American Academy of Pediatrics "*ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents*" (American Academy of Pediatrics, 2011) CPG was identified for evaluation. This CPG was written by a committee of members including: pediatricians, psychiatrists, parents and teachers. This CPG seems to be the standard of care as it is referenced by other sources including: Centers for Disease Control and prevention, Cincinnati Children's Hospital and Children's Mercy Pediatric Care Network.

The AGREE II instrument was used to appraise the quality of the CPG (AGREE Next Steps Consortium, 2009). According to the National Collaborating Centre for Methods and Tools (2011), this instrument assesses the rigor of a CPG's development. An international team of guideline developers and researchers, known as the AGREE



Collaboration (Appraisal of Guidelines, Research and Evaluation), was established to develop this tool. The purpose of the AGREE II Instrument is to provide a framework to: assess the quality of guidelines; provide a methodological strategy for the development of guidelines; and inform what information and how the information ought to be reported in guidelines. The AGREE II instrument consists of 22 key items separated into 6 domains. Each item is graded on a Likert scale ranging in score from 4-1 (strongly recommend, recommend, would not recommend, and unsure). The six domains are: 1) Scope and purpose, 2) Stakeholder involvement 3) Rigor of development, 4) Clarity and presentation, 5) Applicability and 6) Editorial independence. Domain scores are calculated by summing up all the scores of the individual items in a domain and by standardizing the total as a percentage of the maximum possible score for that domain.

The CPG was also evaluated using a rating scheme. The method utilized was the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. Evaluation identified this CPG as one with strong recommendations and strength of evidence and also one that was well suited for use by primary care providers. This CPG contained six key action statements. Recommendations 1-4 and 6 are all rated Quality of Evidence B (strong recommendation). The fifth key action statement has three subsets relative to the patient's age resulting in three ratings. Preschool aged children (ages 4-5) rating of B (strong recommendation), rating of A (strong recommendation) for school aged children (6-11) and a rating of C (recommendation) for adolescents (ages 12-18). Only one of the recommendations, number 5, has an A rating when being applied to a school aged patient. However, all 6 practice recommendations have a rating of strong recommendation. When considering all patients except adolescents, 100% of the

recommendations have the strongest level of evidence (strong recommendation). Overall, the evidence is strong. 6/6 (100%) strong recommendations for practice in patient's ages 4-11. 5/6 (83%) strong and 1/6 moderate (17%) recommendations for practice in patients ages 12-18.

The following is a breakdown of strengths and weaknesses for the AAP CPG:

#### Summary of Strengths and Weaknesses

##### Strengths:

- Clarity of scope and purpose of the document (Domain 1)
- Population was well defined (Domain 1)
- Objective is specific and targeted (Domain 1)
- Subcommittee including relevant professional groups (Domain 2)
- Target users were clearly identified (Domain 2)
- Systemic methods were used to retrieve evidence (Domain 3)
- Seventy references were utilized and reviewed using the GRADE method  
(Domain 3)
- Key recommendations are easily identifiable (Domain 4)
- Good supporting tools for implementation (Domain 5)
- Financial conflicts were clearly stated and potential conflicts were identified  
(Domain 6)

##### Mixed:

- Explanation of facilitators and barrier (Domain 3)
- No discussion on diet, herbal remedies, caffeine, or other natural management  
(Domain 4)
- No criteria for assessing impact of guidelines (Domain 5)

##### Weaknesses:

- Criteria for selecting the evidence was not clearly described (Domain 3)
- Methods for cost identification was not identified (Domain 5)

Applicability to practice for this guideline is noted to be very good in the area of tools, algorithms and methods for implementation. The guideline was found to be lacking in its ability to identify barriers for implementation. Barriers identified in health care settings include: access to mental health services, unsupportive school districts, social stigma of diagnosis, and access to providers comfortable with management of ADHD. When considering the potential resource implications of applying the recommendations, the guideline does not address the cost of medication management. Each key recommendation does have a risk, benefit, cost listed but there is no information provided on how this information was obtained.

The clinical practice guideline, “ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents,” is worth consideration for implementation at the clinical level. This guideline has overall good ratings, tools to help with implementation, and it’s well designed with concise key recommendations.

### **Practice Change Recommendations for Implementation**

“ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents” by the American Academy of Pediatrics (2011), contains six primary recommendations. One of these recommendations had three subsets for each patient age group. All of the recommendations for practice have strong recommendations with the exception of number five. Recommendation number five’s subset is concerning patients’ ages four to

five and has a recommendation rating only. The six key action statements from the American Academy of Pediatrics can be located on their website and are identified within the implementation plan (Appendix A).

### **Assessment Algorithm**

The AAP offers an algorithm to coincide with their CPG (Appendix B). According to the AAP, “The algorithm is entirely consistent with the practice guideline and is based on the practical experience and advice of clinicians experienced in the diagnosis and management of ADHD in children and adolescents” (2011). The steps of the algorithm are meant to increase the speed at which a provider can review the practice guidelines. The detail provided within the algorithm is minimal and therefore does not have the same level of evidence as the key action statements that are provided in the practice guideline. The algorithm states an assumption that mental health surveillance and screening as entailed in the AAP Task Force on Mental Health has been adopted at the primary care practice level. They go on to state, “In light of the prevalence of ADHD, the severity of the consequences of untreated ADHD, and the availability of effective treatments for ADHD, the AAP recommends that every child/adolescent identified with signs or symptoms suggestive of ADHD be evaluated for ADHD” (2011). For an evaluation of every child/adolescent with a potential diagnosis of ADHD to occur, a primary care provider must have a knowledge base to identify this diagnosis and proceed with care as needed.

When information from the CPG and the algorithm are combined, ADHD can be assessed appropriately and in a time-effective manner. All pediatric patients with ADHD symptoms could be screened using the diagnostic criteria, comorbidities identified, and

referrals made as indicated. Information for diagnosis or exclusion of diagnosis can be obtained from parents/guardians, teachers, and the patient based on action statements 2 and 3 in the CPG.

### **Summary**

Effective evaluation, diagnosis, and treatment of ADHD is a multistep process that involves many members of the patient's health care team. Providers must screen for this process but require information from the patient, parent/caregivers and teachers. Assessments need to be completed at each of these levels to provide an accurate diagnosis. When a diagnosis is made, treatment using behavioral therapies and/or medications require the cooperation of all the aforementioned parties. During ongoing management, communication with all of these individuals is still needed. Providers often lack the time to accomplish this in a primary care clinic. Chapter III details the methodology of this project including an initial online survey and a separate educational program that was provided to primary care nurse practitioners.

## **Chapter III**

### **Methodology**

This chapter discusses the research design for the study. It also describes the sample, instrument used and statistical analysis. Due to the increasing rates of ADHD and the healthcare shortage, methods to improve access to care are needed. The method utilized in this project is education. The goal of this project was to improve the knowledge of providers with pediatric ADHD patients.

#### **Project Design**

This is a two part study designed to evaluate whether an increase in knowledge of providers with Clinical Practice Guidelines (CPGs) for Attention Deficit Hyperactivity Disorder (ADHD) occurred after education was provided. A separate online survey (Appendix C) was administered to primary care nurse practitioners to determine current knowledge level in regards to pediatric ADHD. This survey was placed on the 4-State Advanced Practice Nurses (APN) website approximately four weeks prior to the educational intervention to evaluate current knowledge and comfort levels of providers and was utilized as an additional method to assess the need for provider education. This survey included demographic data, current acceptance of pediatric ADHD patients, comfort level with evaluation, diagnosis and management of ADHD and knowledge of ADHD CPGs.

When participants attended the educational intervention, a pretest was administered which included demographic data collection. This data was utilized to determine any variability based on characterization of the group and to evaluate inclusion and exclusion criteria. The study used quantitative data for measurements of the participant's knowledge with diagnostic criteria based on current practice guidelines. Descriptive research was chosen as it is a direct method to assess how ADHD is managed by primary care nurse practitioners. For pre-education results, data was obtained using a pretest (Appendix D). For post education results data was obtained using a posttest (Appendix E). A pretest/posttest application was chosen for the educational intervention of this study due to feasibility and time constraints. The study will provide valuable data in regards to participants and current practice guidelines. The posttest contained the same questions as the pretest in regards to knowledge of ADHD. The educational intervention was presented to the participants and was then followed by a question and answer period. With completion of the education and posttest, one continuing education credit was awarded by the American Academy of Nurse Practitioners (AANP).

The study provided an educational intervention to nurse practitioners and nurse practitioner students. Prior to the educational intervention being provided, an online survey was provided to primary care nurse practitioners to determine their comfort level and knowledge of pediatric ADHD management. Members of the 4-State APN group were invited to complete the initial survey and attend the separate educational intervention. No information was obtained to determine if any individuals completed both areas of data collection. The educational intervention sought to enhance the

participants' knowledge about evaluation, treatment, and diagnosis of pediatric ADHD patients after the program. The study focused on the following research questions:

1. Will an education intervention increase the knowledge of primary care providers when identifying diagnostic criteria that is based on current practice guidelines for pediatric ADHD?
2. Will an education intervention increase the knowledge of primary care providers when selecting appropriate treatment for children based on current practice guidelines for pediatric ADHD?
3. Will an education intervention increase the primary care providers' knowledge of the AAP algorithm and its components?

### **Setting and Participants**

The study participants included nurse practitioners and nurse practitioner students. All participants including students were able to listen to the educational portion of the educational intervention. The pretest and posttest were only completed by current licensed nurse practitioners. The participants were required to have a valid advanced practice license. The age of the participant was not identified although the number of years in practice was requested due to assessment of knowledge and comfort in a practice area. It is important to assess the current knowledge and comfort level of the providers for evaluation, diagnosis and treatment of ADHD, in order to increase access, appropriate identification and treatment. The educational intervention took place October 6<sup>th</sup>, 2016, in Pittsburg, Kansas, at a centrally located building that was easily accessible for all participants. The geographic location was chosen to encourage surrounding nurse practitioners to attend.



## **Recruitment**

The study utilized a purposive sample; this was chosen because purposive sampling focuses on particular characteristics of a population that best enables the research questions (Purposive Sampling, 2012). The target population was recruited from the 4-State APN nurse practitioner group and from surrounding family practice clinics. The 4-State APN is a local professional group with over 100 members. This group strives to provide education to local advanced practice nurses with multiple meetings throughout the year and an annual continuing education conference. Permission was obtained from the 4-State APN to invite their members to 1 hour educational program that was approved by the AANP. All advanced practice nurses in attendance received continuing education credit. Participation in the study included completion of the pretest and posttest.

## **Inclusion/Exclusion Criteria**

The initial online survey was accessible by all members of the 4-State APN group. Initial online survey data was only included for those providers currently practicing in primary care and accepting pediatric patients. Inclusion criteria for the pretest/posttest portion of educational intervention included all nurse practitioner participants present.

The 4-State APN has members that are nurse practitioner students; since they do not currently practice they were not included in the initial survey. Any other attendees including: medical doctors, doctors of osteopathy, clinical nurse specialist or physician assistants did not qualify for this study. No other exclusion criteria was identified.

## **Protection of Human Subjects**

Prior to distribution of the initial online survey or the educational intervention including the pretest and posttest, an application was submitted to the Pittsburg State University Institution Review Board (IRB). The 4-State APN group does not have a formal IRB, but approval was granted from the 2016 presiding officers. The subject population is adult nurse practitioners over the age of 18. It does not contain vulnerable subjects; children, prisoners, or specific populations of race, religion or ethnicity. No deception of subjects took place nor were techniques used that would cause discomfort or harassment. Confidentiality was maintained with coding of the questionnaires. There were no risks associated with the study questionnaire. The responses of the subjects were not disclosed outside the research that could reasonably place them at risk of criminal or civil liability or be damaging to their financial standing, employability or reputation.

Data was obtained for this study through participants volunteering for the study. Participants completing the initial survey, pretest and posttest provided consent for the study. The educational intervention was voluntary in nature with no monetary compensation provided to participants. Confidentiality was maintained regarding all information obtained from the pretest and posttest. The data was utilized for the purpose of this research. Information collected contained no identifying factors of the participants. Completed questionnaires were kept in a locked box accessible only by the primary investigator and were shredded at the completion of the project.

## **Ethical Considerations**

Ethical considerations centered on the questionnaire development as well as the answers provided. Participation in the initial online survey as well as the educational

intervention with pretest and posttest was voluntary. Participants were allowed to remove themselves from the study at any time without fear of reprisal. The most notable ethical concern was anonymity. For this reason, information was recorded and stored without any identifying data. The second concern is the false information that would contaminate data and depart from study guidelines. The ethical concern would be the participant(s) fabricating all or part of the answers or providing information that is not consistent with their current knowledge or comfort in practice.

### **Instrument**

This study utilized an initial online survey. This survey included demographic data as well as questions about current practice, knowledge and comfort level with pediatric ADHD. For the educational intervention, a pen and paper pretest and posttest were utilized by participants to gather quantitative data for descriptive study of the research questions. The pretest included demographic data about the participant including: area of practice, years in practice, state in which the participant is currently practicing, and their current acceptance of ADHD patients. The pretest and posttest contained general knowledge-based multiple choice questions in regards to ADHD management. The pretest and posttest contained the same questions about provider knowledge with ADHD and CPGs. The demographic and current practice questions were removed from the posttest.

An instrument specific to the research questions was not identified so a survey tool was developed. The instrument was developed based on review of current literature and information from the American Academy of Pediatrics CPG. The first four questions on the pretest included demographic data. The next questions related to current provider

practice, followed by questions based on the CPG. The test had a variety of questions including multiple choice and rating scales. The pretest was comprised of three major sections: (a) demographics, (b) current provider practice and (c) current practice guidelines. The posttest had one section: current practice guidelines.

### **Content Validity**

The researcher's developed tool for this study was based on a literature review. The review of literature was performed in an effort to validate the need for education of providers on ADHD with this researcher finding that providers lack a comfort level in treating pediatric patients with ADHD. Content validity of the tool was established by an evaluation of the survey content. Four family nurse practitioners who treat pediatric patients for ADHD in a family practice setting reviewed the pretest and posttest and scored it according to its relevance, clarity, organization and completeness with relation to current practice guidelines for ADHD. The scoring index was measured on a 1-4 Likert scale, with 1=not relevant, 2=somewhat relevant, 3=quite relevant and 4=very relevant. Each provider scored the questions and provided comments and concerns for review. Suggestions were obtained from each reviewer. All recommendations were considered and the test was then modified to improve content, readability and clarity of the questions. After the questions were approved by the practicing nurse practitioners, the primary investigator had three nurse practitioner students complete the test. The pretest was the lengthiest of the questionnaires and was administered to assess for clarity and to detect if survey fatigue is a concern. The pretest took the nurse practitioner students between 10-15 minutes to complete. Survey fatigue and comprehension were not noted as a concern.

## **Procedure**

The project consisted of an initial survey and an educational presentation over current clinical practice guidelines related to ADHD. Consent was implied by participants who completed the initial survey and/or attended the educational intervention and submitted the pretest and posttest. With permission from the 4-State APN group, emails were sent to their members with a link to an initial online survey on pediatric ADHD. The link was also posted on the 4-State APN Facebook page. Participants were instructed to complete the initial online survey one time only. Completion of the online survey provided consent to utilize the data. The data from the online survey was obtained and reviewed by the researcher. Members of the 4-State APN were invited to participate in a free one hour continuing education intervention approved by the AANP. The online survey was closed prior to the educational intervention.

Before beginning the educational intervention, the study's purpose was explained followed by an opportunity for questions. Participants that chose not to participate simply did not complete the packet, but were encouraged to stay for the continuing education unit. Packets consisting of the pretest and posttest were handed out to the appropriate participants. Instructions were provided not to open the packet until the project was explained and all questions are answered. Completion of the pretest and posttest were completely voluntary; participants at the program received continuing education credit regardless of inclusion in the study. The pretest was completed and returned to the packet prior to the beginning of the PowerPoint presentation. The educational intervention lasted approximately 30-45 minutes. When the PowerPoint presentation was complete the posttest was removed from the packet and completed by

the willing participants. Participants were then directed to return the posttest to their packet. Then, the packets were collected and placed in a lockbox. When all packets were returned, participants were allowed time for a question and answer session.

Demographic data was collected from four questions on the online survey. The same four questions were utilized for demographic information on the pretest to describe characteristics of participants. Data from the initial online survey was obtained and accessible only by the researcher. Pretests and posttests were collected by the researcher and secured in a locked box only accessible by the researcher. Data from the initial survey was utilized to assess the current population of nurse practitioners. Statistical analysis was performed on the pretest and posttest utilizing an Excel spreadsheet to tabulate data collected.

### **Summary**

The rates of ADHD indicate a need for providers to be comfortable with management and have a good knowledge base on current CPGs. There is a need for an educational intervention on ADHD with current guidelines and tools to assist providers in accurately following recommendations and improving their comfort managing this condition. According to Harkins et al, (2012) if providers are aware of the guidelines, the more likely they are to use them. This project included an initial survey to determine providers' current practices with ADHD. Then the study provided an educational program to participants with a pretest to evaluate current knowledge followed by a posttest to evaluate knowledge gained from the program. Chapter IV discusses the results of the study.

## **Chapter IV**

### **Results of the Study**

#### **Introduction**

The data in this study was collected to determine whether an increase in knowledge would occur when providers were provided education on the current clinical practice guidelines for pediatric ADHD. The first sample had 26 participants who completed an online survey for nurse practitioners. The second sample included 20 total participants at a local setting for continuing education units. The participants were all nurse practitioners with valid current licensure. The first data set offered information on provider comfort and knowledge in regards to pediatric ADHD prior to any intervention. The second data set analysis will show if education improved knowledge on ADHD CPGs.

#### **Demographic Data**

The demographic data collected from the participants included area of practice, years of practice as a nurse practitioner, state in which they are currently practicing, and whether they currently diagnosis and treat ADHD or not. This data is presented in Table 1, for the initial online survey and Table 2, for the pretest/posttest at the educational intervention.

Of those participating in the initial online survey sixty-five percent of participants (n=17) are in the family practice setting and care for children and 34% (9) reported their specialty as other. Nineteen percent of providers (n=5), have been in practice for 0-3 years, followed by 23% (n=6) at 3-5 years, 23% (n=6) at 5-10 years, 34% (n=9) at 10-20 years, no participants reported greater than 20 years in practice. Sixty-five percent (n=17) of the participants reported currently diagnosing and treating pediatric patients with ADHD. Eighty-four percent (n=22) of the participants reported not following any specific clinical practice guideline for ADHD. Forty-two percent (n=11) of participants reported being uncomfortable or very uncomfortable with diagnosing ADHD. Ninety-two percent (n=24) of the providers surveyed felt they would benefit from further education on the evaluation, diagnosis and treatment of ADHD.

Table 1. Initial Survey Demographic Data

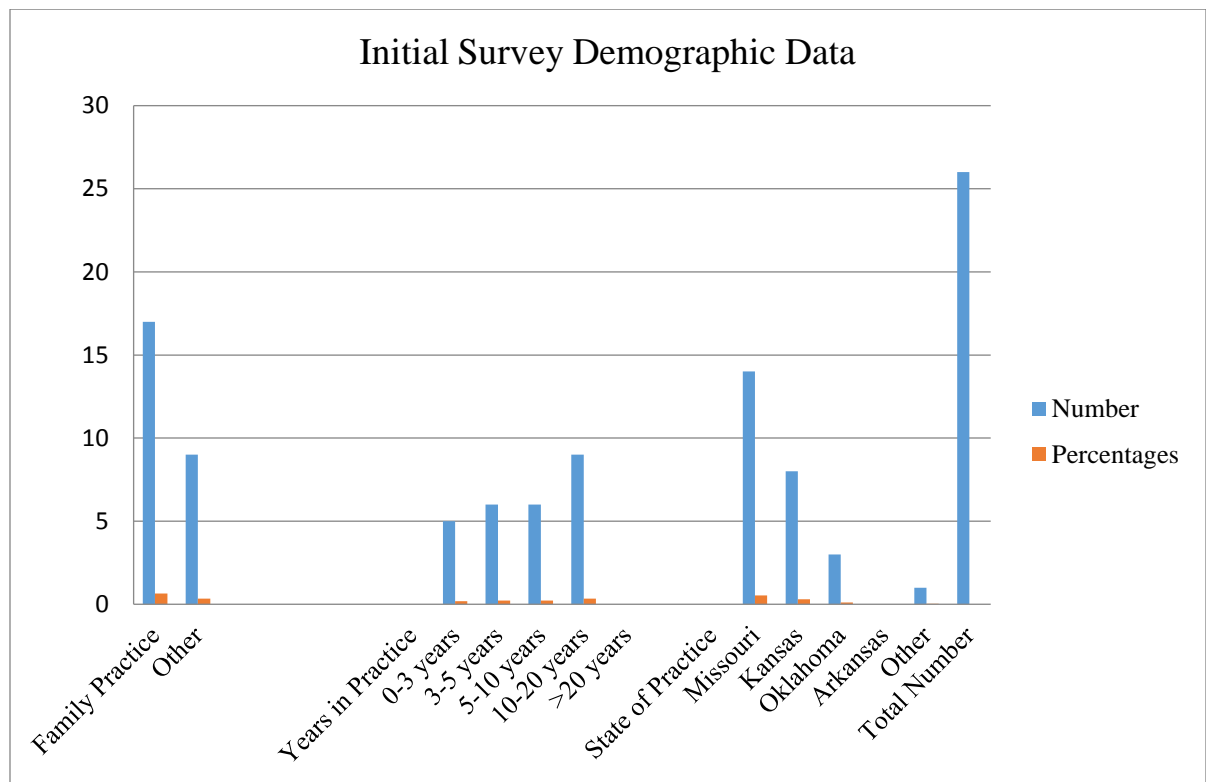
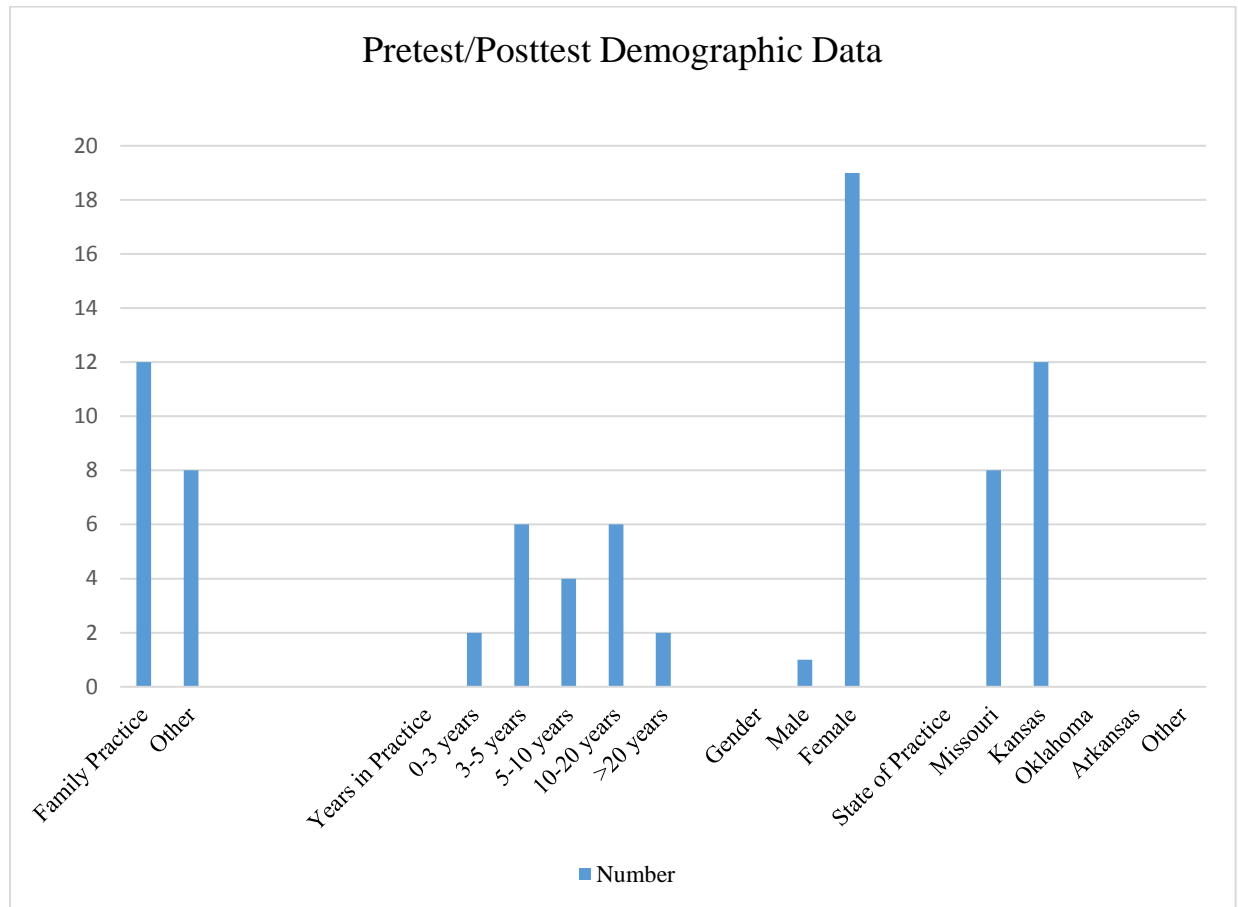




Table 2. Pretest/Posttest Demographic Data



### Pretest and Posttest

All participants were given a pretest immediately prior to the educational intervention and a posttest immediately following the intervention. The tests were anonymous and only identified by a number. Both tests contained the same 20 questions and were worth 20 total points. Nineteen of the questions were multiple choice with one select all that apply question. The questions were focused on assessment, diagnosis and treatment of pediatric ADHD. Ten of the pretest and posttest questions were in relation to knowledge of current clinical practice guidelines. Seven questions on the pretest and posttest were about selecting appropriate treatment for pediatric ADHD. Ten questions on the pretest and posttest were about that AAP algorithm for pediatric ADHD.

## Results of the Study

The pretest scores ranged from 0-12 correct answers. Only one participant did not get any correct answers on the pretest and only one participant was scored as 12 correct with the majority of the scores falling in between. The mean pretest score was 7.8 with a standard deviation of 4.12 in the pretest group (n=20). The posttest scores ranged from 10-19 correct answers. Three participants answered 19 out of 20 questions correct and scored 95% on the posttest. The mean posttest score was 16.4 with a standard deviation of 3.9 in the posttest group (n=20). The differences in pretest and posttest scores had a median of 8.7 (n=20). All respondents (n=20) had an increase in posttest scores after the education was provided as evidenced by Table 3.

Participants answered more questions correctly after the educational intervention in relation to each of the research questions. Tables 3-11 will display the pretest answers compared to the posttest answers as they relate to each research question. The study concluded with substantial statistical significance ( $p < 0.001$ ) that the education provided an increase in the posttest score from the pretest score of the providers with current CPGs on pediatric ADHD. In relation to the research question the study showed a significant increase ( $t(9) = -10.48$ ,  $p < 0.001$ ) in the post-test scores ( $M = 16.3$ ,  $SD = 13.57$ ) over the pre-test scores ( $M = 7.4$ ,  $SD = 15.38$ ) in the participant's ability to identify diagnostic criteria based on current practice guidelines for pediatric ADHD. Participant's ability to select appropriate treatment based on current practice guidelines for pediatric ADHD showed a significant increase ( $t(6) = -7.12$ ,  $p < 0.001$ ) in the post-test scores ( $M = 17.14$ ,  $SD = 2.14$ ) over the pre-test scores ( $M = 6.85$ ,  $SD = 9.14$ ). The study also showed a significant increase ( $t(9) = -5.32$ ,  $p < 0.001$ ) in the post-test scores ( $M = 15.5$ ,  $SD = 24.5$ ) over the pre-test scores

( $M=7.3$ ,  $SD=24.01$ ) in relation to the primary care providers' knowledge of the AAP algorithm and its components.

Table 3. Pretest/Posttest Score Analysis

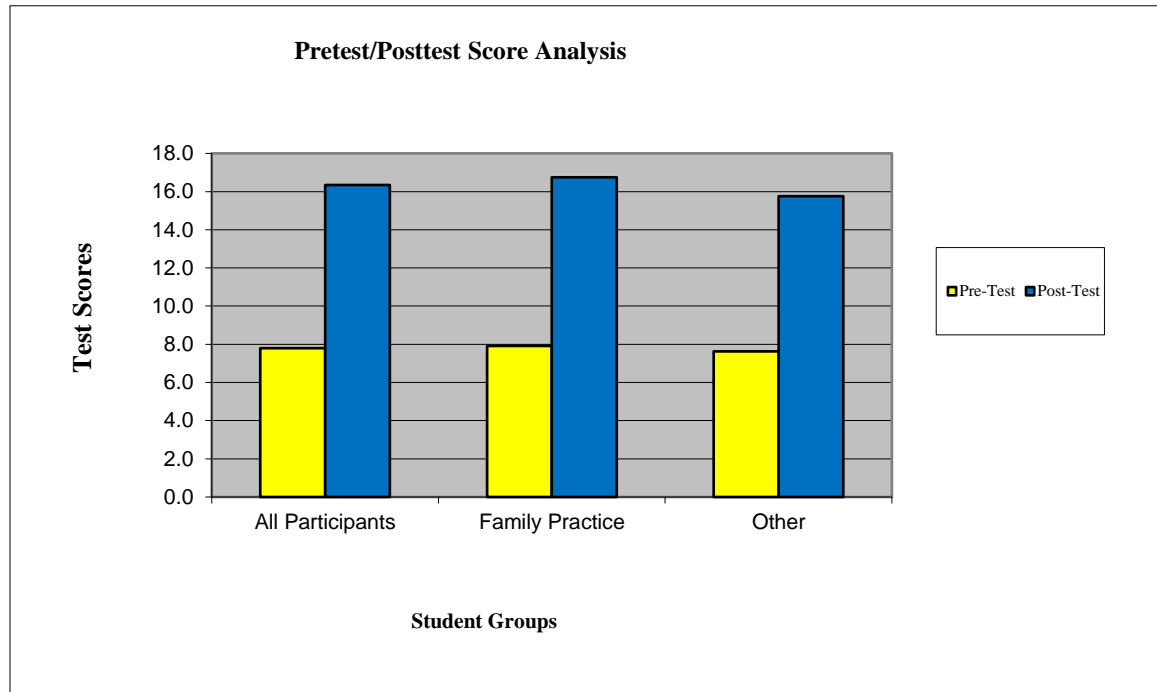


Table 4. Pretest/Posttest Question Analysis

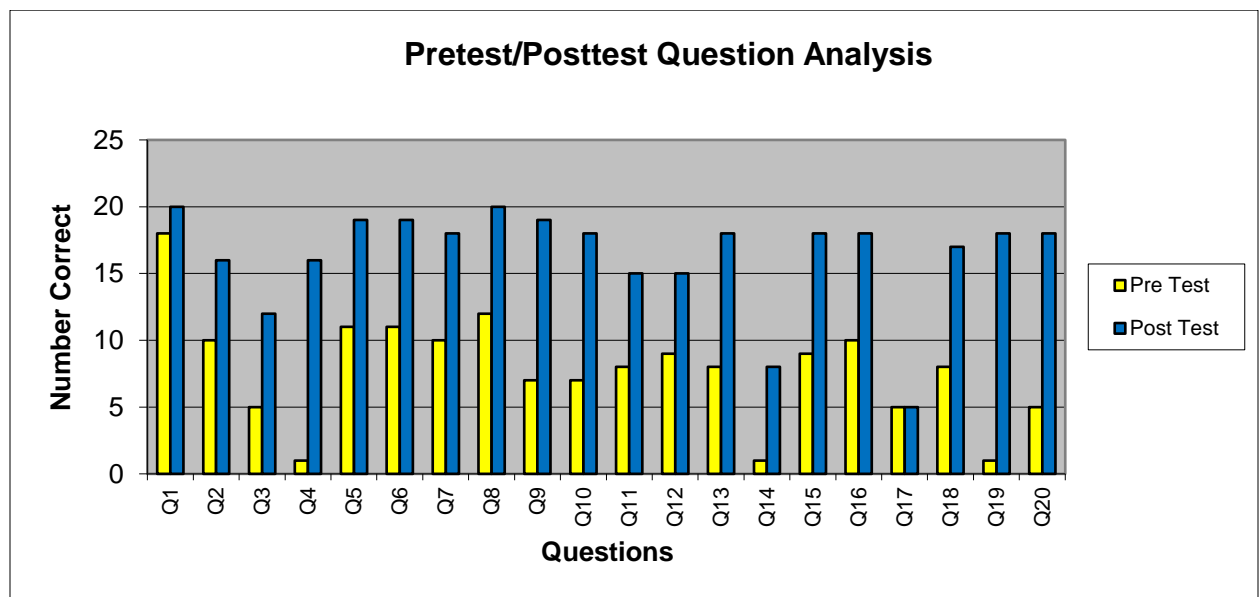


Table 5: Pretest/Posttest Questions; t-Test: Paired Two Sample for Means

	<i>Pretest: Variable 1</i>	<i>Posttest: Variable 2</i>
Mean	7.8	16.35
Variance	17.01052632	15.18684211
Observations	20	20
Pearson Correlation	0.52524043	
Hypothesized Mean Difference	0	
df	19	
t Stat	-9.771218666	
P(T<=t) one-tail	3.81545E-09	
t Critical one-tail	1.729132812	
P(T<=t) two-tail	7.63091E-09	
t Critical two-tail	2.093024054	

Table 6: Pretest/Posttest Results for Research Question 1

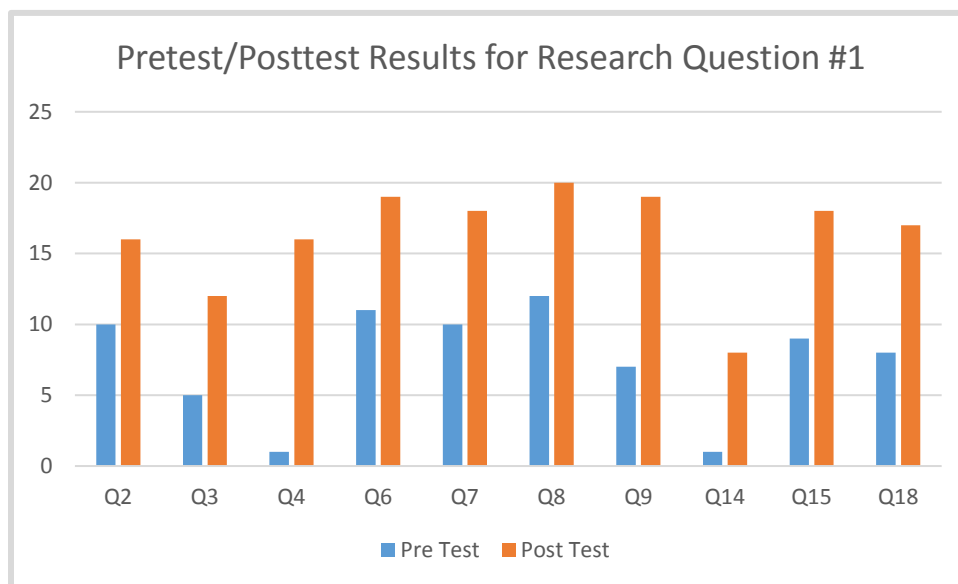


Table 7: Pretest/Posttest Results for Research Question 1; t-Test: Paired Two Sample for Means

<i>Research Question 1</i>	<i>Pretest: Variable 1</i>	<i>Posttest: Variable 2</i>
Mean	7.4	16.3
Variance	15.37777778	13.56666667
Observations	10	10
Pearson Correlation	0.752337965	
Hypothesized Mean Difference	0	
df	9	
t Stat	-10.48066677	
P(T<=t) one-tail	1.20879E-06	
t Critical one-tail	1.833112933	
P(T<=t) two-tail	2.41758E-06	
t Critical two-tail	2.262157163	

Table 8: Pretest/Posttest Results for Research Question 2

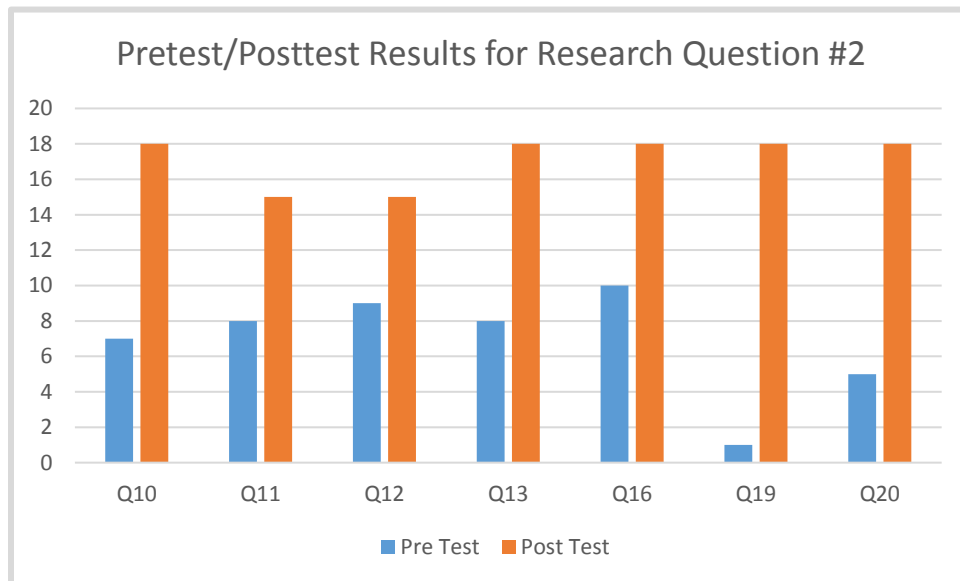


Table 9: Pretest/Posttest Results for Research Question 2; t-Test: Paired Two Sample for Means

<i>Research Question 2</i>	<i>Pretest: Variable 1</i>	<i>Posttest: Variable 2</i>
Mean	6.857142857	17.14286
Variance	9.142857143	2.142857
Observations	7	7
Pearson Correlation	-0.371160904	
Hypothesized Mean Difference	0	
df	6	
t Stat	-7.129062309	
P(T<=t) one-tail	0.000191727	
t Critical one-tail	1.943180281	
P(T<=t) two-tail	0.000383455	
t Critical two-tail	2.446911851	

Table 10: Pretest/Posttest Results for Research Question 3

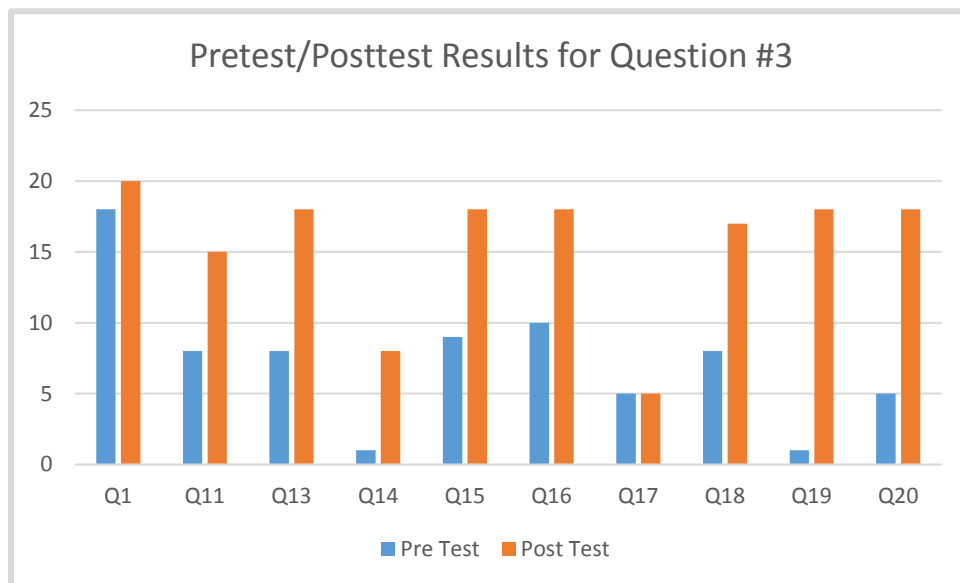


Table 11: Pretest/Posttest Results for Research Question 3; t-Test: Paired Two Sample for Means

<i>Research Question 3</i>	<i>Pretest: Variable 1</i>	<i>Posttest: Variable 2</i>
Mean	7.3	15.5
Variance	24.01111	24.5
Observations	10	10
Pearson Correlation	0.510791	
Hypothesized Mean Difference	0	
df	9	
t Stat	-5.32273	
P(T<=t) one-tail	0.00024	
t Critical one-tail	1.833113	
P(T<=t) two-tail	0.000479	
t Critical two-tail	2.262157	

Analyzing individual questions that were most often answered incorrectly is important to determine content areas that may need reinforced through further education (Table 4). The most frequently missed questions on the pretest were numbers 4, 14 and 19. Seventy-five percent (n=15) of participants incorrectly answered question number 17 based on current clinical guidelines and the algorithm. Question 17 asked, if a patient has symptoms of ADHD but does not meet diagnostic criteria what is the next step? The answers included: educate the parents on normal child behaviors, evaluate for another condition, refer for further psychological testing and schedule a follow-up to reassess. The answers varied among the participants. The correct answer according to guidelines is to evaluate for another condition. The score did not vary from the pretest to the posttest, but question 17 remained the most frequently missed question on both tests. On the pretest 75% (n=15) answered the question incorrectly. On the posttest 75% (n=15) of participants answered the question incorrectly. Possible causative factors include the

wording of the question, multiple options discussed in the educational presentation, and participants believing more than one answer to be correct.

This study indicates that many providers in family practice do not have a good knowledge of the current practice guidelines for pediatric ADHD. Improved scores were noted in all participants with the AAP pediatric clinical practice guideline and usage. Pretest scores ranged from 0-60% (n=1, n=1) correct. Posttest scores ranged from 50-95% (n=1, n=3). The mean pretest score was 39% while the mean posttest score was 82%.

## **Summary**

Chapter four discussed the statistical analysis of the pretest and posttest scores. A positive outcome evaluation was indicated by an increase ( $p<0.001$ ) in correct answers after the educational program was completed. Increased use of the guidelines and improved assessment and treatment are all linked to increased understanding and education of the current practice guidelines. The findings of the study support that many providers are not aware of the current clinical practice guidelines in ADHD. Although information is readily available through websites, guidelines, research and practice settings, providers must update their knowledge continuously, to improve assessment and treatment of children with ADHD. The findings validate the need for educational programs for providers on pediatric ADHD. Chapter 5 discusses future recommendations for research, limitations of the study and conclusions.



## **Chapter V**

### **Summary, Conclusions and Recommendations**

#### **Introduction**

The study obtained data from an online survey of nurse practitioners in regards to their knowledge and comfort level with ADHD. The initial survey was followed by an educational intervention provided to nurse practitioners in order to evaluate whether an increase in knowledge occurred based on pre and posttest responses to specific indicators of pediatric ADHD. The testing challenged the providers' knowledge and sought to evaluate if increased knowledge occurred after an educational intervention. The study focused on the following research questions:

1. Will an educational intervention increase the knowledge of primary care providers when identifying diagnostic criteria that is based on current practice guidelines for pediatric ADHD?
2. Will an educational intervention increase the knowledge of primary care providers when selecting appropriate treatment for children based on current practice guidelines for pediatric ADHD?
3. Will an educational intervention increase the primary care providers' knowledge of the AAP algorithm and its components?

## **Relationships of Outcomes to Research**

### **Increased Accuracy Identifying Diagnostic Criteria**

The educational intervention increased ( $p<0.001$ ) the knowledge of nurse practitioners when identifying diagnostic criteria that is based on CPGs for pediatric ADHD. Prior to the educational intervention nurse practitioners answered pretest questions in relation to diagnostic criteria for pediatric ADHD accurately 37% of the time. After the educational intervention participants answered posttest questions in regards to diagnostic criteria correctly 81.5% of the time. Participants had an average increase of 44.5% from pretest to posttest.

The pretest scores showed that nurse practitioners only answered questions in relation to diagnostic criteria correctly 37% of the time, which correlates with the need for PCP education in the areas of mental health noted in the research. Faghri et al. (2010) reported that the expanding role of PCPs in mental health warrants improved education in diagnosing and treating psychiatric disorders. Education for PCPs is indicated in this ever-growing area of healthcare.

### **Increased Accuracy Selecting Appropriate Treatment**

The educational intervention increased ( $p<0.001$ ) the knowledge of nurse practitioners in regards to selecting appropriate treatment for pediatric ADHD based on current CPGs. Nurse Practitioners answered questions on the pretest in relation to treatment for pediatric ADHD accurately 34% of the time prior to an educational intervention. After the intervention participants answered the same posttest questions correctly 85.7% of the time. Participants had an average increase of 51.7 from pretest to posttest.

The pretest scores correlate with research showing that primary care providers are not following current practice guidelines for ADHD treatment. Charach and Fernandex (2013) reported that children diagnosed by primary care providers are more likely to receive a prescription ADHD medication in the first six months after diagnosis than those diagnosed by psychiatrists. Psychiatrists are more likely to provide titration of stimulant medications and increased dosage monitoring over the first 90 days (Charach & Fernandex, 2013). Many of the providers in this study chose on the pretest the non-stimulant medications as their first therapy, despite stimulant medications being the first line of treatment for pediatric patients ages 12-18 and having the strongest rated pharmacological treatment in all pediatric age groups (AAP, 2011). This finding helped to support a need for education on treatment options in this population of primary care providers.

Treatment of a condition with an addictive medication further validates the need for provider education. Substance-use behaviors increase with delayed initiation of stimulant medications, which makes monitoring for substance abuse very important (McCabe, Veliz, & Boyd, 2016). Prescription drug use is widespread at colleges across the United States and the misuse and abuse of stimulants has increased by 93 percent (Clinton Foundation: Editorial Team, 2014). Providers need education on proper treatment and monitoring of this chronic condition to help prevent addictive behaviors, medication diversion and abuse.

### **Increased Knowledge of the AAP Algorithm**

Nurse practitioners showed an increased ( $p < 0.001$ ) knowledge of the AAP algorithm and its components after the educational intervention. Questions on the pretest

in relation to providers' knowledge of the AAP algorithm and its components showed correct responses by nurse practitioners 36.5% of the time. After education was provided, participants had average scores of 77.5% of correct responses on the same questions. This data revealed an average participant score increase of 41%.

Faghri et al. (2010) reported that treating mental health patients presents additional time management and treatment challenges for PCPs thus providers need a tool that is uncomplicated, easy and quick to interpret. The AAP has created an algorithm to utilize when diagnosing and treating pediatric ADHD patients. Providers must first know that the algorithm exists to utilize its functionality. Lack of knowledge and comfort in regards to the CPG algorithm are reported barriers to patient access for management of ADHD. When information from the CPG and the algorithm are combined ADHD can be assessed appropriately and in a time-effective manner. The pretest scores validate the data found in research that more provider education and utilization of algorithms are needed.

### **Observations**

Many observations can be made based on comparisons of the initial survey data, as well as, pretest and posttest data. Information from this study can also be compared to previous research and studies. Many of the studies reviewed were completed with larger populations with similar notable consistencies as found within this smaller study. The initial survey confirmed reports within the literature that providers are uncomfortable diagnosing and treating pediatric ADHD.

The initial survey data showed that sixty-five percent of the participants were currently diagnosing and treating pediatric patients with ADHD, despite the fact that 42%

of participants were uncomfortable or very uncomfortable diagnosing ADHD. The literature review showed a lack of knowledge and comfort as reported barriers to patient access for management of ADHD. The findings from the initial survey agree with publications from the AAP acknowledging that primary care clinicians might not be confident in their ability to diagnosis and treat pediatric ADHD (2013). Ninety-two percent of the providers surveyed felt they would benefit from further education on the evaluation, diagnosis and treatment of ADHD. This result correlates with this researcher's findings that stated providers treating psychiatric conditions reported the highest level of comfort treating mood disorders and lowest level of comfort for treating behavior disorders.

Studies were reviewed that showed improved provider knowledge after educational interventions but no studies were found showing specific data in relation to pediatric ADHD. Although this study was completed on a small scale, the results did document improvement of provider knowledge after education on pediatric ADHD and the clinical practice guidelines.

### **Evaluation of Conceptual Framework**

The Health Promotion Model had positive influences and helped ensure an increase in knowledge regarding evaluation, diagnosis and treatment of pediatric ADHD. Pender's Health Promotion Model (2011) was utilized as a basis for the research and provided a framework for integration of clinical practice guidelines and education using evidenced-based practice. Providers were educated on the AAP guidelines for diagnosis and treatment of pediatric ADHD and the supporting algorithm. The educational

intervention modeled the expectations for ADHD evaluation and treatment and provided assistance through educational intervention to enable the behavior.

The goal of this project was to provide assistance through education to increase the knowledge of providers in the treatment of pediatric ADHD. Information on ADHD improved self-efficacy of nurse practitioners in relation to the treatment of ADHD. The CPG from the AAP with algorithm served as the plan of action for diagnosis and treatment of patients. Education was provided to positively affect providers' knowledge of pediatric ADHD. Nurse practitioners who attended the educational intervention were actively seeking to regulate their behaviors in patient care. The attendees interacted with their environment and had notable change from the educational intervention. Lastly, self-initiated reconfiguration of the person-environment and the interactive patterns within is essential to changing behavior. Reconfiguration was noted in the participants during this study as demonstrated by the study outcomes. This study invoked a conscious effort to engage in health-promoting behaviors, modeled the expected behaviors within clinical practice, with an expectation that the behaviors would occur and most importantly provide the assistance and support to enable correct pediatric ADHD evaluation, diagnosis and treatment. The integration of Pender's Health Promotion model provided a guide to ensure improved knowledge of the CPG after the educational intervention.

### **Limitations**

One limitation of the study is the findings applied to the specific participants surveyed and may not be generalized to other populations. Members of the 4-State Advanced Practice nurses group were utilized as a convenience sample. Most participants were female (n=19) with male participants (n=1) not evenly represented in

this study. Also, since participants self-selected to participate in this study, the participants may have different ideas and experiences concerning the use of CPGs than those participants who may have chosen to not participate. Another limitation to the study was that all the participants were nurse practitioners (NP). This aspect may limit the study findings to NPs from similar practice settings.

### **Future Research**

The study findings suggest several areas for future research. A better understanding of the pediatric ADHD clinical practice guidelines is noted. Even after education, participants were not able to correctly answer questions in regards to evaluation if the patient does not meet diagnostic criteria for ADHD. One reason for this might be that providers often proceed with more than one method if a patient does not meet diagnostic criteria. Research could continue on this project by assessing retention of provider knowledge three, six, nine and twelve months after the educational intervention. Surveying participants further out from the educational date in order to evaluate whether the current evidenced-based clinical practice guidelines became a part of their daily clinical practice would provide useful information. Data could also be obtained on the provider's changes in regards to ADHD evaluation, diagnosis and treatment. A follow-up study and educational program is needed to provide information to providers regarding ongoing management of ADHD and proper treatment adjustments as the patient ages.

Providers need a knowledge base of ADHD diagnostic criteria in order to practice safely and effectively. Prior to the education, participants were only able to identify correct diagnostic criteria 37% of the time. Although correct diagnosis was improved

after the education, that does not ensure that improvement will be made in the clinical setting. Research is needed on the long-term effects of education and methods for improving diagnosis. Access to the algorithm within an electronic medical record (EMR) is an area of research that could increase accurate diagnosing and treatment. The addition of CPGs and the AAP algorithm within an EMR would allow for quicker provider reference. Research could then be completed to determine the EMR additions improve accuracy of diagnosis and treatment. Access to educational information and patient assessments within a patient portal could also be reviewed. Studies could be completed on effects of forms and questionnaires for ADHD diagnosis being accessible by parents and teachers electronically. The completed forms could also be available in electronic format for providers to review prior to patient visits. Reminders to monitor specific criteria, follow-up with teachers and completion of any needed testing could be available within an EMR. Future research could also include using self-reported answers and chart audits for an accurate evaluation of providers' practice.

### **Dissemination of Information**

The end result of this study was to provide knowledge and initiate a practice change based on the clinical practice guidelines. The information from the project can assist providers in following current practice recommendations which not only improves patient outcomes but can also help to reduce the overall healthcare burden of ADHD. Further education could be provided at future continuing education events including online and video presentations.

This project was approved for 1.25 CE credits through the AANP providing dissemination through educational offerings that are in person, online or in journal



articles. This study can be used to guide educational resources for providers in order to enhance knowledge of current clinical practice guidelines. The educational intervention that was presented as part of this study could be recorded and made available to providers online. Making this education available online would improve educational access and would allow providers from across the nation to review the information provided and would remove both geographical and time barriers.

The need for diagnosis and treatment of mental health by family practice providers is projected to increase (CDC, 2015). This calls for more education of family nurse practitioners prior to starting their clinical practices. Educational institutions should consider a requirement of psychiatric content to be added into anatomy, pathophysiology and pharmacology courses. Clinical opportunities with psychiatric providers actively diagnosing and treating patients would also be beneficial for nurse practitioner students.

Policy briefs have the potential to reach influential legislators and increase opportunities for funding and programs aimed at increasing availability of mental health services for pediatric ADHD and comorbidities. Research studies can help to provide the information in support of education to increase provider knowledge of pediatric ADHD guidelines, thus potentially impacting the economic burden of this chronic disorder. Proper diagnosis and treatment are needed to ensure effective management of the disorder and to improve overall patient and family outcomes.

## **Conclusion**

The purpose of this evidence-based research project was to confirm that providers need more education on ADHD evaluation, diagnosis and treatment, to increase

awareness of the current Clinical Practice Guidelines and algorithms and to improve the knowledge of pediatric ADHD management in primary care providers.

The initial survey confirmed the barrier to treating ADHD that was found during the review of literature. Many nurse practitioners are not comfortable and do not feel they have the knowledge to diagnose and treat pediatric ADHD. The findings within the initial survey helped to develop the chosen material provided in the educational intervention. The participants were given the opportunity to learn about current practice guidelines on pediatric ADHD. The researcher's hope is that this education will increase providers' knowledge of ADHD and increase the number of primary care providers that will diagnose and treat this chronic condition.

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## APPENDIX

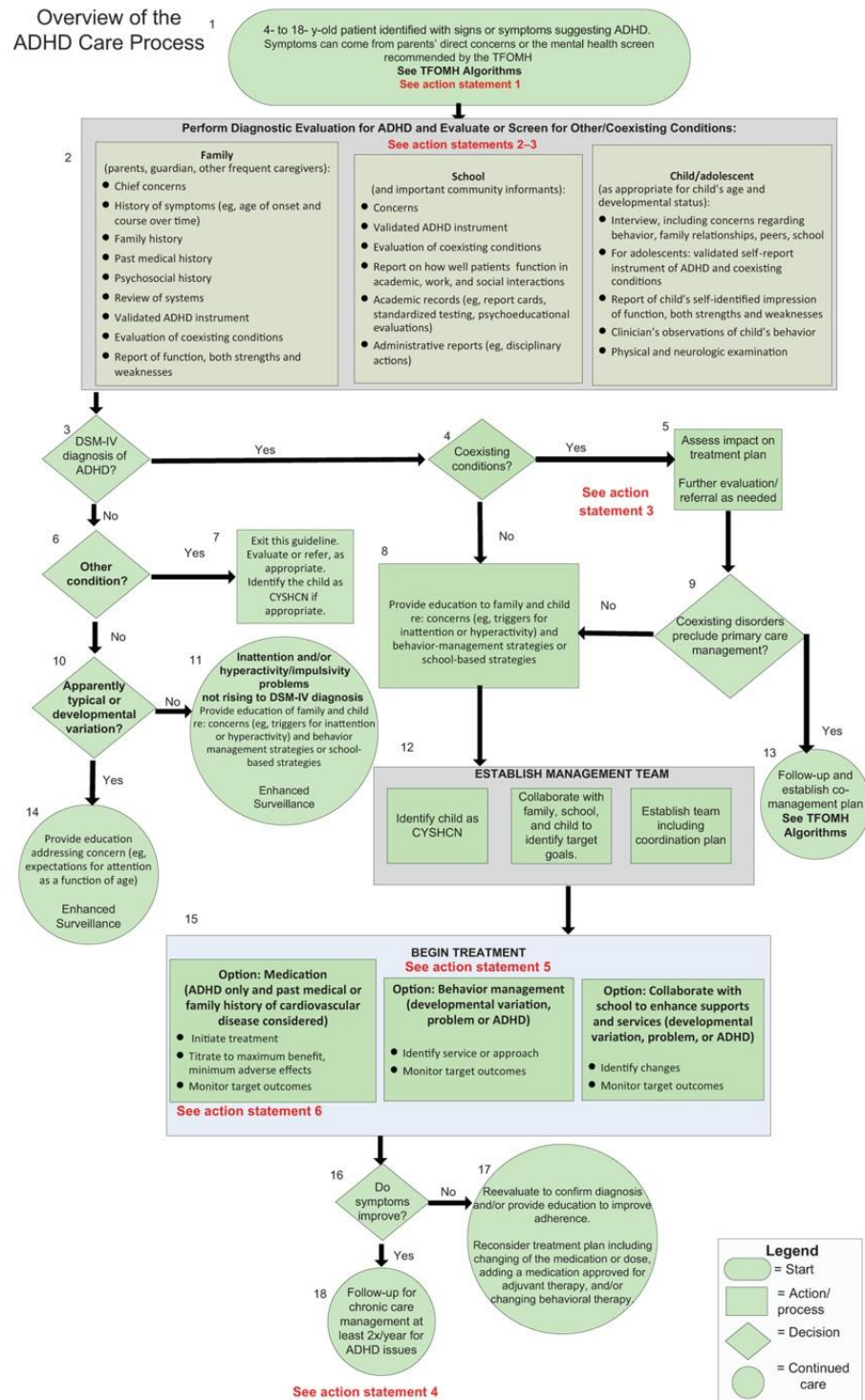
## Appendix A:

### American Academy of Pediatrics on ADHD Summary of key action statements:

<b>Key Action Statement</b>	<b>Rating</b>
The primary care clinician should initiate an evaluation for ADHD for any child 4 through 18 years of age who presents with academic or behavioral problems and symptoms of inattention, hyperactivity, or impulsivity	Quality of evidence B/strong recommendation.
To make a diagnosis of ADHD, the primary care clinician should determine that <i>Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition</i> criteria have been met (including documentation of impairment in more than 1 major setting); information should be obtained primarily from reports from parents or guardians, teachers, and other school and mental health clinicians involved in the child's care. The primary care clinician should also rule out any alternative cause	Quality of evidence B/strong recommendation.
In the evaluation of a child for ADHD, the primary care clinician should include assessment for other conditions that might coexist with ADHD, including emotional or behavioral (eg, anxiety, depressive, oppositional defiant, and conduct disorders), developmental (eg, learning and language disorders or other neurodevelopmental disorders), and physical (eg, tics, sleep apnea) conditions	Quality of evidence B/strong recommendation.
The primary care clinician should recognize ADHD as a chronic condition and, therefore, consider children and adolescents with ADHD as children and youth with special health care needs. Management of children and youth with special health care needs should follow the principles of the chronic care model and the medical home	Quality of evidence B/strong recommendation.
Recommendations for treatment of children and youth with ADHD vary depending on the patient's age:	Quality of evidence A/strong recommendation

<p>For <i>preschool-aged children (4–5 years of age)</i>, the primary care clinician should prescribe evidence-based parent- and/or teacher-administered behavior therapy as the first line of treatment and may prescribe methylphenidate if the behavior interventions do not provide significant improvement and there is moderate-to-severe continuing disturbance in the child's function. In areas where evidence-based behavioral treatments are not available, the clinician needs to weigh the risks of starting medication at an early age against the harm of delaying diagnosis and treatment (quality of evidence B/recommendation).</p> <p>For <i>elementary school-aged children (6–11 years of age)</i>, the primary care clinician should prescribe US Food and Drug Administration–approved medications for ADHD and/or evidence-based parent- and/or teacher-administered behavior therapy as treatment for ADHD, preferably both (quality of evidence B/strong recommendation). The evidence is particularly strong for stimulant medications and sufficient but less strong for atomoxetine, extended-release guanfacine, and extended-release clonidine (in that order) (quality of evidence A/strong recommendation). The school environment, program, or placement is a part of any treatment plan.</p> <p>For <i>adolescents (12–18 years of age)</i>, the primary care clinician should prescribe Food and Drug Administration–approved medications for ADHD with the assent of the adolescent and may prescribe behavior therapy as treatment for ADHD preferably both.</p>	<p>Quality of evidence A/strong recommendation</p> <p>Quality of evidence C/recommendation</p>
<p>The primary care clinician should titrate doses of medication for ADHD to achieve maximum benefit with minimum adverse effects</p>	<p>Quality of evidence B/strong recommendation.</p>

## Appendix B: American Academy of Pediatrics Algorithm for ADHD



ADHD process-of-care algorithm. TFOMH indicates Task Force on Mental Health; CYSHCN, child/youth with special health care needs.<sup>1</sup>

(AAP, 2011)

## Appendix C:

### Initial Survey

Please complete the following survey. Circle the appropriate response or fill in the blanks when applicable.

1. What is your current area of Practice?

Family Practice

Other: \_\_\_\_\_

2. How many years have you practiced as a nurse practitioner?

- a. 0-3 years
- b. 3-5 years
- c. 5-10 years
- d. 10-20 years
- e. >20 years

3. In what State are you currently practicing?

- a. Missouri
- b. Kansas
- c. Arkansas
- d. Oklahoma
- e. Other: \_\_\_\_\_

4. Do you currently diagnosis and treat pediatric patients with ADHD?

- a. Yes
  - b. No
- If no, why not? (Select all that apply)

Against Clinic Policy

Agreement with collaborative Physician

Uncomfortable providing diagnosis

Uncomfortable prescribing stimulant medication

Other: \_\_\_\_\_

5. As a provider how would you rate your education and knowledge base to treat ADHD?

Poor

Fair

Good

Very Good

Excellent

6. Do you feel comfortable diagnosing ADHD?

Very Uncomfortable

Uncomfortable

Neutral

Comfortable

Very

Comfortable

7. Please select which age groups you treat for ADHD.

4-5

6-11

12-18

None



8. Do you follow any specific Clinical Practice Guideline when treating ADHD?

Yes

No

If yes, please list which Clinical Practice Guideline: \_\_\_\_\_

9. Do you have a good knowledge base of current practice guidelines for the diagnosis and management of ADHD?

Poor

Fair

Good

Very Good

Excellent

10. Do you feel comfortable using the American Academy of Pediatrics guideline for ADHD?

Very Uncomfortable  
Comfortable

Uncomfortable

Neutral

Comfortable

Very

11. Are all of your patients with a suspected diagnosis of ADHD referred to a specialist?

Yes

No

12. If so, to whom is the referral made?

Another PCP

Pediatrician

Psychiatrist

Psychologist

Other:

\_\_\_\_\_

13. What is the current wait time for patients who you refer to specialists for assessment of ADHD (initial diagnosis or ongoing treatment)?

>1 month

2-4 months

4-6 months

6-8 months

> 8 months

Other: \_\_\_\_\_

14. After referral to a specialist will you follow up on patients for ongoing management of ADHD?

Yes

No

Not Applicable

15. Rate your knowledge base for treatment options of ADHD?

Poor

Fair

Good

Very Good

Excellent

16. For patients you treat with ADHD how often do you require follow up?

1 month

3 months

6 months

Yearly

Other: \_\_\_\_\_

17. Do you feel that primary care providers should diagnosis ADHD?

Yes

No

18. Do you feel that primary care providers should treat ADHD?

Yes

No

19. Do you think you would benefit from further education on the evaluation, diagnosis and treatment of ADHD?

Yes

No

20. Would you like to receive education on the American Academy of Pediatrics CPG for ADHD?

Yes

No

21. Do you think there is a shortage of providers in your area who treat ADHD?

Yes

No

Thank you for your time and participation in this research.

## Appendix D:

### Pretest

#### Pretest

Please complete the following pretest. Circle the appropriate response or fill in the blanks when applicable.

A. What is your current area of Practice?

Family Practice

Other: \_\_\_\_\_

B. How many years have you practiced as a nurse practitioner?

f. 0-3 years

g. 3-5 years

h. 5-10 years

i. 10-20 years

j. >20 years

C. In what State are you currently practicing?

f. Missouri

g. Kansas

h. Arkansas

i. Oklahoma

j. Other: \_\_\_\_\_

D. Do you currently diagnosis and treat pediatric patients with ADHD?

c. Yes

d. No

If no, why not? (Select all that apply)

Against Clinic Policy

Agreement with collaborative Physician

Uncomfortable providing diagnosis

Uncomfortable prescribing stimulant medication

Other: \_\_\_\_\_

1. Primary care providers can diagnosis ADHD.
  - a. True
  - b. False
  - c. Only with additional training.
2. There is no definitive test for ADHD.
  - a. True
  - b. False
3. The youngest age at which ADHD can be diagnosed is \_\_\_\_\_.
  - a. 3
  - b. 4
  - c. 5
  - d. 7
4. To make a diagnosis of ADHD, the clinician provider needs to establish that at least \_\_\_\_ or more of the 9 core symptoms per dimension are present in either or both of the dimensions of inattention and/or hyperactivity/impulsivity.
  - a. 3
  - b. 4
  - c. 5
  - d. 6
5. ADHD often resolves by adulthood.
  - a. True
  - b. False
6. There are \_\_\_\_\_ types or subsets of ADHD.
  - a. 0
  - b. 3
  - c. 5
  - d. 7
7. Evaluation for ADHD should be completed on all pediatric patients.
  - a. True
  - b. False
8. ADHD symptoms often appear between the ages of
  - a. 0-3 years
  - b. 3-6 years
  - c. 6-9 years

9. To be diagnosed with the ADHD, a child must have symptoms for \_\_\_\_\_ months and to a degree that is greater than other children of the same age.
- 3 or more
  - 6 or more
  - 9 or more
  - 12 or more
10. When a provider determines that management is needed for ADHD which of these has the strongest level of evidence for use?
- Extended release Guanfacine
  - Extended release Clonidine
  - Stimulant medications
  - Behavioral therapy
11. Stimulant medications are the first line of treatment for ADHD.
- True
  - False
  - Depends on age of the patient
12. Studies have found a link between stimulant medication use for ADHD and increased rates of drug abuse.
- True
  - False
13. Patients with ADHD must have cardiac evaluations prior to starting stimulant medications.
- True
  - False
14. Providers should refer suspected ADHD patients when \_\_\_\_\_ (select all that apply).
- Comorbid conditions exist
  - Provider is uncomfortable making the diagnosis
  - Patient's diagnosis is not clear
  - Request is made by the parents
  - Patient is under 5 years of age
  - Symptoms have been present for less than 6 months
15. Patients with ADHD must be evaluated by a psychiatric provider \_\_\_\_\_.
- At initial diagnosis
  - At least once per year
  - With any medication (not including dosage) change
  - As determined by the primary care provider

16. If a stimulant medication is initiated for ADHD and it does not seem to be helping the first action is to \_\_\_\_\_.  
a. Change to a non-stimulant medication  
b. Change to a different stimulant medication  
c. Increase the dose  
d. Re-evaluate ADHD diagnosis
17. If a patient has symptoms of ADHD but does not meet diagnostic criteria the next step is to \_\_\_\_\_.  
a. Educate the parents on normal child behaviors  
b. Evaluate for another condition  
c. Refer for further psychological testing  
d. Schedule a follow-up to reassess
18. Patients with ADHD may only have symptoms at school.  
a. True  
b. False
19. Once a diagnosis of ADHD is established the patient needs follow up appointments at least \_\_\_\_\_.  
a. Every 3 months  
b. Twice per year  
c. Monthly  
d. Yearly
20. Which of these medications is recommended if pharmacotherapy is needed in a 5 year old patient with ADHD?  
a. Guanfacine  
b. Amphetamines  
c. Methylphenidate  
d. Clonidine

Thank you for your time and participation in this research.

## Appendix E:

### Posttest

#### Posttest

Please complete the following pretest. Circle the appropriate response or fill in the blanks when applicable.

1. Primary care providers can diagnosis ADHD.
  - a. True
  - b. False
  - c. Only with additional training.
2. There is no definitive test for ADHD.
  - a. True
  - b. False
3. The youngest age at which ADHD can be diagnosed is \_\_\_\_\_.
  - a. 3
  - b. 4
  - c. 5
  - d. 7
4. To make a diagnosis of ADHD, the clinician provider needs to establish that at least \_\_\_\_ or more of the 9 core symptoms per dimension are present in either or both of the dimensions of inattention and/or hyperactivity/impulsivity.
  - a. 3
  - b. 4
  - c. 5
  - d. 6
5. ADHD often resolves by adulthood.
  - a. True
  - b. False
6. There are \_\_\_\_\_ types or subsets of ADHD.
  - a. 0
  - b. 3
  - c. 5
  - d. 7
7. Evaluation for ADHD should be completed on all pediatric patients.
  - a. True
  - b. False

8. ADHD symptoms often appear between the ages of
- a. 0-3 years
  - b. 3-6 years
  - c. 6-9 years
9. To be diagnosed with the ADHD, a child must have symptoms for \_\_\_\_\_ months and to a degree that is greater than other children of the same age.
- a. 3 or more
  - b. 6 or more
  - c. 9 or more
  - d. 12 or more
10. When a provider determines that management is needed for ADHD which of these has the strongest level of evidence for use?
- a. Extended release Guanfacine
  - b. Extended release Clonidine
  - c. Stimulant medications
  - d. Behavioral therapy
11. Stimulant medications are the first line of treatment for ADHD.
- a. True
  - b. False
  - c. Depends on age of the patient
12. Studies have found a link between stimulant medication use for ADHD and increased rates of drug abuse.
- a. True
  - b. False
13. Patients with ADHD must have cardiac evaluations prior to starting stimulant medications.
- a. True
  - b. False
14. Providers should refer suspected ADHD patients when \_\_\_\_\_ (select all that apply).
- a. Comorbid conditions exist
  - b. Provider is uncomfortable making the diagnosis
  - c. Patient's diagnosis is not clear
  - d. Request is made by the parents
  - e. Patient is under 5 years of age
  - f. Symptoms have been present for less than 6 months



15. Patients with ADHD must be evaluated by a psychiatric provider \_\_\_\_\_.  
a. At initial diagnosis  
b. At least once per year  
c. With any medication (not including dosage) change  
d. As determined by the primary care provider
16. If a stimulant medication is initiated for ADHD and it does not seem to be helping the first action is to \_\_\_\_\_.  
a. Change to a non-stimulant medication  
b. Change to a different stimulant medication  
c. Increase the dose  
d. Re-evaluate ADHD diagnosis
17. If a patient has symptoms of ADHD but does not meet diagnostic criteria the next step is to \_\_\_\_\_.  
a. Educated the parents on normal child behaviors  
b. Evaluate for another condition  
c. Refer for further psychological testing  
d. Schedule a follow-up to reassess
18. Patients with ADHD may only have symptoms at school.  
a. True  
b. False
19. Once a diagnosis of ADHD is established the patient needs follow up appointments at least \_\_\_\_\_.  
a. Every 3 months  
b. Twice per year  
c. Monthly  
d. Yearly
20. Which of these medications is recommended if pharmacotherapy is needed in a 5 year old patient with ADHD?  
a. Guanfacine  
b. Amphetamines  
c. Methylphenidate  
d. Clonidine

Thank you for your time and participation in this research.