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Autism Spectrum Disorder: An Educational Intervention for Future  
Nurse Practitioners

Stephanie G. Margiotis

AUTISM SPECTRUM DISORDER:  
AN EDUCATIONAL INTERVENTION FOR FUTURE  
NURSE PRACTITIONERS

DNP PROJECT

Presented in Partial Fulfillment of the  
Requirements for the Degree of  
Doctor of Nursing Practice

Barry University  
College of Nursing and Health Sciences

Stephanie G. Margiotis

2015

AUTISM SPECTRUM DISORDER:  
AN EDUCATIONAL INTERVENTION FOR FUTURE  
NURSE PRACTITIONERS

DNP SCHOLARLY PROJECT

by

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2015

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## Abstract

**Background:** Autism spectrum disorder (ASD) affects thousands of preschool aged children each year. Toddlers with autism spectrum disorder are not being consistently screened and diagnosed early on; therefore, treatment is being postponed. Current research suggests that routine screening, early identification, and intervention in toddlers with autism spectrum disorder result in improved outcomes by limiting the extent of disability experienced by the child.

**Purpose:** The purpose of this educational intervention project was to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam. If nurse practitioners lack the knowledge and skills required to screen and identify autism spectrum disorder in toddlers in the primary care setting, then toddlers may lack the benefits of early diagnosis and treatments for autism spectrum disorder.

**Theoretical Framework:** The Iowa Model of Evidence-Based Practice, which is intended to promote quality care, guided this study.

**Methods:** An intervention to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam was implemented. A descriptive approach was used in the project. At the completion of the educational intervention, a program evaluation was handed out and turned in.

**Results:** A total of 41 program evaluations were collected. Eighty-five percent of the participants indicated that they understood the importance of screening for autism

spectrum disorder at every well child exam. Additionally, 90% indicated they would consider using screening tools in primary care practice, and 73% stated feeling comfortable interpreting the screening tools.

**Conclusions:** The project, *Autism Spectrum Disorder: An Educational Intervention for Future Nurse Practitioners*, offered an organized and effective approach to screening for autism spectrum disorder in annual assessment of pediatric patients ages 9-48 months. Heightened awareness of screening for autism spectrum disorder may lead to its implementation in standard of practice.

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To my Capstone committee, words cannot express my gratitude. Dr. LePage, my committee chair, thank you for your guidance, insight, encouragement, for believing in me and ensuring my success. I am forever thankful.

## **DEDICATION**

This paper is dedicated to my family.

To my unborn daughter Emma, your timing was a blessing. You have filled my heart with love, joy, dreams, and hopes. Mommy loves you more than you will ever know. I can't wait to meet you, angel.

To my parents, my greatest strength, inspiration, and motivation in life. I am everything I am today because of the unconditional love and support you both have given me.

To Chen, my love – Words cannot express what you mean to me. You are my rock. I look forward to spending the rest of our lives together. I love you.



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## **SECTION ONE**

### **NATURE OF THE PROJECT AND PROBLEM IDENTIFICATION**

Autism spectrum disorder is a brain-based developmental disorder that affects a child's behavior, communication, and social skills. This disorder is characterized, in varying degrees, by difficulties in social interaction, verbal and nonverbal communication, and repetitive behaviors. With the May 2013 publication of the Diagnostic and Statistical Manual of Mental Disorders V (DSM-V), all autism disorders were merged into one umbrella diagnosis of autism spectrum disorder. Previously, they were recognized as distinct subtypes, including autistic disorder, childhood disintegrative disorder, pervasive developmental disorder-not otherwise specified (PDD-NOS), and Asperger syndrome. The revised diagnosis represents a new, more accurate, medically, and scientifically useful way of diagnosing individuals with autism spectrum disorder. The criteria change encourages earlier diagnosis of autism spectrum disorder. With consistent screening and earlier diagnosis of autism spectrum disorder, interventions can be immediately initiated and the quality of outcomes greatly improved (American Psychiatric Association [APA], 2013).

#### **Background of the Project**

Autism spectrum disorder (ASD) affects thousands of preschool aged children each year. According to the U.S. Centers for Disease Control and Prevention (CDC, 2014), 1 in 68 American children has autism spectrum disorder. It also reports that autism spectrum disorder is four to five times more common among boys than girls. An estimated 1 out of 42 boys and 1 in 189 girls are diagnosed with autism spectrum disorder annually in the United States (CDC, 2014). Over the last couple of decades, there has

been a worldwide increase in the number of children diagnosed with autism spectrum disorder, which can be partially attributed to (a) lowering the age of diagnosis and (b) broadening of diagnostic criteria to include other types of autism spectrum disorders (Barbaro, Ridgway, & Dissanayake, 2011). Children with autism spectrum disorder have impairment in social interactions, communication, and behavior. “Children in all cultures and socioeconomic groups can be affected” (Bradley, 2010, p. 304). It has become a worldwide leading concern among health care providers.

Current research suggests that early identification and intervention in toddlers with autism spectrum disorder result in improved outcomes by limiting the extent of disability experienced by the child. “Interventions that begin as early as preschool years are linked with improved outcomes in cognition, language, and educational achievement” (Webb, 2011, p. 229). Toddlers with autism spectrum disorder are not being consistently screened and diagnosed early on; therefore, treatment is being postponed. According to Barbaro et al. (2011), signs of autism spectrum disorders are evident during the first year of life, but very few children are diagnosed before 3 years.

It is essential that family nurse practitioners be able to screen and diagnose autism spectrum disorders early on in preschool aged children. Reported barriers to screening include lack of time, lack of familiarity with autism spectrum disorder screening tools, inadequate reimbursement for screening, and reliance on clinical observations instead of more reliable screening tools to detect autism spectrum disorder (Webb, 2011, p. 229).

Developmental surveillance is a key component and should be integrated in every encounter. “The American Academy of Pediatrics (AAP) recommends developmental

screening with a tool such as the Ages and Stages Questionnaire at the 9,18, and 24 or 30 month well child exams” (Bradley, 2010, p. 304). Other standardized developmental screening tools available are the Checklist for Autism in Toddlers (CHAT) for ages 18-24 months, the Modified Checklist for Autism in Toddlers (M-CHAT) for ages 16-48 months, and the Social Communication Questionnaire (SCQ) for children 4 years and older (Bradley, 2010, p. 304). With proper education and skills, family nurse practitioners can implement routine screening and help identify and diagnose children with autism spectrum disorders at an early age and implement proper treatments for improved outcomes in this population.

### **Problem Statement**

The problem is that there is a lack of data to know if family nurse practitioners have the necessary knowledge and skills necessary to utilize available screening tools for children with autism spectrum disorder. Autism spectrum disorder left undiagnosed and/or untreated in children can lead to a lifetime of dependence, decreased academic capabilities, lack of interaction with the environment, and a disservice to this vulnerable population.

### **Purpose of the Project**

The purpose of this educational intervention project was to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam. If family nurse practitioners lack the knowledge and skills required to screen and identify autism spectrum disorder in toddlers in the primary care setting, then toddlers may lack the benefits of early diagnosis and treatments for autism spectrum disorder. Future family

care nurse practitioners will be educated on the importance of routine screening for autism spectrum disorders and the available tools. Properly educating future family nurse practitioners on the importance of screening using the available tools and early interventions for patients screening positive may lead to improved outcomes for this population.

### **Project Objectives**

The purpose of this project was achieved through the following objectives:

1. Educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam.
2. Identify an evidence-based/best practice tool for screening autism spectrum disorder in primary care practice.
3. Create a targeted educational intervention for future family nurse practitioners caring for pediatric patients ages 9 to 48 months including:
  - a. Importance of screening
  - b. Examples of evidence-based screening tools for autism spectrum disorder screening process
  - c. M-CHAT-R introduction and guide for using in well child assessment
  - d. Interpretation of M-CHAT-R tools
  - e. Intervention for patients screening positive
  - f. Follow-up



## Theoretical Framework

Evidence-based practice is now considered a dominant theory of practice, policy, management, and education within health care worldwide (Doody & Doody, 2011). The IOWA Model of Evidence Based Practice intended use is to promote quality care. The implementation of evidence-based practice has consistently shown to have better patient outcomes compared to routine procedural nursing care. According to Doody and Doody (2011), evidence-based practice involves the use of reliable, explicit, and judicious evidence to make decisions about the care of individual patients, combining the results of well-designed research, clinical expertise, patient concerns, and patient preferences.

The IOWA model focuses on incorporating evidence-based research into practice. Doody and Doody (2011) identified the IOWA model as one that allows health care providers to focus on knowledge and problem-focused triggers. This focus allows staff to question current nursing practices and decide if care can be improved through the use of current research findings (Figure 1).

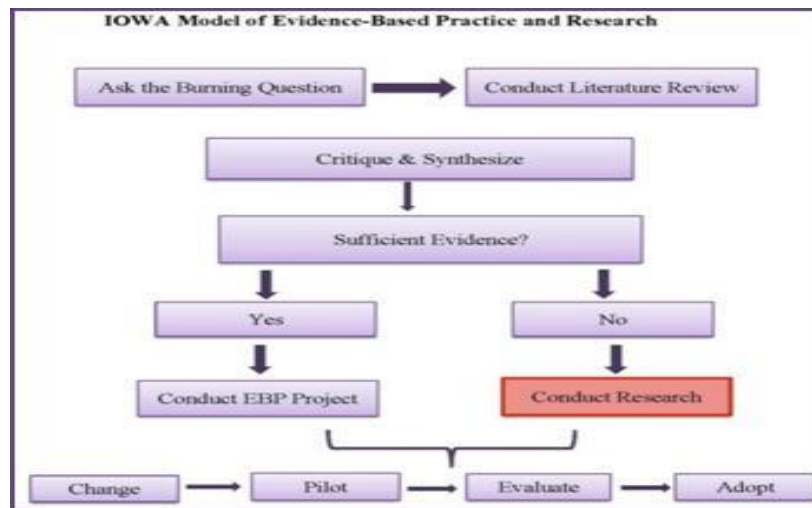


Figure 1. IOWA Model of Evidence-Based Practice and Research (Doody & Doody, 2011).

### **Significance of the Problem to Nursing**

Early and routine screening and identification of autism spectrum disorder in toddlers by family nurse practitioners is vital in implementing treatment early in childhood. Family nurse practitioners must be able to have the adequate knowledge in recognizing autism spectrum disorder in children, be able to incorporate screening tools for autism spectrum disorder in the primary care setting, and be able to make proper referrals for further diagnoses and treatment. If family nurse practitioners fail to implement the available screening tools for autism spectrum disorder at every well child exam, identify patients who screen positive, and make appropriate referrals so treatment can be initiated, the extent of the disability experienced by the child in areas of cognition, language, and educational achievement will be detrimental.

According to Barbaro et al. (2011), early identification of autism spectrum disorder is the first step to facilitating referrals and diagnosis. Early diagnosis is crucial, as it allows for early intervention, which maximizes the outcomes for children with autism spectrum disorder. With family nurse practitioners as primary care providers, it is essential that they be educated on the benefits of routine screening and early identification of autism spectrum disorder and the need to incorporate routine autism spectrum disorder screening tools in the primary care setting.

Routine screening, early identification, and diagnosis of autism spectrum disorder in toddlers by family nurse practitioners are vital in implementing treatment early in childhood. Family nurse practitioners in primary care must be able to have the adequate knowledge in recognizing autism spectrum disorder in toddlers, be able to incorporate

screening tools for autism spectrum disorder in the primary care setting, and be able to make proper referrals for further diagnosis and treatment.

The American Association of Colleges of Nursing outlines elements, competencies, and expectations for advanced nursing practice in *The Essentials of Doctoral Education for Advanced Nursing Practice*. This document defines the eight foundational Essentials of the Doctor of Nursing Practice degree. The Essentials of Doctoral Education for Advanced Nursing Practice include: Scientific Underpinnings for Practice, Organizational and Systems Leadership for Quality Improvement and Systems Thinking, Clinical Scholarship and Analytical Methods for Evidence-Based Practice, Information Systems/Technology and Patient Care Technology for Improvement and Transformation of Health Care, Health Care Policy for Advocacy in Health Care, Interprofessional Collaboration for Improving Patient and Population Outcomes, Clinical Prevention and Population Health for Improving the Nation's Health, and Advanced Nursing Practice (Hickey & Brosnan, 2012). The essentials address the foundational competencies that are core to all advanced nursing practice roles, outline the required competencies of the DNP graduate, and represent the impact the Essentials may ultimately have in health care, resulting in an improvement in health care delivery systems and improved quality of patient care.

The significance of this educational intervention project can be generally applied and supported by all essentials. Under Essential I, the Doctor of Nursing Practice (DNP), the DNP is expected to use science-based theories and concepts, integrate nursing science with knowledge from ethics, biophysics, psychosocial, analytical, and organizational sciences, and evaluate outcomes. By using scientific based theories and procedures, the

project examined the lack of routine screening for autism spectrum disorder by family nurse practitioners, the educational intervention, and the program evaluation, which will serve to evaluate outcomes.

Essential II, which is Organization and Systems Leadership for Quality Improvement and Systems Thinking, will focus on the needs of a set of populations and meet the health needs of the patient populations, which in this project are toddlers with autism spectrum disorder. The focus of Essential II is developing and evaluating approaches to how care is delivered to meet the needs of patients based on scientific findings. This project addressed this Essential through the education of future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam.

Essential III, which is Clinical Scholarship and Analytical Methods for Evidence-Based Practice, allows the translation of research into practice. It is demonstrated by the thorough review of literature and evidence that supports the need for family nurse practitioners caring for pediatric patients ages 9 to 48 months the importance of routine screening for autism spectrum disorder using the available screening tools recommended by the American Academy of Pediatrics. Research shows that early routine screening, diagnosis and treatment of autism spectrum disorder in toddlers, has better outcomes for this population. This will allow application of potential relevant findings such as routine screening for autism spectrum disorder at every well child exam by family nurse practitioners will improve the long term quality of life for those children diagnosed with autism spectrum disorder and assist in developing practice guidelines and improving health care practice for toddlers with autism spectrum disorder.

Essential IV, Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care, calls for the DNP to design, select, use, and evaluate programs that evaluate and monitor outcomes of care, care systems, and quality improvement. The project program evaluation was used to quantify, evaluate, and validate the impact of an educational intervention for future family nurse practitioners in primary care on the importance of screening for autism spectrum disorder in toddlers ages 9 to 48 months at every well check. Outcomes will be used to judge the safety, effectiveness, and overall improved quality of care directly associated with routine screening for autism spectrum disorder by future family nurse practitioners in a primary care setting. Results will assist in improving, changing, and refining current standard of practice.

Essential V, Health Care Policy for Advocacy in Health Care, prepares the DNP to design, influence, and implement health care policies that frame health care financing, practice regulating, access, safety, quality and efficacy. The purpose of this educational intervention is to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of routine screening for autism spectrum disorder at every well child exam. Educating future family nurse practitioners on the importance of routine screening may lead to changes in the current practice and health care policy related to routine screening for autism spectrum disorder in toddlers by family nurse practitioners.

In Essential VI, Interprofessional Collaboration for Improving Patient and Population Health Outcomes, requires the DNP to employ effective communication and collaborative skills in the development and implementation of practice models, peer

review, practice guidelines, health policy, and standards of care. Since family nurse practitioners are at the forefront of providing quality care for all patients, with the current up-to-date review of literature that suggests the importance of routine screening for autism spectrum disorder in toddlers, identifying those who screen positive and providing proper referrals to begin treatment as soon as possible, collaboration among all health care providers from different specialties will be implemented. Interprofessional collaboration will accomplish the mandate for safe, timely, effective, efficient, equitable, and patient-centered care in a complex environment, where health care professionals must function as highly collaborative teams.

In Essential VII, Clinical Prevention and Population Health for Improving the Nation's Health, the DNP is expected to evaluate care delivery models and/or strategies using concepts related to community, environment and occupational health, and cultural and socioeconomic dimensions of health. By educating future family nurse practitioners on routine screening for autism spectrum disorder in toddlers, the community as a whole directly benefits. The nation's health is improved in all areas, and long-term benefits can be measured.

Finally, under Essential VIII, Advanced Nursing Practice, the DNP is expected to guide, mentor, and support other nurses to achieve excellence in nursing practice. The project's main purpose was to educate future family nurse practitioners, serve as a mentor and expert in the area of autism spectrum disorder, and support nurses to achieve excellence in nursing practice by educating them with evidence based practice guidelines and assisting them to incorporate routine screening for autism spectrum disorder in their daily practice.

## **Significance of the Project**

This project has significance in the areas of practice, health care outcomes, health care delivery, and health care policy.

### **Practice**

This project will help future family nurse practitioners in the primary care setting caring for pediatric patients ages 9 to 48 months recognize the importance of routinely implementing autism spectrum disorder screening tools in practice. With the knowledge gained, it is expected that family nurse practitioners will incorporate routine screening for autism spectrum disorder in toddlers into their daily practice. It is also expected that they will have the necessary knowledge in the interpretation of the screening tools, required intervention for those patients screening positive and the required follow-up.

### **Health Care Outcomes**

This project will assist in early identification of autism spectrum disorder in toddlers. If autism spectrum disorder screening is implemented into every well exam as recommended, autism spectrum disorder can be identified early on, and interventions can be implemented. This early intervention will result in an improved prognosis for toddlers with autism spectrum disorder and increased quality of life. This project will impact health care outcomes by increasing the awareness of early identification of autism spectrum disorder in toddlers and education to promote the use of screening tools, implementation of autism spectrum disorder guidelines set by the American Academy of Pediatrics, as well as decrease related disability and morbidity and mortality. This will result in an overall improved quality of life and savings in autism spectrum related health care costs.

**Health Care Delivery**

The current efficient means of health care delivery is to focus on primary prevention. For children with autism spectrum disorder, the timing of diagnosis has a vital impact on improved outcomes and optimal function. Routine screening for autism spectrum disorder in toddlers is a health promoting application. Routine screening for autism spectrum disorder serves to impact optimal function by allowing early treatments to be initiated. This project will help future family nurse practitioners in the primary care setting caring for pediatric patients ages 9 to 48 months recognize the importance of routinely implementing autism spectrum disorder screening tools in practice. Early identification of autism spectrum disorder in toddlers will serve to promote health among this population, improve outcomes, increase efficiency, decrease time to intervene, and decrease long-term issues.

**Health Care Policy**

Efforts to increase public awareness about autism spectrum disorder in toddlers require increase awareness among health care providers. The implementation of this project will help identify areas that require greater provider awareness and may serve as a basis for future research and needs assessment. This project is an important initiation to incorporate autism spectrum disorder and routine screening education for future family nurse practitioners and current family nurse practitioners in practice. Future guidelines can be developed to improve compliance of routine screening for autism spectrum disorder in toddlers.



### **Section Summary**

This section discussed that primary care health providers are encountering autism spectrum disorder more frequently, with a reported prevalence of approximately almost 1 in 68 (CDC, 2014). The family nurse practitioner can play a crucial role in routine screening and early identification of autism spectrum disorder in children. It is important that future nurse practitioners be educated on the importance of screening for autism spectrum disorder at every well child exam. According to Soares and Patel (2012), ongoing training and awareness are key for professionals to access and use the tools available for screening for autism spectrum disorder. This project seeks to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam.

## **SECTION TWO**

### **REVIEW OF THE LITERATURE**

A comprehensive search of the literature was conducted. The literature included refereed journal articles, CDC reports, various professional association screening guidelines, treatment guidelines and recommendations, and case studies.

#### **Sources for Literature Review**

Search engines used to locate pertinent literature included Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus, Medline in PubMed, Google, Dissertation Abstracts, Google Scholar, and Nursing and Allied Health Collection. Key words used in the searches include autism, autism spectrum disorder, autism screening, autism diagnosis, early identification, preschoolers, toddlers, children, M-CHAT-R/F, DSM-V, treatments, and primary care nurse practitioners. Citations were limited by language to English and by the topic of the project. Limitation was also set to literature published since 2008 including seminal work.

#### **Prevalence and Etiology of Autism Spectrum Disorder**

In the United States, the reference most frequently used to define autism spectrum disorder is the Diagnostic and Statistical Manual of Mental Disorders, which is published by the American Psychiatric Association (APA) (Boyd, Odom, Humphreys, & Sam, 2010). The DSM is the standard classification of mental disorders used by mental health professionals. In the United States, the DSM serves as a universal guideline and standard authority for psychiatric diagnosis. It is intended to be applicable in a wide array of contexts and used by clinicians and researchers of many different disciplines and specialties.

Autism spectrum disorder affects boys 4 to 5 times more often than girls, although girls appear to be more severely affected by the disorder. The prevalence of autism spectrum disorder does not appear to be disproportionately represented across ethnic, racial, or socioeconomic groups. However, Boyd et al. (2010) indicated that race/ethnicity as well as socioeconomic factors affect the age at which children are diagnosed, with children from minority groups and lower income or rural households often diagnosed at later ages.

Autism spectrum disorder is presumably present at birth. The etiology of autism spectrum disorder is considered idiopathic with no recognizable etiology in approximately 90% to 95% of the cases. In the remaining 5% to 10% of the cases, the characteristics of autism spectrum disorder are thought to be secondary to the child's primary impairment. Primary impairment is defined as the problems with body structures or body functions that are causing the characteristics seen in autism spectrum disorder (Johnson & Myers, 2008). There is no pathognomonic clinical sign or lab test to confirm the diagnosis of autism spectrum disorder. Autism spectrum disorders are highly heritable; the recurrence rate for parents with one child with idiopathic autism spectrum disorder is approximately 5% to 6%, while the recurrence rate for parents of a child with syndromic autism spectrum disorder will vary depending on the syndrome (Johnson & Myers, 2008). Some common secondary causes of autism spectrum disorder include environmental factors, chromosomal abnormalities, and genetic disorders (Boyd et al., 2010). Such genetic markers being on chromosomes; X, 2, 3, 7, 15, 17, and 22, with neuropathological abnormalities including fewer Purkinje cells in the cerebellum and above average head circumference (Johnson & Myers, 2008). Although many

chromosomal and gene abnormalities have been associated with autism spectrum disorder, none of these are present in all affected children. Further research is needed to obtain more information on the prevalence and etiology of autism spectrum disorders.

The prevalence of autism spectrum disorder has increased tremendously over the last two decades. Several factors have contributed to the increased prevalence of autism spectrum disorder. First, clinicians have diagnosed children with autism spectrum disorder at earlier ages. Second, more children with milder characteristics are being diagnosed. Third, autism spectrum disorder comprises multiple disorders, which now includes children diagnosed with pervasive developmental disorders. Fourth, some agencies did not have a separate eligibility classification for autism spectrum disorder until the 1990s. Finally, the increased public awareness about and knowledge of individuals with autism spectrum disorder (Boyd et al., 2010). Even though the prevalence of autism spectrum disorders has increased due to the factors stated above, routine screening and early identification of autism spectrum disorders in children continue not being incorporated into routine health care practice by primary care providers.

Since primary health care providers are encountering autism spectrum disorders more frequently in children, the family nurse practitioner can play a crucial role in routine screening using the available and recommended tools set forth by the American Academy of Pediatrics and be able to make appropriate referrals to those screening positive for autism spectrum disorders, so interventions can be immediately initiated. It is important that primary care nurse practitioners have the proper education, knowledge,

and training to properly administer the screening tools available for autism spectrum disorders in children.

### **Clinical Characteristics**

The identification of a child suspected to have an autism spectrum disorder is challenging. The challenge is due to the extreme variability in the expression of the three core features of autism spectrum disorder, which include impaired social skills; communication skills deficits; and restricted, repetitive, and stereotypic behaviors (Boyd et al., 2010). Impairment in social skills and communication skills are deficits in social-emotional reciprocity, deficits in non-verbal communication behaviors used for social interaction, and deficits in developing, maintaining, and understanding relationships. The restricted, repetitive, and stereotypic behaviors are stereotyped or repetitive motor movements, use of objects or speech, insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal non-verbal behavior, highly restricted, fixated interests that are abnormal in intensity or focus, and hyper or hypo reactivity to sensory input or unusual interests in sensory aspects of the environment (APA, 2013). The DSM-V lists diagnostic criteria for diagnosis based on characteristics of: social skills deficit, communication skills deficit, restricted, repetitive, or stereotypic behavior, and miscellaneous neurocognitive and sensory motor characteristics.

According to the American Academy of Pediatrics, children who exhibit certain “red flags” should be assessed further. These “red flags” warrant prompt screening by the primary care nurse practitioner, using the tools available for autism spectrum disorder and are reflected in the tools. These signs include but are not limited to:

- Regression
- “In his or her own world”
- Lack of showing, sharing interest, or enjoyment
- Using the caregivers’ hands to obtain needs
- Repetitive movements with objects
- Lack of appropriate gaze
- Lack of response to name
- Unusual prosody/pitch of vocalizations
- Repetitive movements or posturing of body

### **Early Identification**

The prospects for identifying children with autism spectrum disorder during the first 2 years of life has become more promising than in the past years. Scientific knowledge about early warning signs of autism spectrum disorder has increased, researchers have developed effective screening and diagnostic instruments, and evidence has accumulated about the stability of diagnoses that occur around 2 years of age (Boyd et al., 2010). There are published comprehensive practice guidelines and an autism spectrum disorder toolkit, which can be utilized by primary health care providers. These guidelines and screening tools allow for early identification of autism spectrum disorder in children.

In recent years, research and federal funding has emphasized the identification of early warning signs of autism spectrum disorder in infants and toddlers with or at risk for the disorder. The goal is to identify behavioral or physiological indicators occurring early in children’s development that reliably predicts the onset of the disorder (Boyd et

al., 2010). Early identification results in improved outcomes in children diagnosed with autism spectrum disorders.

There is now vast amount of research that shows evidence that early identification, and attendant early interventions are associated with more positive outcomes in communication, social interaction, and cognitive development (Barton et al., 2012). Once a child is diagnosed with autism spectrum disorder, treatments such as non-pharmacological and pharmacological therapies can be initiated to minimize the disabilities associated with autism spectrum disorders. The use of formal screens in addition to primary care surveillance appears to augment the effectiveness of surveillance in identifying children with autism spectrum disorder (Barton et al., 2012).

### **Surveillance and Screening**

It is important that the health care providers gather detailed patient information during visits. Also, it is important to ask specifically if the caregiver has concerns about the child's speech, hearing, or any other aspects of development (Bradley, 2010). If there are any concerns about autism spectrum disorder at any point during any routine well child exam, then a standardized developmental screening tool should be administered and compared to previous screenings done at well child visits. A comprehensive physical exam on the child should be performed. This includes measurements of weight, height, and head circumference with percentiles. Office vision and hearing screens should also be conducted (Bradley, 2010).

Developmental surveillance is a key component and should be integrated in every pediatric encounter. The American Academy of Pediatrics has published comprehensive practice guidelines and an autism spectrum disorder tool kit (Soares & Patel, 2012). The

American Academy of Pediatrics recommends “developmental screening with a tool such as the Ages and Stages Questionnaire at the 9, 18, and 24 or 30 month well child exams” (Bradley, 2010, p. 304). Other standardized developmental screening tools available include the Checklist for Autism in Toddlers (CHAT) for ages 18-24 months, the Modified Checklist for Autism in Toddlers (M-CHAT) for ages 16-48 months, and the Social Communication Questionnaire (SCQ) for children 4 years and older (Bradley, 2010, p. 304).

In 2013, the original version of the M-CHAT was revised to improve specificity and is now, The Modified Checklist for Autism in Toddlers-Revised (M-CHAT-R), and is a scientifically validated tool for screening children between 16 and 30 months of age that assess risk for autism spectrum disorder. The M-CHAT-R is one of The American Academy of Pediatrics’ recommended tools. The M-CHAT-R was developed by neuropsychologists Diana Robins and Deborah Fein and clinical psychologist Marianne Barton.

The M-CHAT-R’s primary goal is to maximize sensitivity, which detects as many cases of autism spectrum disorder as possible. Therefore, there is a high false positive rate, meaning that not all children who score at risk will be diagnosed with autism spectrum disorder. To improve the accuracy of the tool, the authors developed a structured M-CHAT-R follow-up interview. Even with the follow-up, a significant number of the children who screen positive on the M-CHAT-R will not be diagnosed with autism spectrum disorder; however, these children are at high risk for other developmental disorders or delays, and therefore, evaluation is warranted for any child who screens positive. The questionnaire is completed by a parent, takes 5-10 minutes to



complete, and takes less than 2 minutes to be scored by the health care provider (Robins, 2008).

These screening tools for autism spectrum disorders have a series of questions that correspond to a specific age interval. They assist in assessing developmental progress in the child. Each questionnaire contains simple questions for parents to answer about activities their child can or cannot do. The answers are scored and help to determine whether the child's development is on schedule or whether the child should be referred for a professional developmental assessment. Activities discussed in each questionnaire reflect developmental milestones for each age group. Parents can learn more about what to expect their child to be able to do at each stage of development.

Screening is looking at the whole population to identify children at risk for autism spectrum disorder. Identified children are referred for assessment, and assessment determines the existence of delay or disability, which generates a decision regarding intervention. Screening is optimized by surveillance and gives a longitudinal perspective of a child's developmental progress. Standardized developmental screening tools should be used when such surveillance identifies concerns about a child's development and for children who appear to be at low risk of a developmental disorder at the 9-, 18-, and 30-month visits. Toddlers who have siblings with autism spectrum disorder; parent, pediatrician, and other caregiver concern; inconsistent hearing; and/or unusual responsiveness are factors that implicate further screening (Soares & Patel, 2012).

The surveillance and screening algorithm for autism spectrum disorder set forth by the American Academy of Pediatrics is a screening tool where each child is assigned a score and recommendations are made based on that score. The purpose of conducting

surveillance in Step 2 of the algorithm is to determine the presence of risk factors (Johnson & Myers, 2008).

Robins (2008) stated that screening is warranted when: (a) the cost of not detecting the disease is high—for example, in terms of prevalence, severity of disease, cost of treatment; (b) diagnostic criteria are identified; (c) treatment is available; (d) early treatment is more effective than later treatment; and (e) an appropriate screening instrument is available.

Barbaro et al. (2011), in arguing for the importance of routine screening for autism spectrum disorder in pediatric primary care, conducted a study where 22,168 children were monitored developmentally in Melbourne, Australia. Of these children, 89 met the criteria for an autism spectrum disorder, resulting in a positive predictive value of 81%. The data suggests it is possible to screen for autism spectrum disorder in the community, but repeated screening of children from 8 months of age makes it possible to identify more children at risk for an autism spectrum disorder.

There are two classifications of screening tools. Level 1 is administered to all children and meant to identify children at risk for an autism spectrum disorder screening tool in contrast with typical development. A level 1 screening tool is the initial tool used to identify any child with potentially an autism spectrum disorder. Level 2, which is administered to a referred population in early intervention and diagnostic clinics, is meant to differentiate between children at risk for an autism spectrum disorder and other developmental disorders (Soares & Patel, 2012). A level 2 screening tool is used when a child screens positive for autism spectrum disorder and strongly supports and

recommends that the child be referred for an early intervention and diagnostic testing as soon as possible.

Miller et al. (2011) conducted a study that sought to investigate the feasibility and outcome of a systematic autism spectrum disorder screening process for all toddlers in a large, community-based practice. The ITC and M-CHAT screening questionnaires were administered to all toddlers during a 6-month screening process. The researchers found that of the 796 children screened using an autism spectrum disorder screening tool, 13 children had significant signs of early autism spectrum disorder and screened positive. Formal screening measures identified more children with autism spectrum disorder than clinical judgment or caregiver concerns. The results of the study suggest that systematic screening for autism spectrum disorder in children is feasible and does identify children with early signs of autism spectrum disorder. If screening for autism spectrum disorder is positive, referral should be made for a more comprehensive evaluation by a developmental pediatrician, psychiatrist, or psychologist.

### **Diagnostic Criteria**

Diagnosis of autism spectrum disorder in toddlers is based on assessment of functioning in multiple areas, including verbal and nonverbal developmental skills, social communication and interaction skills, presence of atypical motor and sensory behaviors, adaptive levels of functioning, as well as careful review of the child's health, development, and family history (Steiner, Goldsmith, Snow, & Chawarska, 2012). According to Steiner et al. (2012), "Although standardized diagnostic assessments for infants and toddlers yield data that influence diagnostic decision making, the gold standard for diagnosis continues to be expert clinical opinion" (p.1185).

The American Psychiatric Association's Diagnostic and Statistical Manual-V (DSM-V) provides standard criteria to help diagnose autism spectrum disorder:

A. Persistent deficits in social communication and social interaction across multiple context, as manifested by the following, currently or by history (examples are illustrative, not exhaustive, see text):

1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
2. Deficits in nonverbal communication behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior.

B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples

are illustrative, not exhaustive; see text):

1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypies, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat food every day).
3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interest).
4. Hyper- or hypo-reactivity to sensory input or unusual interests in sensory aspects of the environment (e.g., apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior.

- C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).
- D. Symptoms cause clinically significant impairment in social, occupational,

or other important areas of current functioning.

- E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.

Individuals with a well established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified, should be given the diagnosis of autism spectrum disorder.

Severity levels for autism spectrum disorders;

Level 3 – “Requiring very substantial support”

Social communication – Severe deficits in verbal and nonverbal social communication skills cause severe impairments in functioning, very limited initiation of social interactions, and minimal response to social overtures from others. For example, a person with few words of intelligible speech who rarely initiates interaction and, when he or she does, makes unusual approaches to meet needs only and responds to only very direct social approaches.

Restricted, repetitive behaviors – Inflexibility of behavior, extreme difficulty coping with change, or other restricted/repetitive behaviors

markedly interfere with functioning in all spheres. Great distress/difficulty changing focus or action.

Level 2 – “Requiring substantial support”

Social Communication – Marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiation of social interactions; and reduced or abnormal responses to social overtures from others. For example, a person who speaks simple sentences, whose interaction is limited to narrow special interests, and how has marked odd nonverbal communication.

Restricted, repetitive behaviors – Inflexibility of behavior, difficulty coping with change, or other restricted/repetitive behaviors appear frequently enough to be obvious to the casual observer and interfere with functioning in a variety of contexts. Distress and/or difficulty changing focus or action.

Level 1 – “Requiring support”

Social Communication- Without supports in place, deficits in social communication cause noticeable impairments. Difficulty initiating social interactions, and clear examples of atypical or unsuccessful response to social overtures of others. May appear to have decreased interest in social interactions. For example, a person who is able to speak in full sentences and engages in communication with others fails, and whose attempts to make friends are odd and typically unsuccessful.

Restricted, repetitive behaviors – Inflexibility of behavior causes significant interference with functioning in one or more contexts. This is evident by difficulty switching between activities, problems of organization, and planning hamper independence (CDC, 2014).

In order for children to be diagnosed with autism spectrum disorder, routine screening must be done by primary health care providers at every well child exam. By using the screening tools recommended by the American Academy of Pediatrics, children testing positive can be immediately referred to a developmental pediatrician, psychiatrist, or psychologist for a more comprehensive evaluation and formal diagnosis, and treatments can be initiated as soon as possible to improve outcomes for children with autism spectrum disorder.

### **Interventions**

According to Schertz, Reichow, Tan, Vaiouli, and Yildirim (2012), intervention for preschoolers (ages 3 through 5) typically targets more developmentally advanced outcomes than those for toddlers (ages 1 to 3), is more oriented to group settings, and is guided by policy less integrally centered on families. The primary goal of treatment is to maximize functional independence and quality of life by minimizing the core autism spectrum disorder features, facilitating development and learning, promoting socialization, reducing maladaptive behaviors, and educating and supporting families (Johnson & Myers, 2008).

Symptoms of autism spectrum disorder can be managed with non-medical interventions, including applied behavior analysis, structured teaching, use of developmental models, speech and language therapy, social skills instruction and



occupational therapy. Medical interventions include medications to treat the symptoms, which include but are not limited to irritability, aggression, explosive outbursts, self-injury, hyperactivity, impulsivity, inattention, repetitive behavior, insomnia, anxiety, depressive phenotype, and bipolar phenotype (Johnson & Myers, 2008).

### **Section Summary**

This section discussed the vast amount of studies that suggest that routine screening for autism spectrum disorder in toddlers, identifying those at risk or with the disorder, and early interventions is associated with a more positive outcome and a better quality of life for this population. Developmental surveillance should be a component of every well child visit. It is important for primary health care providers to be aware of signs and symptoms of autism spectrum disorder. They must also routinely implement appropriate screening tools and make appropriate referrals if warranted. Autism spectrum disorder is on the rise and is considered by many an epidemic. We must overcome the barriers associated with routine screening for autism spectrum disorder in primary care settings. With all the current research, tools, and resources available, it is imperative that we provide children with the opportunities to live healthy lives and reach their full potential. It is our duty as a society and as health care providers to be able to keep up with current research and be experts in screening, identifying, diagnosing, and managing children with autism spectrum disorder.

## **SECTION THREE**

### **PROJECT METHODS**

#### **Project Design**

The purpose of this educational intervention was to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam. If family nurse practitioners lack the knowledge and skills required to screen and identify autism spectrum disorder in toddlers in the primary care setting, then toddlers may lack the benefits of early diagnosis and treatments for autism spectrum disorder. Future family nurse practitioners will be educated on the importance of routine screening for autism spectrum disorders and the available tools. Properly educating future family nurse practitioners on the importance of routine screening using the available tools and early interventions for patient screening positive enhanced outcomes may be demonstrated for this vulnerable population.

An intervention to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam was implemented. A descriptive approach will be used in the project. The intervention focused on the importance of screening pediatric patients ages 9 to 48 months for autism spectrum disorder at every well child exam, examples of appropriate screening tools, and interventions based on testing positive on screening tool.

#### **Project Objectives**

The purpose of this project was achieved to:

1. Educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam.
2. Identify an evidence-based/best practice tool for screening autism spectrum disorder in primary care practice.
3. Create a targeted educational intervention for future family nurse practitioners caring for pediatric patients ages 9 to 48 months including:
  - a. Importance of screening
  - b. Examples of evidence based screening tools for autism spectrum disorder screening process
  - c. M-CHAT-R introduction and guide for using in well child assessment
  - d. Interpretation of M-CHAT-R tools
  - e. Intervention for patients screening positive
  - f. Follow-up

### **Setting**

The educational intervention was conducted at a large private Catholic University in South Florida. The program was presented in a classroom with third-year family nurse practitioner students enrolled in NUR 670. The family nurse practitioner curriculum centers on the care of individuals, families, and communities across the life continuum. The role of the family care provider embraces health promotion and disease prevention and program objectives lend themselves to this Autism Spectrum Disorder Screening Educational Intervention. The DNP student was invited as an expert guest lecturer for dissemination of this topic.

### **Inclusion Criteria**

Inclusion criteria to participate in the educational intervention was to be a family nurse practitioner student currently enrolled in Summer 2015 NUR 670. The students were advised a week in advance that the DNP student would be presenting the educational program by course faculty. They were invited to participate but advised that it was voluntary. There were no negative consequences if a student did not attend their regularly scheduled class.

### **Exclusion Criteria**

Any students currently enrolled in Summer 2015 NUR 670 choosing not to attend class and/or students not currently enrolled in Summer 2015 NUR 670 were excluded from participation.

### **Ethical Considerations**

Approval for the project was sought from the IRB at Barry University. The project was deemed an educational intervention and therefore did not require human subjects review by the university according to federal guidelines. It was important to consider the students rights and respect their autonomy. The family nurse practitioner program content includes the topic of autism spectrum disorder and current practice guidelines included in the curriculum. The instructor advised students that the lecture was part of a DNP scholarly project. The DNP student had no affiliation with the students enrolled in Summer 2015 NUR 670 and no role in grading. Any student who was not willing to attend or chose to leave during the educational intervention was able to do so at any given time without consequence. There were no direct benefits for participating in this project. The DNP student sought to enhance awareness of the

importance of screening for autism spectrum disorder in toddlers among future family nurse practitioners.

### **Resources**

Budgeting for the educational intervention included consideration of the time and costs of educating future family nurse practitioners to routinely screen for autism spectrum disorder in toddlers. The total estimated budget requirement included \$60.00. The cost included the printing cost of the resources for the 50 attendees including PowerPoint handout, M-CHAT-R, and program evaluation.

### **Outcome Measures**

Data was used to quantify, evaluate, and validate the impact of the Autism Screening Educational Intervention on the future family nurse practitioners. Data supported and participants validated the importance of routinely screening for autism spectrum disorder in toddlers ages 9 to 48 months, at every well check. Outcomes measures included program evaluations, participant engagement, and anecdotal data was used to assist in improving, changing, and refining the program for future presentations.

### **Section Summary**

This section discussed the educational intervention design and an overview of the project. The purpose of this educational intervention was to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam. The Autism Screening Program was presented and program evaluations were completed and students were asked to place them in a dropbox outside the classroom after the program.

## **SECTION FOUR**

### **RESULTS AND DISCUSSION**

#### **Introduction**

The problem identified for this scholarly DNP project was that there is a lack of knowledge among family nurse practitioners in the knowledge and skills related to screening tools for children with autism spectrum disorder. The purpose of this educational intervention project was to educate future family nurse practitioners who may care for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam.

The DNP student identified the need for an educational intervention to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam. There was a lack of routine screening evident in the literature and many models available. Based on the understanding of the role of the family nurse practitioner, it was an excellent opportunity to bridge the gap by educating future providers. The culmination of DNP scholarly work evolved into the autism spectrum disorder educational intervention. The autism spectrum disorder educational intervention required a commitment to the best evidence-based guideline to meet the needs of both the vulnerable population and the health care provider. After careful consideration and expert consensus, the Autism Spectrum Disorder Program was implemented and evaluated.

This section will focus on the discussion of findings, strengths and limitations of the project, the implications for nursing practice, health care outcomes, health care delivery, health care policy, recommendations for future research, and summary.

A project design was planned to provide an overview of autism spectrum disorder in toddlers. A comprehensive literature review over the course of study at Barry University was conducted and scrutinized to help support the purpose of the project. The researched data was extensively reviewed and evaluated. The educational intervention was created for future family nurse practitioners who may care for pediatric patients ages 9 to 48 months. The target population was future family nurse practitioners, as primary care is a central focus on the role and the most common practice setting for well child care.

Future family nurse practitioners were identified as students enrolled in NUR 670 at Barry University in summer 2015. Participants were current registered nurses attending graduate school. As future clinicians, the opportunity to intervene early in their advanced practice education was ideal, as they have fewer preconceptions, are open to education, and are already in an organized classroom with available educational resources, which made it an ideal setting. Also, with the support of faculty and the College of Nursing and Health Sciences administrators, the project was developed. The participants were relevant to the chosen topic and provided an opportunity for implementation of the project.

The project goal was to address the knowledge deficit and educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam. Throughout my career as a pediatric registered nurse, I have experienced firsthand the disabilities experienced by children affected with autism spectrum disorder. It was very apparent that most toddlers were not being screened, diagnosed, and/or treated until later than is identified

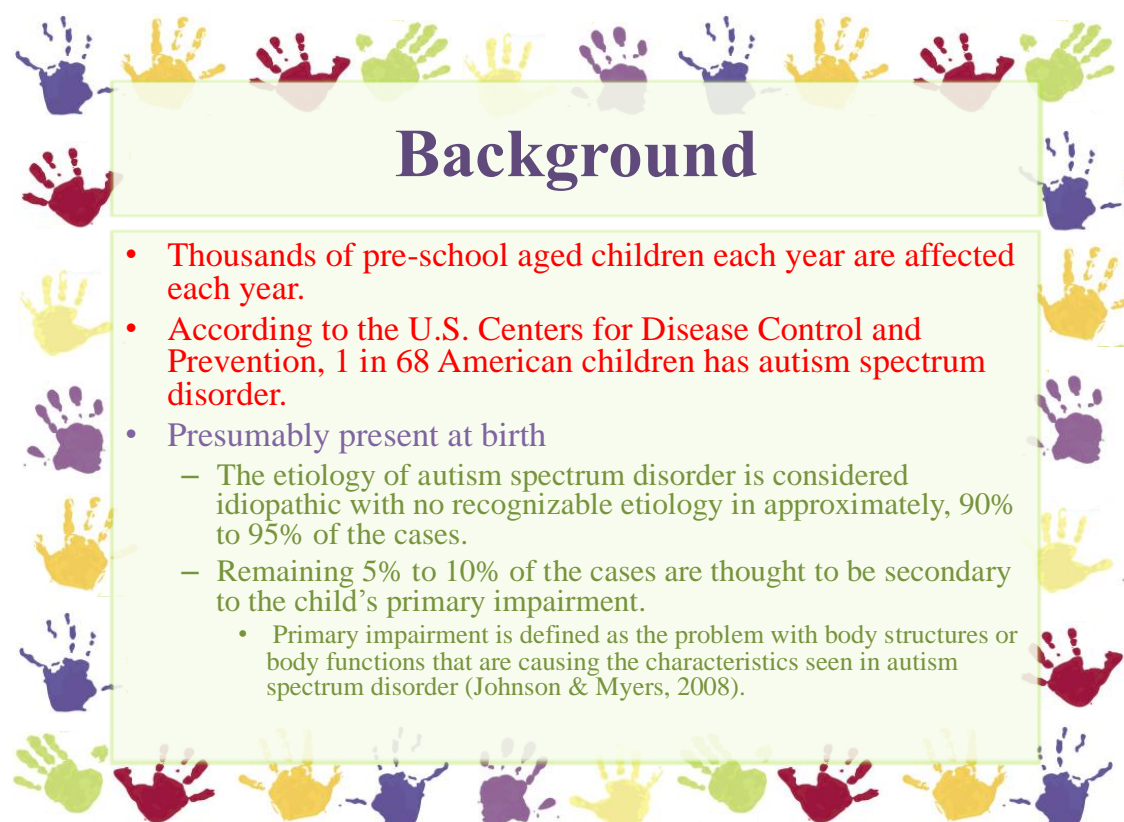
by the American Academy of Pediatrics guidelines. The opportunity as a DNP student to gain expertise became evident. My energy was centered and focused on autism spectrum disorder and its effect on children. Such a complex problem with a plethora of data and varied opinions was evident yet clearly not being addressed. It became obvious to me that there was an important issue that needed to be addressed and that the need for advocacy for children needed to be tackled. The issue of autism was very broad and diverse and embraced many perspectives. It was a necessity to select an aspect that could be explored within the guidelines of a DNP curriculum. The main focus and objective of the scholarly project evolved into screening for autism spectrum disorder in toddlers.

Once screening became the focus, there needed to be an opportunity to address key aspects. The intent of the scholarly project was for future family nurse practitioners to have a clearer understanding of the importance of screening and the impact it has on the future quality of life of children who are diagnosed with autism. My focus became educating future family nurse practitioners before they would begin practicing so that the importance of screening for autism spectrum disorder in toddlers would be ingrained in them. It was essential that future family nurse practitioners had knowledge, skills, and access to resources. The importance of screening for autism spectrum disorder at every well child exam needed to be valued, and the future family nurse practitioners must be able to identify the impact this measure could have on health care. There was a desire to translate this to the clinical areas so that these children could access care as early as possible if they were at risk.

Screening in autism spectrum disorder was not as simple as initially thought, as there was not one clear path. The effects of autism were obvious, and addressing



screening issues of autism spectrum disorder in children was frequently discussed in published findings. The national specialty organizations cite screening as a requirement and a necessity to assist in early diagnosis and management of children with autism spectrum disorder. But the gap in evidence of application was noted in the literature. As a future family nurse practitioner and DNP, there was a potential intervention and educational opportunity available. It is my professional obligation to advocate, and the future quality of health and life of children depends on it. Once this realization was made, the project began to develop and take a life of its own.

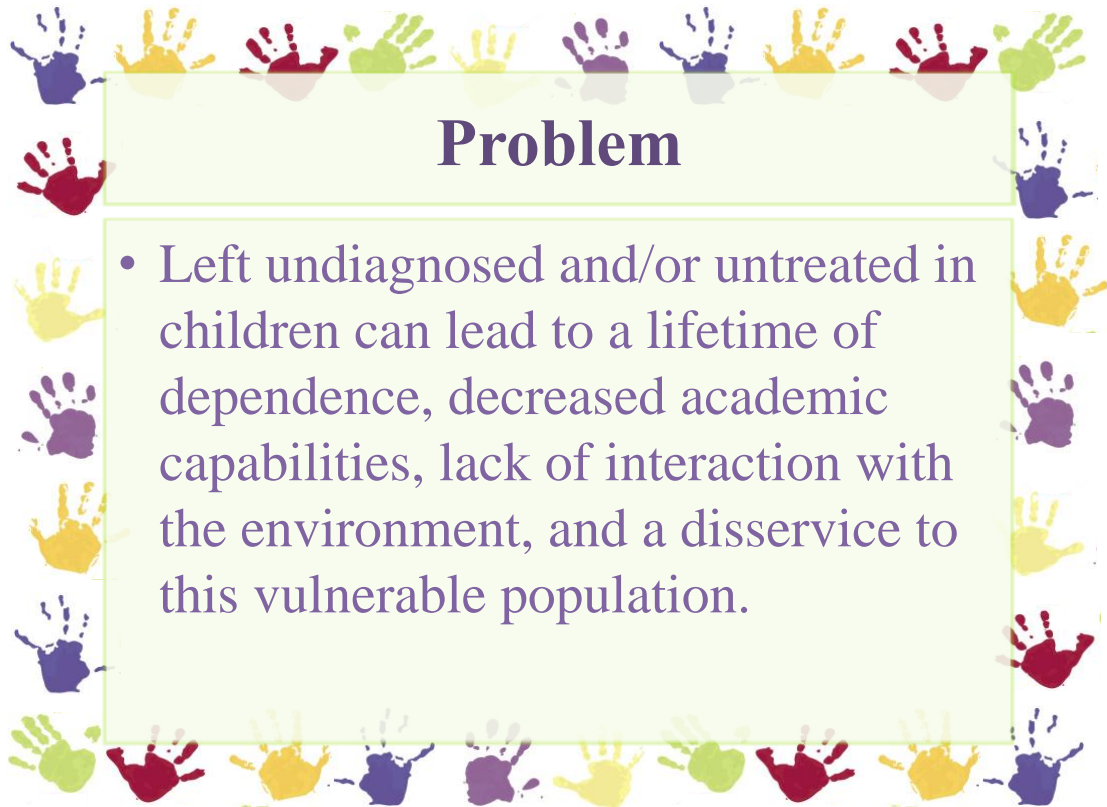


## Background

- Thousands of pre-school aged children each year are affected each year.
- According to the U.S. Centers for Disease Control and Prevention, 1 in 68 American children has autism spectrum disorder.
- Presumably present at birth
  - The etiology of autism spectrum disorder is considered idiopathic with no recognizable etiology in approximately, 90% to 95% of the cases.
  - Remaining 5% to 10% of the cases are thought to be secondary to the child's primary impairment.
    - Primary impairment is defined as the problem with body structures or body functions that are causing the characteristics seen in autism spectrum disorder (Johnson & Myers, 2008).

*Figure 2.* Background of autism spectrum disorder (Margiotis, 2015).

The nature of the problem needed to be framed for the future family nurse practitioners to gain their understanding and support. An introduction to autism spectrum disorder and etiology was discussed. It was important to raise awareness of the prevalence of autism spectrum disorder affecting toddlers in the U.S. The participants were surprised to hear that 1 in 68 American children has autism spectrum disorder (CDC, 2014). This figure seemed to be key information to increase the relevance of the topic to the participants. The DNP student sought to communicate the impact and epidemic that autism spectrum disorder has become. Once the impact, prevalence, and epidemic of autism spectrum disorder was presented, the researcher addressed the problem as health care providers and members of society if children with autism spectrum disorder are not diagnosed and managed was addressed.



*Figure 3. Problem of autism spectrum disorder (Margiotis, 2015).*

The goal was to emphasize the negative impact of the failure of primary care providers to screen and/or diagnose autism spectrum disorder in toddlers. The problem was stated in a manner that allowed the future family nurse practitioner to gain awareness of the problem in a bold, factual manner. The financial, physical, educational, and psychological impact of growing up without effective interventions for autism was explained.

**M-CHAT-R**

**M CHAT** www.m-chat.org

Child's name \_\_\_\_\_ Date \_\_\_\_\_  
 Age \_\_\_\_\_ Relationship to child \_\_\_\_\_

**M-CHAT-R™ (Modified Checklist for Autism in Toddlers-Revised)**

Please answer these questions about your child. Keep in mind how your child usually behaves. If you have seen your child do the behavior a few times, but he or she does not usually do it, then please answer "no." Please circle yes or no for every question. Thank you very much.

1. If you point at something across the room, does your child look at it? (FOR EXAMPLE, if you point at a toy or an animal, does your child look at the toy or animal?)	Yes	No
2. Have you ever wondered if your child might be deaf?	Yes	No
3. Does your child play pretend or make-believe? (FOR EXAMPLE, pretend to drink from an empty cup, pretend to talk on a phone, or pretend to feed a doll or stuffed animal?)	Yes	No
4. Does your child like climbing on things? (FOR EXAMPLE, furniture, playground equipment, or stairs)	Yes	No
5. Does your child make unusual finger movements near his or her eyes? (FOR EXAMPLE, does your child wiggle his or her fingers close to his or her eyes?)	Yes	No
6. Does your child point with one finger to ask for something or to get help? (FOR EXAMPLE, pointing to a snack or toy that is out of reach)	Yes	No
7. Does your child point with one finger to show you something interesting? (FOR EXAMPLE, pointing to an airplane in the sky or a big truck in the road)	Yes	No
8. Is your child interested in other children? (FOR EXAMPLE, does your child watch other children, smile at them, or go to them?)	Yes	No
9. Does your child show you things by bringing them to you or holding them up for you to see – not to get help, but just to share? (FOR EXAMPLE, showing you a flower, a stuffed animal, or a toy truck)	Yes	No
10. Does your child respond when you call his or her name? (FOR EXAMPLE, does he or she look up, talk, or fiddle, or stop what he or she is doing when you call his or her name?)	Yes	No
11. When you smile at your child, does he or she smile back at you?	Yes	No
12. Does your child get upset by everyday noises? (FOR EXAMPLE, does your child scream or cry to noise such as a vacuum cleaner or loud music?)	Yes	No
13. Does your child walk?	Yes	No
14. Does your child look you in the eye when you are talking to him or her, playing with him or her, or dressing him or her?	Yes	No
15. Does your child try to copy what you do? (FOR EXAMPLE, wave bye-bye, clap, or make a funny noise when you do)	Yes	No
16. If you turn your head to look at something, does your child look around to see what you are looking at?	Yes	No
17. Does your child try to get you to watch him or her? (FOR EXAMPLE, does your child look at you for praise, or say "look" or "watch me"?)	Yes	No
18. Does your child understand when you tell him or her to do something? (FOR EXAMPLE, if you don't point, can your child understand "put the book on the chair" or "bring me the blanket"?)	Yes	No
19. If something new happens, does your child look at your face to see how you feel about it? (FOR EXAMPLE, if he or she hears a strange or funny noise, or sees a new toy, will he or she look at your face?)	Yes	No
20. Does your child like movement activities? (FOR EXAMPLE, being swung or bounced on your knee)	Yes	No

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Figure 4. M-CHAT-R screening questionnaire (Robins et al., 2009).

The DNP student selected this nationally recognized evidence-based guideline to screen toddlers based on exhaustive literature review, clinical application, and published data on clinical relevance and ease of use. The M-CHAT-R screening tool was introduced to the students in depth, and the primary goals of the screening tool, which included maximizing sensitivity, were introduced. The author defined sensitivity as the ability to detect as many cases of autism spectrum disorder as possible. It was emphasized that this simple but well-validated tool was consistent with the American Academy of Pediatrics recommendations for screening well children.

The DNP student was sensitive to both the critical need for screening toddlers in primary care and the realization that time, parental limitations, and demands on the nurse

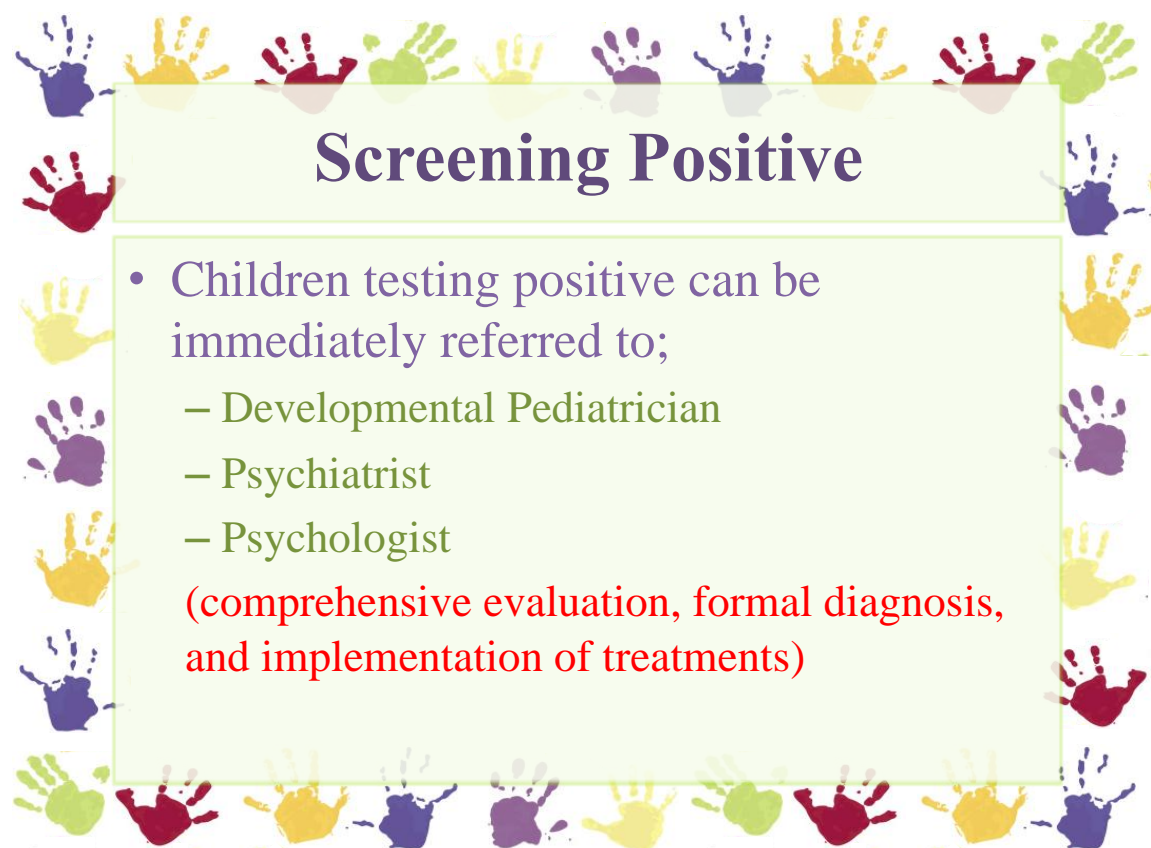
practitioner can make autism spectrum disorder screening a challenge. To ensure the future family nurse practitioners valued the M-CHAT-R, many elements were introduced and reinforced. The participants were informed that the M-CHAT-R is available in more than 50 languages, and it can be completed independently by parents in the waiting area and reviewed by the primary care provider. If parents are unable to complete the questionnaire, providers can complete it together with the parent, but it requires more time. Scoring the M-CHAT-R is one of the most appealing aspects of the tool. The data from the parent can easily be translated in approximately 2 minutes. The M-CHAT-R is available for free download for clinical, research, and educational purposes. Health care providers should not overlook this economic factor.

The algorithm for scoring was also discussed in detail. Once the screening tool is complete and scored, the interventions necessary for those children testing positive were discussed (Figure 5), as well as diagnostic criteria, interventions, and treatments. Children scoring 3-7 are considered at medium risk and the administration of follow-up (second stage of M-CHAT-R/F) is recommended. A high-risk score of 8-20 requires immediate referral for diagnostic evaluation and eligibility for early intervention. Parents and health care providers should be aware that even if the child screens positive on the M-CHAT-R, the child will not be diagnosed with autism spectrum disorder on this alone. However, these children may be at high risk for other developmental disorders and/or delays.

Children who screen positive (medium risk-high risk) warrant further evaluation. Several different specialists can evaluate children for autism spectrum disorder. These include but are not limited to a developmental pediatrician who evaluates, counsels, and

provides treatments for children and their families with a wide range of developmental and behavioral difficulties as well as a psychiatrist who can diagnoses and treat mental disorders and a psychologist who evaluates, diagnoses, treats, and studies behavioral and mental processes. An interdisciplinary, multi-dimensional approach is crucial in evaluating and managing children with autism spectrum disorder.

The ability of primary care providers to have a tangible, economic, and well-validated tool enhances the likelihood of using it in clinical practice. In addition, having a clear understanding of how to deal with high-risk children makes it less ambiguous for providers. It is likely that eliminating barriers can be better for children who might otherwise go unscreened or not referred appropriately.



## Screening Positive

- Children testing positive can be immediately referred to;
  - Developmental Pediatrician
  - Psychiatrist
  - Psychologist

**(comprehensive evaluation, formal diagnosis, and implementation of treatments)**

*Figure 5.* Screening positive for autism spectrum disorder (Margiotis, 2015).

At the end of the educational intervention, a case study was presented and participants were given an allotted time to complete. The purpose of the case study was to familiarize the students with the screening tool and assess their understanding of the screening tool. This ability to apply their knowledge was well received. The scored screening tool was then reviewed and time to ask questions and comments and/or suggestions were encouraged. During the review process of the case study, it became apparent that the participants had very limited knowledge of key aspects when screening for autism spectrum disorder in children. They showed great enthusiasm and were positive about having gained new knowledge and practical skills for screening children with autism spectrum disorder.

A program evaluation was implemented to assess the effectiveness of the educational intervention. It was important to measure and evaluate whether the objectives of the project were met. Each participant was given a program evaluation and reminded that the evaluation was anonymous and voluntary. Participants were instructed to place the program evaluations once completed in a dropbox.

### **Findings of the Project**

The autism spectrum disorder educational intervention and program evaluation was designed to evaluate program objectives. All objectives related to the autism spectrum disorder educational intervention were met based on the written evaluations. Future family nurse practitioners reported a better understanding of screening for autism spectrum disorder, knew how to use an evidence-based screening tool (M-CHAT-R),

understood the significance of a positive screen (M-CHAT-R, medium risk-high risk), and could articulate a plan for intervention.

Forty-one future family nurse practitioners were in attendance, and 100% participated in the educational intervention. All participants received the educational intervention and returned a completed program evaluation, which resulted in a 100% completion rate. This allowed the educator to appraise the students level of knowledge at the conclusion of the autism spectrum disorder educational intervention. The questions on the evaluation were designed to assess and determine if the project objectives were met through the autism spectrum disorder educational intervention.

### **Discussion of Findings**

Overall, the autism spectrum disorder educational intervention was a success. The project objectives were achieved as supported by the written responses to the program evaluations and comments to the DNP student, faculty, and self-reflections. Future family nurse practitioners reported overwhelmingly (85%) that screening of pediatric patients ages 9-48 months for autism spectrum disorder at every well child exam was important. Seventy-eight percent revealed they were very confident in identifying examples of evidence-based screening tools for autism spectrum disorder in primary care practice.

Ninety percent of attendees would consider using M-CHAT-R in practice. To assess the comfort level in scoring the M-CHAT-R used for screening autism spectrum disorder, 73% were very comfortable and 20% reflected some comfort level. Future family nurse practitioners were asked if they had clear understanding of the interventions necessary for those patients screening positive; 68% strongly agreed while 24% agreed.



In future autism spectrum disorder educational interventions, the DNP notes that more discussion on interventions might be beneficial.

In the future, the DNP would like more participants to be present and would place more emphasis on the actual scoring and interpretation of the screening tools. This emphasis may be of great value, as the intent is real-world application. This was a limited DNP scholarly project, and more time and opportunities to learn and apply key autism spectrum disorder concepts to primary care providers is necessary.

### **Strengths and Limitations of the Project**

The opportunity to conceptualize and link a critical issue, which is children with autism spectrum disorder to the family nurse practitioner role, was a major strength of the scholarly project. This allowed for the relationship between both to be further understood and connected. The ability to demonstrate advocacy for this vulnerable population was another strength of the project. This project allowed the DNP student to speak on the behalf of children and address their needs. The translation of research into practice was also implemented. With the vast amount of information available on children and autism spectrum disorder, this project was able to implement the findings of the data available. The participants gained knowledge and understanding of the importance of routine screening for autism spectrum disorder. They had a clear understanding of the benefits of screening such as reliability, cost effectiveness, ease, and limited time consuming. The confidence and likelihood of future family nurse practitioners to screen for autism spectrum disorder was increased. The future family nurse practitioners who participated may have gained knowledge and awareness when dealing with autism spectrum disorder. This educational intervention can serve as stepping stone for future projects related to

toddlers and autism spectrum disorder. The program evaluation designed for this particular project has never been used in any study and or project. This is an important area to consider and could be added to future studies.

The long-term effects of this project cannot be evaluated at this time. Another limitation of the project is the limited amount of time available for the educational intervention. The DNP program had specific obligations based on educational timetable; therefore, time constraints allowed for a single presentation only. The ability to generalize the evaluations of 41 future family nurse practitioners is statistically limited but allowed for a pilot and opportunities to introduce the educational program. Teaching at other venues to incorporate a broader number of health care providers is recommended. With more time, further emphasis on management and treatments can be considered.

## **DNP Essentials**

### **Essential I: Scientific Underpinning for Practice**

The DNP demonstrated the implementation of Essential I by conducting exhaustive research on the topic of autism spectrum disorder. Extensive amounts of data were found, more than possible to evaluate. With extensive inquiry and scrutinizing of information available, the topic of screening for autism spectrum disorder in toddlers was consistently addressed in the data. The large review of literature on the chosen topic resulted in refining the problem and identifying the need to address the possible lack of knowledge among family nurse practitioners and the utilization, understanding, and implementation of autism screening tools. The chosen topic was one that could be approached and studied by the DNP student.

The IOWA Model was the theory that guided the scholarly project. The IOWA Model focuses on incorporating evidence-based research into practice. Its main focus is on knowledge needed to improve quality of health care. Evidence-based studies were used to support the idea and attempt to fill the gap between research and practice. The ability to approach tool selection in an organized and scholarly manner was guided by the theoretical model.

### **Essential II: Organizational and System Leadership for Quality Improvement and Systems Thinking**

This essential was addressed by the DNP by identifying the needs of the vulnerable population being toddlers. Advocating for this vulnerable population was repeatedly evident throughout the DNP student work. Research continuously suggests the need for routine screening for autism spectrum disorder in toddlers, yet it continues to not be routinely implemented by health care providers. The need to incorporate all members of the health care team including patient and family is vital if improved outcomes are expected. An organizational, structural implementation of screening for autism spectrum disorder is critical in addressing the lack of screening and diagnosis. The purpose of the educational intervention was for quality improvement. With increased awareness and knowledge of screening, the future primary care provider will be more likely to screen and improve the health care outcomes for children with autism spectrum disorder. Also, if supported by faculty, the autism spectrum disorder educational intervention could be permanently placed into the curriculum, which in turn would reach thousands of future family nurse practitioners.

### **Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice**

Performing extensive research and identifying the need for education related to screening for autism spectrum disorder in toddlers was addressed by Essential III. Multiple autism spectrum screening tools were scrutinized and reviewed. Thousands of articles related to autism spectrum disorder and screening were researched. The educational intervention and project was designed based on the theoretical framework of evidence-based practice. The literature was critiqued and utilized in the attempt to demonstrate the need for routine screening for autism spectrum disorder in toddlers. The M-CHAT-R was identified after study, consultation, and expert evaluation to be the most effective screening tool for implementation for future family nurse practitioners. It was challenging to narrow it to a single tool, but the DNP student was confident that it and was evaluated and shown to be effective. By utilization of the screening tool for autism spectrum disorder, M-CHAT-R allows for primary care providers to confidently screen and increase the needs of children with autism spectrum disorder to be addressed in a more timely manner.

### **Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and transformation of Health Care**

Technology has been used throughout the entire DNP program. It is one of the most vital resources available to improve and transform health care. Technology has been utilized by the review of literature and worldwide scholarly articles. The screening tool used in the project M-CHAT-R is available online in more than 50 languages via a Word document for all to use. The ability of the tool to be easily acquired in a cost-

effective manner is a product of this technological era. The educational intervention was presented in a multimedia format. The use of technology has made all data readily available and gives everyone the opportunity to gain endless amounts of knowledge on health care. Dissemination of the autism spectrum disorder educational intervention could be adapted for web based family nurse practitioner education. This would allow for access to a larger audience and increase the impact of the project.

### **Essential V: Health Care Policy for Advocacy in Health Care**

One of the aims of the project was to advocate for children in general but specifically those who may suffer from autism spectrum disorder. Children already being a vulnerable population need consistent advocacy, especially those diagnosed with autism spectrum disorder. Autism spectrum disorder can lead to a lifetime of disability and lower quality of life if left undiagnosed and or untreated. The guidelines set by the American Academy of Pediatrics were the driving force behind the entire project and understanding the role of the future family nurse practitioner and identifying the opportunity to unite the problem with a reliable screening tool was an excellent fit. This autism spectrum disorder educational intervention can be replicated to ensure increased awareness and application by nurse practitioners.

### **Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes**

Essential VI was initiated from the very beginning of the DNP as it was clear how important collaboration is for improving health care outcomes. Collaboration has been evident among peers, faculty, committee members, preceptors, researchers, educators, students, mentors, and health care providers, but most important being the patient and

their families. The numerous encounters of the DNP student with children who were suffering from autism spectrum disorder and their parents affected the DNP student profoundly. Parents vocalized how frustrated they were that their children were not diagnosed early and did not receive timely treatment. This became the building ground for the scholarly project topic. Attentiveness to the needs of children with autism spectrum disorder evolved through clinical hours in pediatrics, exposure to the data, and mentorship with pediatric professionals. The project would not have been successful without the interdisciplinary collaboration of nursing professionals, children, and families affected by autism spectrum disorder, medical, psychological, and social researchers and the global community of autism spectrum disorder.

### **Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health**

Autism spectrum disorder contributes to a high rate of disability and decreased quality of life for children. Routine screening for autism spectrum disorder at every well child exam has the potential to positively impact and improve this vulnerable populations health. The project was designed after an extensive review of literature was conducted. It was found that routine screening is vital in the outcome of children with autism spectrum disorder. The emphasis on primary prevention for advanced practice nurses evolved into incorporating education for future family nurse practitioners. It was evident that primary care nurse practitioners need to be educated on the necessary knowledge and skills to utilize available screening tools for children with autism spectrum disorder. Routine screening has a direct correlation with health promotion and improving the nation's health. This is an example of a limited scholarly project with the potential for

big effect if replicated and disseminated. It also demonstrates the specific role for future family nurse practitioners to actively advocate for and affect autism spectrum disorder and improve the quality of life for affected children.

### **Essential VIII: Advanced Nursing Practice**

The DNP project included the design of an autism spectrum disorder educational intervention with its main purpose to educate future family nurse practitioners of the importance of screening for autism spectrum disorder. The guidelines set forth by the American Academy of Pediatrics, and their recommendations were used to reinforce the importance of routine screening. The intervention was developed to educate future family nurse practitioners by providing the M-CHAT-R, a practical, reliable evidence-based tool that can easily be applied to normal routine well child screening. The DNP project focused on the current evidence-based practice literature available and translated the information obtained into the implementation of the project to improve quality of care.

### **Summary**

The DNP essentials were addressed and applied to the implementation of the project. They have been introduced and utilized through out the entire DNP program. Through the program, the essentials have played a key role in the development of the necessary competencies and skills to advance the DNP role. The DNP program has set the foundation as a student and will continue to play a vital role in my DNP role development. The need to utilize the DNP education and skills will enable the continuation to advocate for children with autism spectrum disorder and continue to improve the outcomes of this vulnerable population.

## **Implications for Practice, Health Care Outcomes, Health Care Delivery, Health Care Policy**

This project has implications for practice, health care outcomes, health care delivery, and health care policy. Advocacy for children and families affected by autism spectrum disorder will be an ongoing priority for this DNP scholar.

### **Practice**

This project will assist future family nurse practitioners in primary care, caring for pediatric patients ages 9 to 48 months, to understand and implement routine screening for autism spectrum disorder in practice. By implementing routine screening for autism spectrum disorder in practice, the family nurse practitioner is utilizing a critical science-based theory and concept. The DNP is expected to design, select, use, and evaluate programs that evaluate and monitor outcomes of care, care systems, and quality improvements. The outcomes of routinely screening for autism spectrum disorder by primary care nurse practitioners will result in improving, changing, and refining current standards of practice. The DNP is expected to support other nurses to achieve excellence in nursing practice. Nursing excellence is achieved by educating nurses with evidence-based practice guidelines.

### **Health Care Outcomes**

Research shows that early routine screening, diagnosis, and treatment of autism spectrum disorder in toddlers results in better outcomes for this population. This project centered on translation of research into practice. This allowed the findings of the project to enhance the likelihood of long-term quality of life for those children who screen positive for autism spectrum disorder and improve outcomes. The routine use of autism



screening tools benefits the community as a whole. This autism spectrum educational intervention aligns with national specialty organizations (American Academy of Pediatrics) and supports the national agenda set forth in Healthy People 2020. By educating future family nurse practitioners on routine screening for autism spectrum disorder in toddlers, improving the nation's health can be achieved.

### **Health Care Delivery**

The need to develop and evaluate approaches to how care is delivered has implications for nurse practitioners. The ability to identify assessment skills in primary practice aimed at early detection and referral of autism spectrum disorder is essential. Allowing future family nurse practitioners to employ a reliable tool to develop confidence in assessment of high risk children and score the screening tools to make changes to help meet the needs of patients based on scientific findings is empowering and productive. Effective communication and collaboration skills in the development and implementation of practice guidelines and standards of care is crucial. Collaboration among health care providers for those children testing positive for autism spectrum disorder is safe and increases the ability for timely, patient-centered care to be provided.

### **Health Care Policy**

By educating future family nurse practitioners on the importance of using the M-CHAT- R, an evidence-based autism spectrum disorder screening tool a critical health care issue for toddlers is addressed. This safe, economic, and easy to use tool makes it more approachable. Gaining knowledge and skill in effective screening methods, in turn, can prepare the nurse practitioner to influence, design, and make changes to the current standard of practice related to routine screening for autism spectrum disorder in toddlers

by family nurse practitioners. Careful and meticulous attention with a safe and effective tool can make a difference.

The implications for future study are plentiful. This educational intervention needs increased exposure to allow for the ability to ensure change. Increasing the time devoted to interventions is suggested as evaluations indicated less knowledge in the case study in this area. The need to gain a more in-depth perspective of the barriers associated with screening for autism spectrum disorder in primary care practice by family nurse practitioners can be assessed with greater research efforts.

### **Summary**

Autism spectrum disorder is a complex and life-altering disorder. Autism spectrum disorder not only decreases quality of life and increases disability rates but also contributes to increase costs in health care. As family nurse practitioners in the primary care setting, it is vital to have knowledge of autism spectrum disorder. The project conveyed the DNP essential and focused on addressing health care standards of practice, health care delivery, improving quality of health care, and outcomes. With more educational initiatives targeted at primary care providers, screening for autism spectrum disorder at every well child exam by family nurse practitioners caring for pediatric patients ages 9 to 48 months may become the standard of practice recommended by experts in pediatrics. This scholarly project sought to increase the knowledge of future family nurse practitioners and will serve as the initial intervention in the DNP trajectory for this advanced practice nurse professional.

## REFERENCES

- American Association of Colleges of Nursing (AACN). (2006). *The essentials of doctoral education for advanced nursing practice. DNP essentials*. Washington, DC: Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental Disorders*. (5th ed.). Washington, DC: Author.
- Barbaro, J., Ridgway, L., & Dissanayake, C. (2011). Developmental surveillance of infants and toddlers by maternal and child health nurses in an Australian community-based Setting: Promoting the early identification of autism spectrum disorders. *Journal of Pediatric Nursing, 26*, 334-347.
- Barton, L. M., Mathieu, D. T., & Fein, D. (2012). Screening young children for autism spectrum disorders in primary practice. *Journal of Autism and Developmental Disorders, 42*, 1165-1174.
- Boyd, A. B., Odom, L. S., Humphreys, P. B., & Sam, M. A. (2010). Infants and toddlers with autism spectrum disorder: Early identification and early intervention. *Journal of Early Intervention, 32*(2), 75-98.
- Bradley, R. (2010). Screening for autism spectrum disorders. *The Journal for Nurse Practitioners, 6*(4), 304-305.
- Centers for Disease Control and Prevention. (2014). Information for healthcare providers. Retrieved from <http://www.cdc.gov/ncbddd/autism/hcp.html>
- Doody, C., & Doody O. (2011). Introducing evidence into nursing practice: Using the IOWA model. *British Journal of Nursing, 20*(11), 661-664.
- Hickey, J. V., & Brosnan, C. A. (2012). *Evaluation of health care quality in advanced*

*practice nursing*. New York: Springer.

Johnson, P. C., & Myers, M. S. (2008). The 2007 AAP autism spectrum disorders guidelines & toolkit: What's the bottom line? A pediatrician's roadmap to the latest ASDs guidelines. *Contemporary Pediatrics*, 25(10), 42-68.

Miller, S. J., Gabrielsen, T., Villalobos, M., Alleman, R., Wahmhoff, N., Carbone, S. P., & Segura, B. (2011). The each child study: Systematic screening for autism spectrum disorders in a pediatric setting. *PEDIATRICS, Official Journal of The American Academy of Pediatrics*, 127(5), 865-872.

Robins, L. D. (2008). Screening for autism spectrum disorders in primary care settings. *The National Autistic Society*, 12(5), 537-556.

Schertz, H.H., Reichow, B., Tan, P., Vaiouli, P., & Yildirim, E. (2012). Interventions for toddlers with autism spectrum disorders: An evaluation of research evidence. *Journal of Early Intervention*, 34(3), 166-189.

Soares, N.S., & Patel, D.R. (2012). Office screening and early identification of children with autism. *Pediatric Clinics of North America*, 59, 89-102.

Steiner, M.A., Goldsmoth, R.T., Snow, V.A., & Chawarska, K. (2012). Practitioner's guide to assessment of autism spectrum disorders in infants and toddlers. *Journal of Autism and Developmental Disorders*, 42, 1183-1196.

Webb, L. P. (2011). Screening for autism spectrum disorders during well-child visits in a primary care setting. *The Journal for Nurse Practitioners*, 7(3), 229-235.

## APPENDIX A

## BARRY UNIVERSITY APPROVAL LETTER



11300 NE 2nd Avenue, Miami, FL 33161  
P: 305.899.3800 or 1.800.756.6000, ext. 3800  
F: 305.899.3831  
[www.barry.edu](http://www.barry.edu)

Dear Stephanie Margiottis

The project titled Autism Spectrum Disorder: An Educational Intervention for Future Nurse Practitioners is an educational intervention which does not meet criteria for full Institutional Review Board approval. As a result, this project is approved using an evaluation method.

A handwritten signature in blue ink that reads "Terri Rocafort".

Terri Rocafort  
Director of NP/DNP Specializations  
Barry University  
Miami Shores, Florida 33161

**APPENDIX B****PERMISSION TO USE M-CHAT-R**

Resent-From: <[REDACTED]>

Date: March 5, 2015 at 9:37:58 AM EST

Subject: Re: Permission Request

From: Diana L Robins <[REDACTED]>

To: "Margiotis, Stephanie (Barry Student)"  
<[REDACTED]>

Dear Stephanie,

You are welcome to use the M-CHAT-R/F in your project. Please download the official versions from [www.mchatscreen.com](http://www.mchatscreen.com)

I would like to hear about the results of your project, so please update me when you can.

Best, Diana Robins

**From:** "Margiotis, Stephanie (Barry Student)" <[REDACTED]>

**Date:** Fri, 27 Feb 2015 00:58:09 +0000

**To:** Diana L Robins <[REDACTED]>

**Subject:** Permission Request

To Whom it May Concern,

I am a graduate student at Barry University in South Florida. I am writing in regards to my scholarly project as a part of my education and graduation requirements for my Doctorate of Nursing Practice.

My project consists of an educational intervention for future primary care nurse practitioners. My plan is to teach the MCHAT-R and the MCHAT-R/F with the hope to increase awareness of the importance of routine screening for autism spectrum disorder in toddlers by primary care providers.

I am writing to request permission to utilize the MCHAT-R and the MCHAT-R/F, or find the appropriate way to obtain permission to use the tools. Any help in this matter would be appreciated. Thank you in advance.

Sincerely,  
Stephanie Margiotis

## APPENDIX C

### SCORING THE M-CHAT-R ALGORITHM

#### Permissions for Use of the M-CHAT-R/F™

The Modified Checklist for Autism in Toddlers, Revised with Follow-Up (M-CHAT-R/F; Robins, Fein, & Barton, 2009) is a 2-stage parent-report screening tool to assess risk for Autism Spectrum Disorder (ASD). The M-CHAT-R/F is available for free download for clinical, research, and educational purposes. Download of the M-CHAT-R/F and related material is authorized from [www.mchatscreen.com](http://www.mchatscreen.com).

The M-CHAT-R/F is a copyrighted instrument, and use of the M-CHAT-R/F must follow these guidelines:

- (1) Reprints/reproductions of the M-CHAT-R must include the copyright at the bottom (© 2009 Robins, Fein, & Barton). No modifications can be made to items, instructions, or item order without permission from the authors.
- (2) The M-CHAT-R must be used in its entirety. Evidence indicates that any subsets of items do not demonstrate adequate psychometric properties.
- (3) Parties interested in reproducing the M-CHAT-R/F in print (e.g., a book or journal article) or electronically for use by others (e.g., as part of digital medical record or other software packages) must contact Diana Robins to request permission [REDACTED].
- (4) If you are part of a medical practice, and you want to incorporate the first stage M-CHAT-R questions into your own practice's electronic medical record (EMR), you are welcome to do so. However, if you ever want to distribute your EMR page outside of your practice, please contact Diana Robins to request a licensing agreement.

#### Instructions for Use

The M-CHAT-R can be administered and scored as part of a well-child care visit, and also can be used by specialists or other professionals to assess risk for ASD. The primary goal of the M-CHAT-R is to maximize sensitivity, meaning to detect as many cases of ASD as possible. Therefore, there is a high false positive rate, meaning that not all children who score at risk will be diagnosed with ASD. To address this, we have developed the Follow-Up questions (M-CHAT-R/F). Users should be aware that even with the Follow-Up, a significant number of the children who screen positive on the M-CHAT-R will not be diagnosed with ASD; however, these children are at high risk for other developmental disorders or delays, and therefore, evaluation is warranted for any child who screens positive. The M-CHAT-R can be scored in less than two minutes. Scoring instructions can be downloaded from <http://www.mchatscreen.com>. Associated documents will be available for download as well.

#### Scoring Algorithm

For all items except 2, 5, and 12, the response "NO" indicates ASD risk; for items 2, 5, and 12, "YES" indicates ASD risk. The following algorithm maximizes psychometric properties of the M-CHAT-R:

- LOW-RISK:** **Total Score is 0-2;** if child is younger than 24 months, screen again after second birthday. No further action required unless surveillance indicates risk for ASD.
- MEDIUM-RISK:** **Total Score is 3-7;** Administer the Follow-Up (second stage of M-CHAT-R/F) to get additional information about at-risk responses. If M-CHAT-R/F score remains at 2 or higher, the child has screened positive. Action required: refer child for diagnostic evaluation and eligibility evaluation for early intervention. If score on Follow-Up is 0-1, child has screened negative. No further action required unless surveillance indicates risk for ASD. Child should be rescreened at future well-child visits.
- HIGH-RISK:** **Total Score is 8-20;** It is acceptable to bypass the Follow-Up and refer immediately for diagnostic evaluation and eligibility evaluation for early intervention.



## APPENDIX D

## M-CHAT-R


[www.m-chat.org](http://www.m-chat.org)

Child's name \_\_\_\_\_ Date \_\_\_\_\_  
 Age \_\_\_\_\_ Relationship to child \_\_\_\_\_

**M-CHAT-R™** (Modified Checklist for Autism in Toddlers Revised)

Please answer these questions about your child. Keep in mind how your child usually behaves. If you have seen your child do the behavior a few times, but he or she does not usually do it, then please answer **no**. Please circle **yes** or **no** for every question. Thank you very much.

- |  |     |    |
|--|-----|----|
| 1. If you point at something across the room, does your child look at it?<br>( <b>FOR EXAMPLE</b> , if you point at a toy or an animal, does your child look at the toy or animal?)  | Yes | No |
| 2. Have you ever wondered if your child might be deaf?   | Yes | No |
| 3. Does your child play pretend or make-believe? ( <b>FOR EXAMPLE</b> , pretend to drink from an empty cup, pretend to talk on a phone, or pretend to feed a doll or stuffed animal?)                                      | Yes | No |
| 4. Does your child like climbing on things? ( <b>FOR EXAMPLE</b> , furniture, playground equipment, or stairs)   | Yes | No |
| 5. Does your child make <u>unusual</u> finger movements near his or her eyes?<br>( <b>FOR EXAMPLE</b> , does your child wiggle his or her fingers close to his or her eyes?)   | Yes | No |
| 6. Does your child point with one finger to ask for something or to get help?<br>( <b>FOR EXAMPLE</b> , pointing to a snack or toy that is out of reach)   | Yes | No |
| 7. Does your child point with one finger to show you something interesting?<br>( <b>FOR EXAMPLE</b> , pointing to an airplane in the sky or a big truck in the road)   | Yes | No |
| 8. Is your child interested in other children? ( <b>FOR EXAMPLE</b> , does your child watch other children, smile at them, or go to them?)   | Yes | No |
| 9. Does your child show you things by bringing them to you or holding them up for you to see – not to get help, but just to share? ( <b>FOR EXAMPLE</b> , showing you a flower, a stuffed animal, or a toy truck)          | Yes | No |
| 10. Does your child respond when you call his or her name? ( <b>FOR EXAMPLE</b> , does he or she look up, talk or babble, or stop what he or she is doing when you call his or her name?)                                  | Yes | No |
| 11. When you smile at your child, does he or she smile back at you?  | Yes | No |
| 12. Does your child get upset by everyday noises? ( <b>FOR EXAMPLE</b> , does your child scream or cry to noise such as a vacuum cleaner or loud music?)   | Yes | No |
| 13. Does your child walk?  | Yes | No |
| 14. Does your child look you in the eye when you are talking to him or her, playing with him or her, or dressing him or her?   | Yes | No |
| 15. Does your child try to copy what you do? ( <b>FOR EXAMPLE</b> , wave bye-bye, clap, or make a funny noise when you do)   | Yes | No |
| 16. If you turn your head to look at something, does your child look around to see what you are looking at?  | Yes | No |
| 17. Does your child try to get you to watch him or her? ( <b>FOR EXAMPLE</b> , does your child look at you for praise, or say “look” or “watch me”?)   | Yes | No |
| 18. Does your child understand when you tell him or her to do something?<br>( <b>FOR EXAMPLE</b> , if you don't point, can your child understand “put the book on the chair” or “bring me the blanket”?)                   | Yes | No |
| 19. If something new happens, does your child look at your face to see how you feel about it?<br>( <b>FOR EXAMPLE</b> , if he or she hears a strange or funny noise, or sees a new toy, will he or she look at your face?) | Yes | No |
| 20. Does your child like movement activities?<br>( <b>FOR EXAMPLE</b> , being swung or bounced on your knee)   | Yes | No |

**APPENDIX E****NIH CERTIFICATE OF COMPLETION**

APPENDIX F

**AUTISM SPECTRUM DISORDER: AN EDUCATIONAL INTERVENTION FOR  
FUTURE NURSE PRACTITIONERS POWER POINT**



Autism Spectrum  
Disorder:  
An Educational  
Intervention for Future  
Nurse Practitioners

**Stephanie Margiotis, RN, BSN**

DNP PROJECT

Presented in Partial Fulfillment of  
the Requirements for the Degree of  
Doctor of Nursing Practice  
Barry University  
College of Nursing and Health  
Sciences  
2015

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## Objectives

- Identify the importance of screening for autism spectrum disorder at every well child exam.
- Recognize and feel comfortable using and interpreting screening tools for autism spectrum disorder in primary care practice.

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## Objectives Cont..

- Gain knowledge of the interventions for patients screening positive.
- Feel comfortable providing Follow-up care.



## Introduction

- BSN- Long Island University
- 2011- Barry University
- MSN/DNP Bridge program
- 7 years ER-trauma Nurse
- Special interest in pediatrics, children with disabilities.
- DNP capstone; allow research findings to be put into practice

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## Introduction Cont..

- Brain-based developmental disorder that affects;
  - communication
  - social skills
  - child's behavior

Difficulties in;

- social interaction, verbal, non-verbal communication, and repetitive behaviors.

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## Introduction Cont..

- With consistent screening and earlier diagnosis of autism spectrum disorder, interventions can be immediately initiated and the quality of outcomes greatly improved (APA, 2013).





## Background

- Thousands of pre-school aged children each year are affected each year.
- According to the U.S. Centers for Disease Control and Prevention, 1 in 68 American children has autism spectrum disorder.
- Presumably present at birth
  - The etiology of autism spectrum disorder is considered idiopathic with no recognizable etiology in approximately, 90% to 95% of the cases.
  - Remaining 5% to 10% of the cases are thought to be secondary to the child's primary impairment.
    - Primary impairment is defined as the problem with body structures or body functions that are causing the characteristics seen in autism spectrum disorder (Johnson & Myers, 2008).

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## Background Cont..

- Current research suggests that early identification and intervention in toddlers with autism spectrum disorder result in improved outcomes by limiting the extent of disability experienced by the child.
- “Interventions that begin as early as preschool years are linked with improved outcomes in cognition, language, and educational achievement” (Webb, p.229).

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## Problem

- Left undiagnosed and/or untreated in children can lead to a lifetime of dependence, decreased academic capabilities, lack of interaction with the environment, and a disservice to this vulnerable population.

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## Early Identification

- Identifying children in first 2 years of life has become more promising than in the past years.
- **Scientific knowledge about early warning signs of autism spectrum disorder has increased, and evidence has accumulated about the stability of diagnoses that occur around 2 years of age (Boyd et al., 2010).**

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## Early Identification Cont..

- Published comprehensive practice guidelines
  - Autism spectrum disorder tool kit
  - These guidelines and screening tools allow for early identification of autism spectrum disorder in children
- Research that shows evidence that early identification and attendant early interventions are associated with more positive outcomes in;
  - Communication, social interactions, and cognitive development (Barton, Mathieu, & Fein, 2012).

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## Surveillance

- Key components
  - Developmental surveillance
  - Gather detailed patient information during visits
  - Ask specifically if the caregiver has concerns about the child's speech, hearing, or any other aspects of development

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## Surveillance Cont..

- If there are any concerns-
  - a standardized developmental screening should be administered and compared to previous screening done at well child visits.
  - Comprehensive physical exam-
    - weight, height, and head circumference with percentiles. Office vision and hearing screens should also be conducted (Bradley, 2010).



## Screening

- **The American Academy of Pediatrics recommends developmental screening with a tool such as;**
  - Ages and Stages Questionnaire at the 9, 1, and 24 or 30 month well child exams (Bradley, p. 304).
  - Social Communication Questionnaire (SCQ) for children 4 years and older
  - The Modified Checklist for Autism in Toddlers-Revised (M-CHAT-R) for children between 16 and 30 months of age



# Social Communication Questionnaire

Item	Yes	No
1. Is she/he now able to talk using short phrases or sentences? If no, skip to question 8.	<input type="radio"/>	<input type="radio"/>
2. Can you have a to and fro "conversation" with her/him that involves taking turns or building on what you have said?	<input type="radio"/>	<input type="radio"/>
3. Has she/he ever use odd phrases or say the same thing over and over in almost exactly the same way (either phrases that she/he hears other people use or ones that she/he makes up)?	<input type="radio"/>	<input type="radio"/>
4. Has she/he ever use socially inappropriate questions or statements? For example, has she/he ever regularly ask personal questions or make personal comments at awkward times?	<input type="radio"/>	<input type="radio"/>
5. Has she/he ever gotten his/her pronouns mixed up (e.g., saying you or she/he for I)?	<input type="radio"/>	<input type="radio"/>
6. Has she/he ever use words that she/he seems to have invented or made up her/himself; put things in odd, indirect ways; or use metaphorical ways of saying things (e.g., saying hot rain for steam)?	<input type="radio"/>	<input type="radio"/>
7. Has she/he ever say the same thing over and over in exactly the same way or insist that you say the same thing over and over again?	<input type="radio"/>	<input type="radio"/>
8. Has she/he have things that she/he seems to do in a very particular way or order or rituals that she/he insisted that you go through?	<input type="radio"/>	<input type="radio"/>
9. Has her/his facial expressions usually seemed appropriate to the particular situation, as far as you can tell?	<input type="radio"/>	<input type="radio"/>
10. Has she/he ever used your hand like a tool or as if it were part of his/her own body (e.g., pointing with your finger or putting your hand on a doorknob to get you to open the door)?	<input type="radio"/>	<input type="radio"/>
11. Has she/he ever have any interests that preoccupy her/him and might seem odd to other people (e.g., traffic lights, drainpipes, or timetables)?	<input type="radio"/>	<input type="radio"/>
12. Has she/he ever seemed to be more interested in parts of a toy or an object (e.g., spinning the wheels of a car), rather than in using the object as it was intended?	<input type="radio"/>	<input type="radio"/>
13. Has she/he ever have any special interests that are unusual in their intensity but otherwise appropriate for his/her age and peer group (e.g., trains or dinosaurs)?	<input type="radio"/>	<input type="radio"/>

## Ages and Stages Questionnaire

5. When you hold one hand just to balance your baby, does she take several steps forward? (If your baby already walks alone, mark "yes" for this item.)



6. Does your baby stand up in the middle of the floor by himself and take several steps forward?

GROSS MOTOR TOTAL

### FINE MOTOR

1. After one or two tries, does your baby pick up a piece of string with his first finger and thumb? (The string may be attached to a toy.)



2. Does your baby pick up a crumb or Cheerio with the tips of her thumb and a finger? She may rest her arm or hand on the table while doing it.



3. Does your baby put a small toy down, without dropping it, and then take his hand off the toy?

4. Without resting her arm or hand on the table, does your baby pick up a crumb or Cheerio with the tips of her thumb and a finger?



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## M-CHAT-R

- In 2013, the original version of the M-CHAT was revised to improve specificity and is now, The Modified Checklist for Autism in Toddlers-Revised (M-CHAT-R), and is a scientifically validated tool for screening children between 16-30 months of age that assess risk for autism spectrum disorder.



## Why M-CHAT-R???

- Primary goal is to maximize sensitivity, which detects as many cases of autism spectrum disorder as possible.
- Completed by a parent, takes 5-10 minutes to complete and takes less than two minutes to be scored by the healthcare provider (Robins, Fein, & Barton, 2009).



## M-CHAT-R Cont..

- Series of questions that correspond to a specific age interval.
- It assists in assessing developmental progress in the child.
- Contains simple questions for parents to answer about activities their child is or not able to do.
- Answers are scored and help to determine whether the child's development is on schedule or whether the child should be referred for a developmental assessment by a professional.

# M-CHAT-R



[www.m-chat.org](http://www.m-chat.org)

Child's name \_\_\_\_\_  
Age \_\_\_\_\_

Date \_\_\_\_\_

Relationship to child \_\_\_\_\_

## M-CHAT-R™ (Modified Checklist for Autism in Toddlers - Revised)

Please answer these questions about your child. Keep in mind how your child usually behaves. If you have seen your child do the behavior a few times, but he or she does not usually do it, then please answer "no." Please circle yes or no for every question. Thank you very much.

1. If you point at something across the room, does your child look at it? (FOR EXAMPLE, if you point at a toy or an animal, does your child look at the toy or animal?)	Yes	No
2. Have you ever wondered if your child might be deaf?	Yes	No
3. Does your child play pretend or make-believe? (FOR EXAMPLE, pretend to drink from an empty cup, pretend to talk on a phone, or pretend to feed a doll or stuffed animal?)	Yes	No
4. Does your child like climbing on things? (FOR EXAMPLE, furniture, playground equipment, or stairs)	Yes	No
5. Does your child make unusual finger movements near his or her eyes? (FOR EXAMPLE, does your child wiggle his or her fingers close to his or her eyes?)	Yes	No
6. Does your child point with one finger to ask for something or to get help? (FOR EXAMPLE, pointing to a snack or toy that is out of reach)	Yes	No
7. Does your child point with one finger to show you something interesting? (FOR EXAMPLE, pointing to an airplane in the sky or a log truck in the road)	Yes	No
8. Is your child interested in other children? (FOR EXAMPLE, does your child watch other children, smile at them, or go to them?)	Yes	No
9. Does your child show you things by bringing them to you or holding them up for you to see - not to get help, but just to share? (FOR EXAMPLE, showing you a flower, a stuffed animal, or a toy truck)	Yes	No
10. Does your child respond when you call his or her name? (FOR EXAMPLE, does he or she look up, talk or babble, or stop what he or she is doing when you call his or her name?)	Yes	No
11. When you smile at your child, does he or she smile back at you?	Yes	No
12. Does your child get upset by everyday noises? (FOR EXAMPLE, does your child scream or cry to noise such as a vacuum cleaner or loud music?)	Yes	No
13. Does your child walk?	Yes	No
14. Does your child look you in the eye when you are talking to him or her, playing with him or her, or dressing him or her?	Yes	No
15. Does your child try to copy what you do? (FOR EXAMPLE, wave bye-bye, clap, or make a funny noise when you do)	Yes	No
16. If you turn your head to look at something, does your child look around to see what you are looking at?	Yes	No
17. Does your child try to get you to watch him or her? (FOR EXAMPLE, does your child look at you for praise, or say "look" or "watch me"?)	Yes	No
18. Does your child understand when you tell him or her to do something? (FOR EXAMPLE, if you don't point, can your child understand "put the book on the chair" or "bring me the blanket"?)	Yes	No
19. If something new happens, does your child look at your face to see how you feel about it? (FOR EXAMPLE, if he or she hears a strange or funny noise, or sees a new toy, will he or she look at your face?)	Yes	No
20. Does your child like movement activities? (FOR EXAMPLE, being swung or bounced on your knee)	Yes	No

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# M-CHAT-R

### Permissions for Use of the M-CHAT-R™

The Modified Checklist for Autism in Toddlers, Revised with Follow-Up (M-CHAT-R/F; Roberts, Paul, & Barton, 2009) is a 2-stage parent-report screening tool to assess risk for Autism Spectrum Disorder (ASD). The M-CHAT-R/F is available for free download for clinical, research, and educational purposes. Download of the M-CHAT-R/F and related material is authorized from [www.autismcenter.com](http://www.autismcenter.com).

The M-CHAT-R/F is a copyrighted instrument, and use of the M-CHAT-R/F must follow these guidelines:

- (1) Reproductions of the M-CHAT-R/F must include the copyright at the bottom of each Follow-Up, Paul, & Barton. No reproduction may be made to derive, instruct, or in any other way disseminate derivative copyrighted material.
- (2) The M-CHAT-R/F must be used in its entirety. Evidence indicates that any subsets of items do not demonstrate adequate psychometric properties.
- (3) Parties interested in reproducing the M-CHAT-R/F in print or in a form or format other than electronic must contact the authors (e.g., as part of signed material request or other business proposal) and contact the Autism Center for Research and Assessment (<http://www.autismcenter.com>).
- (4) If you are part of a medical practice, and you want to incorporate the two-stage M-CHAT-R/F screening into your own practice's diagnostic medical record (DMR), you are welcome to do so. However, if you want to distribute your DMR page outside of your practice, please contact the Autism Center to request a licensing agreement.

### Instructions for Use

The M-CHAT-R can be administered and scored as part of a well-child care visit, and also can be used by physicians or other professionals to assess risk for ASD. The primary goal of the M-CHAT-R is to maximize sensitivity, meaning to detect as many cases of ASD as possible. Therefore, there is a high false positive rate, meaning that not all children who score at risk will be diagnosed with ASD. To address this, we have developed the Follow-Up questions (M-CHAT-R/F). Users should be aware that even with the Follow-Up, a significant number of the children who screen positive on the M-CHAT-R will not be diagnosed with ASD. However, these children are at high risk for other developmental disorders of delay, and therefore, evaluation is warranted for any child who screens positive. The M-CHAT-R can be scored in less than five minutes. Scoring instructions can be downloaded from <http://www.autismcenter.com>. Associated documents will be available for download as well.

### Scoring Algorithm

For all items except 2, 5, and 12, the response "NO" indicates ASD risk, for items 2, 5, and 12, "YES" indicates ASD risk. The following algorithm summarizes psychometric properties of the M-CHAT-R.

- LOW-RISK:** Total Score is 0-2. If child is younger than 24 months, screen again after several months. No further action required unless surveillance indicates risk for ASD.
- MEDIUM-RISK:** Total Score is 3-7. Administer the Follow-Up (second stage of M-CHAT-R/F) to get additional information about at-risk responses. If M-CHAT-R/F scores indicate a 2 or higher, the child has screened positive. Action required: refer child for diagnostic evaluation and eligibility evaluation for early intervention. If score on Follow-Up is 0-1, child has screened negative. No further action required unless surveillance indicates risk for ASD. Child should be re-screened at future well-child visits.
- HIGH-RISK:** Total Score is 8-25. It is acceptable to replace the Follow-Up and refer immediately for diagnostic evaluation and eligibility evaluation for early intervention.



## Screening Positive

- Children testing positive can be immediately referred to;
  - Developmental Pediatrician
  - Psychiatrist
  - Psychologist

(comprehensive evaluation, formal diagnosis, and implementation of treatments)





## Diagnostic Criteria

- Assessment of functioning in multiple areas;
  - Verbal and non-verbal developmental skills, social communications and interaction skills, presence of atypical motor and sensory behaviors, adaptive levels of functioning, as well as careful review of the child's health, development, and family history (Steiner, Goldsmith, Snow, & Chawarska, 2012).
- **The gold standard for diagnosis continues to be expert clinical opinion.**
- The American Psychiatric Association's Diagnostic and Statistical Manual-V, (DSM-V), provides standard criteria to help diagnose autism spectrum disorder.

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## Interventions

- The primary goal of treatment is to maximize functional independence and quality of life by minimizing the core autism spectrum disorder features, facilitating development and learning, promoting socialization, reducing maladaptive behaviors, and educating and supporting families (Johnson & Myers, 2008).



## Interventions Cont..

- Non-medical interventions;
  - applied behavior analysis, structured teaching, use of developmental models, speech and language therapy, social skills instruction, and occupational therapy.
- Medical interventions;
  - medications to treat the symptoms, symptoms including but not limited to; irritability, aggression, explosive outbursts, self-injury, hyperactivity, impulsivity, inattention, repetitive behavior, insomnia, anxiety, depressive phenotype, and bipolar phenotype (Johnson & Myers, 2008).

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## Summary

- Routine screening is associated with a more positive outcome and a better quality of life for this population.
- Developmental surveillance and screening should be a component of every well child visit.
- It is imperative that we provide children with the opportunities to live healthy lives and reach their full potential.
- Keep up with current research and be experts in screening, identifying, diagnosing, and managing children with autism spectrum disorder.

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## Case Study

- While waiting to be seen for a routine check up, the mother of a 20 month old male answers the M-CHAT-R questionnaire. Upon entering the room she hands this filled out screen to you.

	1. If you point at something across the room, does your child look at it? (FOR EXAMPLE, if you point at a toy or an animal, does your child look at the toy or animal?)	Yes <input type="radio"/>	No <input type="radio"/>	
	2. Have you ever wondered if your child might be deaf? 3. Does your child play pretend or make-believe? (FOR EXAMPLE, pretend to drink from an empty cup, pretend to talk on a phone, or pretend to feed a doll or stuffed animal?)	Yes <input type="radio"/>	No <input type="radio"/>	
	4. Does your child like climbing on things? (FOR EXAMPLE, furniture, playground equipment, or stairs)	Yes <input type="radio"/>	No <input type="radio"/>	
	5. Does your child make unusual finger movements near his or her eyes? (FOR EXAMPLE, does your child wiggle his or her fingers close to his or her eyes?)	Yes <input type="radio"/>	No <input type="radio"/>	
	6. Does your child point with one finger to ask for something or to get help? (FOR EXAMPLE, pointing to a snack or toy that is out of reach)	Yes <input type="radio"/>	No <input type="radio"/>	
	7. Does your child point with one finger to show you something interesting? (FOR EXAMPLE, pointing to an airplane in the sky or a big truck in the road)	Yes <input type="radio"/>	No <input type="radio"/>	
	8. Is your child interested in other children? (FOR EXAMPLE, does your child watch other children, smile at them, or go to them?)	Yes <input type="radio"/>	No <input type="radio"/>	
	9. Does your child show you things by bringing them to you or holding them up for you to see – not to get help, but just to share? (FOR EXAMPLE, showing you a flower, a stuffed animal, or a toy truck)	Yes <input type="radio"/>	No <input type="radio"/>	
	10. Does your child respond when you call his or her name? (FOR EXAMPLE, does he or she look up, talk or babble, or stop what he or she is doing when you call his or her name?)	Yes <input type="radio"/>	No <input type="radio"/>	
	11. When you smile at your child, does he or she smile back at you?	Yes <input type="radio"/>	No <input type="radio"/>	
	12. Does your child get upset by everyday noises? (FOR EXAMPLE, does your child scream or cry to noise such as a vacuum cleaner or loud music?)	Yes <input type="radio"/>	No <input type="radio"/>	
	13. Does your child walk?	Yes <input type="radio"/>	No <input type="radio"/>	
	14. Does your child look you in the eye when you are talking to him or her, playing with him or her, or dressing him or her?	Yes <input type="radio"/>	No <input type="radio"/>	
	15. Does your child try to copy what you do? (FOR EXAMPLE, wave bye-bye, clap, or make a funny noise when you do)	Yes <input type="radio"/>	No <input type="radio"/>	
	16. If you turn your head to look at something, does your child look around to see what you are looking at?	Yes <input type="radio"/>	No <input type="radio"/>	
	17. Does your child try to get you to watch him or her? (FOR EXAMPLE, does your child look at you for praise, or say "look" or "watch me"?)	Yes <input type="radio"/>	No <input type="radio"/>	
	18. Does your child understand when you tell him or her to do something? (FOR EXAMPLE, if you don't point, can your child understand "put the book on the chair" or "bring me the blanket"?)	Yes <input type="radio"/>	No <input type="radio"/>	
	19. If something new happens, does your child look at your face to see how you feel about it? (FOR EXAMPLE, if he or she hears a strange or funny noise, or sees a new toy, will he or she look at your face?)	Yes <input type="radio"/>	No <input type="radio"/>	
	20. Does your child like movement activities? (FOR EXAMPLE, being swung or bounced on your knee)	Yes <input type="radio"/>	No <input type="radio"/>	

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## Case Study Cont..

- Score the questionnaire
- What score did you obtain?
- What questions if any do you have for the mother?
- What does this score suggest?
- What is your next course of action?
- What will your follow-up care include?



????? Questions ?????







## References

- American Association of Colleges of Nursing (AACN). (2006). *The essentials of doctoral education for advanced nursing practice. DNP essentials*. Washington, DC: Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental Disorders*. (5<sup>th</sup> ed.). Washington, DC: Author.
- Barbaro, J., Ridgway, L., & Dissanayake, C. (2011). Developmental surveillance of infants and toddlers by maternal and child health nurses in an Australian community-based Setting: Promoting the early identification of autism spectrum disorders. *Journal of Pediatric Nursing*, 26, 334-347.
- Barton, L. M., Mathieu, D. T., & Fein, D. (2012). Screening young children for autism spectrum disorders in primary practice. *Journal of Autism and Developmental Disorders*, 42, 1165-1174.
- Boyd, A. B., Odom, L. S., Humphreys, P. B., & Sam, M. A. (2010). Infants and toddlers with autism spectrum disorder: Early Identification and early intervention. *Journal of Early Intervention*, 32(2), 75-98.
- Bradley, R. (2010). Screening for autism spectrum disorders. *The Journal for Nurse Practitioners*, 6(4), 304-305.
- Doody, C., & Doody O. (2011). Introducing evidence into nursing practice: Using the IOWA model. *British Journal of Nursing*, 20(11), 661-664.
- Hickey, J. V., & Brosnan, C. A. (2012). *Evaluation of health care quality in advanced practice nursing*. New York: Springer Pub. Co.
- Johnson, P. C., & Myers, M. S. (2008). The 2007 AAP autism spectrum disorders guidelines & toolkit: What's the bottom line? A pediatrician's roadmap to the latest ASDs guidelines. *Contemporary Pediatrics*, 25(10), 42-68.



## References

- Miller, S. J., Gabrielsen, T., Villalobos, M., Alleman, R., Wahmhoff, N., Carbone, S. P., & Segura, B. (2011). The each child study: Systematic screening for autism spectrum disorders in a pediatric setting. *PEDIATRICS, Official Journal of The American Academy of Pediatrics*, 127(5), 865-872.
- Robins, L. D. (2008). Screening for autism spectrum disorders in primary care settings. *The National Autistic Society*, 12(5), 537-556.
- Schertz, H.H., Reichow, B., Tan, P., Vaiouli, P., & Yildirim, E. (2012). Interventions for toddlers with autism spectrum disorders: An evaluation of research evidence. *Journal of Early Intervention*, 34(3), 166-189.
- Soares, N.S., & Patel, D.R. (2012). Office screening and early identification of children with autism. *Pediatric Clinics of North America*, 59, 89-102.
- Steiner, M.A., Goldsmoth, R.T., Snow, V.A., & Chawarska, K. (2012). Practitioner's guide to assessment of autism spectrum disorders in infants and toddlers. *Journal of Autism and Developmental Disorders*, 42, 1183-1196.
- Webb, L. P. (2011). Screening for autism spectrum disorders during well-child visits in a primary care setting. *The Journal for Nurse Practitioners*, 7(3), 229-235.

## APPENDIX G

### PROGRAM EVALUATION

#### Autism Spectrum Disorder:

#### An Educational Intervention for Future Nurse Practitioners

Using a Likert scale; 5-1, 5 being strongly agree, 4 being agree, 3 being neutral, 2 being disagree, and 1 being strongly disagree, please respond to each question by circling the response that best expresses your opinion:

1. Did the presentation meet the primary objective to educate future family nurse practitioners caring for pediatric patients ages 9 to 48 months of the importance of screening for autism spectrum disorder at every well child exam?

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

2. Are you able to identify examples of evidenced based screening tools for autism spectrum disorder in primary care practice?

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

3. Will you consider using the screening tools in primary care practice?

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

4. Are you comfortable interpreting the screening tools?

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

5. Do you have a clear understanding of the interventions necessary for those patients screening positive?

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

6. Are you confident in your ability to follow-up with those patients screening positive?

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

Comments:                    Thank you for your participation

## VITA

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### Education

Doctor of Nursing Practice, Barry University, Miami Shores, FL	2015
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American Nurses Association

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